Appendix A7: National Standards – Wine & Beverage

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National Standards Applicable to Wine & Beverage Categories

Standards for All Beverages and Drinks

GBT 10789-2015 General Standard for Beverage

National Standards of People's Republic of China

GB/T 10789-2015

Replacing GB 10789-2007

National Food Safety Standard

General Standard for Beverage

Issued on: 2015-02-04 Implemented on: 2016-04-01

Issued by General Administration of Supervision, Inspections and Quarantine of the People's Republic of China and China National Standardization Management Committee

Foreword

This Standard is drafted in accordance with the rules given by GB/T 1.1-2009.

This Standard replaces GB 10789-2007 *General Standard for Beverage and its No.1 Amendment.*

As compared to GB 10789-2007, key changes are as follows:

- Made adjustments to the classifications name and sequences for beverages;
- Delete or modify part of beverage category classification and definition
- Adjust the index terms expressed in the basic requirement table

This standard was proposed by the China Light Industry Union.

This standard is placed under the jurisdiction of the Beverage Technical Committee Division under the National Food Industry Standardization Technical Commission.

The organizations involved in the drafting of this standard: National Food Industry Standardization Technical Commission, Coca-Cola (Shanghai) Co., Ltd, Tingyi (Cayman Islands) Holding Corporation (Master Kong), Hangzhou Wahaha Group Co.Ltd, Nongfu Shanquan Co.,Ltd, Beijing Huiyuan F&B Group Co.,Ltd, Pepsi Asia R&D Center Co., Ltd, and Uniform Enterprise (China) Investment Co.,Ltd, Sichuan Bluesword Beverage Group, Huarun C'estbon Food and Beverage (Shenzhen) Co., Ltd, Nestle (China) Co., Ltd, Redbull Vitamin Beverage Co., Ltd, Vitasoy (Shanghai) Co., Ltd, Robust (Guangdong) Co., Ltd, Hebei Chengde Lolo Co., Ltd and SDIC Zhonglu Fruit Juice Co., Ltd.

The key personnel involved in the drafting of this standard: Yunan Li, Yonglan Yang, Junyan Zhang, Zhigang Luo, Penggui Di, Li Zhou, Shaozhen Li, Mian Cheng, Yingping Huang, Zongfeng Zou, Li Ren, Hong Tao, Zhenjun Wu, Jie Yuan, Wanlong Wen, Xuchang Wang and Chuanzhu Leng.

This standard will replace the previous versions:

- GB 10789-1989, GB 10789-1996, GB 10789-2007.

National Food Safety Standards

General Standard for Beverage

1. Scope

This standard specifies the details on the terms and definitions, classifications, naming, technical requirements, labeling, claims, transport, storage and bottled drinking water consumer distinguishing requirements for beverages.

This standard applies to the formulation of standards for the production, research & development of beverages as well as product standards and other relevant standards related to beverages.

This standard is not applicable to medicine or drug for drinking.

2. Normative References

Clauses involved in the following documents constitute the ones in this standard through reference in this standard. If any reference is dated, only the version with date is applicable to this file. Any latest version ((including all the amendments)) of the non-dated reference is applicable to this standard.

GB 2760 *Hygienic Standards for the Use of Food Additives*

GB 7718 *General Standard for the Labeling of Prepackaged Foods*

GB 8537 *Drinking Natural Mineral Water*

GB/T 10792 *Carbonated Beverages*

GB 14880 *Hygienic Standards for the Use of Food Nutritional Supplements*

GB 15266 *Sports Beverage*

GB 17323 *Bottled Purified Water for Drinking*

GB/T 21732 *Milk Beverages*

GB/T 21733 *Tea Beverage*

GB 28050 *General Rules for Pre-packaged Food Labels*

GB/T 29602-2013 *Solid Beverage*

GB/T 30767-2014 *Coffee Beverage*

GB/T 30885-2014 *Plant Protein Beverage – Soymilk and Soymilk Beverage*

GB/T 31121-2014 *Fruit & Vegetable Juices and Fruit & Vegetable Beverage*

GB/T 31325 *Plant Protein Beverage – Walnut Beverage*

GB/T 31326 *Botanical Beverage*

QB/T 2300 *Plant Protein Beverage Coconut Meat Juice and Reconstituted Coconut Meat Juice*

QB/T 2438 *Plant Protein Beverage – Almond Juice*

QB/T 2439 *Plant Protein Beverage – Peanut Juice*

QB/T 4068 *Tea Concentrates for Food Industry*

QB/T 4221 *Cereal Beverage*

QB/T 4222 *Mixed Protein Beverage*

3. Terms and Definition

The following terms and definitions will apply to this standard.

3.1 Beverage; drinks

Refer to product with not have more than 0.5% ethanol content (weight fraction) that is being prepackaged for drinking directly or after reconstitution with certain proportion water, and could be in beverage syrup or solid status.

3.2 Beverage Syrup

Refer to product based on food ingredients and / or food additives, diluted by certain proportion of water or diluted by adding carbon dioxide beverages.

4. Classifications

Refer to Appendix A for detailed information on this.

4.1 Packaged Drinking Water

Refer to product sealed in containers where source of water that from surface, underground or public water supply system directly for drinking.

4.1.1 Natural Mineral Water

Refer to water that contains a certain amount of minerals, trace elements or other components, where the source of water emerged automatically from depths of ground surface or harvested after drilling deep below the surface. Specific regions where the source of water lies should be unpolluted and prevention measures have to be taken to prevent any form of pollution of water. Under normal circumstances, range periodical fluctuations of water's properties such as chemical content, flow and temperature should be relatively stable.

4.1.2 Purified Drinking Water

Refer to product where source of water is derived from the surface, underground or public water supply system.

4.1.3 Other Types Drinking Water

4.1.3.1 Natural Spring Water

Refer to product where the source of water is derived from spring water that emerged automatically from depths of ground surface or harvested after drilling deep below the surface, of which the underground spring is unpolluted and does not pass through any public water supply system.

4.1.3.2 Natural Drinking Water

Refer to product where source of water is derived from unpolluted sources such as well, reservoir, lakes or alpine glaciers that did not pass through any public water supply system.

4.1.3.3 Other Drinking Water

Drinking water excludes in the category of 4.1.3.1 and 4.1.3.2. Refer to product that from surface, underground or public water supply system directly, intentionally added a certain amount of minerals through the use of appropriate processing method but without flavoring or other food ingredients.

4.2 Fruit / Vegetable Juices and Beverage

Refer to beverages, products of processing or fermentation using main ingredients such as fruits and (or) vegetables (including edible roots, stems, leaves, flowers and fruits).

4.2.1 Fruit / Vegetable Juice (Puree)

Refer to juice (puree) that is fermentable but not yet fermented, produced from processing of fruit or vegetable using physical methods (mechanical method, water extraction, etc.); or product reconstituted from concentrated fruit juice (puree) or concentrated vegetable juice (puree) by adding the same amount of juice liquid lost earlier in the enrichment process of the concentrated fruit / vegetable juice (puree), such as raw

juice (non-reconstituted juice), fruit juice (reconstituted juice), vegetable juice, fruit / vegetable puree, reconstituted fruit / vegetable puree, etc.

4.2.2 Concentrated Fruit / Vegetable Juice (Puree)

Refer to product originally from fruit or vegetable that will possess the typical features of fruit or vegetable juice (pulp) after reconstitution, produced from the removal of a certain proportion of water from fruit or vegetable juice (pulp) by physical methods, by adding the same amount of juice liquid lost earlier in the enrichment process.

Concentrated mix fruit / vegetable juice refers to no less than two concentrated fruit juices, or concentrated vegetable juices, or a mix with concentrated fruit juice and vegetable juice.

4.2.3 Fruit / Vegetable Juice (puree) Beverage

Refer to product originally from fruit / vegetable juice or concentrated fruit / vegetable juice (puree), by adding other food ingredients or food additives or not. Examples of this are fruit / vegetable beverages, pulp beverage, mix fruit / vegetable beverage, concentrated mix fruit / vegetable beverage and fruit drinks.

4.3 Protein Beverages

Refer to beverage, product of processing or fermentation with dairy, dairy products, and other edible protein from animals, or parts of plant (e.g. fruits, seeds or kernels) with a certain level of protein content as key ingredients, by adding other food ingredients and / or food additives or not.

4.3.1 Milk Beverage

Refer to beverage, product of processing or fermentation with dairy or dairy products, by adding other food ingredients and / or food additives or not. Examples of this are preparation of milk drinks, fermented milk drinks, lactic acid bacteria beverages, etc.

4.3.2 Plant Protein Beverage

Refer to beverage formulated by adding water, or other food supplementary ingredients into paste/fluid processed (can be fermented using lactic acid bacteria as well) from plant parts, such as fruits, seeds or kernels that contain a certain amount of protein as key ingredients, by adding other food ingredients and / or food additives or not. Examples of this are soymilk, soy-bean beverage, coconut juice (milk), almond beverage (milk), walnut beverage (milk) and peanut beverage (milk).

Mix plant protein beverage refers to more than two or above plant parts, such as fruits, seeds or kernels that contain a certain amount of protein as key ingredients, by adding other food ingredients and / or food additives or not. Examples of this are peanut walnuts, walnut almonds, peanut and almonds mix protein beverage.

4.3.3 Mixed Protein Beverage

Refer to beverage, product of processing or fermentation with dairy or dairy products and different plant protein as key ingredients, by adding other food ingredients and / or food additives or not.

4.3.4 Other Protein Beverage

Other protein beverages excludes from 4.3.1 to 4.3.3.

4.4 Carbonated Beverage

Refer to beverages originally from food ingredients or food additives that are infused with carbon dioxide gas under certain conditions, excluding beverages that contain self-generated carbon dioxide gas as a result of fermentation. Examples of this are fruit flavored type, cola type and other carbonated drink of cola type.

4.5 Beverages for Special Uses

Refer to beverages that were infused with special functional components so as to adapt to special dietary requirements of special groups of individuals.

4.5.1 Sports Beverage

Refer to nutritional beverage and its content that specifically cater to the biological characteristics and needs of individuals participating in sports or physical activities in terms of adding water, electrolytes and energy.

4.5.2 Nutritional Beverage

Refer to beverage that is infused with appropriate amount of food nutritional supplements so as to replenish the special nutritional needs of a specific group of individuals such as nutritional supplements-liquid.

4.5.3 Energy Beverage

Refer to beverage that adding appropriate nutritional elements or other specific elements to supplement power or speed up energy release or absorption.

4.5.4 Electrolyte Beverage

Refer to beverage that adding essential minerals or other nutritional elements for replenishing the metabolism resulted electrolytes and water.

4.5.5 Other Special Usage Beverage

Other usage beverages excludes from 4.5.1 to 4.5.4.

4.6 Flavored Beverage

Refer to processed or fermented beverages that have their flavors adjusted through the use of main methods such as adding edible flavorings (spices), sugar (including sugar and starch sugar) and (or) sweetener, acidulant. Examples of this are tea flavored beverage, fruit flavored beverage, milk flavored beverage, coffee flavored beverage, water flavored beverage and other flavored beverage.

Note:

Water flavored beverage here refers to without color processing and sugar added such as soda water beverage, mint water beverage and rose water beverage.

4.7 Tea Beverage

Refer to liquid beverage that retains the original flavor of tea liquid, product of processing procedures using water extracts of tea leaves or their concentrates, tea powder as key ingredients. Minute amount of sugar and (or) sweetener can be added, by adding other food ingredients and / or food additives or not. Examples of this are original tea, concentrated tea, tea beverage, fruit tea beverage, milk tea beverage, mixed tea beverage and other tea beverage.

4.8 Coffee Beverage

Refer to beverage, product of processing with water extract of coffee, ground coffee powder or its concentrate, instant coffee powder as ingredients, by adding sugar (including sugar and starch sugar), dairy and dairy products, creamer or not. Examples of this are concentrated coffee beverage, coffee beverage, low caffeine coffee beverage, low caffeine concentrated coffee beverage, etc.

4.9 Botanical Beverage

Refer to beverages, products of processing or fermentation with plant or plant extract (excl. fruits, vegetables, tea and coffee) as ingredient, by adding other food ingredients and / or food additives or not. Examples of this are cocoa beverage, cereal beverage, herb beverage, edible fungi beverage, algae beverage, but excluding fruit / vegetable juice and its beverage, tea beverage and coffee beverage.

4.10 Solid Beverage

Refer to products that are meant to be dissolved/brewed before drinking, in the form of powder, particulates or cubes that are processed from food ingredients and food additives. Examples include fruit juice powder, bean powder, tea powder, coffee powder, fruit flavored beverage solid, soda beverage solid (effervescent tablets) and ginger powder.

4.11 Other Beverage

Other beverage excludes those mentioned above from section 4.1 to 4.10, among which functional beverage refers to beverage with specific heath care function and being approved by related government.

5. Name

Beverage name could either refer to the naming rule in accordance with Chapter 4, or cross naming by two or above categories.

6. Technical Requirements

6.1 See Table 1 for basic technical requirements.

Table 1 Basic Requirements

Product Category		Basic Requirement
Natural Mineral Water		Implemented in accordance with GB 8537
Purified Drinking Water		Implemented in accordance with GB 17323
Fruit / Vegetable Juice & Beverage		Implemented in accordance with GB/T 31121-2014
Protein Beverage	Milk Beverage	Implemented in accordance with GB/T 21732
	Plant Protein Beverage	Implemented in accordance with GB 8537
	Walnut Beverage	Implemented in accordance with GB/T 31325
	Peanut Juice	Implemented in accordance with QB/T 2439
	Almond Juice	Implemented in accordance with QB/T 2438
	Coconut Meat Juice	Implemented in accordance with QB/T 2300
	Soymilk and Soymilk Beverage	Implemented in accordance with GB/T 30885-2014
	Mixed Protein Beverage	Implemented in accordance with GB/T 4222
	Other Protein Beverage	Protein content >= 0.5%
Carbonated Beverage		Implemented in accordance with GB/T 10792
Sport Beverage		Implemented in accordance with GB 15266
Tea Beverage		Implemented in accordance with GB/T 21773 and QB/T 4068
Coffee Beverage		Implemented in accordance with GB/T 30767-2014
Botanical Beverage		Implemented in accordance with GB/T 31326
Cereal Beverage		Implemented in accordance with QB/T 4221
Solid Beverage		Implemented in accordance with GB/T 29602-2013

6.2 Beverages listed in from 4.1 to 4.9 and in 4.11 are applicable to include or add carbon dioxide, which could claim to ‘gas’ or ‘gas drinks’. If the carbon dioxide volume reaches the standard of GB/T 10792, it can be named as Soda.

6.3 Beverage juice (puree) listed in from 4.2 to 4.9 and in 4.11, shall be comply with the requirements listed in Table 1 after using according to labeling required or dilution.

6.4 Products cross-named with two product categories or above, shall comply with the basic requirements of corresponding categories. Food additives and nutritional supplements added to the beverages should comply with the requirements of GB 2760, GB 14880 respectively. For example, ‘Fruit carbonated beverage’ shall comply with the basic requirements of fruit juice and carbonated beverage in Table 1, and its food additives and nutritional supplements shall followed by GB 2760 and GB 14880 respectively.

7. Food Safety Requirements

It shall comply with national food safety standards.

8. Label and Claim

8.1 It shall comply with the requirements of GB 7718 and GB 28050.

8.2 Beverage after fermentation can be claimed as fermented beverage.

9. Transportation and Storage

9.1 Products during transport should avoid the sun, rain, or heavy pressure. If the products need cold chain transportation and storage, it shall meet the required transportation and storage condition as shown on the product package.

9.2 Products should not be mixed, transported and stored with poisonous, harmful, odorous, volatile or corrosive goods.

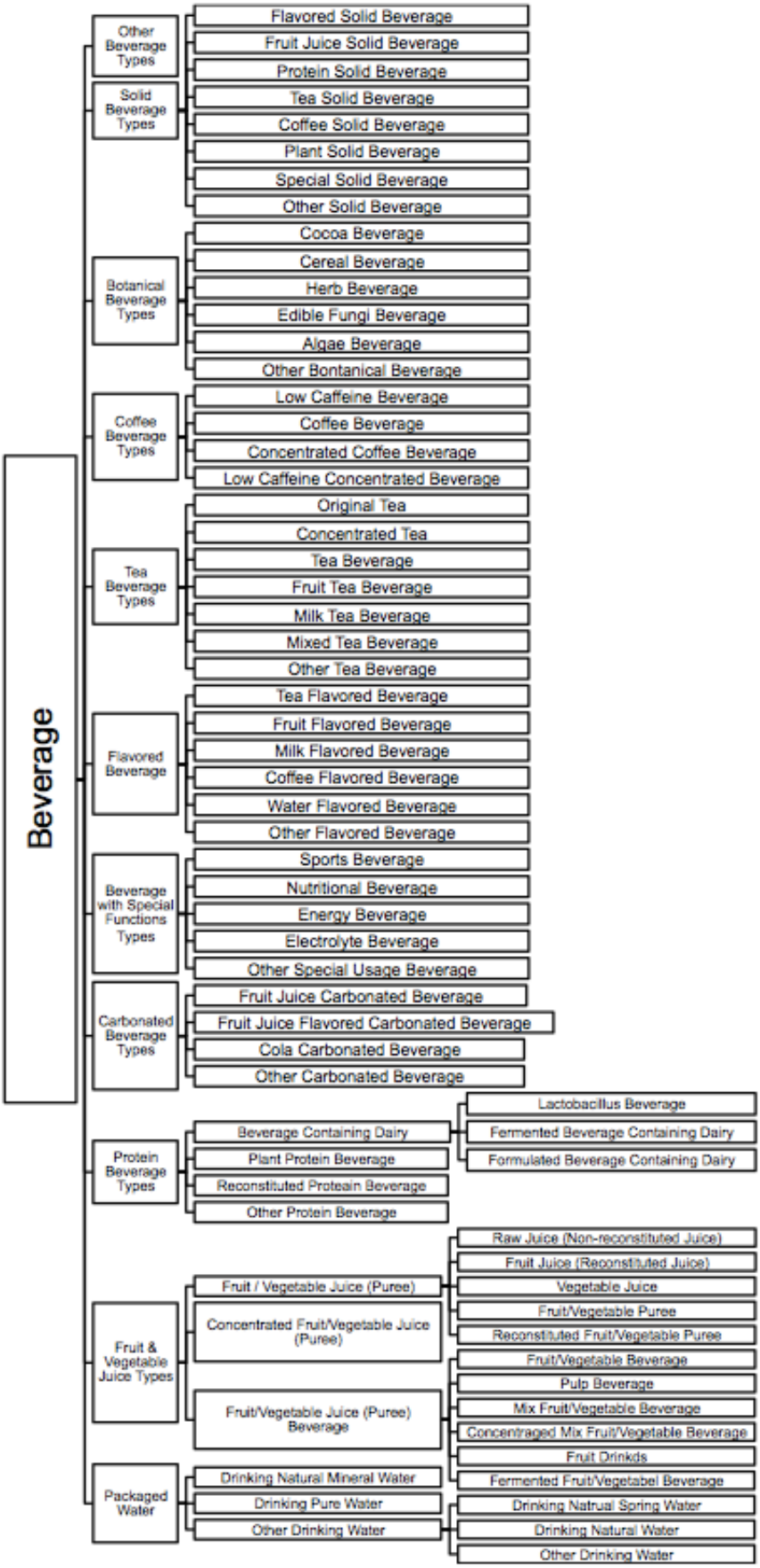
9.3 Products should be stored in a clean, dark, dry, ventilated, pest-free and rodent-free warehouse.

9.4 Sealing parts should not soak in the water for long time to avoid pollution.

10. Bottled Water Consumer Identification Requirements

Marking, printing, bonding, adhesion, spray or other methods are encouraged to be used on the packaging of the bottled water with the volume less than 600mL so that consumers can identify the figures, characters, graphs, symbols or layers and areas for marking on the beverage that they have.

Appendix A
(Normative Appendix)
Beverage Overall Classification Chart



National Standards of People's Republic of China

GB 5009.139-2014

National Food Safety Standards

Determination of Caffeine in Beverage

Issued on: 2014-12-01 Implemented on: 2015-05-01

Issued by the National Health and Family Planning Commission of the People's Republic of China

Foreword

This standard substitutes GB/T 5009.139-2003 Determination of Caffeine in Beverage and GB/T19182-2003 Coffee—Determination of Caffeine Content—Liquid Chromatography.

As compared with GB/T 5009.139-2003, this standard has made major changes as follows:

- Delete Method 1: ultraviolet spectrophotometry in the original standard GB/T 5009.139-2003;
- Add the classification of samples;
- Revise the conditions for sample treatment;
- Revise the detection limit and add the quantitative limit;
- Revise the chromatographic conditions.

The previous versions of the standards substituted by this standard are as follows:

- GB/T 5009.139-2003;
- GB/T 19182-2003.

National Food Safety Standards

Determination of Caffeine in Beverage

1. Scope

This standard specifies such determination method as high-performing Liquid Chromatography for caffeine content in cola beverage, coffee, tea and their solid and liquid beverage products.

This standard is applicable to determination of caffeine content in cola Beverage, coffee, tea and their solid and liquid Beverage products.

2. Principle

Upon deaeration, cola Beverage is extracted with water and purified with MgO; milk-free coffee and tea liquid Beverage products are extracted with water and purified with MgO; for milked coffee and tea liquid Beverage products, protein is settled with CCl3COOH solution; coffee, tea and its solid Beverage products are extracted with water purified with MGO; then upon separation By C18 chromatographic column, UV detector is used for detection and external standard method for quantifying.

3. Reagents and Materials

Note: except prescribed otherwise, reagents used for this method are analytical reagent and water is the first-class water provided in GB/T 6682.

3.1 Reagents

3.1.1 MgO

3.1.2 CCl3COOH

3.1.3 CH3OH: chromatographic reagent.

3.2 Preparation of Reagent

CCl3COOH solution (10 G/L): weigh 1G CCl3COOH (3.1.2) and put into 100 mL flask, and add water to the scale.

3.3 Reference Solution

Caffeine reference solution (C8H10N4O2): purity ≥99%.

3.4 Preparation of Reference Solution

3.4.1 Caffeine reference reserve liquid (2.0 mg/mL): accurately weigh 20mg of caffeine reference solution (accurate up to 0.1 mg) and put into 10 mL flask, use CH3OH for dissolution and constant volume. Place in 4℃ refrigerator, for a valid period of 6 months.

3.4.2 Caffeine reference intermediate liquid (200 μg/mL): accurate suck 5.0 mL caffeine reference reserve liquid (3.4.1) and put into 50 mL flask, use for constant volume. Place in 4℃ refrigerator for a valid period of 1 month.

3.4.3 Caffeine reference curve working liquid: suck caffeine reference intermediate liquid (3.4.2) By 0.5 mL, 1.0 mL, 2.0 mL, 5.0 mL, and 10.0 mL, respectively, for putting into 10 mL flask, and use water for constant column. The reference serial concentration is 10.0 μg/mL, 20.0 μg/mL, 40.0 μg/mL, 100 μg/mL, 200 μg/mL, respectively. It is prepared when to Be used.

4. Instrument and Equipment

4.1 High-performing liquid chromatograph, with UV detector or diode array detector.

4.2 Balance: inductor as 0.1 mg.

4.3 Water-bath.

4.4 Ultrasonic cleaner.

4.5 0.45μm micro-porous membrane.

5. Analytical Steps

5.1 Preparation of Sample

5.1.1 Cola-type beverage:

a) Deaeration: samples are cleaned with the ultrasonic cleaner for 5min at 40℃;

b) Purification: weigh 5 g (accurate to 0.001 g) sample, add water for constant volume to 5 mL (make the caffeine content in sample solution within the reference curve range), shake evenly, add 0.5g MgO, vibrate, stew, and take leachate for filtering with micro-porous membrane and reserve for use.

5.1.2 Milk-free coffee and tea liquid product: weigh 5g (accurate to 0.001 G) sample, add water for constant volume to 5 mL (make the caffeine content in sample solution within the reference curve range), shake evenly, add 0.5g MgO, vibrate, stew, take leachate for filtering with micro-porous membrane and reserve for use.

5.1.3 Milked coffee and tea liquid product: weigh 1 g (accurate to 0.001g) sample, add in CCl3COOH solution for constant volume to 10 mL (make the caffeine content in sample solution within the reference curve range), shake evenly, stew, settle protein, take leachate for filtering with micro-porous membrane and reserve for use.

5.1.4 Coffee, tea and its solid product: weigh 1g (accurate to 0.001g) crushed even sample of less than 30mess for putting into 250 mL cone flask, add in about 200 mL water, boil in bath for 30 min, shake from time to time, take out running water for cooling for 1min, add in 5g MgO, vibrate, put in again the boiled water bath for 20min, take out the cone flask, for cooling to the room temperature, transfer into 250 mL flask, add water for constant volume to the scale (make the caffeine content in sample solution within the reference curve range), shake evenly, stew, take leachate for filtering with micro-porous membrane and reserve for use.

5.2 Reference Conditions of Instrument

Chromatographic column: C18 column (particle-size 5μm, column length 150 mm × diameter 3.9 mm) or chromatographic column of equivalent performance.

Mobile phase: CH3OH + water =24+76.

Flow rate: 1.0 mL/min.

Detection wave length: 272 nm.

Column temperature: 25℃.

Sample size: 10 μL.

5.3 Preparation of Reference Curve

Inject the reference serial work liquid into liquid chromatograph, respectively, determine the relevant peak area, and prepare the reference curve with the concentration of reference working liquid as X-axis and peak area as Y-axis (for the caffeine reference chromatograph, see Figure A.1 in Appendix A).

5.4 Determination of Sample Solution

Inject the sample solution into liquid chromatograph, determine the composition with retention time, as well as record the peak area, obtain the concentration of caffeine in liquid to be detected according to reference curve and determine in parallel at least twice.

6. Expression of Analytical Results

Caffeine content in samples is calculated as per Formula (1):

$$X=\frac{c \times V}{m} \times \frac{1000}{1000} \quad \text{..... (1)}$$

Where:

X——content of caffeine in sample, with the unit of mg/kg;

c——quality concentration of caffeine in sample solution, with the unit of μg/mL;

V——total volume of tested sample, with the unit of mL;

m——quality of weighed sample, with the unit of g;

1000——conversion coefficient.

The calculation result is expressed with the arithmetic mean value of two independent termination results obtained under the duplicate condition, and the result reserves three-digit valid figure.

7. Precision

Cola-type beverage: the absolute D-value obtained from two independent determination results under duplicate condition shall not exceed the arithmetic mean value by 5%; coffee, tea and its solid beverage product: the absolute D-value obtained from two independent determination results under duplicate condition shall not exceed the arithmetic mean value by 10 %.

8. Miscellaneous

For the method, the linear range is 220ng/mL~439μg/mL. Limit of detection: 3-times baseline noise signal is used to determine the limit of detection as 0.7 ng; the limit of detection for cola, milk-free coffee and tea liquid beverage products is 0.07 mg/kg, and quantitative limit is 0.2 mg/kg; 1g sample is taken from milked coffee and tea liquid Beverage product to determine the limit of detection as 0.7mg/kg and quantitative limit as 2.0 mg/L; 1g sample is taken from coffee, tea and its solid Beverage product to determine the limit of detection as 18 mg/kg and quantitative limit as 54 mg/kg.

Appendix A

Caffeine Chromatogram

Figure A.1 is a Chromatogram for standard solution of caffeine

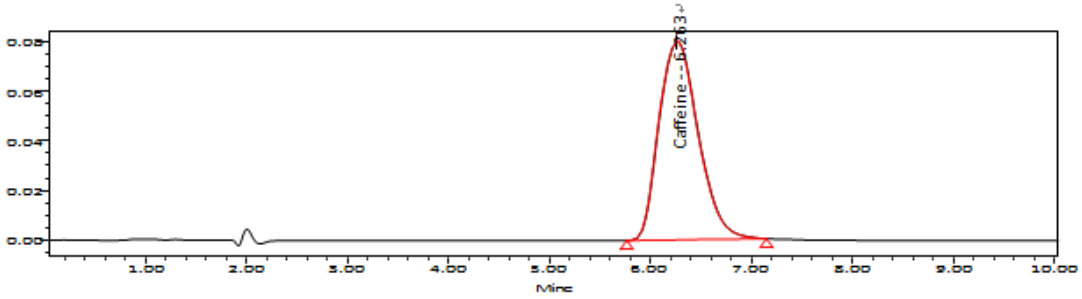


Figure A.1: Standard Chromatogram of Caffeine

National Standards of People's Republic of China

GB/T 17204-2008

National Food Safety Standard

Classification of Alcoholic Beverages

Issued on: 2008-06-25 Implemented on: 2009-06-01

Issued by General Administration of Supervision, Inspections and Quarantine of the People's Republic of China and China National Standardization Management Committee

Foreword

The standard replaces GB/T 17204-1998 Classification of Alcoholic Beverages.

As compared to GB/T 17204-1998, key changes are as follows:

- Removed the upper limit requirements for alcohol content of alcoholic beverages, and also removed the alcohol content requirements for alcohols classified under the fermented alcohol and distilled alcohol product definitions.

- Removed the range requirements of alcohol content listed in the definitions and the classifications according to original wheat juice concentration from the overall beer section of this article, but added a section on other classifications. Definitions for dry beer, ice beer, low alcohol beer, wheat beer and turbid beer in the special beer section were amended, while the definitions for non-alcohol beer, fruit & vegetable beer were added.

- Appropriate amendments were made to the descriptions of the definitions, with reference to Office of International Vine and Wine (OIV) Regulation (2003 Edition) and Technical Specifications for China Wine Brewing. Added definitions for special wines – icewines, noble rot wines, flor or film wines, low alcohol wines, non-alcohol wines and V.amurensis wines. The requirements for alcohol content listed in the definitions were removed. Specified the details on the individual classifications in accordance with product types, sugar contents, carbon dioxide contents and production processes.

- Added details on the individual classifications in accordance with raw ingredients and product styles for the Chinese rice wines section along with their corresponding definitions.

- Product classifications in the Chinese spirits section were amended to a different set of criteria, i.e. in accordance with saccharification and fermentation agents, production processes and flavors, of which all the corresponding definitions for each were provided.

- Removed the range requirements of alcohol content listed in the definitions and the limit requirements on years of aging from the overall brandy section of this article, while the definition for grape brandy was refined.

- Removed the range requirements of alcohol content listed in the definitions from the overall whisky section of this article, while limit requirements on years of aging were amended.

- Removed the range requirements of alcohol content listed in the definitions from the overall vodka section of this article.

- Removed the range requirements of alcohol content listed in the definitions from the overall rum section of this article.

- Added the juniper-flavored spirit drink section, of which all the corresponding definitions were provided.

- Added the definition for fruit spirit under the integrated alcoholic beverages from plants part of the

blended alcoholic beverage section and made corresponding amendments to its definition.

This standard was proposed by the Brewing Technical Committee Division of the National Food Industry Standardization Technical Committee and placed under its jurisdiction.

The organizations involved in the drafting of this standard: Chinese Food Fermentation Industry Research Institute, Luzhou Laojiao Group Co.,Ltd. And Sino-French Joint-Venture Dynasty Winery Ltd.

The key personnel involved in the drafting of this standard: Xinguang Guo, Yongpu Kang, Caihong Shen, Shusheng Wang, Wei Zhang, Suyi Zhang, Chunya Zhang and Zhenghe Xiong.

This standard replaces all the previous versions:

- GB/T 17204-1998

National Food Safety Standards

Classification of Alcoholic Beverages

1. Scope

This standard specified the details on the definitions, principles of classifications and classifications for alcoholic beverages.

This standard applies to the production and Research & Development of alcoholic beverages as well as the formulation of the individual product standards, analysis methods and any other relevant standards.

2. Terms and Definition

The following terms and definitions will apply to the standard.

2.1 Alcoholic Beverages

Refer to alcoholic beverages that have alcohol content above 0.5%vol, including fermented alcoholic drink, distilled spirits liqueur.

Note: Non-alcohol beer with alcohol content lower than 0.5%vol is also considered alcoholic beverages.

3. Principles of Classifications

Perform classifications according to different raw ingredients, production processes and product properties.

4. Classifications

4.1 Fermented Alcoholic Drink

Refer to alcoholic beverage, product of fermentation or partial fermentation of ingredients such as grains, fruits and dairy.

4.1.1 Beer

Refer to fermented alcohol that is low in alcohol content, foamed and contains carbon dioxide, a product of yeast fermentation with malt, water as key ingredients and the addition of hops (incl. hops products).

Note: Including non-alcohol beer (de-alcohol beer).

4.1.1.1 Classifications According to Sterilization Methods

4.1.1.1.1 Pasteurized Beer

Refer to beer that underwent pasteurization or instantaneous high temperature sterilization procedure.

4.1.1.1.2 Draft Beer

Refer to beer that has reached a certain level of stability, with the removal of bacteria through the use of other physical-chemical methods rather than through the use of pasteurization or instantaneous high temperature sterilization.

4.1.1.1.3 Fresh Beer

Refer to beer that has reached a certain level of stability, with a certain allowable amount of live yeast present in the end products, without going through any pasteurization or instantaneous high temperature sterilization.

4.1.1.2 Classifications According to Chroma

4.1.1.2.1 Light Beer

Beer with chroma 2 EBC~14 EBC.

4.1.1.2.2 Dark Beer

Beer with chroma 15 EBC~40 EBC.

4.1.1.2.3 Black Beer

Beer with chroma higher than or equal to 41 EBC.

4.1.1.3 Other Classifications

Special Beer: Refer to beer that has an unique and special style brought out through a change in raw ingredients used in the processing and a change in the process itself.

4.1.1.3.1 Dry Beer

Refer to beer with a dry taste and a true (actual) degree of fermentation of not less than 72%. Other than these characteristics, other requirements should comply with the regulations that correspond to the category of beer the product fall under.

4.1.1.3.2 Low-alcohol Beer

Refer to beer with alcohol content 0.6%vol~2.5%vol. Other than these characteristics, other requirements should comply with the regulations that correspond to the category of beer the product fall under.

4.1.1.3.3 Non-alcohol Beer

Refer to beer with alcohol content less than or equal to 0.5%vol and original malt juice concentration larger or equal to 3.0 ^{o}P. Other than these characteristics, other requirements should comply with the regulations that correspond to the category of beer the product fall under.

4.1.1.3.4 Wheat Beer

Refer to beer that produces a special aroma as a result of using wheat malt in the brewing process, with wheat malt (content more than 40% of total malt content) and water as key brewing ingredients.

4.1.1.3.5 Turbid Beer

Refer to beer with turbidity larger or equal to 2.0 EBC that contains a certain amount of yeast bacteria or gel-like substances with special flavor in its end product. Other than these characteristics, other requirements should comply with the regulations that correspond to the category of beer the product fall under.

4.1.1.3.6 Ice Beer

Refer to beer that underwent ice crystallization process with a turbidity less than or equal to 0.8 EBC. Other than these characteristics, other requirements should comply with the regulations that correspond to the category of beer the product fall under.

4.1.1.3.7 Fruit and Vegetable Beer

a) Beer with Fruit and Vegetable Flavor: Refer to beer that largely retains its fundamental beer flavor but possesses physical-chemical index and flavor characteristics of the specific amount of fruit and vegetable ingredients added. Other than these characteristics, other requirements should comply with the regulations that correspond to the category of beer the product fall under.

b) Taste of Fruit and Vegetable Beer: Refer to beer, on the basis of retaining its fundamental flavor, possesses distinct taste of fruit and vegetable with the addition of a minute amount of food flavoring. Other than these characteristics, other requirements should comply with the regulations that correspond to the category of beer the product fall under.

4.1.2 Wines

Refer to fermentation wines that contain certain of alcohol content, products of complete or partial fermentation of fresh grapes or grape juice as the key ingredients.

4.1.2.1 Classifications According to Wine Sugar Content

4.1.2.1.1 Dry Wines

Refer to wines that have sugar content (by glucose content) less than or equal to 4.0 g/L. Or they refer to wines with sugar content not exceeding 9.0 g/L when the deviation between total sugar and total acid (by tartaric acid content) content is less than or equal to 2.0 g/L.

4.1.2.1.2 Semi-dry Wines

Refer to wines that have sugar content higher than that of dry wines, at content not exceeding 12.0 g/L. Or they refer to wines with sugar content not exceeding 18.0 g/L when the deviation between total sugar and total acid (by tartaric acid content) content is less than or equal to 2.0 g/L.

4.1.2.1.3 Semi-sweet Wines

Refer to wines that have sugar content higher than that of semi-dry wines, at content not exceeding 45.0 g/L.

4.1.2.1.4 Sweet Wines

Refer to wines with sugar content higher than 45.0 g/L.

4.1.2.2 Classifications According to Carbon Dioxide Content (by Pressure)

4.1.2.2.1 Still Wines

Refer to wines with carbon dioxide gas pressure less than 0.05 MPa at 20^{o}C.

4.1.2.2.2 Sparkling Wines

Refer to wines with carbon dioxide gas pressure more than or equal to 0.05 MPa at 20°C.

4.1.2.2.3 High-sparkling Wines

Refer to bubbling wines with carbon dioxide gas (all produced naturally as a result of fermentation) pressure more than or equal to 0.35 MPa (CO_2 gas pressure more than or equal to 0.3 MPa if volume of bottle smaller than 250 mL) at 20°C.

a) Brut High-sparkling Wines: Refer to bubbling wines that have sugar content less than or equal to 12.0 g/L (with allowed deviation at 3.0 g/L).

b) Extra-dry High-sparkling Wines: Refer to bubbling wines that have sugar content in the range of 12.1 g/L~17.0 g/L (with allowed deviation at 3.0 g/L).

c) Dry High-sparkling Wines: Refer to bubbling wines that have sugar content in the range of 17.1 g/L~32.0 g/L (with allowed deviation at 3.0 g/L).

d) Semi-dry High-sparkling Wines: Refer to bubbling wines that have sugar content in the range of 32.1 g/L~50.0 g/L (with allowed deviation at 3.0 g/L).

e) Sweet High-sparkling Wines: Refer to bubbling wines that have sugar content exceeding 50.0 g/L (with allowed deviation at 3.0 g/L).

4.1.2.2.4 Semi-sparkling Wines

Refer to bubbling wines with carbon dioxide gas (all produced naturally as a result of fermentation) pressure in the range of 0.05 MPa~0.34 MPa at 20°C.

4.1.2.3 Classifications According to Production Processes

Can be segmented into wines and special wines.

Special Wines: Refer to wines brewed using specific methods during the harvesting and brewing phase using fresh grapes and grape juice as ingredients.

4.1.2.3.1 Liqueur Wines

Refer to wines with their final product alcohol content in the range of 15.0 %~22.0 % (volume fraction) as a result of adding grape brandy, edible alcohol or grape alcohol as well as supplementary ingredients such as grape juice, concentrated grape juice, caramelized grape juice, white granulated sugar, into grape-based wines with alcohol content of 12 % and above (volume fraction).

4.1.2.3.2 Carbonated Wines

Refer to wines that possess the physical properties similar to those of sparkling wine, where the carbon dioxide content in these wines is a result of partial or full artificial infusion.

4.1.2.3.3 Icewines

Refer to wine produced in the following process. Delay the harvest process of the grapes, keep the grapes on the grape tree for a set period of time under an environment of temperature lower than −7°C and allow

the grapes to freeze. Harvest the frozen grapes, crush the grapes in their frozen state, ferment and brew into wine (no external source of sugar is allowed during the production process.

4.1.2.3.4 Noble Rot Wines

Refer to wines that are brewed with grapes of which their fruit compositions were significantly changed due to Botrytis cinerea infection during a period after the grapes have matured.

4.1.2.3.5 Flor or Film Wines

Refer to wines with alcohol content higher or equal to 15.0 % (volume fraction), products of possibly adding grape brandy, grape alcohol or edible alcohol into wine that freely formed a typical layer of yeast film after full or partial fermentation processing.

4.1.2.3.6 Flavored Wines

Refer to wines that are produced by soaking aromatic plants or adding aromatic plant extracts (or distillates) into base wines.

4.1.2.3.7 Low Alcohol Wines

Refer to wines that have alcohol content 1.0~7.0% (volume fraction) produced through full or partial fermentation of fresh grapes or grape juice that is followed with a specific special process.

4.1.2.3.8 Non-alcohol Wines

Refer to wines that have alcohol content 0.5~1.0% (volume fraction) produced through full or partial fermentation of fresh grapes or grape juice that is followed with a specific special process.

4.1.2.3.9 Vitis amurensis Wines

Refer to wines produced through full or partial fermentation brewing process using fresh V.amurensis grapes (incl. wild grapes such as downy grapes, Vitis davidii foex, fall grapes and other hybrid species) or V.amurensis grape juice as the key ingredients.

4.1.3 Fruit Wine

Refer to fermented wine, product of fermentation or partial fermentation of fresh fruits or fruit juice as the key ingredients.

4.1.3.1 Guidelines for Naming

Fruit wines should be named after the fruits that are used as raw materials in the processing to distinguish themselves from grape-based wines. When only one type of fruits is used, wine can be named according to the fruit specie used. Examples include: strawberry wine, orange wine. When two or more types of fruits are used as ingredients, wine can be named according to the single fruit specie with the highest proportionate content in the wine.

4.1.3.2 Classifications

With reference to the classifications of grape-based wines, fruit wines can be segmented into 3 main categories in accordance with the carbon dioxide content (by pressure) and the processing technology used: still fruit wines, sparkling fruit wines and special fruit wines (refer to Sections 4.1.2.2.1, 4.1.2.2.2, 4.1.2.3).

Fruit wines can also be segmented in accordance with sugar content, i.e. dry, semi-dry, semi-sweet and sweet fruit wines (refer to Section 4.1.2.1).

4.1.4 Chinese Rice Wine

Refer to fermented alcohol, brewed through saccharification and fermentation by adding processing aids such as koji and yeast into key grain type ingredients such as rice and shumi.

4.1.4.1 Classifications According to Alcohol Sugar Content

4.1.4.1.1 Dry Chinese Rice Wine: Total sugar content less than or equal to 15.0 g/L.

4.1.4.1.2 Semi-dry Chinese Rice Wine: Total sugar content in the range of 15.1 g/L~40.0 g/L.

4.1.4.1.3 Semi-sweet Chinese Rice Wine: Total sugar content in the range of 40.1 g/L~100.0 g/L.

4.1.4.1.4 Sweet Chinese Rice Wine: Total sugar content exceeding 100.0 g/L.

4.1.4.2 Classifications According to Raw Ingredients

4.1.4.2.1 Rice Wine.

4.1.4.2.2 Non-rice Wine.

4.1.4.3 Classifications According to Product Style

4.1.4.3.1 Traditional Type Chinese Rice Wine

Refer to rice wine, product of a series of processes, i.e. steam-cooking, adding koji, saccharification, fermentation, pressing, filtering, wine frying (sterilization), storage and blending using key rice-based ingredients such as rice, shumi, corn, millet and wheat.

4.1.4.3.2 Qingshuang Type Chinese Rice Wine

Refer rice wine with refreshing palate, adding koji (or partial enzymatic agents and yeast) as saccharification fermentation agent, and undergoing a series of processes, i.e. steam-cooking, saccharification, fermentation, pressing, filtering, wine frying (sterilization), storage and blending using key rice-based ingredients such as rice, shumi, corn, millet and wheat.

4.1.4.3.3 Special Type Chinese Rice Wine

Refer to rice wine that possesses unique flavor due to changes in main and supplementary ingredients as well as processes (e.g. adding medicinal and edible substances) but still retain the style of Chinese rice wine.

4.1.5 Milk Wine

Refer to fermented wine brewed using a series of processes, e.g. fermentation, filtration, sterilization using dairy, whey or whey powder as key ingredients.

4.1.6 Other Fermented Alcoholic Beverages

Refer to fermented wines that are not classified in any of the abovementioned categories.

4.2 Distilled Spirits

Refer to alcoholic beverages, products of fermentation, distillation and blending using key ingredients such as grains, tubers, fruits and dairy products.

4.2.1 Chinese Spirits

Refer to Chinese spirits, adding large, small or bran koji as saccharification fermentation agent, and undergoing a series of processes, i.e. steam-cooking, saccharification, fermentation, distillation by using grains as key ingredients.

4.2.1.1 Classifications According to Saccharification & Fermentation Agent

4.2.1.1.1 Big Koji Chinese Spirits: Spirits brewed using big koji as saccharification fermentation agent.

4.2.1.1.2 Small Koji Chinese Spirits: Spirits brewed using small koji as saccharification fermentation agent.

4.2.1.1.3 Bran Koji Chinese Spirits: Spirits brewed using bran koji as saccharification fermentation agent.

4.2.1.1.4 Compound Chinese Spirits: Spirits brewed using big koji, small koji or bran koji as the saccharification fermentation agent, or spirits brewed by adding glucoamylase as saccharification agent and fermentation aids such as brewing yeast.

4.2.1.2 Classifications According to Production Processes

4.2.1.2.1 Traditional Chinese Spirits

Refer to spirits that possess style and characteristics which such product should have, product of solid (or semi-solid) saccharification, fermentation, distillation, aging and blending using grains as key ingredients, without adding any edible alcohol and aromatic or flavoring substances that are not a result of spirit fermentation processes.

4.2.1.2.2 Chinese Spirits by Liquid Fermentation

Refer to spirits formulated through proper flavoring and blending using base alcohol (or edible alcohol) that is produced with a series of processes, i.e. liquid saccharification, fermentation, distillation with substances containing starch and sugar as ingredients.

4.2.1.2.3 Chinese Spirits Made from Tradition and Liquid Fermentation

Refer to spirits formulated with Chinese spirits made from tradition and liquid fermentation (not lower than 30%), Chinese spirits made from liquid fermentation and food additives.

4.2.1.3 Classifications According to Flavor

4.2.1.3.1 Strong Flavor Chinese Spirits

Refer to spirits with main composite aroma derived from ethyl caproate content, product of tradition and liquid fermentation, distillation, aging and blending using grains as key ingredients, without adding any edible alcohol and aromatic or flavoring substances that are not a result of spirit fermentation processes.

4.2.1.3.2 Mild Flavor Chinese Spirits

Refer to spirits with main composite aroma derived from ethyl acetate content, product of tradition and liquid fermentation, distillation, aging and blending using grains as key ingredients, without adding any edible alcohol and aromatic or flavoring substances that are not a result of spirit fermentation processes.

4.2.1.3.3 Rice Flavor Chinese Spirits

Refer to spirits with main composite aroma derived from ethyl lactate, β-benzyl alcohol content, product of tradition and liquid fermentation, distillation, aging and blending using rice as key ingredients, without adding any edible alcohol and aromatic or flavoring substances that are not a result of spirit fermentation processes.

4.2.1.3.4 Feng-flavour Chinese Spirits

Refer to spirits with main composite aroma derived from ethyl acetate, ethyl caproate content, product of tradition and liquid fermentation, distillation, aging and blending using grains as key ingredients, without adding any edible alcohol and aromatic or flavoring substances that are not a result of spirit fermentation processes.

4.2.1.3.5 Chi-flavour Chinese Spirits

Refer to spirits with soy-based chi-flavor, product of a series of processes, i.e. steam-cooking, adding large wine cake as main saccharification fermentation agent then undergoing saccharification and fermentation processes concurrently, potstill distillation, soaking, blending and brewing using rice as key ingredients, without adding any edible alcohol and aromatic or flavoring substances that are not a result of spirit fermentation processes.

4.2.1.3.6 Zhima-flavour Chinese Spirits

Refer to spirits with sesame type style, product of tradition and liquid fermentation, distillation, aging and blending using sorghum, wheat (bran husk) as key ingredients, without adding any edible alcohol and aromatic or flavoring substances that are not a result of spirit fermentation processes.

4.2.1.3.7 Te-flavour Chinese Spirits

Refer to spirits with Te-flavor style, product of tradition and liquid fermentation, distillation, aging and blending using rice as key ingredients, without adding any edible alcohol and aromatic or flavoring substances that are not a result of spirit fermentation processes.

4.2.1.3.8 Nongjiang-flavour Chinese Spirits

Refer to spirits with Nongjiang-flavor style, product of tradition and liquid fermentation, distillation, aging and blending using grains as key ingredients, without adding any edible alcohol and aromatic or flavoring substances that are not a result of spirit fermentation processes.

4.2.1.3.9 Laobaigan-flavour Chinese Spirits

Refer to spirits with main composite aroma derived from ethyl lactate, ethyl acetate content, product of tradition and liquid fermentation, distillation, aging and blending using grains as key ingredients, without adding any edible alcohol and aromatic or flavoring substances that are not a result of spirit fermentation processes.

4.2.1.3.10 Jiang-flavour Chinese Spirits

Refer to spirits with their own characteristic style, product of tradition and liquid fermentation, distillation, aging and blending using grains as key ingredients, without adding any edible alcohol and aromatic or flavoring substances that are not a result of spirit fermentation processes.

4.2.1.3.11 Other flavors

Refer to any spirit that is not abovementioned.

4.2.2 Brandy

Refer to distilled alcohol, product of a series of processes, i.e. fermentation, distillation, aging and formulation using fresh fruits or fruit juice as ingredients.

4.2.2.1 Grape Brandy (simply called: Brandy)

4.2.2.1.1 Brandy Made from Grape Juice

Refer to brandy, product of a series of processes, i.e. fermentation, distillation, aging in oak barrels and formulation using grape juice and pulps as ingredients.

4.2.2.1.2 Brandy Made from Grape Marc

Refer to brandy, product of a series of processes, i.e. fermentation, distillation, aging in oak barrels and formulation using grape marc leftover after fermentation as ingredients.

4.2.2.2 Fruit Brandy

Refer to brandy, product of a series of processes, i.e. full or partial fermentation, or soaking with edible alcohol and distillation using fresh fruits as ingredients. Fruit name should be added before brandy name.

4.2.2.3 Blended Brandy

Refer to brandy formulated by adding certain amount of edible alcohol into the base alcohol, i.e. brandy made from grape juice or brandy made from grape marc.

4.2.3 Whisky

Refer to distilled alcohol, product of a series of processes, i.e. saccharification, fermentation, distillation, aging and blending using malt, grains as ingredients.

4.2.3.1 Malt Whisky

Refer to whisky that has been aged in oak barrels for at least 2 years after saccharification, fermentation and distillation, derived entirely from malt barley as its ingredient.

4.2.3.2 Grain Whisky

Refer to whisky that has been aged in oak barrels for at least 2 years after saccharification, fermentation and distillation, derived from different grains (e.g. rye, wheat, corn, highland barley, and oat) as its ingredients.

4.2.3.3 Blended Whisky

Refer to whisky formulated with different whisky types (e.g. malt whisky, grain whisky) according to a certain mixture proportion.

4.2.4 Vodka

Refer to distilled spirits, products of special refining processes of edible alcohol that is the result of fermentation and distillation of grains, tubers, molasses and other similar agricultural products as its key ingredients.

4.2.5 Rum

Refer to distilled spirits, products of a series of processes, i.e. fermentation, distillation, aging and formulation, using sugarcane juice or honey as ingredients.

4.2.6 Juniper-flavoured Spirit Drinks

Refer to distilled spirits produced from soaking in juniper or undergoing flavoring-redistillation after saccharification, fermentation and distillation processing, using ingredients such as grains.

4.2.7 Milk Spirit

Refer to distilled spirit brewed from a series of processes, e.g. fermentation and distillation, using dairy, whey or whey powder as key ingredients.

4.2.8 Other Distilled Spirits

Refer to any other distilled spirit that is not under the abovementioned categories.

4.3 Blended Alcoholic Beverage

Refer to alcoholic beverage produced after its base alcohol (i.e. fermented alcohol, distilled spirit or edible alcohol) underwent formulation, mixing or reprocessing, possibly infused with dual-function medicinal and edible supplementary ingredients or food additives, as a result changing the style of the original base alcohol.

4.3.1 Integrated Alcoholic Beverages from Plants

Refer to formulated alcohols that have the obvious plant aroma and useful components, produced from reprocessing alcohols with flowers, leaves, roots, stems and/or fruits of dual-function medicinal and edible plants as their sources of aroma and nutrients.

4.3.1.1 Fruit Spirits

Refer to formulated alcohols that have obvious fruit aroma, produced from processes such as soaking, using fruits as ingredients.

4.3.2 Integrated Alcoholic Beverages from Animals

Refer to formulated alcohols that contain obvious useful components of animals, produced from reprocessing alcohols with dual-function medicinal and edible animals and their derived products as their sources of aroma and nutrients.

4.3.3 Integrated Alcoholic Beverages from Plants and Animals

Refer to formulated alcohol that uses useful components of both plants and animals.

4.3.4 Other Integrated Alcoholic Beverages

Refer to any other integrated alcoholic beverage that is not under the above-mentioned categories.

National Standards of People's Republic of China

GB 2757-2012

National Food Safety Standards

Liquor and its Compound Alcohol

Issued on: 2012-08-06 Implemented on: 2013-02-01

Issued by Ministry of Health of the People's Republic of China

Foreword

This standard replaces GB 2757-1981 Hygiene Standard for Liquor and its Compound Alcohol along with its first and second amendment articles.

As compared with GB 2757-1981, key changes are as follows:

- Amended the standard's title;
- Amended index limit for cyanide;
- Removed index limit for manganese;
- Added requirements for labeling.

Sections 4.2～4.4 in this standard were implemented with effect from 1st Aug, 2013.

National Food Safety Standards

Liquor and its Compound Alcohol

1. Scope

This Standard applies to liquor and its compound wine.

2. Terms and Definition

2.1 Liquor

Take cereal grains, tubers, fruits, milk or others as main materials. After the process of fermentation, distillation, blend it to the potable spirit.

2.2 Liquor Compound Alcohol

Take liquor or edible alcohol as wine base, add edible auxiliary materials or food additives, blend, mix or rework to make it out to be potable spirit with different style from the wine base.

3. Technical Requirements

3.1 Requirements for Raw Materials

Conform to relevant standards and rules.

3.2 Sensory Requirements

Conform to relevant standards and rules.

3.3 Physical-Chemical Indexes

Physical-chemical indexes should comply with the requirements listed in Table 1.

Table 1 Physical-Chemical Indexes

Items		Index		Test Method
		Grains	Others	
Methanol[a] / (g/L)	≤	0.6	2.0	GB/T 5009.48
Cyanide[a] (by HCN) / (mg/L)	≤	8.0		GB/T 5009.48
[a]methanol and cyanide index value should be converted to basis of 100% alcohol content.				

3.4 Content Limits for Contaminants and Mycotoxin

3.4.1 Limits on contaminants should comply with the requirements of GB 2762.

3.4.2 Limits on mycotoxin should comply with the requirements of GB 2761.

3.5 Food Additives

Use of food additives should comply with the requirements of GB 2760.

4. Labeling

4.1 Labels for liquor and its compound alcohol should indicate alcohol content, warnings and validity period as well as comply with requirements of GB 7718.

4.2 Alcohol content should be labeled with “%vol” as its units.

4.3 “Excessive drinking is harmful to health” should be indicated on the label, other warnings can also be indicated at the same time.

4.4 Spirits with alcohol greater or equal to 10%vol can avoid indicating validity period.

National Standards of People's Republic of China

GB 2758-2012

Food Security National Standard

Fermented Alcohol and its Compound Alcohol

Issued on: 2012-08-06 Implemented on: 2013-02-01

Issued by Ministry of Health of the People's Republic of China

Foreword

This standard will replace GB 2758-2005 Hygienic Standard for Fermented Alcohol.

As compared to GB 2758-2005, key changes are as follows:

- Standard’s title was amended;
- Index limit of cyanide was removed;
- Index limits on microorganism were amended;
- Requirements on labelling and logos were added.

Section 4.2～4.5 in this standard will be implemented from 2013-08-01 onwards.

Food Security National Standards

Fermented Alcohol and its Compound Alcohol

1. Scope

This standard applies to fermented alcohol and its compound alcohol.

2. Terms and Definition

2.1 Fermented Alcohol

Refers to alcoholic beverage that is the result of fermentation or partial fermentation of grains, fruits, dairy as its key ingredients.

2.2 Compound Alcohol of Fermented Alcohol

Refers to alcoholic beverage, of which the style of its base alcohol has been changed as a result of formulation, mixing or processing with the addition of edible supplementary ingredients or food additives into fermented alcohol abovementioned as base ingredient.

3. Technical Requirements

3.1 Requirements on Raw Ingredients

Comply with corresponding standards and relevant regulations.

3.2 Sensory Requirements

Comply with corresponding standards and relevant regulations.

3.3 Physical-Chemical Indexes

Physical-chemical indexes should comply with the requirements listed in Table 1.

Table 1 Physical-Chemical Indexes

Items		Index	Test Method
		Beer	
Formaldehyde / (mg/L)	≤	2.0	GB/T 5009.49

3.4 Contaminants and Limits on Mycotoxin Content

3.4.1 Limits on amount of contaminants should comply with the requirements in GB 2762.

3.4.2 Limits on mycotoxin content should comply with the requirements in GB 2761.

3.5 Limits on Microorganism Content

Limits on microorganism content should comply with the requirements listed in Table 2.

Table 2 Limits on Microorganism Content

Items	Sampling Method and Content Limit[a]			Test Method
	n	c	m	
Salmonella	5	0	0/25 mL	GB/T 4789.25
Staphylococcus aureus	5	0	0/25 mL	
[a]Analysis and processing of samples should be implemented according to GB 4789.1.				

3.6 Food Additives

The use of food additives should comply with the requirements in GB 2760.

4. Labeling

4.1 Labels for fermented alcohol and its compound alcohol should comply with the requirements in GB 7718, with the exception of details on alcohol content, concentration of original wort, original fruit juice content, warning language and validity period (or shelf life).

4.2 Alcohol content should be presented in units of “%vol”.

4.3 Beer products should be labeled with concentration of original wort, under the heading of “original wort concentration”, with Plato degree symbol “°P” as its unit. Fruit alcohol (except wine) should be labeled with original fruit juice content, included in the ingredient list in the “xx%” format.

4.4 “Excessive drinking is harmful to health” warning should be labeled, possibly with other warnings. Beer products that use glass bottles should include warnings such as “Do not strike, avoid breaking”.

4.5 Wine and other fermented alcohol & its compound alcohol with alcohol content ≥10%vol need not display any validity period (shelf-life).

Water

GB 5749-2006 Hygienic Standards for Drinking Water Quality

National Standards of People's Republic of China

GB 5749-2006

Hygienic Standards for Drinking Water Quality

Issued on: 2006-12-29 Implemented on: 2007-07-01

Issued by Ministry of Health of the People's Republic of China and China National Standardization Management Committee

Foreword

The entirety of the technical content in this standard is mandatory.

This standard will replace GB 5749-1985 Hygienic Standards for Drinking Water from its implementation date onwards.

As compared with GB 5749-1985, key changes are as follows:

- Number of water quality indexes had been increased from 35 items in GB 5749-1985 to 106 items in this standard; of which 71 items were newly added and 8 items were amended, including the following:

  a) Microorganism indexes were increased from 2 items to 6 items, i.e. indexes for Escherichia coli, heat-resistant coliforms, giardia and cryptosporidium were added； while index for total coliform was amended;

  b) Indexes for drinking water disinfectant were increased from 1 item to 4 items, i.e. indexes for monochloramine，ozone and chlorine dioxide were added;

  c) Indexes for inorganic compounds under the toxicological index category were increased from 10 to 21 items, i.e. indexes for bromate, chlorite, chlorate, antimony, barium, beryllium, boron, molybdenum, nickel, thallium and cyanogen chloride were added; indexes for arsenic, cadmium, lead and nitrate were amended;

     Indexes for organic compound under the toxicological index category were increased from 5 to 53 items, i.e. indexes for formaldehyde, trihalomethane, dichloromethane, 1,2-dichloroethane, 1,1,1-trichloroethane, bromoform, monochloride dibromomethane, dichloro monobromomethane, epoxy chloropropane, chloroethylene, 1,1-dichloroethylene, 1,2-dichloroethylene, trichlorethylene, tetrachloroethylene, hexachlorobutadiene, dichloroacetic acid, trichloroacetic acid, trichloroacetaldehyde， benzene, methylbenzene, xylene, ethylbenzene, styrene, 2,4,6-trichlorophenol, chlorobenzene, 1,2-dichlorobenzene, 1,4-dichlorobenzene, trichlorobenzene, phthalate (2-ethylhexyl) ester， acrylamide， microcystin-LR, bentazone, chlorothalonil, deltamethrin ， dimethoate, 2,4-dichlorophenoxyacetic acid, heptachlor, hexachlorobenzene, lindane, malathion, parathion, methyl parathion, pentachlorophenol, atrazine, carbofuran, chlorpyrifos , dichlorphos and glyphosate were added; index for carbon tetrachloride were amended;

  d) Indexes for sensory properties and general chemicals were increased from 15 to 20 items, i.e. indexes for oxygen consumption, ammonia nitrogen, sulfide, sodium and aluminum were added; index for turbidity was amended;

  e) Index for radioactive α under the radioactivity indexes was amended.

- Removed two sections of content previously included, i.e. water source selection and hygiene measures for water source.

- Simplify water quality inspection guidelines for water supply units, where part of the content was listed into the Hygiene Standards of Central Water Supply for Drinking Water.

- Added Appendix A.

- Added normative references for this standard.

Appendix A in this standard is an informative appendix.

Inspection items and date of implementation of the stipulated indexes listed in “Table 3 Unconventional Quality Indexes and Limits for Water” of this standard are determined by the provincial level government according to actual situation locally. Situation of implementation will be reported to the National Standardization Management Committee, Ministry of Construction and Ministry of Health for record purposes and the actual situation of implementation will be reported by these three authorities. The deadline for implementation of all of the required indexes will be July 1st, 2012.

This standard was proposed by the Ministry of Health, Ministry of Construction, Ministry of Water Resources, Ministry of Land and Resources and State Environmental Protection Administration of the People's Republic of China.

This standard is place under the jurisdiction of the Ministry of Health of the People's Republic of China.

The organization responsible for the drafting of this standard: Bureau for Regulating Product Safety Pertaining to the Environment and Health of the China Center for Disease Control and Prevention.

The organizations involved in the drafting of this standard: Guangdong Province Health Supervision Bureau, Zhejiang Province Health Supervision Bureau, Jiangsu Province Center for Disease Control and Prevention, Beijing City Center for Disease Control and Prevention, Shanghai City Center for Disease Control and Prevention, Water Association for China Cities and Towns, China Research Institute of Water Resources and Hydropower and Environmental Standards Research Institute of the State Environmental Protection Administration.

The key personnel responsible for the drafting of this standard: Yinlong Jin,Changjie Chen,Xiping Chen,Lan Zhang,Yaxing Chen, Zugeng Cai,Rihua Gan, Tuhang Shen,Changyi Guo, Jianrong Wei,Ruizhu Ning,Wenchao Liu and Lingling Hu.

The key personnel involved in the drafting of this standard: Shiwen Cai, Shaobing Ling, Fan Liu, Xiaoyuan Yao, Kunming Lu, Guoguang Chen, Huaidong Zhou and Yanping Li.

This standard was first issued in Aug1985 and this current version is the standard’s first amendment version.

Hygienic Standards for Drinking Water Quality

1. Scope

This standard specifies the details on the hygiene requirements for quality of drinking water, quality of the source of drinking water, central water supply units, secondary water supply and products pertaining to hygiene & safety of drinking water as well as supervision water quality and inspection methods.

This standard applies to drinking water supplied from various types of central water supplies in urban and rural areas. It is also applicable to drinking water supplied from non-central water supplies.

2. Normative References

Clauses involved in the following documents constitute the ones in this standard through reference in this standard. If any reference is dated, the following amendment or revised versions (excluding errata) are not applicable to this standard. However, the study of whether the latest version of these documents can be used by all parties who reach agreement according to this standard is encouraged. Any latest version of the non-dated reference is applicable to this standard.

GB 3838 *Quality Standards for Surface Water Environment*

GB/T 5750 *Drinking Water Standard and Testing Methods* (All Sections)

GB 14848 *Quality Standards for Ground Water*

GB 17051 *Hygiene Specifications for Secondary Water Supply Facilities*

GB/T 17218 Hygiene and Safety Evaluation for Chemical Treatment Reagents Used in *Drinking Water*

GB/T 17219 *Safety Evaluation Standard for Transportation Facilities and Protection Materials of Drinking Water*

CJ/T 206 *Water Quality Standards for Urban Water Supply*

SL 308 *Qualification Standards for Rural Water Supply Units*

Hygiene Standards of Central Water Supply for Drinking Water – Ministry of Health

3. Terms and Definition

The following terms and definitions will apply to this standard.

3.1 Drinking Water

Refer to drinking water and water for domestic uses, meant for day-to-day usage by people.

3.2 Type of Water Supply

3.2.1 Central Water Supply

Refer to method of supplying water from a central source of water supply, through water distribution networks or through public water points to the user households, including self-established water supply

facilities. Water stations supplying drinking water to user households and dual water supply providing water to public venues or residential communities are also classified under central water supply category.

3.2.2 Secondary Water Supply

Refer to method of supplying water through water pipes or water containers to user households, of which the content water has been stored, pressurized and sterilized or thoroughly processed after being channeled from a central water supply.

3.2.3 Small Central Water Supply

Refer to a type of central water supply that provides water of volume less than 1,000 m^3 (or provides water to less than 10,000 individuals) on a daily basis in rural areas.

3.2.4 Non-central Water Supply

Refer to method of supplying water without any water supply facilities or only with simple facilities, where user households draw water directly from primary sources of water.

3.3 Regular Indices

Refer to water quality indexes that reflect the basic water quality situation of drinking water.

3.4 Non-regular Indices

Refer to drinking water quality indexes that are implemented according to regions, time and special circumstances.

4. Hygiene Requirements for Drinking Water

4.1 Drinking water should comply with the following requirements so as to ensure the safety of user households drinking the water.

4.1.1 Drinking water should not contain any pathogenic microorganisms.

4.1.2 Chemical substances in drinking water should not cause harm to the health of the drinkers.

4.1.3 Radioactive substances in drinking water should not cause harm to the health of the drinkers

4.1.4 Sensory properties of drinking water should be good.

4.1.5 Drinking water should be sterilized.

4.1.6 Drinking water quality should comply with the hygiene requirements listed in Table 1 and 3. Quantity limits of disinfectant in product water from central water supplies, residual quantity of disinfectant in product water and peripheral water within water pipe networks all should comply with the requirements of Table 2.

4.1.7 Water quality indexes of small central water supply and non-central water supply can be temporarily implemented according to Table 4 due to circumstantial restrictions, while rest of the required indexes should still comply with Table 1,2 and 3.

4.1.8 Under the circumstance that a public event causes material impact on water quality, requirements on sensory properties and general chemical indexes can be relaxed appropriately if approved by state

authorities at municipal level or above.

4.1.9 When drinking water contains indexes listed in Table A.1 of Appendix A, quantity limits listed in the table can be referenced and based upon for evaluation.

Table 1 Conventional Quality Indexes and Limits for Water

Index	Limits
1. Microorganism Indexes[a]	
Total Coliform / (MPN/100mL or CFU/100mL)	Should not be detected
Heat-resistant Coliforms / (MPN/100mL or CFU/100mL)	Should not be detected
Escherichia coli / (MPN/100mL or CFU/100mL)	Should not be detected
Total Bacterial Count / (CFU/mL)	100
2.Toxicological Indexes	
Arsenic / (mg/L)	0.01
Cadmium / (mg/L)	0.005
Chrome (Hexavalent) / (mg/L)	0.05
Lead / (mg/L)	0.01
Mercury / (mg/L)	0.001
Selenium / (mg/L)	0.01
Cyanide / (mg/L)	0.05
Fluoride / (mg/L)	1.0
Nitrate (by N) / (mg/L)	10 Underground source limited to 20
Trichloromethane / (mg/L)	0.06
Carbon Tetrachloride / (mg/L)	0.002
Bromate (when using ozone) / (mg/L)	0.01
Formaldehyde (when using ozone) / (mg/L)	0.9
Chlorite (When sterilizing with chlorine monoxide) / (mg/L)	0.7
Chlorate (When sterilizing with compound chlorine monoxide) / (mg/L)	0.7
3. Sensory Properties and General Chemical Indexes	
Chroma (Platinum Cobalt Chroma Unit)	15
Turbidity (Scattered Turbidity Unit) / NTU	1 Water source and purification technology limited to 3
Smell and Taste	No unusual odor and taste
Visible Impurities	None
pH	6.5 ≤ pH ≤ 8.5
Aluminum / (mg/L)	0.2
Iron / (mg/L)	0.3
Manganese / (mg/L)	0.1
Copper / (mg/L)	1.0
Zinc / (mg/L)	1.0
Chloride / (mg/L)	250
Sulfate / (mg/L)	250
Total Soluble Solids / (mg/L)	1000
Index	**Limits**
Total Hardness ($CaCO_3$) / (mg/L)	450
Oxygen Consumption (COD_{Mn}, by O_2) / (mg/L)	3 Water source limited to 5, when original O_2 consumption>6 mg/L
Volatile Phenols (by phenol) / (mg/L)	0.002
Anionic Synthetic Detergent Solution / (mg/L)	0.3
4. Radioactive Indexes[b]	Guidance Values
Total α Radioactivity / (Bq/L)	0.5

Total β Radioactivity / (Bq/L)	0.1
[a] MPN represents most possible value; CFU represents unit of bacterial colony forming. When coliforms are detected in water sample, tests for Escherichia coli or heat-resistant coliforms should be conducted next; if coliforms are not detected, the step above will not be necessary. [b] If radioactive indexes exceed the guidance value, nuclide analysis and evaluation should be conducted so as to determine if the water is drinkable or not.	

Table 2 Conventional Indexes and Requirements for Disinfectants in Drinking Water

Disinfectant Name	Time of Contact with Water	Limits on Product Water (mg/L)	Residues in Product Water (mg/L)	Residues in Water at End of Pipe Network (mg/L)
Chlorine Gas and Free Chlorine Agents (Free Chlorine Ions)	≥30min	4	≥0.3	≥0.05
Monochloro Amine (Total Chlorine)	≥120min	3	≥0.5	≥0.05
Ozone (O_3)	≥12min	0.3	–	0.02 If Cl added, Total Cl≥0.05
Chlorine Dioxide (ClO_2)	≥30min	0.8	≥0.1	≥0.02

Table 3 Unconventional Quality Indexes and Limits for Water

Index	Limits
1. Microorganism Indexes	
Giardia / (qty/10L)	<1
Cryptosporidium / (qty/10L)	<1
2.Toxicological Indexes	
Antimony / (mg/L)	0.005
Barium / (mg/L)	0.7
Beryllium / (mg/L)	0.002
Boron / (mg/L)	0.5
Molybdenum / (mg/L)	0.07
Nickel / (mg/L)	0.02
Silver / (mg/L)	0.05
Thallium / (mg/L)	0.0001
Cyanogen Chloride (by CN^-) / (mg/L)	0.07
Monochloride Dibromomethane / (mg/L)	0.1
Dichloro Monobromomethane / (mg/L)	0.06
Dichloroacetic Acid / (mg/L)	0.05
1,2-dichloroethane / (mg/L)	0.03
Dichloromethane / (mg/L)	0.02
Trihalomethane (Subtotal of Chloroform, Monochloride Dibromomethane, Dichloro Monobromomethane, Bromoform)	Sum of proportion percentages of the concentration of each of substances in the compound should not exceed 1
1,1,1-trichloroethane / (mg/L)	2
Trichloroacetic Acid / (mg/L)	0.1
Trichloroacetaldehyde / (mg/L)	0.01
Trichloroacetaldehyde / (mg/L)	0.01
2,4,6-trichlorophenol / (mg/L)	0.2
Bromoform / (mg/L)	0.1
Heptachlor /(mg/L)	0.0004
Malathion / (mg/L)	0.25

Table to be continued…

…Table continued

Index	Limits
Pentachlorophenol / (mg/L)	0.009
BHC (Total Content) / (mg/L)	0.005
Hexachlorobenzene / (mg/L)	0.001
Dimethoate / (mg/L)	0.08
Parathion / (mg/L)	0.003
Bentazone / (mg/L)	0.3
Methyl Parathion / (mg/L)	0.02
Chlorothalonil / (mg/L)	0.01
Carbofuran /(mg/L)	0.007
Lindane / (mg/L)	0.002
Chlorpyrifos /(mg/L)	0.03
Glyphosate / (mg/L)	0.7
Dichlorvos / (mg/L)	0.001
Atrazine / (mg/L)	0.002
Deltamethrin / (mg/L)	0.02
2,4-dichlorophenoxyacetic Acid / (mg/L)	0.03
Dichlorodiphenyl Trichloroethane (DDT) / (mg/L)	0.001
Ethylbenzene / (mg/L)	0.3
Xylene (Total Content) / (mg/L)	0.5
1,1-dichloroethylene / (mg/L)	0.03
1,2-dichloroethylene / (mg/L)	0.05
1,2-dichlorobenzene / (mg/L)	1
1,4-dichlorobenzene / (mg/L)	0.3
Trichlorethylene / (mg/L)	0.07
Trichlorobenzene (Total Content) / (mg/L)	0.02
Hexachlorobutadiene / (mg/L)	0.0006
Acrylamide / (mg/L)	0.0005
Tetrachloroethylene / (mg/L)	0.04
Methylbenzene / (mg/L)	0.7
Phthalate (2-ethylhexyl) Ester / (mg/L)	0.008
Epoxy Chloropropane / (mg/L)	0.0004
Benzene / (mg/L)	0.01
Styrene / (mg/L)	0.02
Benzo (a) Pyrene / (mg/L)	0.00001
Chloroethylene / (mg/L)	0.005
Chlorobenzene / (mg/L)	0.3
Microcystin-LR / (mg/L)	0.001
3. Sensory Properties and General Chemical Indexes	
Ammonia Nitrogen (by N) / (mg/L)	0.5
Sulfide / (mg/L)	0.02
Sodium (Na) / (mg/L)	200

Table 4 Partial Quality Indexes and Limits for Water of Small Central Supply and Non-central Supply

Index	Limits
1. Microorganism Indexes	
Total Coliform / (MPN/100mL or CFU/100mL)	500
2.Toxicological Indexes	
Arsenic / (mg/L)	0.05
Fluoride / (mg/L)	1.2
Ammonia Nitrogen (by N) / (mg/L)	20
3. Sensory Properties and General Chemical Indexes	
Chroma (Platinum Cobalt Chroma Unit)	20
Turbidity (Scattered Turbidity Unit) / NTU	3 Water source and purification technology limited to 5
pH	$6.5 \leq pH \leq 9.5$
Total Soluble Solids / (mg/L)	1500
Total Hardness ($CaCO_3$) / (mg/L)	550
Oxygen Consumption (COD_{Mn}, by O_2) / (mg/L)	5
Iron / (mg/L)	0.5
Manganese / (mg/L)	0.3
Chloride / (mg/L)	300
Sulfate / (mg/L)	300

5. Hygiene Requirements for Water Source Quality of Drinking Water

5.1 Surface water used as source of drinking water should comply with the requirements in GB 3838.

5.2 Underground water used as source of drinking water should comply with the requirements in GB/T 14848.

6. Hygiene Requirements for Central Supply Units

Hygiene requirements on central supply units should be implemented in accordance with Ministry of Health's *Hygiene Standards of Central Water Supply for Drinking Water*.

7. Hygiene Requirements for Secondary Water Supply

Facilities and treatment of secondary water supply should be implemented in accordance with GB 17051.

8. Hygiene Requirements for Products Pertaining to Hygiene & Safety of Drinking Water

8.1 Chemical reagents used in processes such as flocculation, coagulation aid, sterilization, oxidation, adsorption, pH adjustment, rust protection, scale inhibition should not contaminate the drinking water and should comply with the requirements in GB/T 17218.

8.2 Water transportation facilities, protection materials and water processing materials also should not contaminate the drinking water and should comply with the requirements in GB/T 17219.

9. Inspection of Water Quality

9.1 Inspection of Water Quality at Water Supply Unit

9.1.1 Unconventional quality indexes for water of water supply units are selected and determined by local water supply administrative and management authorities or departments (provincial level and above) after

negotiation and discussion with the Ministry of Health.

9.1.2 Selection of sampling site, inspection items and frequency, qualified percentage computation with regards to water quality inspection of urban central supply unit should be implemented in accordance with CJ/T 206.

9.1.3 Selection of sampling site, inspection items and frequency, qualified percentage computation with regards to water quality inspection of rural central supply unit should be implemented in accordance with SL 308.

9.1.4 Results of water quality inspection of water supply units should be reported up to the regional hygiene administrative authorities regularly, where the content and procedures of the reporting process should be determined through proper negotiation and discussion between local water supply administrative authorities and the hygiene administrative authorities.

9.1.5 If drinking water quality shows abnormality, reports should be filed to the local water supply administrative authorities and health administrative authorities in a timely manner.

9.2 Inspection of Water Quality during Hygiene Inspection

9.2.1 Hygiene administrative authorities at every level should conduct hygiene supervision and inspections on the water quality of individual types of water supply units periodically according to actual circumstances and practical needs.

9.2.2 Under the circumstance that a public event causes material impact on water quality, hygiene administrative authorities (of provincial level and above) should set up plans for hygiene supervision and inspections on drinking water quality according to practical needs.

9.2.3 Scope of inspection, items and frequency of hygiene supervision will be determined by the regional health administrative authorities of city level and above.

10. Inspection Method for Water Quality

Water supervision of drinking water quality should be implemented in accordance with GB/T 5750 (all sections).

References

[1] World Health Organization. Guidelines for Drinking-water Quality, third edition. Vol. 1, 2004, Geneva

[2] EU's Drinking Water Standards. Council Directive 98/93/EC on the quality of water intended for human consumption. Adopted by the Council, on 3 November 1998.

[3] US EPA. Drinking Water Standards and Health Advisories, Winter 2004.

[4] Russia Federation Drinking Water Standard, Implemented on Jan 2002.

[5] Japan Drinking Water Quality Standard, Implemented on Apr 2004.

Appendix A

(Informative Appendix)

Reference Indexes and Limits for Drinking Water Quality

Table A.1 Reference Indexes and Limits for Drinking Water Quality

Index	Limits
Enterococcus / (CFU/100mL)	0
Clostridium Perfringens / (CFU/100mL)	0
Bis (2-ethyl-ethyl) Adipate / (mg/L)	0.4
Ethylene Dibromide / (mg/L)	0.00005
Dioxins (2,3,7,8-TCDD) / (mg/L)	0.00000003
Geosmin (Dimethylnaphthalene Ethanol) / (mg/L)	0.00001
Pentachloropropane / (mg/L)	0.03
Bisphenol A / (mg/L)	0.01
Acrylonitrile / (mg/L)	0.1
Acrylic Acid / (mg/L)	0.5
Acrolein / (mg/L)	0.1
Tetraethyl Lead / (mg/L)	0.0001
Glutaraldehyde / (mg/L)	0.07
Methyl Isobutyl Ethanol Camphane-2 / (mg/L)	0.00001
Petroleum Type (Total Content) / (mg/L)	0.3
Asbestos (>10 μm) / (10 thousand pieces/L)	700
Nitrite / (mg/L)	1
Polycyclic Aromatic Hydrocarbons (Total Content) / (mg/L)	0.002
Polychlorinated Biphenyls (Total Content) / (mg/L)	0.0005
Diethyl Ester Phthalic Acid / (mg/L)	0.3
Dibutyl Ester Phthalic Acid / (mg/L)	0.003
Naphthenic Acid / (mg/L)	1.0
Anisole / (mg/L)	0.05
Total Organic Carbon (TOC) / (mg/L)	5
B-naphthol / (mg/L)	0.4
Butyl Xanthic Acid / (mg/L)	0.001
Ethyl Mercury Chloride / (mg/L)	0.0001
Nitrobenzene / (mg/L)	0.017

National Standards of People's Republic of China

GB 8637-2008

National Food Safety Standards

Drinking Natural Mineral Water

Issued on: 2008-12-29 Implemented on: 2009-10-01

Issued by General Administration of Supervision, Inspection and Quarantine of the People's Republic of China and China National Standardization Management Committee

Foreword

The provision 3, 5.2, 8.1, 1.1 of this standard is mandatory documents, the rest are guiding documents.

This Standard Refer to Codex Alimentarius Commission (CAC) CODEX STAN 108-1981,Rev 1-19971) Natural Mineral Water Standard.

This Standard replaces GB 8537-1995 Drinking Natural Mineral Water.

Comparing with GB 8537-1995, the following main changes have been made to the Standard:

- Modify the “in full force” to “provisions mandatory”;
- Complete the definition of natural mineral water;
- Add the products classification;
- Delete the specific rules for water source, conforming to GB/T 13727 Natural Mineral Water Geological Exploration Specifications;
- Delete one line indicators (bromide);
- Add four limited indicators (antimony, manganese, nickel, bromated), modify four items (cadmium, arsenic, boron, fluoride), delete 4 items(lithium, strontium, iodide, zinc);
- Increase two pollutant indicators (LAS, mineral oil), modify one item (nitrite).
- Increase three microbiological indicators (streptococcus faecium, Pseudomonas aeruginosa clostridium perfringens), delete one item (the total bacterial falls)
- Delete the original appendix A Drinking natural water Evaluation report data requirements (reference documents), change appendix B to appendix A.

The appendix A of this standard is quoted documents.

This standard is proposed by the China National Light Industry Union.

This standard is centralized by the national beverage standardization technical committee.

This standard is drafted by Chinese food fermentation industry research institute, the Chinese center for disease control and prevention on environment and health related product safety, China's geological environment monitoring, the Chinese center for disease control and prevention nutrition and food security, Natural mineral water branch of China beverage industry association, Haikou coconut trees mineral water co., LTD, Shenzhen danone yili fountain drinks co., LTD.

The draftmen of this standard are: The participating draftmen of this standard are: Xingguang Guo, Zhaojin Cao, Yanshan Tian, Xiumei Liu, Yongying Kang, Jun Chen, Wanrong Wen, Qijing Tian, Zhong Du, Fang Xu.

Previously issued versions: GB 8537-1987, GB 8537-1995.

National Food Safety Standards

Drinking Natural Mineral Water

1. Scope

This standard specifies details on the product classifications, requirements, testing methods, testing guidelines, labeling, packaging, transportation and storage for drinking natural mineral water.

This standard applies to the production, inspection and sales/distribution of drinking natural mineral water.

2. Normative References

Clauses involved in the following documents constitute the ones in this standard through reference in this standard. If any reference is dated, the following amendment or revised versions (excluding errata) are not applicable to this standard. However, the study of whether the latest version of these documents can be used by all parties who reach agreement according to this standard is encouraged. Any latest version of the non-dated reference is applicable to this standard.

GB 7718 *General Standard for the Labeling of Prepackaged Foods*

GB 8538 *Testing Method for Drinking Natural Mineral Water*

GB/T 13727 *Specifications for Natural Mineral Water Geological Exploration Activities*

GB 16330 *Hygienic Specifications for Drinking Natural Mineral Water Plants*

3. Terms and Definition

The following terms and definitions will apply to this standard.

3.1 Drinking Natural Mineral Water

Refer to water that contains a certain amount of minerals, trace elements or other components, where the source of water emerged automatically from depths of ground surface or harvested after drilling deep below the surface. Specific regions where the source of water lies should be unpolluted and prevention measures have to be taken to prevent any form of pollution of water. Under normal circumstances, range periodical fluctuations of water's properties such as chemical content, flow and temperature should be relatively stable.

4. Product Classifications

Classify according to the carbon dioxide content in the products:

a) Carbonated natural mineral water: Natural mineral water with carbon dioxide of the same source visibly being released, forming gas bubbles in the water under normal temperature and pressure after being packaged;

b) Aerated natural mineral water: Natural mineral water that forms bubbles due to aeration process, handled in accordance with Section 5.3.2;

c) Gasless natural mineral water: Natural mineral water that has its free carbon dioxide content less than the required carbon dioxide content that arises from a certain amount of bicarbonate maintained

dissolved in the water after being packaged, handled in accordance with Section 5.3.2;

d) Degassed natural mineral water: Natural mineral water without any carbon dioxide visibly being released in the water under normal temperature and pressure after being packaged, handled in accordance with Section 5.3.2.

5. Requirements

5.1 Requirements for Water Source

Water source exploration and evaluation, water source protection measures and monitoring of water source sites should be implemented in accordance with GB/T 13727.

5.2 Water Quality Requirements

5.2.1 Sensory Requirements

Comply with the requirements listed in Table 1.

Table 1 Sensory Requirements

Index		Requirements
Chroma / Degree	≤	15 (w/o unusual colors)
Turbidity / NTU	≤	5
Smell and Taste		Has typical taste of mineral water, no unusual odor and taste
Visible Impurities		Minute amount of mineral salt precipitation is allowed, but no other impurities

5.2.2 Physical-Chemical Requirements

5.2.2.1 Index Boundaries

One (or more) index should comply with the requirements listed in Table 2.

Table 2 Index Limits

Index		Requirements
Lithium / (mg/L)	≥	0.20
Strontium / (mg/L)	≥	0.20 (when content at 0.20~0.40 mg/L range, water temperature at source should be above 25°C)
Zinc / (mg/L)	≥	0.20
Iodide / (mg/L)	≥	0.20
Metasilicate / (mg/L)	≥	25.0 (when content at 25.0~30.0 mg/L range, water temperature at source should be above 25°C)
Selenium / (mg/L)	≥	0.01
Free Carbon Dioxide / (mg/L)	≥	250
Total Soluble Solids / (mg/L)	≥	1,000

5.2.2.2 Index Limits

Should comply with the requirements listed in Table 3.

Table 3 Index Limits

Index		Requirements
Selenium / (mg/L)	<	0.05
Antimony / (mg/L)	<	0.005
Arsenic / (mg/L)	<	0.01
Copper / (mg/L)	<	1.0
Barium / (mg/L)	<	0.7
Cadmium / (mg/L)	<	0.003
Chromium / (mg/L)	<	0.05
Lead / (mg/L)	<	0.01
ercury / (mg/L)	<	0.001
Manganese / (mg/L)	<	0.4
nickel/(mg/L)	<	0.02
Silver / (mg/L)	<	0.05
Bromate / (mg/L)	<	0.01
Borate (by B) / (mg/L)	<	5
Nitrate (by NO_3^-) / (mg/L)	<	4.5
Fluoride (by F^-) / (mg/L)	<	1.5
Oxygen Consumption (by O_2) / (mg/L)	<	3.0
^{226}Radium Radioactivity (Bq/L)	<	1.1

5.2.2.3 Contaminant Indexes

Should comply with the requirements listed in Table 4.

Table 4 Contaminant Indexes

Index		Requirements
Volatile Phenols (by Phenol) / (mg/L)	<	0.002
Cyanide (CN^-) / (mg/L)	<	0.010
LAS / (mg/L)	<	0.3
Mineral Oil / (mg/L)	<	0.05
Nitrite / (mg/L)	<	0.1
Total β Radioactivity / (mg/L)	<	1.50

5.2.3 Microorganism Requirements

Should comply with the requirements listed in Table 5 and Table 6.

Table 5 Microorganism Requirements

Index	Requirements
Coliforms / (MPN/100mL)	0
Streptococcus faecium / (CFU/250mL)	0
Pseudomonas aeruginosa / (CFU/250mL)	0
Clostridium perfringens / (CFU/50mL)	0
Note 1: Draw sample of 1 × 250 mL (clostridium perfringens sample 1 × 50 mL) and conduct the first round of tests, comply with Table 5 then report as qualified. Note 2: When test result is between 1 and 2, draw *n* samples according to Table 6 for second round of tests. Note 3: When the test result is 2 or above, it should be reported as unqualified.	

Table 6 Second Round of Tests

Index	Sample Quantity		Limits	
	n	c	m	M
Coliforms	4	1	0	2
Streptococcus faecium	4	1	0	2
Pseudomonas aeruginosa	4	1	0	2
Clostridium perfringens	4	1	0	2

Note: n – Sample quantity that should be drawn per batch of products;
c – Max number of samples allowed to exceed m value, if exceeded, products judged unqualified;
m – Limit (CFU) value for max allowable number of microorganisms in 250 mL (or 50 mL) samples;
M – Limit (CFU) value for microorganism unacceptable in 250 mL (or 50 mL) samples, if equal to or higher than M, all products are unqualified.

5.3 Processing Requirements

5.3.1 Harvesting, processing and bottling should be conducted under conditions that the hygiene and safety of source of natural mineral water are ensured and the requirements of GB 16330 are complied with.

5.3.2 Under the premise that the basis characteristics and content of main components of drinking natural mineral water source remains unchanged, removal of unstable components using processes such as aeration, decantation and filtration is allowed; recycling and infusion of carbon dioxide of the same source is allowed; allowed to add carbon dioxide food additives or remove carbon dioxide from the water.

5.3.3 Transporting the water in containers to be bottled off-site is forbidden.

6. Testing Methods

Water quality should be tested according to methods specified in GB/T 8538.

Refer to Appendix A for inspection report format of natural mineral water.

7. Testing Guidelines

7.1 Sampling

Draw samples randomly for every product batch: for products with net content less than 3 L, samples drawn should not be less than 10 bottles; for products with net content more than or equal to 3 L, samples drawn should not be less than 5 barrels.

7.2 Out-factory Inspection

7.2.1 Determine product batch and shift according to corresponding regulations. Inspections on sensory requirements, coliforms and Pseudomonas aeruginosa listed under microorganism indexes should be conducted for every batch of products leaving the factory.

7.2.2 Conduct at least one test of Pseudomonas aeruginosa and Clostridium perfringens respectively every month.

7.3 Type Inspection

All the inspection items specified as technical requirements in this standard are type inspection test items. Type inspection should be conducted at least once every wet and dry season within a year or when any of the following situations arises:

a) When there are significant changes to the equipment and processes;

b) Upon resumption of production after a long period of stoppage;

c) When results of out-factory inspection differs materially from those of the usual records;

d) When there are significant fluctuations in water quality.

7.4 Judgment Guidelines

When inspection item does not meet requirements of this standard, draw double the quantity of samples from this batch of products as compared to quantity used in the first round of tests for re-inspection. Judgment will be based on results of the second round of tests. If re-inspection still finds one item that fail to meet requirements, this product batch will be deemed disqualified or unqualified. Microorganism indexes should be tested and judged based on requirements in Section 5.2.3.

8. Labeling, Packaging, Transportation and Storage

8.1 Labeling

8.1.1 Prepackaged product labels should comply with the requirements of GB 7718, as well as the following requirements:

- Indicate the name of the source of the drinking natural mineral water;

- Indicate the index boundary that shows that product attain basic compliance, as well as total soluble solids content and range of content value for individual cations (K^+, Na^+, Ca^{2+}, Mg^{2+});

- Indicate “Contains Fluroine” if fluorine content exceeds 1.0 mg/L;

- Indicate product type, using attributive phrases in front of product names, e.g.: “Carbonated Natural Mineral Water”; or indicate product name as “Natural Mineral Water” and then indicate specific product type under the name: carbonated type or aerated type; for “gasless” or “degassed” type natural mineral water, product type indication can be avoided.

8.1.2 Unless evaluated and approved by relevant state authorities, label should not make claims that products have medical effects.

8.2 Packaging

8.2.1 Packaging materials should comply with requirements of relevant national hygienic standards.

8.2.2 Packaging container (bottle, barrel) external surface should be kept clean, tightly sealed without any signs of leakage, with sealing labels secured firmly.

8.3 Transportation

8.3.1 Mode of transportation used should be clean, hygienic. Products should not be transported together with poisonous, harmful, corrosive, volatile and foul-smelling substances.

8.3.2 Handle with care, avoid throwing, knocking and extrusion.

8.3.3 Avoid direct sunlight, rain, moisture and freezing during transportation.

8.4 Storage

8.4.1 Products should not be stored together with poisonous, harmful, corrosive, volatile or foul-smelling substances.

8.4.2 Products should be stored in shady, cool, dry and well-ventilated warehouses; they should not be stored in the open, exposed to direct sunlight, rain or any source of heat.

8.4.3 Transport or store at temperature of 0^{o}C or lower, taking specific measures to prevent freezing.

Appendix A

(Informative Appendix)

Inspection Report for Drinking Natural Mineral Water

Spring Name | Sampling Date

Spring Code | Date Sample was sent in

Sampling Site | Inspection Date

Water Temperature °C | Report Date

Items		$\rho(B)/(mg/L)$	$c(\frac{1}{z}B^{z\pm})/(mmol/L)$	$x(\frac{1}{z}B^{z\pm})/\%$	Items	$\rho(B)/(mg/L)$	Items	$\rho(B)/(mg/L)$
Cation	K^+				Total Soluble Solids		Barium	
	Na^+				Metasilicate		Chromium	
	Ca^{2+}				Free CO_2		Lead	
	Mg^{2+}				Lithium		Antimony	
	$Fe^{2+} + Fe^{3+}$				Strontium		Manganese	
	Subtotal				Iodide		Nickel	
Anion	HCO_3^-				Zinc		Cobalt	
	CO_3^{2-}				Selenium		Vanadium	
	Cl^-				Copper		Aluminum	
	SO_4^{2-}				Arsenic		Silver	
	F^-				Mercury		Volatile Phenols	
	NO_3^-				Cadmium		Cyanide	
	Subtotal				Borate		Nitrite	
					Bromide		Bromate	

Visible Impurities:___ Chroma:_____ Turbidity:_____ Smell & Taste:_____ pH:_____	Total Hardness (by $CaCO_3$):_____ mg/L Total Alkalinity (by $CaCO_3$):_____ mg/L Total Acidity ($CaCO_3$):_____ mg/L	Coliforms:____MPN/100mL S.faecium:____CFU/250mL P.aeruginosa:__CFU/250mL C.perfringens:__CFU/250mL	O_2 Consump:__mg/L LAS:_____mg/L Mineral Oil:____mg/L ^{226}Radium:____Bq/L Total β:_____Bq/L

Inspection Conclusion	Issued Date: Year Month Day
Note:	

Ratified | Checked Edited

National Standards of People's Republic of China

GB 17323-1998

National Food Safety Standards

Bottled Purified Water for Drinking

Issued on: 1998-04-21 Implemented on: 1999-10-01

Issued by the State Bureau of Quality Technical Supervision

Foreword

This standard pertains to bottled purified water for drinking, of which the definitions and range take references from standard amendment for Bottled Water issued U.S Food and Drug Administration (FDA) in 1993.

Experiment method for “conductivity” is listed into Appendix A as the appendix for the standard.

This standard was proposed by China Light Industry Union.

This standard is placed under the jurisdiction of the National Food Fermentation Standardization Center.

The organizations involved in the drafting of this standard: China Food Fermentation Industry Research Institute, Guangzhou Quality and Inspections Station of the China Light Industry Union, Shenzhen Yibao F&B Co.,Ltd, Zhaoqing Lake Ding Distilled Water Co.,Ltd, Shenzhen Jingtian F&B Co.,Ltd and Guangdong Jianlibao Beverage Factory.

The key personnel involved in the drafting of this standard: Qingqu Xu, Damin Chou, Yi Wang, Musheng Wu, Jingliang Chou and Ruiwen Deng.

This standard should be explained by the National Food Fermentation Standardization Center.

National Food Safety Standards

Bottled Purified Water for Drinking

1. Scope

This standard specifies the details on the technical requirements, testing methods as well as the requirements for labeling, packaging, transportation and storage for bottled purified water for drinking and it applies to products defined in Chapter 3.

2. Normative References

Clauses involved in the following documents constitute the ones in this standard through reference in this standard. When this standard is published, all shown versions will be valid. Since all standards may be amended or updated, thus study of whether the latest version of these documents can be used by all parties who reach agreement according to this standard is encouraged.

GB 191-90 *Illustration and Logo for Packaging, Storage and Transportation*

GB 5749-85 *Hygienic Standard for Drinking Water*

GB 5750-85 *Inspection Method of Hygienic Standard for Drinking Water*

GB 6682-92 *Specifications and Testing Methods for Water Used in Analysis Experiments*

GB 7718-94 *General Standard for the Labeling of Prepackaged Foods*

GB/T 8538-1995 *Test Methods for Natural Mineral Drinking Water*

GB 10789-1996 Soft *Beverage Classifications*

GB 10790-89 *Inspection Guidelines, Labeling, Packaging, Transportation and Storage for Soft Beverages*

GB 17324-1998 *Hygienic Standard for Bottled Purified Water for Drinking*

3. Definitions

This standard will adopt the following definitions.

3.1 Bottled Purified Water for Drinking

Refers to water that can be drinkable directly, containing no additives and sealed within a container, manufactured with distillation, deionization or ion exchange method, reverse osmosis and other appropriate processes using water that satisfies hygienic standards for drinking water as the source of water for these processes.

4. Technical Requirements

4.1 Water source should meet the individual technical requirements of GB 5749.

4.2 Sensory Requirements

Sensory requirements should comply with the requirements listed in Table 1.

Table 1

Items	Index	Requirements
Chromaticity, Degree ≤	5	Does not show any unusual colors
Turbidity, Degree ≤	1	–
Odor and Taste	–	No unusual taste or odor
Visible Foreign Objects	–	Should not be detected

4.3 Physical-Chemical Indexes

4.3.1 Quality Physical-Chemical Indexes

Quality physical-chemical indexes should comply with the requirements listed in Table 2.

Table 2

Items	Index
pH Value	5.0~7.0
Conductivity [(25+-1)°C], μS/cm ≤	10
Potassium Permanganate Consumption (by O_2), mg/L ≤	1.0
Chloride (by Cl^-), mg/L ≤	6.0

4.3.2 Contamination Physical-Chemical Indexes

Contamination physical-chemical indexes should comply with the requirements listed in Table 3.

Table 3

Items	Index
Lead	Implemented in accordance with GB 17324
Arsenic	
Copper	
Cyanide (by CN^-)[1]	
Volatile Phenols (by Phenol)[1]	
Free Chlorine Ion (by Cl^-)	
Chloroform	
Carbon Tetrachloride	
Nitrite (by NO_2^-)	
1) Tests for cyanide and volatile phenols only limited to products that use distillation processing.	

4.4 Microorganism Indexes

Microorganism indexes should be in accordance with GB 17324.

4.5 Net Content

Deviations in net content values of individual prepackaged packaging should not exceed required limits listed in Table 4. Average net content value of samples drawn from products of the same batch should not be lower than the net content value indicated on the product labels.

Table 4

Net Content *Q*	Deviation	
	Percentage of *Q*	mL
100 mL~200 mL	4.5	–
200 mL~300 mL	–	9
300 mL~500 mL	3	–
500 mL~1 L	–	15
1 L~10 L	1.5	–
10 L~15 L	–	150
15 L~25 L	1	–

5. Testing Methods

Water used for experiments should comply with the requirements of GB 6682.

5.1 Chromaticity, Turbidity, Odor and Taste, Visible Foreign Objects: In accordance with the determination methods in GB/T 8538.

5.2 pH Value, cyanide should be tested in accordance with methods in GB 5750; potassium permanganate consumption (amount of oxygen consumed) should be tested in accordance with methods in GB/T 8538.

5.3 Conductivity: See Appendix A.

5.4 Lead, arsenic, copper, cyanide, volatile phenols, free chlorine ions, chloroform, carbon tetrachloride, nitrite, and microorganism indexes should be tested in accordance with methods in GB 17324.

5.5 Net Content

Slowly pour the water sample into a measuring cylinder along the inner walls of the container under temperature condition (20±2)^{o}C and then read off the reading of volume. Use weighing method if total volume exceeds 2 L.

6. Inspection Guidelines

6.1 Batches

Products of the same production shift, derived from the same bottling facility, of same specifications will be grouped as a single batch.

6.2 Out-factory Inspection

6.2.1 Products should be inspected batch-by-batch by the in-house inspection department of the manufacturing factory before they are released for shipping. Once products are deemed qualified after inspection, qualification certification should be issued and the certificates should be attached to the insides (outsides) of the packaging boxes before being released from factory.

6.2.2 Sampling Method and Quantity

Randomly draw 15 bottles (cans) of samples from every batch (but if volume more than 2L, draw 6 bottles). 6 bottles (cans) (2 bottles if more than 2L) will be used for tests on sensory requirements, net content, pH value, conductivity [net content inspection requires 3 bottles (cans) (2 bottles if more than 2L)]; 3 bottles (cans) (2 bottles if more than 2L) will be used for tests on total bacteria count and coliform; last 6 bottles

(cans) (2 bottles if more than 2L) will be reserved as backup samples.

6.2.3 Out-factory Inspection Items

Sensory requirements, net content, pH value, conductivity, total bacteria count, coliform are mandatory inspection items for every batch, while other items can be conducted on a non-routine basis.

6.3 Type Inspection

6.3.1 Type inspection should be conducted every quarter or once every production cycle. It should be also conducted under any of the following situations:

a) When there are changes to the main and supplementary ingredients used or changes to any key processes;

b) Upon resumption of production after a long period of stoppage;

c) When specifically requested by State Quality Supervision and Inspections Authorities.

6.3.2 Sampling Method and Quantity

Randomly draw 18 bottles (cans) of samples from every batch (but if volume more than 2L, draw 6 bottles). 9 bottles (cans) (2 bottles if more than 2L) will be used for tests on sensory requirements, net content, physical-chemical indexes [net content inspection requires 3 bottles (cans) (2 bottles if more than 2L)]; 3 bottles (cans) (2 bottles if more than 2L) will be used for tests on microorganisms; last 6 bottles (cans) (2 bottles if more than 2L) will be reserved as backup samples.

6.3.3 Type Inspection Items

All inspection items included in the technical requirements of this standard.

6.4 Judgment Guidelines

6.4.1 If results of tests on sensory requirements, net content, pH value, conductivity for not meet the requirements of this standard during out-factory inspection, conduct re-inspection on specific unqualified items with two times the quantity of samples drawn in the initial inspection. If there is still one item that fails to meet the requirements, entire batch of products will be deemed disqualified. If results of tests on total bacteria count and coliform fail to meet requirements, the entire batch will be deemed disqualified.

6.4.2 If there is one item that fails to meet requirements of this standard (except net content) during type inspection, the entire batch will be deemed disqualified. If there is one bottle (can) with net content deviation exceeding the allowable deviation limit or if the average net content value is lower the net content value indicated on the product label, re-inspection on the specific item is allowed to be conducted albeit with two times the quantity of samples drawn in the initial inspection. If the abovementioned situation persists, the entire batch will be deemed disqualified.

7. Labeling, Packaging, Transportation, Storage

7.1 Labeling

7.1.1 Product labels should indicate in accordance with GB 7718: product name, net content value, name and address of manufacturer (or distributor), date of production, expiration date and product standard code. Product name and net content value should be presented in the same field of vision for the consumers.

7.1.2 Products that adopt distillation-processing methods should indicate “distilled water” name; products with other processing methodology are forbidden from using the “distilled water” name. When using “newly created name”, “special, unique name”, “brand name” or “trademarked name”, “purified water for drinking” should be indicated with obvious fonts after the specific product name used, i.e. either of the earlier mentioned types.

7.1.3 Packaging boxes should be indicated with product name, name and address of manufacturer (or distributor) as well as net content value and total quantity of individual unitary packaging.

7.1.4 Transportation logos and shipping marks should comply with the requirements of GB/T 191.

7.2 Packaging

Packaging material and container should comply with the corresponding hygiene requirements and administrative regulations, as well as the requirements in GB 10790.

7.3 Transportation

7.3.1 Mode of transportation should be clean and hygienic. Products should not be transported together with poisonous, harmful, corrosive, volatile or foul-smelling substances.

7.3.2 Handle products with care during transportation. Throwing, impact and extrusion are strictly prohibited.

7.3.3 Sunlight, rain and moisture should be avoided throughout the transportation process.

7.4 Storage

7.4.1 Products should not be stored together with poisonous, harmful, corrosive, volatile or foul-smelling substances.

7.4.2 Products should be stored in cool, dry and well-ventilated warehouses; should not be placed in the open exposed to sunlight and rain or place near any heat source; padding of more than 100 mm thickness should be placed below packaging boxes of products.

7.5 Validity Period

7.5.1 While comply with the requirements of section 7.3 and 7.4, validity period: should be more than or equal to 12 months for packaging smaller than 3,000 mL; more than or equal to 1 month for packaging larger than 3,000 mL.

Appendix A

(Standard Appendix)

Determination of Conductivity

A1 Summary of Method

Conductivity is the inverse value of the resistance measured between two electrodes of 1 cm^2 each at a distance of 1 cm between them, whereby the resistance value is read off directly from the conductivity apparatus.

A2 Apparatus and Reagents

A2.1 Apparatus

A2.1.1 Conductivity Apparatus (Attached with Conductivity Electrodes)

A2.1.2 Thermostatic Water Bath

A2.1.3 100 mL or 250 mL beaker

A2.2 Reagents

0.0100 mol/L potassium chloride standard solution: Extract minute amount of potassium chloride (superior grade pure), dry it in 110°C oven for 2 hours. Accurately weigh and extract 0.7456 g of it after it has been cooled, dissolve in re-distilled water (cooled after being re-boiled) (conductivity smaller than 1 μS/cm), transfer it into a 1,000 mL volumetric flask and then dilute the solution to a fixed volume. Conductivity of this solution at 25°C is 1411.83 μS/cm. Stored the solution in a flask made of hard glass that comes with a stopper attached.

A3 Analysis Procedure

Select electrodes and experiment conditions according to the conductivity apparatus' user guide. Adjust the apparatus appropriately, wash the electrodes with analyte solution 3 times and then insert the electrodes into a beaker filled with the analyte solution (A2.1.2). Select appropriate metrics, read off the apparatus so as to compute the conductivity value of the analyte solution.

Note:

1. Avoid moisture on the wires of the electrodes, if not accuracy of the experiment will be affected.

2. Beaker used for analyte solution should be washed by the solution 3 times to prevent ion contamination.

A4 Precision and Accuracy

Relative deviation between conductivity values derived from 10 individual experiments in the same laboratory on water sample of conductivity 1.36 μS/cm should be within the 1.0% range.

A5 Determination of Electrode Constant

Take an electrode with undetermined electrode constant, wash it with potassium chloride standard solution (prepared as in A2.2) 5 times and then insert it into a beaker filled with potassium chloride standard solution. Determine the conductivity under a specific temperature, and then compute the electrode constant of that particular electrode.

$$\text{Electrode Constant} = K / S \quad \text{..... (A1)}$$

In the formula:

K – Conductivity of potassium chloride standard solution at a certain temperature, can be found in Appendix A of GB 6682.

S – Conductivity of the potassium chloride standard solution under similar experiment conditions.

Note: Some conductivity apparatus has already labeled the electrode constant value when it was shipped out of its manufacturing facility, thus adjustment and calibration can be done directly according to this value provided. If the constant is unknown, then it can be measured by the use of this method.

National Standards of People's Republic of China

GB 17324-2003

Hygienic Standard of

Bottled Purified Water for Drinking

Issued on: 2003-09-24 Implemented on: 2004-05-01

Issued by the Ministry of Health and the National Standardization Management Committee of the People's Republic of China

Foreword

The entirety of this standard is mandatory.

This standard replaces GB 17324-1998 Hygienic Standard of Bottled Purified Water for Drinking.

As compared with GB 17324-1998, key changes are as follows:

- Amended the standard formatting and layout in accordance with GB/T 1.1-2000;
- Amended the structure of the original standard, i.e. added hygiene requirements for main, supplementary ingredients and production, processing as well as requirements for packaging, labeling, storage and transportation;
- Retitled the standard to Hygienic Standard of Bottled (Barreled) Purified Water for Drinking (only changes made to Chinese title).

GB 17324-1998 was repealed upon the implementation of this standard.

Appendix A included in this standard is a normative appendix.

This standard was proposed by the Ministry of Health of the People's Republic of China and placed under its jurisdiction.

The organizations involved in the drafting of this standard: Tianjin City Public Hygiene Inspection Bureau of the Health Authority, Liaoning Province Hygiene Inspection Bureau, Hangzhou Wahaha Group Ltd., Beijing City Food Hygiene Supervision and Inspection Bureau, Guangdong Province Food Hygiene Supervision and Inspection Bureau and Zhejiang Province Food Hygiene Supervision and Inspection Bureau.

The key personnel involved in the drafting of this standard: Chunming Cui, Xutai Wang, Ting Yu, Liufa Xu, Yuzhi Yeung, Yan Wen and Faming Zhang.

This standard was first issued in 1998. This is the first amendment of the original version.

Hygienic Standard of

Bottled Purified Water for Drinking

1. Scope

This standard specified the details on the definitions, index requirements, hygiene requirements for production process as well as requirements on packaging, labeling, storage, transportation and corresponding inspection methods for bottled purified water for drinking.

The standard applies to the bottled (barreled) purified water for drinking.

2. Normative References

Clauses involved in the following documents constitute the ones in this standard through reference in this standard. If any reference is dated, the following amendment or revised versions (excluding errata) are not applicable to this standard. However, the study of whether the latest version of these documents can be used by all parties who reach agreement according to this standard is encouraged. Any latest version of the non-dated reference is applicable to this standard.

GB/T 4789.21 *Microbiological Examination of Food Hygiene - Examination of Frozen Drinks and Cold Drinks*

GB 5738 *Testing Method for Natural Mineral Drinking Water*

GB 5749 *Hygienic Standard for Drinking Water*

GB/T 8535 *Testing Method for Natural Mineral Drinking Water*

GB 17323 *Bottled Purified Water for Drinking*

3. Definitions

The following terms and definitions apply to this standard.

3.1 Bottled (Barreled) Purified Water for Drinking

Refer to water that can be drinkable directly, containing no additives and sealed within a container, manufactured with electrodialysis, ion exchange method, reverse osmosis, distillation and other appropriate processes using water that satisfies hygienic standards for drinking water as the source of water for these processes.

4. Index Requirements

4.1 Raw Ingredient Requirements

Water source should meet the individual technical requirements of GB 5749.

4.2 Sensory Requirements

Sensory requirements should comply with the requirements listed in Table 1.

Table 1 Sensory Requirements

Items	Requirements
Chromaticity	5, should not show unusual colors
Turbidity	1
Odor and Taste	Should not have unusual odor or taste
Visible Foreign Objects	Should not be detected

4.3 Physical-Chemical Indexes

Physical-chemical indexes should comply with the requirements listed in Table 2

Table 2 Physical-Chemical Indexes

Items			Index
pH Value		≤	5.0~7.0
Conductivity [(25+-1)°C] / (μS/cm)	≤	≤	10
Potassium Permanganate Consumption (by O_2) / (mg/L)	≤	≤	1.0
Chloride (by Cl^-) / (mg/L)	≤	≤	6.0
Nitrite (by NO_2^-) / (mg/L)		≤	0.002
Carbon Tetrachloride / (mg/L)		≤	0.001
Lead / (mg/L)		≤	0.01
Total Arsenic / (mg/L)		≤	0.01
Copper / (mg/L)		≤	1.0
Cyanide[a] (by CN^-)/(mg/L)		≤	0.002
Volatile Phenols (by Phenol)[a] / (mg/L)		≤	0.002
Chloroform / (mg/L)		≤	0.02
Free Chlorine Ion (by Cl^-) / (mg/L)		≤	0.005
[a]Only applies to distilled water.			

4.4 Microorganism Indexes

Microorganism indexes should comply with the requirements listed in Table 3.

Table 3 Microorganism Indexes

Items		Index
Total Bacteria Count / (cfu/mL)	≤	20
Coliform / (MPN/100mL)	≤	3
Molds and Yeasts / (cfu/mL)	≤	Should not be detected
Pathogens (Salmonella, Shigella, Staphylococcus aureus)		Should not be detected

5. Hygiene Requirements for Production Process

Should comply with the requirements listed in Appendix A.

6. Packaging

Packaging container and material should comply with corresponding hygienic standards and relevant regulations.

7. Labeling

Label for prepackaged products should comply with the requirements of relevant regulations.

8. Storage and Transportation

8.1 Storage

Products should be stored in cool, dry and well-ventilated places should not be stored together with poisonous, harmful, corrosive, volatile or foul-smelling substances.

8.2 Transportation

Avoid sunlight and rain during transportation process. Products should not be transported together with poisonous, harmful, foul-smelling substances or substances that will have a material impact on the quality of the products.

9. Inspection Methods

9.1 Sensory Indexes

Should be tested in accordance with methods in GB/T 8538.

9.2 Physical-Chemical Indexes

9.2.1 pH Value, Conductivity, Potassium Permanganate Consumption, Chloride

Should be tested in accordance with methods in GB 17323.

9.2.2 Free Chlorine Ion, Total Arsenic, Lead, Copper, Cyanide, Nitrite, Volatile Phenols, Chloroform, Carbon Tetrachloride

Should be tested in accordance with methods in GB/T 5750.

9.3 Microorganism Indexes

Should be tested in accordance with methods in GB/T 4789.21.

Appendix A

(Normative Appendix)

Hygienic Guidelines for Bottled (Barreled) Purified Water for Drinking

A.1 Purpose

Provide guidance on the production of bottled purified water for drinking so as to fulfill the specific food hygiene requirements and safeguard the health of the people. This guideline was drafted in accordance with the relevant rules of the *Food Hygiene Law of the People's Republic of China*.

A.2 Scope

Bottled purified water for drinking Refer to water that can be drinkable directly, containing no additives and sealed within a container, manufactured with electrodialysis, ion exchange method, reverse osmosis, distillation and other appropriate processes using water that satisfies hygienic standards for drinking water as the source of water for these processes.

A.3 Guideline Principles

1. Design and layout for construction, expansion and renovation of individual production units should comply with GB 14881 *Standardized Hygienic Specifications for Food Enterprises*.

2. Only sealed room should be used as water processing facility, while bottling facility should be well sealed and installed with air purification equipment, of which air purity should reach 1,000 level and automatic bottling should be adopted.

3. Facilities, pipes, tools, equipment and water storage facilities should be made with non-toxic, odorless, corrosion resistant and easy to clean materials. Surfaces of these should be smooth, without any holes, peeling, gaps, dead corners, blind spots and should be convenient to clean, disinfect; storage tanks should have good drainage system, so as to prevent microorganism contamination due to formation of stagnant water.

4. Packaging materials should comply with relevant national hygienic standards and bottles (except barrels) are forbidden from being recycled and reused. Automatic system should be used for thorough cleaning and sterilization before bottling and capping procedure.

5. Take effective disinfection measures, so as to ensure that indexes such as total bacteria count, coliforms and drug residues are not detected in the terminal water, bottles or caps that had already been cleaned.

6. Personnel should maintain good personal hygiene, i.e. should wear clean work clothes, caps (hairs should not be exposed outside the cap), shoes and jackets before entering the processing facilities. Personnel should change their clothes again and wear face masks before entering the bottling facility.

7. In-house hygiene organization should be established by the purified water production unit, employing qualified inspection personnel; laboratory that meets specified requirements should be established to be made responsible for production inspections and tests, and capability of the laboratory should correspond to the production capacity of the production unit. Tests for sensory indexes, pH value, conductivity, total bacteria count, coliforms are mandatory inspection items for every batch of products and products can only be released for shipping and distribution if qualified by such inspections.

8. Purified water production unit should conduct inspections on the raw ingredients (water) frequently, conducting such inspection once annually in accordance with GB 5749; besides conducting routine inspections on every batch of purified water products, all-item inspection should be conducted twice annually in accordance with this standard; if there is a production stoppage, all-item inspection should be conducted before resuming production and the report of the inspection results should be kept safely for any future examination by food hygiene supervision authorities.

9. Bottled (Barreled) purified water for drinking should comply with the requirements of the F*ood Hygiene Law of the People's Republic of China* and GB 7718, besides indicating product name, should also indicate words "purified water". Purified water produced without distillation processing should not be labeled as distilled water.

National Standards of People's Republic of China

GB 19298-2014

National Food Safety Standards

Packed Water for Drinking

Issued on: 2014-12-24 Implemented on: 2015-05-24

Issued by the National Health and Family Planning Commission of the People's Republic of China

Foreword

This standard substitutes GB19298—2003 Hygienic Standard of Bottled Water for Drinking and its Amendment No. 1 and No. 2, GB17324—2003 Hygienic Standard of Bottled Purified Water for Drinking and this standard shall prevail where GB17323—1998 Bottled Purified Water for Drinking involves the indicators of this standard.

As compared with GB19298—2003 and GB17324—2003, this standard has made major changes as follows:

- The standard title is revised as “National Standard for Food Safety—Packed Water for Drinking”;
- The scope is revised;
- Definitions are revised;
- Raw material requirements are revised;
- Oranoleptic requirements are revised;
- Physicochemical indicators are revised;
- Microbial limit is revised;
- Detection method is revised;
- Provisions are added for labels and marks.

This standard 4.1~4.2 shall be implemented as from January 1, 2016.

National Food Safety Standards

Packed Water for Drinking

1. Scope

This standard is applicable for packed water for direct drinking.

This standard is not applicable for natural mineral water for drinking.

2. Terms and Definitions

2.1 Packed Water for Drinking

Water, sealed in packing containers in compliance with the food safety standard and relevant provision, for direct drinking.

2.1.1 Purified water for drinking

Water in compliance with Section 3.1 Raw Material Requirement is taken as water source for production, which is processed into packed water for drinking by distillation method, electrodialysis method, ion exchange method, reverse osmosis method or other appropriate water purification processes.

2.1.2 Other drinking water

2.1.2.1 Drinking water of natural sources, with water in conformity to the raw material requirements in Sections 3.1.2 and 3.1.3 used as water source for production and treated by such finite treatment methods as deaeration, aeration, decandation, filtering, ozonation or UV sterilization process only, without changing the basic physicochemical characteristics of water.

2.1.2.2 Packed water for drinking, processed with water in conformity to Section 3.1 Raw Material Requirements, which is appropriately processed and added with appropriate amount of food additives, but shall be added with sugar, sweetener, essence and spice or other food.

3. Technical Requirements

3.1 Raw Material Requirements

3.1.1 Where water from water supply system is used as water source for production, its water quality shall conform to the provisions of GB5749.

3.1.2 Where surface water or underground water other than from public water supply system is used as water source for production, its water quality shall conform to the provisions of GB5749 Hygienic Requirements for Water Source of Drinking Water. After the source water is treated, quality of water for food processing shall conform to the provisions of GB5749.

3.1.3 Hygienic protection of water sources: protective measures shall be taken within the range of easy contamination to avoid any contamination to or external impact on chemical, microbial and physic quality of water sources.

3.2 Organoleptic Requirements

Table 1 Organoleptic Requirements

Items	Requirement		Testing Method
	Purified water for drinking	Other drinking water	
Chroma/degree ≤	5	10	GB/T5750
Turbidity/NTU ≤	1	1	
Status	With any foreign stuff seen with normal vision	Extremely limited amount of mineral sediment allowed, without any foreign stuff seen with normal vision	
Taste and smell	Without any peculiar taste and smell		

3.3 Physicochemical indicators

The physicochemical indicators shall conform to the provisions of Table 2.

Table 2 Physicochemical indicators

Items	Indicators	Testing Method
Residual chlorine (free chlorine)/ (mg/L) ≤	0.05	GB/T 5750
CCl4/(mg/L) ≤	0.002	
CHCl3/ (mg/L) ≤	0.02	
Oxygen consumption (as per O2)/ (mg/L) ≤	2.0	
Bromate/ (mg/L) ≤	0.01	
Volatide phenol[a] (as per phenol)/ (mg/L) ≤	0.002	
Cyanide (as per CN-)[b]/ (mg/L) ≤	0.05	
Anionic synthetic detergent[c]/ (mg/L) ≤	0.3	
Total α radioactivity[c]/ (bq/L) ≤	0.5	
Total β radioactivity[c]/ (bq/L) ≤	1	

a Limited to water for drinking and other drinking water process by distillation.
b Limited to purified water for drinking by distillation.
c Limited to packed water for drinking processed with surface water or underground water as water sources for production.

3.4 Limitation of Pollutants

Limitation of pollutants shall conform to the provisions of GB2762.

3.5 Limitation of Microbial

Limitation of microbial shall conform to the provisions of Table 3.

Table 3: Microbial Indicators

Items	Sampling Program[a] and Limitation			Testing Method
	n	c	m	
Coliforms/ (cfu/mL)	5	0	0	GB4789.3 Plate Counting Method
P.Aeruginosa/ (CFU/250mL)	5	0	0	GB/T 8538
[a] Products shall be sampled and treated as per GB4789.1.				

3.6 Food Additives

Food additives shall be used in conformity to the provisions of GB 2760.

4. Miscellaneous

4.1 When the packed water for drinking is added with any food additives, shall have wording as “Food additives are added for tasting” shall be indicated in the location adjacent to the product name.

4.2 The name of packed water for drinking shall be true and scientific; packed water for drinking shall not be named with one or more than one ingredient other than water.

National Standards of People's Republic of China

GB 15037-2006

National Food Safety Standards

Wines

Issued on: 2006-12-11 Implemented on: 2008-01-01

Issued by the General Administration of Supervision, Inspections and Quarantine of the People's Republic of China and China National Standardization Management Committee

Foreword

Chapters 3, Sections 5.2, 5.3, 5.4 and 8.1, 8.2 in this standard are mandatory, while the rest are recommended.

This standard applies to the wine produced after the date of implementation.

The definition section in this standard adopted the *Office of International Vine and Wine (OIV) Regulation* (2003 Edition) but they are non-equivalent.

This standard is an amendment for GB/T 15037-1994 *Wines*.

This standard replaces GB/T 15037-1994.

As compared to GB/T 15037-1994, key changes are as follows:

1） Appropriate amendments were made to the descriptions of the definitions, with reference to *Office of International Vine and Wine (OIV) Regulation (2003 Edition)* and *Technical Specifications for China Wine Brewing*. Added definitions for special wines – liqueur wines, icewines, noble rot wines, flor or film wines, low alcohol wines, non-alcohol wines, grape-wines;

2） Added product classifications according to sugar content, on top of retaining the different product classifications according to the color and luster as well as carbon dioxide content of wines as specified in GB/T 15037-1994;

3） Requirements:

- Free sulfur dioxide and total sulfur dioxide index will be implemented in accordance with GB 2758-2005 Hygienic Standards for Fermented Alcohols;
- No requirement was made for total acidity, but the measured value of acidity should be presented/indicated so as to facilitate the judging of specific wine types;
- Added the index limits for citric acid, copper, methanol and preservatives; among which the upper limit specified for benzoic acid was designated for amount produced naturally as a result of the wine fermentation process, and not for amount artificially added;
- Added the requirements that no “compound colorants”, “sweetener”, “flavoring essence” and “thickening agent” should be added;

4） Added the requirement for net content;

5） Made amendments to the sampling table and corresponding clauses under the section on inspection guidelines;

6） Added Appendix A to facilitate the process of evaluation and description pertaining to the product classification based on sensory aspects.

Appendix A in this standard is an informative appendix.

This standard was proposed by the China Light Industry Union.

This standard is placed under the jurisdiction of the Brewing Technical Committee Division of the National Food Industry Standardization Committee.

The organizations responsible for the drafting of this standard: Chinese Food Fermentation Industry Research Institute, Yantai Changyu Wine Co., Ltd, China Great Wall Wine Co., Ltd, Sino-French Joint Venture Dynasty Wine Co., Ltd, National Wine Quality Supervision and Inspection Center, Xintian International Wine Industry Co., Ltd and Wine Subsidiary of the Gansu Mogao Industrial Development Co., Ltd.

The key personnel involved in the drafting of this standard: Yongpu Kang, Jiming Li, Yali Tian, Shusheng Wang, Jiyi Zhu, Yong Chen, Xinyi Dong and Qijing Tian.

This standard replaces the previous version:

- GB/T 15037-1994.

National Food Safety Standards

Wines

1. Scope

This standard specifies the details on the terms and definition, product classifications, requirements, analysis methods, inspection guidelines and labeling, packaging, transportation and storage of wine.

This standard applies to the production, inspection and sales/distribution of wine.

2. Normative References

Clauses involved in the following documents constitute the ones in this standard through reference in this standard. If any reference is dated, the following amendment or revised versions (excluding errata) are not applicable to this standard. However, the study of whether the latest version of these documents can be used by all parties who reach agreement according to this standard is encouraged. Any latest version of the non-dated reference is applicable to this standard.

GB/T 191 *Illustration and Logo for Packaging, Storage and Transportation*

GB 2758 *Hygienic Standards for Fermented Alcohol*

GB/T 5009.29 *Determination of Sorbic Acid and Benzoic Acid in Foods*

GB 10344 *General Principles of Prepackaged Wine Beverage Labels*

GB/T 15038 *Universal Analysis Methods of Wine and Fruit Alcohol*

JJF 1070 Quantitative Inspection Guidelines for *Net Content of Prepackaged Products*

General Administration of Quality Supervision, Inspection and Quarantine [2005] 75th Order – *Administrative Measure for the Quantitative Inspection of Prepackaged Products*

3. Terms and Definition

The following terms and definitions will apply to this standard.

3.1 Wines

Refer to fermentation wines that contain certain of alcohol content, products of complete or partial fermentation of fresh grapes or grape juice as the key ingredients.

3.1.1 Dry Wines

Refer to wines that have sugar content (by glucose content) less than or equal to 4.0 g/L. Or they refer to wines with sugar content not exceeding 9.0 g/L when the deviation between total sugar and total acid (by tartaric acid content) content is less than or equal to 2.0 g/L.

3.1.2 Semi-dry Wines

Refer to wines that have sugar content higher than that of dry wines, at content not exceeding 12.0 g/L. Or they refer to wines with sugar content not exceeding 18.0 g/L when the deviation between total sugar and total acid (by tartaric acid content) content is less than or equal to 2.0 g/L.

3.1.3 Semi-sweet Wines

Refer to wines that have sugar content higher than that of semi-dry wines, at content not exceeding 45.0 g/L.

3.1.4 Sweet Wines

Refer to wines with sugar content higher than 45.0 g/L.

3.1.5 Still Wines

Refer to wines with carbon dioxide gas pressure less than 0.05 MPa at 20^{o}C.

3.1.6 Sparkling Wines

Refer to wines with carbon dioxide gas pressure more than or equal to 0.05 MPa at 20^{o}C.

3.1.6.1 Sparkling Wines

Refer to bubbling wines with carbon dioxide gas (all produced naturally as a result of fermentation) pressure more than or equal to 0.35 MPa (CO_2 gas pressure more than or equal to 0.3 MPa if volume of bottle smaller than 250 mL) at 20^{o}C.

3.1.6.1.1 Brut Sparkling Wines

Refer to bubbling wines that have sugar content less than or equal to 12.0 g/L (with allowed deviation at 3.0 g/L).

3.1.6.1.2 Extra-dry Sparkling Wines

Refer to bubbling wines that have sugar content in the range of 12.1 g/L~17.0 g/L (with allowed deviation at 3.0 g/L).

3.1.6.1.3 Dry Sparkling Wines

Refer to bubbling wines that have sugar content in the range of 17.1 g/L~32.0 g/L (with allowed deviation at 3.0 g/L).

3.1.6.1.4 Semi-dry Sparkling Wines

Refer to bubbling wines that have sugar content in the range of 32.1 g/L~50.0 g/L (with allowed deviation at 3.0 g/L).

3.1.6.1.5 Sweet Sparkling Wines

Refer to bubbling wines that have sugar content exceeding 50.0 g/L (with allowed deviation at 3.0 g/L).

3.1.6.2 Semi-sparkling Wines

Refer to bubbling wines with carbon dioxide gas (all produced naturally as a result of fermentation) pressure in the range of 0.05 MPa~0.34 MPa at 20ºC.

3.2 Special Wines

Refer to wines brewed using specific methods during the harvesting and brewing phase using fresh grapes and grape juice as ingredients.

3.2.1 Liqueur Wines

Refer to wines with their final product alcohol content in the range of 15.0 %~22.0 % (volume fraction) as a result of adding grape brandy, edible alcohol or grape alcohol as well as supplementary ingredients such as grape juice, concentrated grape juice, caramelized grape juice, white granulated sugar, into grape-based wines with alcohol content of 12 % and above (volume fraction).

3.2.2 Carbonated Wines

Refer to wines that possess the physical properties similar to those of sparkling wine, where the carbon dioxide content in these wines is a result of partial or full artificial infusion.

3.2.3 Icewines

Refer to wine produced in the following process. Delay the harvest process of the grapes, keep the grapes on the grape tree for a set period of time under an environment of temperature lower than −7ºC and allow the grapes to freeze. Harvest the frozen grapes, crush the grapes in their frozen state, ferment and brew into wine (no external source of sugar is allowed during the production process.

3.2.4 Noble Rot Wines

Refer to wines that are brewed with grapes of which their fruit compositions were significantly changed due to Botrytis cinerea infection during a period after the grapes have matured.

3.2.5 Flor or Film Wines

Refer to wines with alcohol content higher or equal to 15.0 % (volume fraction), products of possibly adding grape brandy, grape alcohol or edible alcohol into wine that freely formed a typical layer of yeast film after full or partial fermentation processing.

3.2.6 Flavored Wines

Refer to wines that are produced by soaking aromatic plants or adding aromatic plant extracts (or distillates) into base wines.

3.2.7 Low alcohol wines

Refer to wines that have alcohol content 1.0~7.0% (volume fraction) produced through full or partial fermentation of fresh grapes or grape juice that is followed with a specific special process.

3.2.8 Non-alcohol wines

Refer to wines that have alcohol content 0.5~1.0% (volume fraction) produced through full or partial fermentation of fresh grapes or grape juice that is followed with a specific special process.

3.2.9 V.amurensis Wines

Refer to wines produced through full or partial fermentation brewing process using fresh V.amurensis grapes (incl. wild grapes such as downy grapes, Vitis davidii foex, fall grapes and other hybrid species) or V.amurensis grape juice as the key ingredients.

3.3 Vintage Wines

Refer to wines with the percentage proportion of vintage wine within the wine product not less than 80% (volume fraction) of the overall alcohol content, of which the year indicated Refer to the year that the ingredient grapes were harvested.

3.4 Varietal Wines

Refer to wines with the percentage proportion of wine brewed with the grape specie indicated within the wine product not less than 75% (volume fraction) of the overall alcohol content.

3.5 Original Wines

Refer to wines with the percentage proportion of wine brewed with grapes of the specific origin of production within the wine product not less than 80% (volume fraction) of the overall alcohol content.

Note: All such products should not be added with compound colorants, sweeteners, flavoring essences and thickening agent.

4. Product Classifications

4.1 Classifications According to Color and Luster

4.1.1 White Wines.

4.1.2 Peach Red Wines.

4.1.3 Red Wines.

4.2 Classifications According to Sugar Content

4.2.1 Dry Wines.

4.2.2 Semi-dry Wines.

4.2.3 Semi-sweet Wines.

4.2.4 Sweet Wines.

4.3 Classifications According to Carbon Dioxide Content

4.3.1 Still Wines.

4.3.2 Sparkling Wines.

4.3.2.1 Sparkling Wines.

4.3.2.2 Semi-sparkling Wines.

5. Requirements

5.1 Sensory Requirements[1]

Comply with the requirements listed in Table 1.

Table 1 Sensory Requirements

Items			Requirements
Appearance	Color, Luster	White Wines	Close to colorless, slight yellow with stint of green, pale yellow, straw yellow, golden yellow
		Red Wines	Purplish-red, dark red, ruby red, light red with light stint of brown
		Peach Red Wines	Peach red, light rose red, pale red
	Clarity		Clear with luster, w/o obvious suspended substances (a little cork slag is allowed if cork is used for sealing, while a little precipitation is allowed for wine more than 1 year since bottling)
	Degree of Foaming		Small air bubbles in form likened to strings of beads should rise up upon pouring sparkling wine into a cup. Bubbles should maintain a certain level of continuity
Smell and Taste	Smell		Has pure, elegant, delightful, harmonious aroma of fruits and wine, aged wine should also have aged or oak aroma
	Taste	Dry, Semi-dry Wines	Has pure, elegant, cool palate and pleasant fruit aroma, full-bodied
		Semi-sweet, Sweet Wines	Has sweet deep palate with a good balance between sweet and sour, rich-bodied
		Sparkling Wines	Has elegant, pure, harmonious, pleasant palate and the unique flavor of typical of sparkling wine, with simulative capability
Typicality			Has the characteristics and style required that are indicative of the product category
Note: Sensory evaluation should be conducted with reference to Appendix A.			

[1] Special wines should be implemented according to corresponding product standards.

5.2 Physical-Chemical Requirements[2]

Comply with the requirements listed in Table 2.

Table 2 Physical-Chemical Requirements

Items			Requirements
Alcohol Content[a] (20°C) (Volume Fraction) / (%)			≥7.0
Total Sugar[d] (Glucose) / (g/L)	Still Wines	Dry Wines[b]	≤4.0
		Semi-dry Wines[c]	4.1~12.0
		Semi-sweet Wines	12.1~45.0
		Sweet Wines	≥45.1
	Sparkling Wines	Brut Sparkling Wines	≤12.0 (Allowed Deviation is 3.0)
		Extra-dry Sparkling Wines	12.1~17.0 (Allowed Deviation is 3.0)
		Dry Sparkling Wines	17.1~32.0 (Allowed Deviation is 3.0)
		Semi-dry Sparkling Wines	32.1~50.0
		Sweet Sparkling Wines	≥50.1
Dry Extract/ (g/L)	White Wines		≥16.0
	Peach Red Wines		≥17.0
	Red Wines		≥18.0
Volatile Acid (by Acetic Acid) / (g/L)			≤1.2
Citric Acid / (g/L)	Dry, Semi-dry, Semi-sweet Wines		≤1.0
	Sweet Wines		≤2.0
Carbon Dioxide (20°C) / MPa	Semi-sparkling Wines	<250mL/bottle	0.05~0.29
		≥250mL/bottle	0.05~0.34
	Sparkling Wines	<250mL/bottle	≥0.30
		≥250mL/bottle	≥0.35
Iron / (mg/L)			≤8.0
Copper / (mg/L)			≤1.0
Methanol / (mg/L)	White, Peach Red Wines		≤250
	Red Wines		≤400
Benzoic Acid or Sodium Benzoate (Benzoic Acid) / (mg/L)			≤50
Sorbic Acid or Potassium Sorbate (Sorbic Acid) / (mg/L)			≤200
Note: No requirements on total acid, present with experiment results (in tartaric acid, g/L).			

[a] Deviation between alcohol content indicated on label and value determined should not exceed ±1.0% (volume fraction) range.
[b] When deviation between total sugar and total acid (tartaric acid) is less or equal to 2.0 g/L, maximum sugar content allowed is 9.0 g/L.
[c] When deviation between total sugar and total acid (tartaric acid) is less or equal to 2.0g/L, maximum sugar content allowed is 18.0 g/L.
[d] Total sugar requirement for semi-sparkling wines is the same as that for still wines.

5.3 Hygiene Requirements

Comply with the requirements of GB 2758.

5.4 Net Content

Implemented in accordance with General Administration of Quality Supervision, Inspection and Quarantine [2005] 75th Order.

[2] Special wines should be implemented according to corresponding product standards.

6. Analysis Methods

6.1 Sensory Requirements

Test in accordance with GB/T 15038.

6.2 Physical-Chemical Requirements (excl. Benzoic Acid and Sorbic Acid)

Test in accordance with GB/T 15038.

6.3 Benzoic Acid, Sorbic Acid

Test in accordance with GB/T 5009.29.

6.4 Net Content

Test in accordance with JJF 1070.

7. Inspection Guidelines

7.1 Batches

Products manufactured during the same production period, of the same product category, same quality and same specifications will be grouped as a single batch.

7.2 Sampling

7.2.1 Draw samples (in boxes) according to guidelines listed in Table 3. Sample quantity can be increased proportionally if unitary sample packaging net content is less than 500 mL or if total sampling volume does not meet the 1,500 mL mark.

Table 3 Sampling Table

Range of Batch Quantity / No. of Boxes	Sample Quantity / No. of Boxes	Unitary Sample Quantity / No. of Bottles
<50	3	3
51~1,200	5	2
1201~3,500	8	1
Above 3,501	13	1

7.2.2 After samples have been drawn, immediately label the samples with the following information indicated: sample name, product specifications, quantity, manufacturer name, sampling time and place, sampling personnel. Seal and safe keep 2 bottles of sample for the next 2 months for further reference. Other samples should be sent to the laboratory immediately for inspections on items such as sensory, physical-chemical, hygiene.

7.3 Inspection Classifications

7.3.1 Out-factory Inspection

7.3.1.1 Products should be inspected batch-by-batch by the manufacturing factory's internal quality supervision and inspection department according to this standard before out-factory shipping. If the products are qualified, qualified certification should be issued for the production batch before shipping out. The

certificate can be placed in the packaging boxes or within individual product packaging. Alternatively, equivalence of stamping wordings like “qualified” or “qualified by inspection” on the labels or packaging boxes is also allowed.

7.3.1.2 Inspection items: Sensory requirements, alcohol content, total sugar, dry extract, volatile acid, carbon dioxide, total sulfur dioxide, net content, total bacterial count under microorganism indexes.

7.3.2 Type Inspection

7.3.2.1 Inspection items: All inspection items required by this standard.

7.3.2.2 Under normal circumstances, type inspection for the same product category need only to be conducted semiannually. Yet, type inspection should also be conducted if any of the following situations arises:

a) When there are significant changes in the main or supplementary ingredients used;

b) When key processes or equipment used changes;

c) When new products are being manufactured or when there is resumption of production after stoppage of routine production for 3 months or more;

d) When material discrepancies are observed between the results of the last type inspection and those of the out-factory inspection;

e) When it is specifically required by the state quality supervision and inspection institutions according to relevant regulations.

7.4 Judging Guidelines

7.4.1 Disqualification Classifications

7.4.1.1 Category A Disqualification: Sensory requirements, alcohol content, dry extract, volatile acid, methanol, critic acid, preservatives, hygiene requirements, net content and labeling.

7.4.1.2 Category B Disqualification: Total sugar, carbon dioxide, iron and copper.

7.4.2 When results of two or less (incl. two) test items fail to meet the standard requirements, a second round of inspection, specifically on the items that did not meet requirements, should be conducted with two times the quantity of samples used in the initial inspection process, and the results of the following inspection will be used as basis for judgment.

7.4.3 If any of the following situations arises with the re-inspection results, this entire batch of products will be disqualified:

a) One or more items in category A fails to meet requirements;

b) One item in category B exceeds more than 50% of the specified limits;

c) Two items in category B fail to meet requirements.

7.4.4 When there is a disagreement between parties of product exchanges and acceptance process on the specific inspection results, it can be resolved by negotiations between relevant parties, or through arbitration

inspection by relevant authorities on behalf of the parties involved, using the result of arbitration inspection as the basis for judgment.

8. Labeling

8.1 Prepackaged wine labels should be implemented in accordance with GB 10344, and product type (or sugar content) should be indicated according to the specific sugar content;

8.2 If year of wine, specie, origin of production are indicated on product labels, labels should comply with the definitions listed in Sections 3.3, 3.4 and 3.5.

8.3 Besides clearly indicating the product name, manufacturer (or distributor) name and address on the external packaging boxes, net content of unitary packaging and total quantity should also be shown clearly.

8.4 Transportation logos and shipping marks should comply with the requirements of GB/T 191.

9. Packaging, Transportation, Storage

9.1 Packaging

9.1.1 Packaging materials should comply with food hygienic requirement. Packaging materials for sparkling wines should comply with the corresponding voltage resistance requirements.

9.1.2 Packaging containers should be clean, tightly sealed, with no signs of any leakage.

9.1.3 The outer packing should use qualified packing material, and conform to corresponding standard.

9.2 Transportation, Storage

9.2.1 Wine bottles that use cork (or similar substitutes) for seal should be stored and transported in an “upside down” or “lying down” position.

9.2.2 Products should be kept clean, avoiding any strong shaking, direct sunlight or rain and prevented from freezing during storage and transportation. They should be handled gently during loading and unloading.

9.2.3 Storage venues should be shady, cool, dry, well ventilated. Products should be kept strictly away from direct sunlight, rain or any potential fire hazard.

9.2.4 End products should not have direct contact with wet/moist floor and they should not be stored or transported together with poisonous, hazardous, foul-smelling and easily corrosive substances.

9.2.5 Temperature during transportation should be kept at 5^{o}C~35^{o}C, while storage temperature should be kept at 5^{o}C~25^{o}C.

Appendix A

(Informative Appendix)

Sensory Grading & Evaluation Description

Table A.1 Wine Sensory Grading & Evaluation Description

Grade	Descriptions
Premium Product	Has color, luster that product supposed to have, i.e. natural, delightful, clear (transparent) with luster; has pure, rich, elegant and harmonious fruit aroma (wine aroma), balanced palate with fine texture, full-bodied, complete and lingering aftertaste, has the delightful style that product supposed to have.
Excellent Product	Has color, luster that product supposed to have; clear and transparent, w/o suspended substances, has pure and harmonious fruit aroma (wine aroma), pure palate, and smooth, quite complete, elegant with lingering aftertaste, has excellent style.
Qualified Product	Has a slightly different color, luster as compared to what product should have, seems unnatural, allowing minute amount of precipitation, has smell that product supposed to have, no unusual taste, balanced palate though taste is not coordinated, complete but w/o obvious flaws.
Disqualified Product	Has color, luster that do not match what such product should have, severely lack luster or seems turbid, unusual smell and taste are obvious, bland and boring palate, uncoordinated, or has other obvious flaws (if satisfy just one of the abovementioned descriptions, excl. color and luster, product will be deemed disqualified).
Inferior Product	Does not possess properties supposed to have.

National Standards of People's Republic of China

GB/T 25504-2010

National Food Safety Standards

Icewines

Issued on: 2011-01-11 Implemented on: 2011-09-01

Issued by the General Administration of Supervision, Inspections and Quarantine of the People's Republic of China and China National Standardization Management Committee

Foreword

This standard is proposed by the National Food Industry Standardization Committee.

This standard is place under the jurisdiction of the National Brewers Standardization Committee.

The organizations involved in the drafting of this standard: Chinese Food Fermentation Industry Research Institute, Wine Science and Technology Development Center of China Agricultural University, Yantai Zhangyu Wine Co., Ltd, Sino-French Joint Venture Dynasty Wine Co., Ltd, Liaoning Zhang Yubing Icewine Winery Co., Ltd, Bengxi, Liaoning Province Bengxi City Quality Supervision and Inspection Agency, Liaoning Province Bengxi City Hengren County Quality Supervision and Inspection Agency.

The key personnel involved in the drafting of this standard: Xinguang Guo, Weidong Huang, Jiming Li, Chunya Zhang, Jicheng Zhen, Xiwu Fan, Chenye Yu.

National Food Safety Standards

Icewines

1. Scope

This standard specifies the details on the terms and definition, requirements, analysis methods, inspection guidelines, labeling, packaging, transportation and storage for icewines.

This standard applies to the production, inspection and sales/distribution of icewines.

2. Normative References

The normative documents referenced in the text are indispensable to the application of this standard. If any reference is dated, only the version bearing the date is applicable for this standard. Any latest version (including all amendment articles) of the non-dated reference is applicable to this standard.

GB/T 191 *Illustration and Logo for Packaging, Storage and Transportation* (GB/T 191-2008, ISO 780:1997, MOD)

GB 2758 *Hygienic Standards for Fermented Alcohol*

GB 10344 *General Principles of Prepackaged Wine Beverage Labels*

GB/T 15037 *Wines*

GB/T 15038 *Universal Analysis Methods of Wine and Fruit Alcohol*

3. Terms and Definition

The following terms and definitions will apply for this standard.

3.1 Icewines

Refer to wine produced in the following process. Delay the harvest process of the grapes, keep the grapes on the grape tree for a set period of time under an environment of temperature lower than −7°C and allow the grapes to freeze. Harvest the frozen grapes, crush the grapes in their frozen state, ferment and brew into wine (no external source of sugar is allowed during the production process.

4. Products Classifications

4.1 Classify wine according to its color, i.e. either red icewines or white icewines.

Note: White icewines can be called simple icewines.

5. Requirements

5.1 Sensory Requirements

Should comply with the requirements listed in Table 1.

Table 1 Sensory Requirements

Items	Requirements	
	White Icewines	Red Icewines
Color and Luster	Pale yellow or gold in color	Brownish-red or ruby-red in color
Clarity	Appears clear, glossy and without any visible suspended objects (wine sealed with cork is allowed to have minute amount of cork residues, while wine that is 1 year old since it was bottled is allowed to have minute amount of precipitation	
Smell	Possesses pure, rich, elegant, delightful and harmonious aroma of dried fruits, honey and wine bouquet. Aroma of the variety of ingredients used should stand out. Aged icewine should also possess aged or oak-like aroma	
Taste	Full bodied, with a good balance between sweet and sour flavor, taste should be soft and harmonious	
Style	Outstanding and distinct typicality	

5.2 Physical-Chemical Requirements

Should comply with the requirements listed in Table 2.

Table 2 Physical-Chemical Requirements

Items			Requirements
Alcohol Content[a] / (%vol)			9.0~14.0
Total Sugar (Glucose) / (g/L)		≥	125.0
Dry Extract / (g/L)		≥	30
Sucrose / (g/L)		≤	10
Volatile Acid (Acetic Acid) / (g/L)		≤	2.1
Iron / (mg/L)		≤	Should comply with the requirements in GB 15037
Copper / (mg/L)		≤	
Methanol /(mg/L)	White Icewines / (mg/L)	≤	
	Red Icewines / (mg/L)	≤	
[a]Discrepancy between actual alcohol content and alcohol content value indicated on product label should be within the ±1.0 %vol range.			

5.3 Hygiene Requirements

Should comply with the requirements of GB 2758.

6. Analysis Methods

6.1 Sensory Requirements

Tested in accordance with GB/T 15038.

6.2 Physical-Chemical Requirements

6.2.1 Alcohol Content, Total Sugar, Dry Extract, Volatile Acid, Iron, Copper, Methanol

Tests for alcohol content, total sugar, dry extract, volatile acid, iron, copper and methanol should comply with GB/T 15038.

6.2.2 Sucrose

6.2.2.1 Principle

Sucrose enters the chromatography column in its mobile phase and due to the fact that sucrose and other sugar categories show different degree of retention on the chromatography column, this process will achieve the goal of separation of sucrose from other sugar categories. Thereafter, it can be tested for with a differential refraction detector, conducting qualitative determination on the sample through the use of external standard method.

6.2.2 Apparatus and Materials

6.2.2.1 High Performance Liquid Chromatograph (attached with differential refraction detector and column thermostatic system).

6.2.2.2 Chromatography Column: Amino bonded column, particle size: 5 μm; column dimension ф4.6 mm × 250 mm or any other chromatography column with similar effect of analysis.

6.2.2.3 Mobile Phase Vacuum Filtration Degasser with 0.2 μm or 0.45 μm microporous film.

6.2.2.4 Analysis Balance: Precision of 0.1 mg.

6.2.2.5 Micro Injector: 10 μL.

6.2.2.3 Reagents and Solutions

6.2.2.3.1 Acetonitrile: Chromatographically pure.

6.2.2.3.2 Water: Re-distilled water or ultrapure water.

6.2.2.3.3 Sucrose Standard Solution: Purity should be above 95%, formulate 5 individual standard solutions with different concentration of sucrose in the range of 0.1 mg/mL~1.0 mg/mL.

6.2.2.4 Analysis Procedure

6.2.2.4.1 Preparation of Sample Solution

Dilute the sample to 10% of its initial concentration, filter with 0.45 μm filter paper, set aside for tests later.

6.2.2.4.2 Chromatographic Conditions

Mobile phase based on configuration of acetonitrile : water ratio = 80:20 (volume ratio). Connect the differential refraction detector to a power source the day before the actual tests, preheat and stabilize, then install the chromatography column and adjust the column temperature to 35^{o}C, channeling mobile phase at a flow rate of 0.1 mL/min overnight. Channel the mobile phase into the reference pool for 20 minutes or more before formally conducting the experiment on the sample, then restore the flow of the mobile phase into the sample pool and adjust the rate of flow to 1.0 mL/min. Channel through the base line and once the flow through the base line stabilized, inject sample in at a quantity of 5 μL~10 μL.

6.2.2.4.3 Standard Curve Illustration

Inject the each of the sucrose standard solution series respectively into the device and then use the standard concentrations attained to plot the standard curve according to the peak area. Linear correlation coefficient should be more than 0.999.

6.2.2.4.3 Test for Sample

Inject the sample as prepared in 6.2.2.4.1 in. Define the chromatographic peaks of sucrose in the sample according to the retention time of each of the standard solutions. Compute the sucrose content by the use of external standard method according to the area of the peaks.

6.2.2.5 Result Calculation

Sucrose content in the sample can be calculated using the following formula (1), unit being %.

$$X_1 = \frac{A_i * \frac{m_s}{V_s}}{A_S * \frac{m}{V}} * 100\% \qquad \text{---------- (1)}$$

In the formula:

X_1 − Sucrose content in sample, %;

A_i − Peak area of sucrose in sample;

m_s − Weight of sucrose in standard solution, unit is gram (g);

V_s − Volume of diluted standard solution, unit is milliliter (mL);

A_S − Peak area of sucrose in standard solution;

M – Weight of sample, unit is gram (g);

V − Volume of diluted sample, unit is milliliter.

Result of calculation should be presented in whole number.

6.2.2.6 Precision

Discrepancies between the results of two independent tests conducted under iterative conditions and the average value of the test results should not exceed the 1% range.

7. Testing Guidelines

7.1 Batches

Products manufactured within the same production period, of the same category, quality and specifications, packaged and meant for out-factory shipping will be classified as a single batch.

7.2 Sampling

7.2.1 Randomly draw sample from the storeroom for finished products, sample units in bottles.

7.2.2 Samples of individual packaged products for every batch should not be less than 6 bottles (total volume should not be less than 1,500 mL)

7.2.3 Samples drawn should be labeled immediately, indicating the following details: product name, product specifications, quantity, manufacturer name, sampling time and place, sampling personnel. Reserve and seal 2 sample bottles for 2 months for further reference. Send the remainder immediately to the laboratory for inspections for items such as sensory, physical-chemical and hygiene indexes.

7.3 Inspection Classifications

7.3.1 Out-factory Inspection

7.3.1.1 Products should be inspected batch-by-batch by the manufacturing factory's internal quality supervision and inspection department according to this standard before out-factory shipping. If the products are qualified, qualified certification should be issued for the production batch before shipping out. The certificate can be placed in the packaging boxes or within individual product packaging. Alternatively, equivalence of stamping wordings like "qualified" or "qualified by inspection" on the labels or packaging boxes is also allowed.

7.3.1.2 Inspection items: sensory, alcohol content, total sugar, dry extract, sucrose, volatile acid, net content, total sulfur dioxide, total aerobic bacterial count.

7.3.2 Type Inspection

7.3.2.1 Inspection items: All inspection items required by this standard.

7.3.2.2 Under normal circumstances, type inspection for the same product category need only to be conducted semiannually. Yet, type inspection should also be conducted if any of the following situations arises:

f) When there are significant changes in the main or supplementary ingredients used;

g) When key processes or equipment used changes;

h) When new products are being manufactured or when there is resumption of production after stoppage of routine production for 3 months or more;

i) When material discrepancies are observed between the results of the last type inspection and those of the out-factory inspection;

j) When it is specifically required by the State quality supervision and inspection institutions according to relevant regulations.

7.4 Judging Guidelines

7.4.1 If results of all test items meet requirements in standard during out-factory inspection, then the production batch will be deemed qualified.

7.4.2 If out-factory inspection results show that there are one or more test items failing to meet the

corresponding product requirements, a second round of inspection should be conducted on the same production batch, though with double the quantity of samples as compared to the first round. If second round of inspection still failed to meet standard requirements, this production batch will be deemed unqualified/failed.

7.4.3 If results of all test items meet requirements in standard during type inspection, then the production batch will be deemed qualified.

7.4.4 If type inspection results show that there are one or more test items failing to meet the corresponding product requirements, a second round of inspection should be conducted on the same production batch, though with double the quantity of samples as compared to the first round. If second round of inspection still failed to meet standard requirements, this production batch will be deemed unqualified/failed.

8. Labelling & Logos

8.1 Labels of prepackaged icewines should comply with the requirements of GB 10344, and should indicate sugar content.

8.2 Besides clearly indicating the product name, manufacturer (or distributor) name and address on the external packaging boxes, net content of unitary packaging and total quantity should also be shown clearly.

8.3 Transportation logos and shipping marks should comply with the requirements of GB/T 191.

9. Packaging, Transportation, Storage

9.1 Packaging

9.1.1 Packaging material should comply with food hygienic requirements.

9.1.2 Packaging container should be positioned upright, clean, tightly sealed with no signs of any leakage.

9.1.3 The outer packing should use qualified packing material, and conform to corresponding standard.

9.2 Transportation, Storage

9.2.1 Use cork (or similar substitutes) to seal the icewine bottles. The bottles should be stored and transported in an “upside down” or “lying down” position.

9.2.2 Products should be kept clean, avoiding any strong shaking, direct sunlight or rain and prevented from freezing during storage and transportation. They should be handled gently during loading and unloading.

9.2.3 Storage venues should be shady, cool, dry, well ventilated. Products should be kept strictly away from direct sunlight, rain or any potential fire hazard.

9.2.4 End products should not have direct contact with wet/moist floor and they should not be stored or transported together with poisonous, hazardous, foul-smelling and easily corrosive substances.

9.2.5 Temperature during transportation should be kept at 5^{o}C~35^{o}C, while storage temperature should be kept at 5^{o}C~25^{o}C.

National Standards of People's Republic of China

GB/T 27586-2011

National Food Safety Standards

Vitis Amurensis Wines

Issued on: 2011-12-05 Implemented on: 2012-06-01

Issued by the General Administration of Supervision, Inspections and Quarantine of the People's Republic of China and China National Standardization Management Committee

Foreword

This standard was drafted according to the requirements in GB/T 1.1-2009.

This standard was proposed by the China Light Industry Union.

This standard is placed under the jurisdiction of the National Brewers Standardization Technical Committee (SAC/TC 471).

The organizations involved in the drafting of this standard: China Food Fermentation Industry Research Institute, National Fruit Wines, Fruit and Vegetable Beverages Quality Supervision and Inspection Center, Mount Changbai Wine Industry Group Co.,Ltd, Tonghua Wine Co.,Ltd, Guangxi Zhongtianling Royal Wine Co.,Ltd, Jilin Tianchi Wine Co.,Ltd and Tonghua Tongtian Wine Co.,Ltd.

The key personnel involved in the drafting of this standard: Zhenghe Xiong, Xinguang Guo, Zijun Jiang, Jun Wang, Huapeng Chen, Yulong Bai, Junhua Ji, Jiangshen Yu, Wei Zhang, Tongjie Liu, Yuliang Yan, Fenghua Guo, Bingchu Luo, Zhongzhe Yao and Lijun Wang.

National Food Safety Standards

Vitis Amurensis Wines

1. Scope

This standard specifies the details on the terms and definition, requirements, analysis methods, testing guidelines and labelling, packaging, transportation and storage for vitis amurensis wines.

This standard applies to the production, inspection and sales/distribution of vitis amurensis wines.

2. Normative References

Clauses involved in the following documents constitute the ones in this standard through reference in this standard. If any reference is dated, the following amendment or revised versions (excluding errata) are not applicable to this standard.

GB/T 191 *Illustration and Logo for Packaging, Storage and Transportation*

GB 2758 *Hygienic Standards for Fermented Alcohol*

GB/T 5009.49 *Analysis Methods for Hygienic Standard of Fermented Alcohol and its Formulated Alcohol*

GB 15037-2006 *Wines*

GB/T 15038 *Universal Analysis Methods of Wine and Fruit Alcohol*

3. Terms and Definition

Terms and definitions specified in GB 15037-2006 and the following terms and definitions will apply to this standard.

3.1 Vitis Amurensis Wines

Refer to grape wines produced through full or partial fermentation brewing process using fresh V.amurensis grapes (incl. wild grapes such as downy grapes, Vitis davidii foex, fall grapes and other hybrid species) or V.amurensis grape juice as the key ingredients.

Note: Amended GB 15037-2006, definition in section 3.2.9.

3.2 Special V.amurensis Wines

Refer to grape wines produced with the employment of specific special methods during the harvesting or brewing processes, with fresh V.amurensis grapes or V.amurensis grape juice as the key ingredients.

3.2.1 Flavoured V.amurensis Wines

Refer to grape wines that are produced by soaking aromatic plants or aromatic plant extracts (distillates) with V.amurensis wine as the base of the final wine products.

3.2.2 Liqueur V.amurensis Wines

Refer to grape wines that has a final alcohol content of 15.0~22.0% (volume fraction) through the addition of ingredients such as grape brandy, edible alcohol or grape alcohol and grape juice, concentrated grape juice, caramelized grape juice, white granulated sugar in V.amurensis base wine with total alcohol content that is already 7% or higher (volume fraction).

3.2.3 Low Alcohol V.amurensis Wines

Refer to grape wines that have alcohol content 1.0~7.0% (volume fraction) produced through full or partial fermentation that is followed with a specific special process, using fresh V.amurensis and its juice as the key ingredients.

3.2.4 Non-alcohol V.amurensis Wines

Refer to grape wines that have alcohol content 0.5~1.0% (volume fraction) produced through full or partial fermentation that is followed with a specific special process, using fresh V.amurensis and its juice as the key ingredients.

4. Product Classifications

4.1 According to Color

4.1.1 White V.amurensis Wines.

4.1.2 Peach Red V.amurensis Wines.

4.1.3 Red V.amurensis Wines.

4.2 According to Sugar Content

4.2.1 Dry V.amurensis Wines.

4.2.2 Semi-dry V.amurensis Wines.

4.2.3 Semi-sweet V.amurensis Wines.

4.2.4 Sweet V.amurensis Wines.

4.3 According to Carbon Dioxide Content

4.3.1 Still V.amurensis Wines.

4.3.2 Sparkling V.amurensis Wines.

5. Requirements

5.1 Sensory Requirements[3]

Should comply with the requirements listed in Table 1.

Table 1 Sensory Requirements

Items			Requirements
Appearance	Color, Luster	White V.amurensis Wines	Close to colorless, slight yellow with stint of green, pale yellow, straw yellow, golden yellow
		Red V.amurensis Wines	Purplish-red, dark red, ruby red, light red with light stint of brown
		Peach Red V.amurensis Wines	Peach red, light rose red, pale red
		Flavored V.amurensis Wines	Dark red, brownish red, ruby red, pale red, gold
	Clarity		Clear with luster, w/o obvious suspended substances (a little cork slag is allowed if cork is used for sealing, while a little precipitation is allowed for wine more than 1 year since bottling)
	Degree of Foaming		Small air bubbles in form likened to strings of beads should rise up upon pouring sparkling wine into a cup. Bubbles should maintain a certain level of continuity.
Smell and Taste	Smell		Has pure, elegant, delightful, harmonious aroma of fruits and wine, aged wine should also have aged or oak aroma; flavored wine should have harmonious smell of aromatic plants and that of the wine itself
	Taste	Dry, Semi-dry V.amurensis Wines	Has pure, elegant, cool palate and pleasant fruit aroma, full-bodied
		Semi-sweet, Sweet V.amurensis Wines	Has sweet deep palate with a good balance between sweet and sour, rich-bodied
		Sparkling V.amurensis Wines	Has elegant, pure, harmonious, pleasant palate and the unique flavor of typical of sparkling wine, with simulative capability
		Flavored V.amurensis Wines	Has deep, cool palate and harmonious smell of aromatic plants, rich-bodied
Typicality			Has the characteristics and style required that are indicative of the product category

[3]Special vitis amurensis wines should comply with corresponding product standard.

5.2 Physical-Chemical Requirements[4]

Should comply with the requirements listed in Table 2.

Table 2 Physical-Chemical Requirements

Items		Requirements	
		Excellent Grade	First Grade
Alcohol Content[a] (20°C) (Volume Fraction) / (%)		≥7.0	
Total Sugar (Glucose) / (g/L)	Dry V.amurensis Wines[b]	≤4.0	
	Semi-dry V.amurensis Wines[c]	4.1~12.0	
	Semi-sweet V.amurensis Wines	12.1~50.0	
	Semi-sweet Sparkling V.amurensis Wines	20.1~50.0	
	Sweet V.amurensis Wines	≥50.1	
Dry Extract[d] / (g/L)		≥15.0	≥12.0
Volatile Acid (Acetic Acid) / (g/L)		≤1.1	
Citric Acid / (g/L)	Dry, Semi-dry, Semi-sweet V.amurensis Wines	≤1.0	
	Sweet V.amurensis Wines	≤2.0	
Carbon Dioxide (20°C) / MPa	Sparkling V.amurensis Wines	≥0.05	
Note: No requirements on total acid, present with experiment results (in tartaric acid, g/L).			
[a]Deviation between alcohol content indicated on label and value determined should not exceed ±1.0% (volume fraction) range. [b]When deviation between total sugar and total acid (tartaric acid) is less or equal to 2.0 g/L, maximum sugar content allowed is 9.0 g/L. [c]When deviation between total sugar and total acid (tartaric acid) is less or equal to 2.0g/L, maximum sugar content allowed is 18.0 g/L. [d]Dry extracts in sparkling V.amurensis Wines should be ≥12.0 g/L.			

5.3 Hygiene Requirements

Should comply with the requirements listed in GB 2758.

6. Analysis Methods

6.1 Sensory Requirements

Test in accordance with GB/T 15038.

6.2 Physical-Chemical Requirements

Tests for alcohol content, total sugar, volatile acid, citric acid and carbon dioxide should comply with requirements in GB/T 15038.

6.3 Hygienic Index

Test in accordance with GB/T 5009.49.

[4]Special vitis amurensis wines should comply with corresponding product standard.

7. Testing Guidelines

7.1 Batches

Products manufactured during the same production period, of the same product category, same quality, same specifications and meant for packaging and shipping out of factory will be grouped as a single batch.

7.2 Sampling

7.2.1 Draw samples (in boxes) according to guidelines listed in Table 3. Sample quantity can be increased proportionally if unitary sample packaging net content is less than 500 mL or if total sampling volume does not meet the 1,500 mL mark.

Table 3 Sampling Table

Range of Batch Quantity / No. of Boxes	Sample Quantity / No. of Boxes	Unitary Sample Quantity / No. of Bottles
<50	3	3
51~1,200	5	2
1,201~3,500	8	1
More than 3,501	13	1

7.2.2 After samples have been drawn, immediately label the samples with the following information indicated: sample name, product specifications, quantity, manufacturer name, sampling time and place, sampling personnel. Seal and safe keep 2 bottles of sample for the next 2 months for further reference. Other samples should be sent to the laboratory immediately for inspections on items such as sensory, physical-chemical, hygiene.

7.3 Inspection Classifications

7.3.1 Out-factory Inspection

7.3.1.1 Products should be inspected batch-by-batch by the manufacturing factory's internal quality supervision and inspection department according to this standard before out-factory shipping. If the products are qualified, qualified certification should be issued for the production batch before shipping out. The certificate can be placed in the packaging boxes or within individual product packaging. Alternatively, equivalence of stamping wordings like "qualified" or "qualified by inspection" on the labels or packaging boxes is also allowed.

7.3.1.2 Inspection items: Sensory requirements, alcohol content, total sugar, dry extract, volatile acid, carbon dioxide, total sulfur dioxide.

7.3.2 Type Inspection

7.3.2.1 Inspection items: All inspection items required by this standard.

7.3.2.2 Under normal circumstances, type inspection for the same product category need only to be conducted semiannually. Yet, type inspection should also be conducted if any of the following situations arises:

k) When there are significant changes in the main or supplementary ingredients used;

l) When key processes or equipment used changes;

m) When new products are being manufactured or when there is resumption of production after stoppage of routine production for 3 months or more;

n) When material discrepancies are observed between the results of the last type inspection and those of the out-factory inspection;

o) When it is specifically required by the State quality supervision and inspection institutions according to relevant regulations.

7.4 Judging Guidelines

7.4.1 Disqualification Classifications

7.4.1.1 Category A Disqualification: Sensory requirements, alcohol content, dry extract, volatile acid, total sulfur dioxide, citric acid, labelling, net content, hygiene requirements.

7.4.1.2 Category B Disqualification: Total sugar, carbon dioxide.

7.4.2 Result Judgment

7.4.2.1 When results of two or less (incl. two) test items fail to meet the standard requirements, a second round of inspection, specifically on the items that did not meet requirements, should be conducted with two times the quantity of samples used in the initial inspection process, and the results of the following inspection will be used as basis for judgment.

7.4.2.2 If any of the following situations arises with the re-inspection results, this entire batch of products will be disqualified:

- One or more items in category A fails to meet requirements;
- One item in category B exceeds more than 50% of the specified limits;
- Two items in category B fail to meet requirements.

8. Labelling

8.1 Labels of prepackaged V.amurensis wines should comply with corresponding regulations and should indicate product category (or sugar content) according to the actual sugar content in the wine products.

8.2 Besides clearly indicating the product name, manufacturer (or distributor) name and address on the external packaging boxes, net content of unitary packaging and total quantity should also be shown clearly.

8.4 Transportation logos and shipping marks should comply with the requirements of GB/T 191.

9. Packaging, Transportation, Storage

9.1 Packaging

9.1.1 Packaging material should comply with food hygienic requirements.

9.1.2 Packaging container should be positioned upright, clean, tightly sealed with no signs of any leakage.

9.1.3 The outer packing should use qualified packing material, and conform to corresponding standard.

9.2 Transportation and Storage

9.2.1 Use cork (or similar substitutes) to seal the V.amurensis wine bottles. The bottles should be stored and transported in an “upside down” or “lying down” position.

9.2.2 Products should be kept clean, avoiding any strong shaking, direct sunlight or rain and prevented from freezing during storage and transportation. They should be handled gently during loading and unloading.

9.2.3 Storage venues should be shady, cool, dry, well ventilated. Products should be kept strictly away from direct sunlight, rain or any potential fire hazard.

9.2.4 End products should not have direct contact with wet/moist floor and they should not be stored or transported together with poisonous, hazardous, foul-smelling and easily corrosive substances.

9.2.5 Temperature during transportation should be kept at 5^{o}C~35^{o}C, while storage temperature should be kept at 5^{o}C~25^{o}C.

GBT 23778-2009 Cylindrical Cork Stoppers for Alcohol and Other Food Packaging

National Standards of People's Republic of China

GB/T 23778-2009

National Food Safety Standards

Cylindrical Cork Stoppers for Alcohol and Other Food Packaging

Issued on: 2009-05-18 Implemented on: 2009-12-01

Issued by the General Administration of Supervision, Inspections and Quarantine of the People's Republic of China and China National Standardization Management Committee

Foreword

This standard was proposed by China Standardization Research Institute.

This standard is placed under the jurisdiction of the China Standardization Research Institute.

The organizations involved in the drafting of this standard: National Supervision and Inspection Center for Wine, Spirits and Liqueur Products, Yantai Qilin Packaging Co.,Ltd, Yantai Huading Packaging Co.,Ltd and Yantai Yirong Wine Packaging Co.,Ltd.

The key personnel involved in the drafting of this standard: Jiyi Zhu, Shaohui Feng, Yidie Zhao, Yan Zhang, Xushan Xue, Shuling Wang, Youguang Chen and Guoqing Xing.

National Food Safety Standards

Cylindrical Cork Stoppers for Alcohol and Other Food Packaging

1. Scope

This standard specifies the details on the terms and definition, product classifications, requirements, test methods, testing guidelines and labeling, packaging, transportation and storage of cylindrical cork stoppers for alcohol and other food packing.

This standard applies to cylindrical cork stoppers for alcohol, beverage and other food packaging containers.

2. Normative References

The normative documents referenced in the text are indispensable to the application of this standard. For dated references, only the edition bearing such date applies to this standard. For undated references, the latest edition of the normative document referred to (including all the amendments) applies.

GB/T 601 *Chemical Reagents – Preparation of Standard Titration Solution*

GB/T 2828.1 *Procedurefor Counting, Sampling and Inspection*

Part One: Batch-by-Batch Inspection Sampling Plan Identified According to Acceptance Quality Limits (AQL)

GB/T 4789.2 *Food Hygiene Microbiology Inspection – Determination of Total Bacteria Count*

GB/T 4789.15 *Food Hygiene Microbiology Inspection – Determination of Mould and Yeast* Count

GB/T 4789.28 *Food Hygiene Microbiology Inspection – Dyeing Method, Culture Medium and Reagents*

3. Terms and Definition

The following terms and definitions apply to this standard.

3.1 Cork

Refer to Quercus tree bark derived from cork layers formed by layers of cells developed on the tree bark that have reached a certain age and thickness during the tree's growth process.

3.2 Cylindrical Cork Stoppers

Refer to stoppers that are used to seal bottles or other containers through the use of processed block-shaped cork or polymeric cork particles.

3.3 Natural Cork Stoppers

Refer to stoppers that had been manufactured from the processing of one, or two or more pieces of corks.

3.4 Filled Cork Stoppers

Refer to stoppers that have their surface defects and holes filled and rectified, i.e. composite products made through smearing a layer of cork powder and adhesive on natural cork stoppers with relatively poor appearance quality.

3.5 Pasted N + N Cork Stoppers

Refer to stoppers that use polymeric cork as the body of stoppers, while pasting 1 or 2 pieces of natural cork pieces on two sides or 1 side of the stopper body. Usually named depending on format as pasted 0+1 cork stoppers, pasted 1+1 cork stoppers, pasted 0+2 cork stoppers, pasted 2+2 cork stoppers, etc.

3.6 Agglomerated Cork Stoppers

Refer to stoppers processed and produced from mixture of cork particles and adhesives that has undergone pressure casting into forms such as plate, stick or monomer under certain temperature and pressure.

3.7 T-top Cork Stoppers

Refer to stoppers that use natural cork stoppers or agglomerated cork stoppers as the main body with materials such as wood, plastic, metal, glass and ceramic used for the top of the stoppers.

3.8 Lenticel

Refer to grooves and holes that appear on the cork stoppers.

4. Product Classifications

4.1 Cylindrical cork stoppers can be classified according to the differences in materials or processing methods used as follows: Natural cork stoppers (incl. filled cork stoppers), pasted N+N cork stoppers, agglomerated cork stoppers and T-top cork stoppers.

5. Requirements

5.1 Requirements for Raw Materials

5.1.1 Main materials (corks) used in cylindrical cork stoppers should comply with the technical requirements specified in this standard for the manufacturing of such products.

5.1.2 During the manufacturing of cylindrical cork stoppers, only processing aids such as adhesives, inks, lubricants (silicon, wax) that comply with national level food requirements should be used.

5.2 Sensory Requirements

5.2.1 Color and Luster

Surface color, luster foundation for cylindrical cork stoppers of the same batch should be consistent, soft without any trace of water stains.

5.2.2 Smell

Cylindrical cork stoppers should not have moldy smell and other unusual odor.

5.2.3 Appearance Quality

5.2.3.1 Surface is bright, clean and the ends should be flat and neat. Lenticels are allowed on surface of natural cork stoppers.

5.2.3.2 Printed or scald-on patterns should be clear, symmetrical and complete.

Note: Appearance grading of natural cork stoppers should be implemented in accordance with bilateral agreements between parties from two sides of the supply and demand contract.

5.3 Size Requirements

Should comply with the requirements of Table 1.

Table 1 Size Deviations

Classifications	Diameter Allowed Deviations / mm	Length Allowed Deviations / mm	Out-of-roundness Allowed Deviations / mm
Natural Cork Stoppers	±0.5	±1.0	≤0.5
Other Stoppers[a]	±0.4	±0.5	≤0.4
Thickness of pasted pieces on pasted cork stoppers/mm	≥3.5		
Note: Thickness of pasted pieces on pasted cork stoppers used for sparkling wines≥6.0mm.			
[a]Diameter and out-of-roundness index for T-top stoppers should use column body as the basis for measurements.			

5.4 Physical Characteristics

Should comply with the requirements of Table 2.

Table 2 Physical Characteristics

Items	Index		
	Natural Cork Stoppers	Agglomerated Cork Stoppers	T-top Cork Stoppers
Water Content[a] / %	4.0~8.0		
Force of Extraction / N	150~450		
Rebound Rate/ % ≥	90		
Density / (kg/m^3)	100~220	260~320	250~330
Drop Rate of Slag / (mg/piece) ≤	3.0	1.0	3.0
Sealing Performance	No leakage under 0.15 MPa pressure maintained for 30 mins	No leakage under 0.20 MPa pressure maintained for 3 hours	No leakage under 0.20 MPa pressure maintained for 3 hours
Agglomeration Structure Stability[b]	No slags separating from the agglomerated cork stopper after soaking stopper in boiling water for 90 mins		
[a]Only water content index inspection is needed to conducted for T-top cork stoppers. [b]Only applies to agglomerated cork stoppers.			

5.5 Residual Quantity of Oxidizing Agent

Residual quantity of oxidizing agent should exceed 0.2 mg/piece.

5.6 Microorganism Indexes

Should comply with the requirements of Table 3.

Table 3 Microorganism Indexes

Items		Index
Total Bacteria Count / (CFU/piece)	≤	5
Yeast / (CFU/piece)	≤	3
Mould / (CFU/piece)	≤	5

6. Test Methods

6.1 Water Used in Testing

Water used in testing should comply with the requirements for second grade water used in testing.

6.2 Sensory Inspection

6.2.1 Color, Luster and Appearance

Visually inspect the color, luster and appearance conditions of the cork stoppers in an area with sufficient light.

6.2.2 Smell

Take 10 stoppers and place each in a sealed container containing 100 mL distilled water respectively. Smell the stoppers after 24 hours of soaking and then make record if the stoppers have any unusual odor like moldy smell.

6.3 Dimensions

6.3.1 Diameter

6.3.1.1 Natural, Agglomerated and Pasted 0+2, 2+2 Cylindrical Cork Stoppers

Use calipers with precision of 0.02 mm to measure in an orthogonal manner along the longer side from the center portion, precision of measurement should be 0.1 mm.

6.3.1.2 Pasted 0+1, 1+1 Cylindrical Cork Stoppers

Use calipers with precision of 0.02 mm to measure at the position of the glue line between the agglomerated part and the cork disc part, precision of measurement should be 0.1 mm.

6.3.2 Length

Use calipers with precision of 0.02 mm to measure the center position between the two ends of sides of the cork, precision of measurement should be 0.1 mm.

6.3.3 Out-of-roundness

Measure the diameter of the stopper according to the requirements of Section 6.3.1, of which out-of-roundness is the difference between the largest diameter value and the smallest diameter value, precision of measurement should be 0.1 mm.

6.4 Water Content

6.4.1 Method

Take 10 cylindrical stoppers, use a balance with precision of ten-thousandth of a gram to determine the weight (m_1) of each of the samples and then place each sample in an oven at 103°C±4°C for 24 hours. If samples are pasted N+N cork stoppers, separate the pasted portions from the agglomerated portion first before placing in oven. Remove the stoppers and then weigh after cooling in dryer for 30 mins. Place the stoppers again into the oven for 2 hours, weigh after cooled. Repeat until sample reach equilibrium weight (m_2) (equilibrium weight is reached when the difference between two continuous weight measurement does not exceed 10 mg).

6.4.2 Result Calculation

Water content can be calculated with the following formula (1).

$$X = \frac{m_1 - m_2}{m_1} * 100 \quad \text{..... (1)}$$

In the formula:

X – Water content in sample, %;

m_1 – Weight of sample before drying, unit is in gram (g);

m_2 – Weight of sample after drying, unit is in gram (g).

Calculated based on the arithmetic mean of results for the 10 samples and accuracy should be maintained to the closest one decimal place.

6.5 Force of Extraction

6.5.1 Equipment and Apparatus

6.5.1.1 Inner diameter of standard column is 18.5 mm±0.02 mm or glass bottle compatible with the bottle cork stopper.

6.5.1.2 Corti equipment with strong penetration capability:

Length available for use: 40 mm~60 mm.

Inner diameter: 3 mm~4 mm.

Outer diameter: 8.5 mm~10 mm.

Diameter of Corti equipment's steel wire: 2.7 mm~3.2 mm.

Distance between spirals: 8 mm~11 mm.

6.5.1.3 Cork extraction apparatus: Pressure sensor with precision 1 N, speed 0 mm/min~500 mm/min.

6.5.2 Test Method

Wash the standard column or mouth of the glass bottle with acetone solution and then dry it. Take 10 cylindrical cork stoppers, attached the standard column to the cork extraction apparatus, connect the Corti equipment and cork extraction apparatus and remove the cork with speed of 300 mm/min, of which reading displayed will be the force of extraction value. Force of extraction values for every cork stopper should fall in the value range stipulated by the standard. Test method of reinserting the stoppers into the standard column then extract it out again is used as arbitration experiment method.

6.6 Rebound Rate

6.6.1 Method

Take 10 cylindrical cork stoppers, use calipers of 0.02 mm precision at the position required by Section 6.3.1 and determine their diameters (d_1) before compression. Thereafter, use a compressor equipment to compress the stoppers to 65%~70% of their original diameters, remove the stoppers and wait for 3 mins to pass. Measure the diameters (d_2) again after compressions in the same manner.

6.6.2 Result Calculation

Rebound rate can be calculated with the following formula (2).

$$T = \frac{d_2}{d_1} * 100 \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (2)$$

In the formula:

T – Rebound rate of sample, %;

d_2 – Diameter of sample after compression, unit is in millimeter (mm);

d_1 – Diameter of sample before compression, unit is in millimeter (mm).

Calculated based on the arithmetic mean of results for the 10 samples and accuracy should be maintained to the closest whole number.

6.7 Density

6.7.1 Method

Take 10 stoppers, place them in a testing environment with temperature 20°C±4°C and humidity 60%±10% until the stoppers reach equilibrium weight. Thereafter, use a balance with precision of ten-thousandth of a gram to determine the weight values (m).

6.7.2 Result Calculation

Density can be calculated with the following formula (3).

$$\rho = \frac{m * 10^6}{\pi * (\frac{d}{2})^2 * L} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (3)$$

In the formula:

ρ – Density of sample, unit is in kilogram per cubic meter (kg/m3);

m – Weight of sample, unit is in gram (g);

d – Diameter of sample, unit is in millimeter (mm);

L – Length of sample, unit is in millimeter (mm).

Calculated based on the arithmetic mean of results for the 10 samples and accuracy should be maintained to the closest whole number.

6.8 Drop Rate of Slag

6.8.1 Method

Group 4 cylindrical cork stoppers together and conduct 2 parallel experiments. Dry a piece of 1.2 μm filter membrane to equilibrium weight in a 103ºC±4ºC oven, remove and use a balance with precision of ten-thousandth of a gram to determine its weight (m_1). Place each group of stoppers in a 500 mL conical flask containing 250 mL 10% (volume fraction) aqueous ethanol solution, then place conical flask on an oscillator (oscillation speed at 140 r/min~160 r/min) for 10 mins. Pour the content into the filtration apparatus for filtering, and then add 50 mL 10% (volume fraction) aqueous ethanol solution to flush and wash the conical flask and the filtration apparatus. Remove the filter membrane used from the oven after drying, then weigh it after placing it into a dryer to cool for 30 mins, so as to attain the equilibrium weight (m_2) (difference between two continuous weight measurement does not exceed 10 mg).

6.8.2 Result Calculation

Drop rate of slag can be calculated with the following formula (4).

$$X = \frac{m_2 - m_1}{4} * 1000 \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (4)$$

In the formula:

X – Drop rate of slag of sample, unit is in milligram per piece (mg/p);

m_2 – Weight of filter membrane after filtering, dried to equilibrium weight, unit is in gram (g);

m_1 – Weight of filter membrane before filtering, dried to equilibrium weight, unit is in gram (g):

Calculated based on the arithmetic mean of results for the 10 samples and accuracy should be maintained to the closest one decimal place.

6.9 Sealing Performance

Wash the standard column with acetone and dry. Take 10 cylindrical cork stoppers, use a corking machine to press the cork stoppers into the standard column that imitate the mouth of a bottle, place for 30 mins and then inject 3~5 mL 10% (volume fraction) aqueous ethanol solution dyed with methylene blue. Place each standard column on the pressure meter (pressure precision 0.01 MPa), placing a piece of filter paper at the bottom of each standard column with direct contact with them. Increase air pressure on the colored solution content within the columns: natural cork stopper under 0.15 MPa maintained for 30 mins; agglomerated and

pasted N+N cork stopper under 0.20 MPa maintained for 3 hours. Observe if there is any sign of leakage based on the mobile liquid that passes through the filter paper.

6.10 Agglomeration Structural Stability

Take 10 agglomerated cork stoppers, soak in boiling water for 90 mins and observe if there is any slag separating from the agglomerated portion of the stoppers.

6.11 Residual Quantity of Oxidizing Agent

6.11.1 Principle

Oxidizing agent residues will react with potassium iodine to produce iodine under acidic conditions, titrate the resultant iodine with sodium thiosulfate standard solution with starch as indicator and mixture solution turning from blue to colorless as the titration end point, record the volume of sodium thiosulfate standard solution consumed in the titration process and then calculate the oxidizing agent residue using the given formula.

Chemical Reaction Formula:

$$H_2O_2 + 2H^+ + 2I^- \rightarrow I_2 + 2H_2O$$
$$2S_2O_3^{2-} + I_2 \rightarrow S_4O_6^{2-} + 2I^-$$

6.11.2 Reagents

6.11.2.1 Sulfuric acid solution (1+3): Take 1 unit of concentrated sulfuric acid and then gradually inject it into 3 units of water.

6.11.2.2 Potassium iodide solution: 50g/L, formulate when the need to use arise.

6.11.2.3 0.02 mol/L sodium thiosulfate standard solution: Formulate according to GB/T 601, using 0.01 mol/L sodium thiosulfate standard solution, then diluting it to 1/5 concentration right before use.

6.11.2.4 5 g/L starch solution: Weight and take 0.5 g starch, add 5 mL water to turn it into starch paste. Add it into 50 mL boiling water while still stirring, boil for 1~2 mins, cool and dilute it to 100 mL, of which such solution is valid for two weeks.

6.11.2.5 Acetum solution (1+1): Take 1 unit of glacial acetic acid and mix with 1 unit of water.

6.11.3 Method

Group 4 cylindrical cork stoppers together and conduct 2 parallel experiments. Add 25 mL potassium iodide solution (6.11.2.2), 5 mL sulfuric acid solution (6.11.2.1), 0.5 mL starch solution (6.11.2.4 5 g/L starch solution), 5 mL acetum solution (6.11.2.5) and 200 mL distilled water in this specific order into a 500 mL iodine bottle with stopper. Tighten the stopper of the bottle and shake (on an oscillator) for 0.5 hours. Use 0.02 mol/L sodium thiosulfate standard solution (6.11.2.3) to titrate the content in the bottle. The end point of the titration test will be when color of bottle content fades from blue to colorless and the solution remains colorless for another 30 s. Record the volume of sodium thiosulfate standard solution consumed (V_1). Set up a blank test concurrently, using the same operations as abovementioned. Record the volume of sodium thiosulfate standard solution consumed (V_0).

6.11.4 Result Calculation

Residual quantity of oxidizing agent can be calculated with the following formula (5).

$$X = \frac{c*(V_1 - V_0)*17}{4} \quad \text{..... (5)}$$

In the formula:

X – Residual quantity of oxidizing agent, unit is in milligram per piece (mg/p);

c – Molar density of sodium thiosulfate solution, unit is in mol per liter (mol/L);

V_1 – Volume of sodium thiosulfate standard solution consumed during the titration on sample, unit is in milliliter (mL);

V_0 – Volume of sodium thiosulfate standard solution consumed during titration on blank test, unit is in milliliter (mL);

17 – Corresponding weight of hydrogen peroxide to 1 mmol sodium thiosulfate standard solution, unit is in milligram (mg).

Calculated based on the arithmetic mean of results for the 10 samples and accuracy should be maintained to the closest one decimal place.

Relative deviation between the results of two concurrent experiments should not exceed 5%.

6.12 Total Bacterial Count

6.12.1 Method

Sterilize all items, such as apparatus, tubes, culture medium, 100 mL saline water, filtration device and 0.45 μm filter membrane with 50 mm diameter that will be used in the test through high pressure sterilization method.

Group 4 cylindrical cork stoppers together and conduct 2 parallel experiments. Place each group of stoppers into a sterilized container containing 100 mL saline water under sterile conditions respectively and then seal the containers. Shake the container on an oscillator for 0.5 hour, use sterile filter membrane with 0.45 μm gaps to filter the content. Transfer the filtrate into a culture dish and pour in agar culture medium at temperature 46°C±1°C (see GB/T 4789.28 for the formulation of culture medium).

Once the agar culture coagulated, flip over the plate and place it in an incubator at temperature 36°C±1°C for 48 hours±2 hours. Concurrently set up a blank test with 100 mL saline water for comparison.

6.12.2 Accounting Method of Total Bacterial Count

Sense of sight can be used to observe bacteria situation when conducting the plant bacteria count accounting, but magnifying glass should be used along with normal sense of sight so as to prevent any omission. Compute the arithmetic average of the two groups of samples, of which result should be kept to the closest whole number.

6.13 Mould and Yeast

6.13.1 Method

Sterilize all items, such as apparatus, tubes, culture medium, 100 mL saline water, filtration device and 0.45 μm filter membrane with 50 mm diameter that will be used in the test through high pressure sterilization method.

Group 4 cylindrical cork stoppers together and conduct 2 parallel experiments. Place each group of stoppers into a sterilized container containing 100 mL saline water under sterile conditions respectively and then seal the containers. Shake the container on an oscillator for 0.5 hour, use sterile filter membrane with 0.45 μm gaps to filter the content. Transfer the filtrate into a culture dish and pour in agar culture medium at temperature 46°C±1°C (see GB/T 4789.28 for the formulation of culture medium).

Once the agar culture coagulated, flip over the plate and place it in an incubator at temperature range 25~28°C. Cultivate for a total of 5 days but begin observation from the 3rd day onwards. Concurrently set up a blank test with 100 mL saline water for comparison.

6.13.2 Accounting Method of Bacteria Group

Sense of sight can be used to observe bacteria situation when conducting the plant bacteria count accounting, but magnifying glass should be used along with normal sense of sight so as to prevent any omission. Compute and record the total mould bacteria and yeast bacteria counts on the plate respectively, minus the total bacteria count for each sample of the 4-sample group. Compute the arithmetic average of the two groups of samples, of which result should be kept to the closest whole number.

7. Inspection Guidelines

7.1 Out-factory Inspection

7.1.1 Inspection should be conducted by units in batches of products. Cylindrical cork stoppers based on the same material, produced continuously under the same process conditions, of the same quality and specifications will be grouped as a single batch, of which quantity of every batch should not exceed 1 million.

7.1.2 Out-factory inspection items includes: Sensory requirements, size, water content, density.

7.1.3 Sensory requirements and dimension should comply with GB/T 2828. 1, adopting normal once-off inspection plan, taking into consideration special inspection level S-3 and in accordance with acceptance quality limits (AQL) 4.0.

Sampling plan should be implemented according to Table 4.

Table 4 Sampling Table

Group Quantity, *N*	Sample Quantity, *n*	Accepted Quantity, Ac	Refused Quantity, Re
＜500	8	1	2
501~1,200	13	1	2
1,201~3,200	13	1	2
3,201~10,000	20	2	3
10,001~35,000	20	2	3
35,001~150,000	32	3	4
150,001~500,000	32	3	4

7.1.4 When accounting and sampling for qualified products, draw sufficient number of samples in a random manner for water content and density inspection tests.

7.1.5 Out-factory inspection judgment: If one of the out-factory inspection items does not meet requirements, should draw double the quantity of samples for re-inspection on the unqualified inspection item. If it still fail to meet requirements, this particular batch of products will be deemed unqualified.

7.2 Type Inspection

7.2.1 Inspection Item

Randomly draw sufficient number of samples for type inspection, inspection items include all required items specified in Chapter 6.

7.2.2 Type inspection should be conducted if any of the following situations arises:

a) Before new product samples are manufactured, before new products are being produced in bulk, or before inspection was requested for these new products;

b) When there are significant changes in processes or key materials used;

c) Upon resumption of production after 1 year of stoppage;

d) When specifically requested by higher authorities, i.e. quality supervision and inspection departments.

7.2.3 If the microorganism index fails to meet the requirements, the specific batch of products will be deemed unqualified; otherwise, if other items fail to meet requirements, double the sample quantity and then conduct re-inspection. If issues persist, this particular batch of products will also be deemed unqualified.

8. Labeling, Packaging, Transportation and Storage

8.1 Product Labels

Outer packaging should have the following content indicated clearly: Product name, specifications, model, product classifications, quality grade, date of production, code of product standard, address of factory, contact phone number and country of origin of raw materials used as well as labels for messages such as avoid rain, avoid moisture (words or images).

8.2 Packaging

8.2.1 Outer Packaging

External packaging used for cylindrical cork stoppers can employ the use of corrugated boxes or weaved bags that comply with the requirements of such materials and other corresponding standards.

8.2.2 Internal Packaging

Internal packaging used for cylindrical cork stoppers should employ the use of polyethylene plastic bags that comply with food requirements. Upon packaging of the stoppers, the polyethylene plastic bags should be removed of all the air inside (vacuum), then injected with sulfur dioxide or nitrogen gas and sealed.

8.3 Transportation

Products should be handled with care, avoiding compression, shock, sun and rain exposure, and corrosion during the transportation process.

8.4 Storage

Products should be stored in a dry, well-ventilated warehouse, stored separately from poisonous, foul-smelling or corrosive substances in different rooms. Products should be elevated from the floor with proper padding. Period of storage should not exceed 6 months and products should be stored under within a temperature range of 15~20^{o}C and humidity condition of 40%~70%.

GB 4927-2008 Beer

National Standards of People's Republic of China

GB 4927-2008

National Food Safety Standards

Beer

Issued on: 2008-12-29 Implemented on: 2009-10-01

Issued by the Ministry of Health of the People's Republic of China and China National Standardization Management Committee

Foreword

Section 3.1 and 8.1 in this standard are mandatory, while the remainder of the standard is recommended but optional.

This standard replaced GB 4927-2001 *Beer*.

As compared to GB 4927-2001, key changes are as follows:

- Shifted the definition of special beer to be classified under section 3, Terms and Definition, then amended the definition for dry beer, ice beer, low-alcohol beer, wheat beer, turbid beer and added definitions for non-alcohol beer, fruit and vegetable beer;
- Added a section on product classifications;
- Renamed “Net Content Deviation” section to simply “Net Content”;
- Second grade was removed from the different grades of quality for beer;
- Measurement unit for alcohol content was changed to volume fraction (%vol);
- Modified the index requirements for light beer on foam durability, alcohol content, original wheat juice concentration, total acid and carbon dioxide;
- Modified the index requirements for dark beer on foam durability, alcohol content, original wheat juice concentration, carbon dioxide as well as added the requirements for sucrose transformation enzymatic activity;
- Made appropriate amount of amendments on out-factory inspection items.

This standard was proposed by National Food Industry Standardization Management Committee.

This standard was placed under the jurisdiction of the National Brewers Standardization Management Committee.

The organizations involved in the drafting of this standard: China Food Fermentation Industry Research Institute, Guangzhou Pearl River Beer Co., Ltd, Beijing Yanjing Beer Co., Ltd, Kingway Beer (China) Co., Ltd, Hangzhou West Lake Beer Asahi (investment) Co., Ltd.

The key personnel involved in the drafting of this standard: Xingguang Guo, Jiuwu Zhang, Guiquan Fang, Fengchao Jia, Changxing Song, Qing Ye and Huiping Li.

This standard will replace all the earlier editions:

- GB 4927-1985, GB 4927-1991, GB 4927-2001.

National Food Safety Standards

Beer

1. Scope

This standard specifies the details on the terms and definition, product classifications, requirements, analysis methods, inspection guidelines, labelling, packaging, transportation and storage for beer.

This standard applies to the production, inspection and sales/distribution of beer.

2. Normative References

Clauses involved in the following documents constitute the ones in this standard through reference in this standard. If any reference is dated, the following amendment or revised versions (excluding errata) are not applicable to this standard. However, the study of whether the latest version of these documents can be used by all parties who reach agreement according to this standard is encouraged. Any latest version of the non-dated reference is applicable to this standard.

GB/T 191 *Illustration and Logo for Packaging, Storage and Transportation* (GB/T 191-2008, ISO 780; 1997, MOD)

GB 2758 *Hygienic Standard for Fermented Alcohol*

GB 4588 *Beer Bottles*

GB/T 4928 *Analysis Methods for Beer*

GB/T 4928 *Plastic Turnover Boxes for Bottled Alcohol & Beverage*

GB/T 6542 *Single and Double Corrugated Boxes for Transportation Packaging*

GB/T 9106 *Packing Container - Aluminum Two Piece Cans with Easy to Open Caps*

GB 10344 *Labelling Guideline for Pre-packaged Beverage*

GB/T 13521 *Crown Type Bottle Caps*

GB/T 17714 *Beer Barrel*

No.75 Order Issued by the General Administration for Quality Supervision, Inspection and Quarantine (AQSIQ) [2005] on *Administrative Regulation on the Measurement and Supervision of Prepackaged Goods*

3. Terms and Definition

The following terms and definitions will apply for this document.

3.1 Beer

Refers to fermented alcohol that is low in alcohol content, foamed and contains carbon dioxide, a product of yeast fermentation with malt, water as key ingredients and the addition of hops (incl. hops products).

Note: It includes non-alcohol beer (de-alcohol beer).

3.2 Pasteurized Beer

Refers to beer that underwent pasteurization or instantaneous high temperature sterilization procedure.

3.3 Draft Beer

Refers to beer that has reached a certain level of stability, with the removal of bacteria through the use of other physical-chemical methods rather than through the use of pasteurization or instantaneous high temperature sterilization.

3.4 Fresh Beer

Refers to beer that has reached a certain level of stability, with a certain allowable amount of live yeast present in the end products, without going through any pasteurization or instantaneous high temperature sterilization.

3.5 Special Beer

Refers to beer that has an unique and special style brought out through a change in raw ingredients used in the processing and a change in the process itself.

3.5.1 Dry Beer

Refers to beer with a dry taste and a true (actual) degree of fermentation of not less than 72%. Other than these characteristics, other requirements should comply with the regulations that correspond to the category of beer the product fall under.

3.5.2 Ice Beer

Refers to beer that underwent ice crystallization process with a turbidity less than or equal to 0.8 EBC. Other than these characteristics, other requirements should comply with the regulations that correspond to the category of beer the product fall under.

3.5.3 Low-alcohol Beer

Refers to beer with alcohol content 0.6%vol~2.5%vol. Other than these characteristics, other requirements should comply with the regulations that correspond to the category of beer the product fall under.

3.5.4 Non-alcohol Beer (or De-alcohol Beer)

Refers to beer with alcohol content less than or equal to 0.5%vol and original malt juice concentration larger or equal to 3.0 ^{o}P. Other than these characteristics, other requirements should comply with the regulations that correspond to the category of beer the product fall under.

3.5.5 Wheat Beer

Refers to beer that produces a special aroma as a result of using wheat malt in the brewing process, with wheat malt (content more than 40% of total malt content) and water as key brewing ingredients. Other than these characteristics, other requirements should comply with the regulations that correspond to the category of beer the product fall under.

3.5.6 Turbid Beer

Refers to beer with turbidity larger or equal to 2.0 EBC that contains a certain amount of yeast bacteria or gel-like substances with special flavor in its end product. Other than these characteristics, other requirements should comply with the regulations that correspond to the category of beer the product fall under.

3.5.7 Fruit and Vegetable Beer

3.5.7.1 Beer with Fruit and Vegetable Flavor

Refers to beer that largely retains its fundamental beer flavor but possesses physical-chemical index and flavor characteristics of the specific amount of fruit and vegetable ingredients added. Other than these characteristics, other requirements should comply with the regulations that correspond to the category of beer the product fall under.

3.5.7.2 Taste of Fruit and Vegetable Beer

Refers to beer, on the basis of retaining its fundamental flavor, possesses distinct taste of fruit and vegetable with the addition of a minute amount of food flavoring. Other than these characteristics, other requirements should comply with the regulations that correspond to the category of beer the product fall under.

3.6 Plato

Is an internationally universal unit of measurement for the concentration of malt juice, with symbol "^{o}P". It represents the number of grams of extract in every 100 g of malt juice.

3.7 Ice Crystallization

Refers to a process of ultra-freezing beer with specialized freezing facilities, forming small ice crystals in the process.

4. Products Classifications

4.1 Light Beer: Beer with chroma 2 EBC~14 EBC.

4.2 Dark Beer: Beer with chroma 15 EBC~40 EBC.

4.3 Black Beer: Beer with chroma higher than or equal to 41 EBC.

4.4 Special Beer.

5. Requirements

5.1 Sensory Requirements

5.1.1 Light Beer

Light beer should comply with the requirements listed in Table 1.

Table 1 Sensory Requirements for Light Beer

Items			Superior Grade	First Grade
Appearance[a]	Clarity		Clear, visible precipitation and suspended substances allowed (that are not external foreign objects)	
	Turbidity / EBC ≤		0.9	1.2
Foam	Form of Foam		White and smooth, lasting and cling to cup	Relatively less white and smooth, lasting and cling to cup
	Foam Durability[b] / s ≥	Bottle	180	130
		Can	150	110
Smell and Taste			Has obvious aroma of hops with pure, refreshing taste, well balanced bodied and soft, w/o unusual odor or taste	Has relatively less obvious aroma of hops with pure, less refreshing taste, well balanced bodied and soft, w/o unusual odor or taste

[a] There is no requirements on “fresh beer” that is not bottled.
[b] There is no requirements on barreled (fresh, draft, pasteurized) beer.

5.1.2 Dark and Black Beer

Dark and black beer should comply with the requirements listed in Table 2.

Table 2 Sensory Requirements for Dark and Black Beer

Items			Superior Grade	First Grade
Appearance[a]	Clarity		Clear, visible precipitation and suspended substances allowed (that are not external foreign objects)	
Foam	Form of Foam		Smooth and cling to cup	Relatively less smooth and cling to cup
	Foam Durability[b] / s ≥	Bottle	180	130
		Can	150	110
Smell and Taste			Has obvious aroma of malt with pure, refreshing taste, full-bodied w/o heavy aftertaste and soft, w/o unusual taste	Has relatively less obvious aroma of malt with pure, less refreshing taste, full-bodied w/o heavy aftertaste and soft, w/o unusual taste

[a] There is no requirements on “fresh beer” that is not bottled.
[b]There is no requirements on barreled (fresh, draft, pasteurized) beer.

5.2 Physical-Chemical Requirements

5.2.1 Light Beer

Light beer should comply with the requirements listed in Table 3.

Table 3 Physical-Chemical Requirements for Light Beer

Items			Superior Grade	First Grade
Alcohol Content[a] / (%vol)	≥	≥14.1 °P	5.2	
		12.1 °P~14.0 °P	4.5	
		11.1 °P~12.0 °P	4.1	
		10.1 °P~11.0 °P	3.7	
		8.1 °P~10.0 °P	3.3	
		≤8.0 °P	2.5	
Original Wheat Juice Concentration[b] / °P			X	
Total Acid / (mL/100mL)	≤	≥14.1 °P	3.0	
		10.1 °P~14.0 °P	2.6	
		≤10.0 °P	2.2	
Carbon Dioxide[c] / % (Mass Fraction)			0.35~0.65	
Diacetyl / (Mg/L)	≤		0.10	0.15
Sucrose Transformation Enzymatic Activity[d]			Positive	

[a]Does not include low and non-alcohol beer.
[b]"X" is the original wheat juice concentration indicated on the label, for ≥10.0 °P deviation allowed is "-0.3"; for<10.0 °P deviation allowed is "-0.2".
[C]Carbon dioxide content in barreled (fresh, draft, pasteurized) beer should not be lower than 0.25% (mass fraction).
[d]Requirements only apply for "draft beer" and "fresh beer".

5.2.1 Dark and Black Beer

Dark and black beer should comply with the requirements listed in Table 4.

Table 4 Physical-Chemical Requirements for Dark and Black Beer

Items			Superior Grade	First Grade
Alcohol Content[a] / (%vol)	≥	≥14.1 °P	5.2	
		12.1 °P~14.0 °P	4.5	
		11.1 °P~12.0 °P	4.1	
		10.1 °P~11.0 °P	3.7	
		8.1 °P~10.0 °P	3.3	
		≤8.0 °P	2.5	
Original Wheat Juice Concentration[b] / °P			X	
Total Acid / (mL/100mL)	≤		4.0	
Carbon Dioxide[c] / % (Mass Fraction)			0.35~0.65	
Sucrose Transformation Enzymatic Activity[d]			Positive	

[a]Does not include low and non-alcohol beer.
[b]"X" is the original wheat juice concentration indicated on the label, for ≥10.0 °P deviation allowed is "-0.3"; for<10.0 °P deviation allowed is "-0.2".
[C]Carbon dioxide content in barreled (fresh, draft, pasteurized) beer should not be lower than 0.25% (mass fraction).
[d]Requirements only apply for "draft beer" and "fresh beer".

5.2.3 Special Beer

With the exception of characteristic indexes, other requirements should comply with the regulations that correspond to the category of beer the product fall under.

5.3 Hygienic Requirements

Comply with the requirements in GB 2758.

5.4 Net Content

Comply with No.75 Order Issued by the General Administration for Quality Supervision, Inspection and Quarantine (AQSIQ) [2005].

6. Analysis Methods

Tests for sensory requirements, net content and physical-chemical requirements should be in accordance with GB/T 4928.

7. Testing Guidelines

7.1 Batches

New beer that is filtered after reaching matured stage of fermentation, stored in the same clean tank, of the same line of packaging, continuously produced with the same packaging format on the same day of production, meant for out-factory shipping (or transfer to storage), registered under the same quality inspection report form will be classified as a single batch.

7.2 Sampling

7.2.1 Sampling should be conducted according to Table 5. Samples should be drawn from beer barrel and sealed with sterilized equipment under a sterile environment. Boxed (bottle, can) beer should be sampled according to Table 5, whereby unitary samples should be randomly drawn from each box according to quantity specified. When total volume of samples is less than 4.0 L, volume of samples drawn should be increased proportionally.

Table 5 Sampling Table

Range of Batch Quantity / No. of Boxes	Sample Quantity / No. of Boxes	Unitary Sample Quantity / No. of Bottles
＜50	3	3
51~1,200	5	2
1,201~35,000	8	1
Above 35,000	13	1

7.2.2 After samples have been drawn, immediately label the samples with the following information indicated: sample name, product specifications, quantity, manufacturer name, sampling time and place, sampling personnel. Seal and safe keep 1/3 of samples at a temperature of 5^{o}C~25^{o}C for the next 10 days for further reference. Other samples should be sent to the laboratory immediately for inspections on items such as sensory, physical-chemical, hygiene.

7.3 Inspection Classifications

7.3.1 Out-factory Inspection

7.3.1.1 Products should be inspected batch-by-batch by the manufacturing factory's internal quality supervision and inspection department according to this standard before out-factory shipping. If the products are qualified, qualified certification should be issued for the production batch before shipping out. The certificate can be placed in the packaging boxes or within individual product packaging. Alternatively, equivalence of stamping wordings like "qualified" or "qualified by inspection" on the labels or packaging boxes is also allowed.

7.3.1.2 Inspection items: Net content, sensory requirements, physical-chemical requirements.

7.3.2 Type Inspection

7.3.2.1 Inspection items: All requirements listed in section 5.1~5.4.

7.3.2.2 Under normal circumstances, type inspection for the same product category need only to be conducted semiannually. Yet, type inspection should also be conducted if any of the following situations arises:

a) When raw ingredients used changed significantly;

b) When production resumes after any equipment changes or stoppage of routine production for 3 months or more;

c) When material discrepancies are observed between the results of the last type inspection and those of the out-factory inspection;

d) When it is specifically required by the State quality supervision and inspection institutions.

7.4 "Disqualified Item" Classifications

7.4.1 "Defects" item: Hygienic requirements.

7.4.2 "Serious flaws" item: Net content, labelling, characteristic requirements for special beer (e.g.: "actual degree of fermentation for dry beer, "turbidity" for ice beer), diacetyl and "sucrose transformation enzymatic activity" specifically for draft beer and fresh beer categories.

7.4.3 "Common defects" item: All other items that are not include in the "defects" and "serious flaws" categories.

7.5 Judging Guidelines

7.5.1 If inspection results show that there are less than 2 test items (incl. 2) failing to meet the corresponding product requirements, a second round of inspection should be conducted on the same production batch, though with double the quantity of samples as compared to the first round. The basis of judging if this production batch is qualified will be the results of the second round of inspection and tests.

7.5.2 If second round of inspection still found 1 "defect" or "serious flaw", the entire production batch will be deemed disqualified.

7.5.3 If second round of inspection still found 1 "common defect", but the inspection result of that particular item does not fall below the minimum requirement of the next product grade, then the production batch will be deemed qualified; however if the number of "common defect" exceeds 1 item, then the batch will be deemed disqualified.

8. Labelling, Packaging, Transportation & Storage

8.1 Labelling

8.1.1 Sales packaging labels should comply with relevant requirements in GB 10344, indicating: product name, list of ingredients, alcohol content, original wheat juice concentration, net content, manufacturer name and address, bottled (manufactured) date, validity period (expiry), implementation date of standard and

grade of quality. Beer packaged with glass bottle should indicate “warnings” – “Avoid Impact, Prevent Bursting” on its label, attached label, external packaging for the consumers.

8.1.2 External packaging of paper boxes should indicate product name, manufacturer name and address, date of production, as well as net content and total quantity of unitary packages of products.

8.1.3 Transportation logos and shipping marks should comply with the requirements of GB/T 191.

8.2 Packaging

8.2.1 Bottled beer should use glass bottles that comply with the relevant requirements in GB 4544 and bottle caps that comply with the relevant requirements in GB/T 13521.

8.2.2 Can beer should be packaged with containers that have sufficient level of tolerance for stress, e.g.: aluminum two piece cans with easy to open caps that comply with the requirements in GB/T 9106.

8.2.3 Barreled beer should use barrels that comply with relevant requirements in GB/T 17714.

8.2.4 Products should be tightly sealed, showing no signs of leaking.

8.2.5 External packaging of bottled beer should use corrugated boxes that comply with the requirements in GB/T 6543, plastic turnover boxes that comply with the requirements in GB/T 5738 or soft plastic overall packaging. Bottled beers should not be sold in format where they are only secured by ropes.

Note: When automatic packaging facility is used, partitions need not be installed in the corrugated boxes.

8.3 Transportation & Storage

8.3 During transportation, beers should handle gently, i.e. they should not be thrown around and impact and pressure should be avoided.

8.3.2 Beer should not be packaged, stored, transported together with or in the proximity of poisonous, hazardous, volatile, foul-smelling substances or substances that rot easily.

8.3.3 Beer should be transported or stored at a temperature of 5^{o}C~25^{o}C; insulation measures should be taken to prevent beer from freezing or warming up if the temperature is beyond the range specified.

8.3.4 Beer should be stored in shady, cool, well-ventilated places; should not be placed in open environment, strictly away from direct sunlight and rain; should not be in direct contact with the moist/wet floor.

National Standards of People's Republic of China

GB 4544-1996

National Food Safety Standards

Beer Bottles

Issued on: 1996-06-25 Implemented on: 1997-01-01

Issued by the General Administration of Supervision, Inspections and Quarantine of the People's Republic of China

Foreword

This standard is an amendment for GB 4544-91 Beer Bottles.

This standard provides guidelines on the dedicated labels required on the beer bottles.

This standard listed the suggestions pertaining to recycled beer bottle lifespan and packaging for lightweight disposable beer bottles into Appendix A and B respectively.

This standard will be implemented from January 1, 1997 onwards.

Once this standard is implemented, it will replace GB 4544-91 at the same time.

Appendix A and B in this standard are normative appendices.

This standard was proposed by the China Light Industry Union.

This standard is placed under the jurisdiction of the National Household Glass and Enamel Standardization Center.

The organizations involved in the drafting of this standard: Glass and Enamel Research Institute of the China Light Industry Union, Qingdao Jinghua Glass Factory, Tsingtao Brewery Co.,Ltd, Shanghai Ao'lian Glass Products Co.,Ltd and Chongqing Brewery Co.,Ltd.

The key personnel involved in the drafting of this standard: Guoxiu Zhang, Aixue Qiu, Baohua Wang, Yongzhi Lin and Yan Yuan.

This standard was first released on June 1, 1984 and previously amended on February 10, 1991.

National Food Safety Standards

Beer Bottles

1. Scope

This standard specifies the details on product classifications, technical requirements, test methods, and labelling, packaging requirements for beer bottles.

This standard applies to the glass bottles designated to hold beer.

2. Normative References

Clauses involved in the following documents constitute the ones in this standard through reference in this standard. If any reference is dated, only that particular dated version will apply. However, the study of whether the latest version of these documents can be used by all parties who reach agreement according to this standard is encouraged.

GB 2828-87 *Procedure for Sample Counting and Sampling Table Batch-by-batch Inspection* (Applicable to Continuous Batch Inspection)

GB 4545-84 *Stress Testing Method for Inner Wall of Glass Bottles and Containers*

GB 4546-1996 *Testing Method for Resistance to Internal Pressure within the Glass Bottles and Containers*

GB 4547-91 *Testing Method for Thermal Shock Resistance and Durability of Glass Containers* (eqv IS0 7459:1984)

GB 4548-95 *Testing Method and Grading for Resistance to Water Corrosion on the Inner Surfaces of Glass Containers* (eqv IS0 4802-1:1988)

GB 6552-86 *Testing Method for Resistance to Mechanical Impacts of Glass Bottles and Containers*

GB 8452-87 *Glass Container – Deterministic Method for Vertical Axis Deviation of Glass Bottles*

GB 9987-88 *Terms Used in Glass Bottles and Container Production*

GB 10809-89 *Glass Container – Dimensions of Mouth of Crown-shaped Glass Bottles*

3. Product Classifications

3.1 Classify into two categories – beer bottles and lightweight disposable beer bottles (Refer to Appendix A) according to weight of bottles.

3.2 Classify into superior grade, first grade and qualified grade products according to quality standards of products.

3.3 Refer to Diagram 1 for description of shape of bottle and name of its individual parts name.

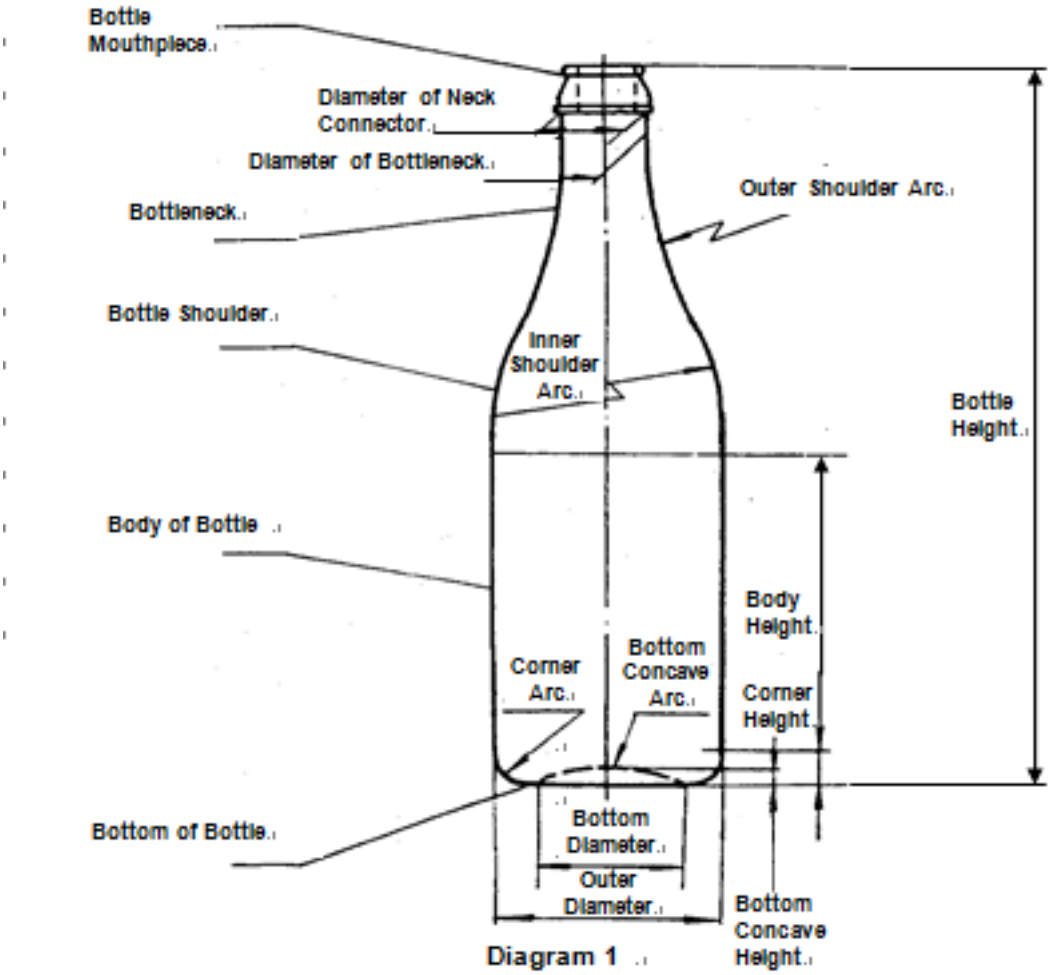


Diagram 1

4. Technical Requirements

4.1 Beer manufacturing enterprises need to establish a system for sampling and inspection for new bottles and recycled bottles.

4.2 Physical-chemical performance should comply with the requirements listed in Table 1.

Table 1

Item Name	Index		
	Superior Grade	First Grade	Qualified Grade
Resistance to Internal Pressure	≥1.6	≥1.4	≥1.2
Thermal Shock Resistance, °C	Temperature Difference≥42	Temperature Difference≥41	Temperature Difference≥39
Internal Stress, Grade	Actual Stress≤4		
Resistance to Water Corrosion on the Inner Surfaces, Grade	HC3		
Impact Resistance, J	≥0.8	≥0.7	≥0.6

4.3 Dimensions

4.3.1 Dimension of 640 mL Beer Bottle

Should comply with the requirements listed in Table 2.

Table 2

Item Name	Index		
	Superior Grade	First Grade	Qualified Grade
Volume when Filled to Brim, mL	670±10		
Outer Diameter, mm	75±1.4	75±1.6	75±1.8
Vertical Axis Deviation, mm	≤3.2	≤3.6	≤4.0
Bottle Height, mm	289±1.5	289±1.8	289±1.8
Thickness of the Body of Bottle, mm	≥2.0		

4.3.2 Dimension of Beer Bottle of Other Specifications

4.3.2.1 Deviation in volume when filled to brim should comply with requirements listed in Table 3.

Table 3

Nominal capacity mL	Relative Deviation %	Absolute Deviation mL
50~100	–	–
100~200	±3	±3
200~300	–	–
300~500	±2	±6
500~1,000	–	–
1,000~5,000	±1	±10

4.3.2.2 Height deviation T_H (mm) can be calculated according to the following formula (1).

$$T_H = \pm (0.6 + 0.004H) \quad \ldots\ldots (1)$$

In the formula: H – Bottle height, mm.

4.3.2.3 Outer diameter of the body of the bottle T_D (mm) can be calculated according to the following formula (2).

$$T_D = (0.5 + 0.012D) \quad \ldots\ldots (2)$$

In the formula: D – Outer diameter, mm.

4.3.2.4 Vertical axis deviation T_V can be calculated according to the following formula (3), (4).

H≤120mm

$$T_V = 1.5 \quad \ldots\ldots (3)$$

H>120mm

$$T_V = (0.3+0.01H) \quad \ldots\ldots (4)$$

4.3.3 Thickness ratio of walls around the same bottle should not exceed 2:1.

4.3.4 Thickness of bottom of the bottle should be more than 3 mm.

4.3.5 Thickness ratio of bottom of the same bottle should not exceed 2:1.

4.3.6 Limit deviation of the dimension of the bottle mouthpiece should comply with requirements of GB 10809.

4.3.7 Bottleneck: Outer diameter of the bottleneck 35 mm below the surface of the bottle opening should not exceed 30 mm.

4.4 Appearance quality should comply with requirements listed in Table.4.

Table 4

Name of Defect	Index	Criteria
Mouthpiece Defects	Sharp spikes at mouth area	Not allowed
	Defects at opening that affects sealing of the bottles	Not allowed
Forming Stones, Pieces	Larger than 1.5 mm	Not allowed
	0.3~1.5 mm in size, no surrounding crack ≤	2
	On the circumference of the opening meant for sealing	Not allowed
Cracks	Refraction	Not allowed
Air Bubbles, Number	Diameter exceed 6 mm	Not allowed
	Diameter at 1~6 mm ≤	3
	Visible but diameter smaller than 1 mm **Every cm^2** ≤	5
	Burst bubbles and surface bubbles	Not allowed
Parting Line	Sharp and stings the hands	Not allowed
	Amount of bulging, mm ≤	0.5
	Obvious parting line on original model	Not allowed
Finishing	Serious, obvious wrinkles, strips, cold spots, black oil, greasy patches and defects that have serious effect on appearance	Not allowed
Inner Wall Defects	Object sticks to wall, glass formed strings	Not allowed

4.5 Supporting surface at the bottom of the bottle should have spot-shaped or stripe-shaped knurling.

5. Testing Methods

5.1 Physical-chemical Performance

5.1.1 Pressure resistance tests should be conducted in accordance with GB 4546.

5.1.2 Thermal shock resistance tests should be conducted in accordance with GB 4547.

5.1.3 Inner stress tests should be conducted in accordance with GB 4545.

5.1.4 Tests for resistance to water corrosion on inner surfaces should be conducted in accordance with GB 4548.

5.1.5 Mechanical impact resistance tests should be conducted in accordance with GB 6552. Center of the body of the bottle should be chosen as impact point for such tests.

5.2 Content, Dimension

5.2.1 Content

Use a balance with sensitivity of 1 g to weigh the empty bottle and then weigh the bottle again after filling it up with room at room temperature. Compute the difference between the two values and that will be the content value.

5.2.2 Dimension

5.2.2.1 Outer Diameter of Body of Bottle

Measure the center portion of the bottle's body with a ruler and a gauge, where the values taken all angles on the same level should all fulfill the corresponding requirements.

5.2.2.2 Vertical Axis Deviation

Should be conducted in accordance with GB 8452.

5.2.2.3 Bottle Height

Measure this with a height rule or equipment for height measurement.

5.2.2.4 Thickness of Wall and Bottom of the Bottle

Measure these with a gauge for thickness measurement.

5.2.2.5 Thickness Ratio of Walls around the Same Bottle

Determine the ratio of thickness with a gauge meant for thickness measurement, taking measurements at the same height level.

5.2.2.6 Thickness Ratio of Bottom of the Same Bottle

Determine the ratio of thickness with a gauge meant for thickness measurement, taking measurements at the thinnest point and the thickest point for ratio calculation.

5.2.2.6 Bottle Mouthpiece and Bottleneck

Measure diameter by the use of a dedicated pass-through gauge or pair of calipers, bearing in mind that depth to insert the measuring apparatus should not be less than 35 mm.

5.2.2.7 Appearance Quality

Determine by sense of sight. If required, use a 10× magnifying lens for determination.

6. Inspection Guidelines

6.1 Product handover and acceptance procedure should comply with the requirements of GB 2828 pertaining to the second round sampling plan during batch-by-batch inspection, where the customer side has the authority to request qualify inspection and evaluation on the products in accordance with this standard. Otherwise, any acceptance inspection can only be conducted if both sides of the transaction allow this arrangement to go ahead by contract or mutual agreement.

6.2 Product acceptance inspection should be presented in the format of quantity of disqualified items in every 100 units of products. Submitted acceptance quality level (AQL) of the batch of products involved in the transaction and the identification level should comply with the requirements of Table 5.

Table 5

Classification	Item	Identification Level (IL)	Acceptance Quality Level (AQL)		
			Superior Grade	First Grade	Qualified Grade
Physical-Chemical Performance	• Inner Stress • Thermal Shock Resistance • Impact Resistance • Resistance to Internal Pressure	S-3	0.4 0.65 0.65 0.65	0.65 1.0 1.0 1.0	0.65 1.5 1.5 1.5
	Resistance to Water Corrosion on Inner Surfaces	Judge in accordance with GB 4548			
Content, Dimension	Vertical Axis Deviation, Inner & Outer Diameter of Bottle Mouthpiece	S-4	1.0	1.5	2.5
	Content, Height, Thickness Ratio	S-4	1.0	1.5	2.5
	Thickness, Outer Diameter of Body and Neck of Bottle	S-4	1.5	2.5	4.0
Appearance Quality	Defect at Bottle Mouthpiece, Cracks, Inner Wall Defects	1	1.0	1.5	2.5
	Stones, Bubbles, Parting Line, Finishing	1	4.0	6.5	6.5

6.3 If batch-by-batch inspection fails to meet requirements, should conduct another round of inspection. If products failed to meet requirements of the second round of inspection, then this particular batch of products can not apply for another round of re-inspection.

7. Labelling, Packaging

7.1 Labelling

A dedicated mark “B” should be imprinted within the region 20 mm above the bottom of every product, so as to indicate that this is a bottle specifically used for holding beer whereas the mark should be in No.2 typeface font and format as the basis (length × width: 6 mm × 3 mm). The following details should also be indicated in the same region with the mark: logo of the manufacturing enterprise, year of production, season.

7.2 Packaging

Use appropriate packaging so as to minimize the negative impact on quality of beer bottle due to improper transportation or mishandling. Packaging material used should keep products clean as well as protect the products from breaking.

Every packaging should come with certification or certified label, which clearly indicate the name of the manufacturing enterprise, product name, specifications, quantity, batch number, name (identification number) of personnel responsible for packaging inspection as well as phrases like “fragile” or “handle with care”.

Appendix A

(Informative Appendix)

Lightweight Disposable Beer Bottles

A1 Technical Requirements

A1.1 Lightweight disposable beer bottles should have obvious characteristics and should not be allowed to be used repeatedly.

A1.2 Physical-chemical performance should comply with the requirements listed in Table A1.

Table A.1

Inner Stress Actual Stress, Grade	Thermal Shock Resistance Temperature Deviation, °C	Impact Resistance, J	Resistance to Inner Pressure, MPa	Resistance to Water Corrosion on Inner Surfaces, Grade
≤4	≥39	≥0.4	≥1.2	HC3

A1.3 Dimension

A1.3.1 Dimension Deviation

A1.3.1.1 1 Deviation in volume when filled to brim should comply with the requirements listed in Table A2.

Table A.2

Nominal capacity mL	Relative Deviation %	Absolute Deviation mL
50~100	–	±3
100~200	±3	–
200~300	–	±6
300~500	±2	–
500~1,000	–	±10
1,000~5,000	±1	–

A1.3.1.2 Height deviation T_H (mm) can be calculated according to the following formula (A1).

$$T_H = \pm (0.6 + 0.004H) \quad \text{(A1)}$$

In the formula: H – Bottle height, mm.

A1.3.1.3 Outer diameter of the body of bottle T_D (mm) can be calculated according to the following formula (A2).

$$T_D = (0.5 + 0.012D) \quad \text{(A2)}$$

In the formula: D – Outer diameter, mm.

A1.3.1.4 Vertical axis deviation T_V can be calculated according to the following formula (A3), (A4).

H≤120mm

$T_V = 1.5$ …….. (A3)

H>120mm

$T_V = (0.3 + 0.01H)$ …….. (A4)

A1.3.2 Thickness ratio of walls around the same bottle should not exceed 2:1.

A1.3.3 Thickness of bottom of the bottle should be more than 3 mm.

A1.3.4 Thickness ratio of bottom of the same bottle should not exceed 2:1.

A1.3.5 Limit deviation of the dimension of the bottle mouthpiece should comply with requirements of GB 10809.

A1.3.6 Bottleneck: Outer diameter of the bottleneck 35 mm below the surface of the bottle opening should not exceed 30 mm.

A1.4 Appearance Quality

Comply with the requirements in section 4.4.

A1.5 Supporting surface at the bottom of the bottle should have spot-shaped or stripe-shaped knurling.

A2 Testing Methods

Test in accordance with chapter 5.

A3 Acceptance Guidelines

Comply with requirements in chapter 6.

A4 Labelling, Packaging

A4.1 Labelling

A4.1.1 Comply with the requirements in section 7.1.

A4.1.2 A dedicated phrase “non-recyclable” should be imprinted on the shoulder region of every product with No.1 typeface font and format as the basis (length × width: ~8 mm × 5.5 mm, distance between each character ~2~3 mm). This is to distinguish from normal beer bottles and prevent these lightweight bottles from getting mixed up with the rest.

A4.2 Packaging

Use pallets or paper boxes as packaging to keep products clean as well as protect the products from breaking.

Every packaging should come with certification or certified label, which clearly indicate the name of the manufacturing enterprise, product name (indicate that this is lightweight disposable bottle), specifications, quantity, batch number, name (identification number) of personnel responsible for packaging inspection as well as phrases like “fragile” or “handle with care”.

Appendix B

(Informative Appendix)

Suggestions for Lifespan and Packaging for Lightweight Disposable Beer Bottles

B1 Suggested recycling lifespan for such beer bottles is 2 years.

B2 Pallet packaging is recommended so as to ensure the quality of beer bottles is maintained during the transportation process.

National Standards of People's Republic of China

GB 7416-2008

National Food Safety Standards

Malting Barley

Issued on: 2008-06-25 Implemented on: 2009-06-01

Issued by the General Administration of Supervision, Inspections and Quarantine of the People's Republic of China and National Standardization Management Committee

Foreword

This standard replaces GB/T 7416-2000 Malting Barley.

As comparing to GB/T 7416-2000, key changes are as follows:

- In the Terms and Definition section, definition of malting barley was added, description of water sensitivity was removed while other definitions and descriptions such as for 2-row, multi-row barley were amended accordingly;
- “Sensory” test item in Table 1 was changed to “appearance”, though there is no change on the description of the test;
- Table 2 in the previous version was further divided into 2 different tables, i.e. having a physical-chemical index table for 2-row and multi-row barley respectively;
- Thousand kernels weight index requirements for superior and first grade 2-row, multi-row barley were increased by one percentage point each, requirements for second grade remain unchanged;
- Protein indexes for each of the 2-row and multi-row barley was amended;
- Kernel selection test was refined further into full kernel and thin kernel categories and the full kernel index for 2-row and multi-row of superior and first grade were increased by 3~4 percentage point each, requirements for second grade remain unchanged, requirements for thin kernels were added for each category;
- “Water sensitivity index” was removed and shifted its testing method into Appendix A;
- Dish culture method was designated as the first method while the funnel method as the second, out of the two test methods specified for 3-day and 5-day germination rate;
- Moisture index was added on top the 5-day germination rate as the key indexes that act as a basis in the judgment guidelines section;
- Shifted the Analysis Methods for Technical Indexes under the Enterprises’ Self-Control into Appendix A for the enterprises’ reference;
- Appendix A and B in the previous version were combined into one.

Appendix A included in this standard is a normative appendix.

This standard was proposed by Brewing Technical Committee under the National Food Industry Standardization Committee and it was placed under its jurisdiction as well.

The organizations involved in the drafting of this standard: China Food Fermentation Industry Research Institute, Yongshuntai Malt Group Co,.Ltd, Guangzhou Pearl River Beer Co.,Ltd, Guangzhou Malt Co,.Ltd, Beijing Yanjing Beer Co.,Ltd and Ningbo Malt Co,.Ltd.

The key personnel involved in the drafting of this standard: Jiuwu Zhang, Yongying Kang, Xiaofan Xiong, Guiquan Fang, Li Mo, Fengchao Jia, Haibo Zhang, Huiping Li, Yan Lin, Chunyan Huang, Yonghong Han,

Fanghong Gu and Fengping Chai.

This standard replaces the earlier versions:

- GB 7416-1987, GB/T 7416-2000.

National Food Safety Standards

Malting Barley

1. Scope

This standard specified details on the terms and definition, products classification, requirements, analysis methods, inspection guidelines, labelling, packaging, transportation and storage for malting barley.

This standard applies to the sourcing, inspection and sales/distribution of malting barley specially used for beer brewing.

2. Normative References

Clauses involved in the following documents constitute the ones in this standard through reference in this standard. If any reference is dated, the following amendment or revised versions (excluding errata) are not applicable to this standard. However, the study of whether the latest version of these documents can be used by all parties who reach agreement according to this standard is encouraged. Any latest version of the non-dated reference is applicable to this standard.

GB/T 191 *Illustration and Logo for Packaging, Storage and Transportation* (GB/T 191-2008, ISO 780:1197, MOD)

GB/T 601 *Chemical Reagent – Preparation of Standard Titration Solution*

GB/T 603 *Chemical Reagent – Preparation of Solutions and Substances Formulated for Use in Tests* (GB/T 603-2002, ISO 6353-1:1982, NEQ)

GB 2715 *Hygienic Standard of Grains*

GB/T 5491 *Tests for Grains, Oil Seeds - Sampling, Sample Allocation*

GB/T 6682 *Specifications and Testing Methods for Water Used in Laboratory* (GB/T 6682-2008, ISO 3696:1987, MOD)

3. Terms and Definition

The following terms and definitions will apply for this standard.

3.1 Malting Barley

Refers to 2-row and multi-row barley, identified using a certain procedure that are suitable for malting and beer brewing.

3.2 2-row Barley

Refers to barley with flat-shaped ears and only two symmetrical rows of kernels along the cob.

3.3 Multi-row Barley

4-row and 6-row barley are collectively called multi-row barley.

3.3.1 4-row Barley

Refers to barley with 2 sets of intersecting kernels, whereby the cross section of its ear is square in shape.

3.3.2 6-row Barley

Refers to barley with 6 rows of kernels developed in a manner surrounding a single cob, whereby the cross section of its ear is hexagon in shape.

3.4 Thousand Kernels Weight

Refers to the weight of 1,000 pieces of dry barley kernels.

3.5 3-day Germination Rate

Refers to the percentage of germinating kernels with respect to the total number of kernels after 3 days, mainly representing degree of tidiness in the germination process.

3.6 5-day Germination Rate

Refers to the percentage of germinating kernels with respect to the total number of kernels after 3 days, mainly representing the proportion of barley that will germinate.

4. Products Classifications

Classify the products according to the form of the wheat ears: 2-row barley and multi-row barley (which collectively refers to 4-row and 6-row barley).

Classify the products according to seeding seasons: Spring barley and winter barley.

5. Requirements

5.1 Sensory Requirements

Sensory requirements should comply with the requirements listed in Table 1.

Table 1 Sensory Requirements

Items	Superior Grade	First Grade	Second Grade
Appearance	Pale yellow with luster, no kernels with diseased spots[a]	Pale yellow or yellow with some luster, no kernels with diseased spots[a]	Yellow, no kernels with diseased spots[a]
Smell	Has the aroma that original barley should have, w/o moldy or any other unusual odor	w/o moldy or any other unusual odor	w/o moldy or any other unusual odor
[a]Refers to diseased spots as specified by the target of inspection and quarantine.			

5.2 Physical-Chemical Requirements

5.2.1 2-row Barley

2-row barley should comply with the requirements listed in Table 2.

Table 2 Physical-Chemical Requirements for 2-row Barley

Items		2-row Barley		
		Superior Grade	First Grade	Second Grade
Impurities / %	≥	1.0	1.5	2.0
Breakage Rate / %	≥	0.5	1.0	1.5
Moisture / %	≥	12.0		13.0
Thousand Kernels Weight (dried)	≤	38.0	35.0	32.0
3-day Germination Rate / %	≤	95	92	85
5-day Germination Rate / %	≤	97	95	90
Protein (dried) / %		10.0~12.5		9.0~13.5
Full Kernels (Ventral Diameter≥2.5 mm) / %	≥	85.0	80.0	70.0
Thin kernels (Ventral Diameter<2.2 mm) / %	≤	4.0	5.0	6.0

5.2.2 Multi-row Barley

Multi-row barley should comply with the requirements listed in Table 3.

Table 3 Physical-Chemical Requirements for Multi-row Barley

Items		Multi-row Barley		
		Superior Grade	First Grade	Second Grade
Impurities / %	≥	1.0	1.5	2.0
Breakage Rate / %	≥	0.5	1.0	1.5
Moisture / %	≥	12.0		13.0
Thousand Kernels Weight (dried)	≤	37.0	33.0	28.0
3-day Germination Rate / %	≤	95	92	85
5-day Germination Rate / %	≤	97	95	90
Protein (dried) / %		10.0~12.5		9.0~13.5
Full Kernels (Ventral Diameter≥2.5 mm) / %	≥	80.0	75.0	60.0
Thin kernels (Ventral Diameter<2.2 mm) / %	≤	4.0	6.0	8.0

5.3 Hygiene Requirements

Should be implemented with reference to GB 2715 and relevant standards.

6. Analysis Methods

Water used in these methods, unless otherwise stated, should comply with the requirements of GB/T 6682. All reagents, unless otherwise specified, all refer to reagents that are analytically pure (AR). Formulated “solutions”, unless otherwise stated, all refer to aqueous solutions.

Under the circumstance that there are two or more methods of analysis for the same test item, laboratory has the option of choosing which to use at their convenience, but the first method is designated as the arbitration method in case of disagreement.

All samples used (except those for impurities and breakage rate tests) used for physical-chemical analysis should be have any impurities evenly removed before tests.

6.1 Appearance

Observe the color of barley at a place with bright natural light, then hold the barley sample in hand for 5 mins and inspect its smell; observe color; record any presence of luster, kernels with diseased spots (as determined by target of inspection and quarantine), kernels with moldy spots, moldy odor and other unusual odor situations.

6.2 Impurities

Weigh and extract 200 g (precision 0.1 g), remove seeds, stalks of other plants along with soil and pebbles that are not part of the barley. Clean the barley of bran, kernels with diseased spots (as determined by target of inspection and quarantine) and weigh all the impurities removed on a balance (sensitivity 0.1 g). Lastly, calculate the percentage of impurities of total weight.

Result should be presented in one decimal place.

6.3 Rate of Breakage

Weigh and extract 200 g (precision 0.1 g), remove broken, halved kernels and weigh all damaged or incomplete kernels on a balance (sensitivity 0.1 g). Calculate the percentage of broken or incomplete kernels of total weight.

Result should be presented in one decimal place.

6.4 Moisture

6.4.1 Principle

Samples should be dried directly at 105°C~107°C, whereby the mass percentage differential will be the moisture content value for the sample.

6.4.2 Apparatus

6.4.2.1 Balance for Analysis: Sensitivity 0.1 mg.

6.4.2.2 Electrical-heating Drying Oven: Precision of temperature control ±1°C.

6.4.2.3 Weighing Disk: 30 mm × 50 mm.

6.4.2.4 Miag DLFU Plate-Style Blender or Whirlwind Grinder.

6.4.2.5 Dryer: Use allochroic silicagel as drying agent.

6.4.3 Analysis Procedure

6.4.3.1 Preparation of Powdered Sample

Extract a certain amount of barley sample. Use the Miag DLFU plate-style blender with spacing between plates at 0.2 mm, blend the samples into powdered sample.

6.4.3.2 Determination

Weigh and extract 3~5 g powdered sample (precision 0.0001 g) and place it in a weighing disk that had been dried to a stable weight. Place the disk along with its lid into an electrical-heating drying oven at 106ºC±1ºC and then bake for 3 hours after removing the lid of the disk. Place the disk with its lid covered again into a dryer while the disk is still hot to allow it to cool. Weigh the disk after 30 mins, place the disk into the electrical-heating drying oven to be baked for another 1 hour, weigh. Repeat till the weight stabilized.

6.4.4 Result Calculation

Moisture content in the sample can be calculated with the following formula (1), unit is in %.

$$X_1 = \frac{m_1 - m_2}{m_1 - m} * 100 \quad \text{……………………………………… (1)}$$

In the formula:

X_1 – Mass fraction of moisture in sample, %;

m_1 – Weight of weighing disk with sample before drying, unit is in gram (g);

m_2 – Weight of weighing disk with sample after drying, unit is in gram (g);

m – Weight of weighing disk, unit is in gram (g).

Result should be presented in one decimal place.

6.4.5 Precision

Discrepancies between the results of two independent tests conducted under iterative conditions and the average value of the test results should not exceed the 2% range.

6.5 Thousand Kernels Weight

6.5.1 Apparatus

6.5.1.1 Counter.

6.5.1.2 Balance (Sensitivity 0.1 g).

6.5.2 Analysis Procedure

Randomly draw 1,000 barley kernels from barley samples that had impurities removed and weigh these on the balance. Conduct at least two parallel tests.

6.5.3 Result Calculation

Thousand kernels weight of sample can be calculated with the following formula (2), unit is gram.

$$X_2 = X_{2'}(1 - X_1) \quad \text{……………………………………… (2)}$$

In the formula:

X_2 – Thousand kernels weight of sample (dried), unit is in gram (g);

$X_{2'}$ – Weight of thousand kernels measured directly, unit is in gram (g);

X_1 – Mass fraction of moisture content in sample, %.

Result should be presented in one decimal place.

6.5.4 Precision

Discrepancies between the results of two independent tests conducted under iterative conditions and the average value of the test results should not exceed the 2% range.

6.6 Germination Rate, 3-day and 5-day

6.6.1 Dish Culture Method

6.6.1.1 Apparatus

6.6.1.1.1 Culture Dish: diameter 10 cm.

6.6.1.1.2 Thermostatic-humidistatic Incubator.

6.6.1.1.3 Filter Paper: Medium speed filter paper.

6.6.1.2 Analysis Procedure

Place two pieces of medium speed filter paper (with diameter 9 cm) at the bottom of the culture dish and then add 4 mL water evenly to moist the filter papers. Extract 100 kernel samples and place it on the filter papers, allowing abdomen area of each kernel to be in good, direct contact with the filter papers. Cover the lid of the culture dish and then cover the dish with a thin film of plastic to prevent evaporation or place the culture dish into the thermostatic-humidistatic incubator. Allow the kernels to germinate in dark places at temperature 18ºC~20ºC.

6.6.1.3 Result Calculation

3-day germination rate, i.e. number of the germinating kernels after 72 hours can be calculated with the following formula (3), unit is %.

$$X_3 = 100 - n \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (3)$$

5-day germination rate, i.e. number of the germinating kernels after 120 hours can be calculated with the following formula (4), unit is %.

$$X_4 = 100 - n \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (4)$$

In the formula:

X_3 – 3-day germination rate for sample, %;

n – Number of kernels that did not germinate;

X_4 – 5-day germination rate for sample, %.

Result should be presented in whole number format.

6.6.1.4 Precision

Discrepancies between the results of two independent tests conducted under iterative conditions and the average value of the test results should not exceed the 3% range.

6.6.2 Funnel Method

6.6.2.1 Apparatus

6.6.2.1.1 Funnel: Diameter 100mm, with a flat glass rod at the neck of the funnel.

6.6.2.1.2 Culture Dish Lid.

6.6.2.1.3 Big Beaker.

6.6.2.1.4 Mist Sprayer.

6.6.2.2 Analysis Procedure

Extract 1,000 kernel samples and place them in a big beaker and then soak them in water for an hour at a temperature of 18ºC~20ºC. Dispose of the water, then wash kernels with tap water 5 times and again soak the kernels in water for another 6 hours at a temperature of 18ºC~20ºC. Dispose of water, transfer the barley kernels onto the funnel, cover funnel with culture dish lid and let the kernels settle overnight at temperature 18ºC~20ºC. Pour out the kernels the following day, mix evenly and then spray the kernels with water using a mist sprayer. Once the kernels are moist, return them onto the funnel. Repeat this operation once in the morning and once in the afternoon (with the time between the two iterations 10~12 hours).

6.6.2.3 Result Calculation

3-day germination rate, i.e. number of the germinating kernels after 72 hours can be calculated with the following formula (5), unit is %.

$$X_3 = \frac{1000 - n}{10} \quad \text{..... (5)}$$

5-day germination rate, i.e. number of the germinating kernels after 120 hours can be calculated with the following formula (6), unit is %.

$$X_4 = \frac{1000 - n}{10} \quad \text{..... (6)}$$

In the formula:

X_3 – 3-day germination rate for sample, %;

n – Number of kernels that did not germinate;

X_4 – 5-day germination rate for sample, %.

Result should be presented in whole number format.

6.6.1.4 Precision

Discrepancies between the results of two independent tests conducted under iterative conditions and the average value of the test results should not exceed the 2% range.

6.7 Protein

6.7.1 Principle

Under the effect of a catalyst, the samples will disintegrate in sulfuric acid, causing nitrogen in the organic compounds to form ammonia. Absorb the ammonia produced from distillation with boric acid solution and then determine the nitrogen content by acid-alkaline titration method.

6.7.2 Reagent and Solution

6.7.2.1 Water that does not contain ammonia: Formulate in accordance with GB/T 603.

6.7.2.2 Concentrated sulfuric acid: 95%~98%.

6.7.2.3 Sodium hydroxide solution (400 g/L): Weigh and extract 400 g sodium hydroxide, dissolve in 1L water (that does not contain ammonia), leave it to settle. Extract the clear liquid on the upper layer of the mixture and transfer into a bottle with rubber stopper.

6.7.2.4 Boric acid solution (20 g/L): Weigh and extract 20 g boric acid, dissolved with water and fill it up to 1L.

6.7.2.5 Hydrochloric acid standard titration reagent [c(HCl) = 0.1 mol/L]: Formulate and label in accordance with GB.T 601.

6.7.2.6 Catalyst Mixture: Mix potassium sulfate (K_2SO_4) and copper sulfate ($CuSO_4.5H_2O$) at a ratio of 10+1 and then grind to smooth powder.

6.7.2.7 Bromocresol green indicator reagent (1 g/L): Formulate in accordance with GB/T 603.

6.7.2.8 Methyl red indicator reagent (1 g/L): Formulate in accordance with GB/T 603.

6.7.2.9 Bromocresol green indicator reagent mixture: Add bromocresol green ethanol solution into methyl red ethanol solution at a ratio of 10+1 and then mix evenly.

6.7.3 Apparatus

6.7.3.1 Kjeldahl Apparatus: self-assembled apparatus or apparatus that came with a set of parts.

6.7.3.2 Balance (sensitivity 0.1 g).

6.7.3.3 Acid Burette: 50 mL.

6.7.4 Analysis Procedure

6.7.4.1 Preparation of Powdered Sample

Same as 6.4.3.1.

6.7.4.2 Samples Digestion

Weigh and extract 1.5 g (precision 0.0002 g) powdered sample and then carefully transfer into Kjeldahl bottle that have been dried of any moisture. Add 10 g catalyst mixture and shake well after gradually adding 20 mL concentrated sulfuric acid. Heat the bottle up with a slow fire inside a cabinet until the solution stops foaming, then change to a strong flame and heats it to boil. Once the solution turns clear, continue to heat for another 20~30 mins.

6.7.4.3 Samples Distillation

Once the digested solution cooled, gradually add 250 mL water (does not contain ammonia), then shake evenly, let it cool and then add a few pieces of small tiles. Connect the Kjeldahl apparatus to the distillation device and then connect the tip of the pipe for distillate to a conical flask containing 25 mL boric acid solution and 0.5 mL bromocresol green indicator reagent mixture. The tip of the pipe should be under the surface of the solution mixture in the conical flask. Add 70 mL sodium hydroxide solution into the kjeldahl apparatus with the use of a channeling funnel, shake gently allowing the content to mix evenly, heat and distill. When distillate collected reach a volume of 180 mL, stop distillation.

6.7.4.4 Samples Titration

Titrate the distillate with hydrochloric acid standard titration reagent, with the distillate changing color from green to grey as the end point of titration. Make records of the volume (mL) of titration reagent used.

Conduct a control test concurrently based on the operation described above.

6.7.5 Result Calculation

Protein content in the sample can be calculated with the following formula (7), unit in %.

$$X_5 = \frac{(V_2 - V_1) * c * 14}{m(1 - X_1) * 1000} * 6.25 * 100 \quad \text{………………………………. (7)}$$

In the formula:

X_5 – Mas fraction of protein content in sample (dried), %;

V_2 – Volume of hydrochloric acid standard titration reagent consumed in titration of sample, unit is in milliliter (mL);

V_1 – Volume of hydrochloric acid standard titration reagent consumed in control titration test, unit is in milliliter (mL);

C – Concentration of hydrochloric acid standard titration reagent, unit is in mol per liter (mol/L);

14 – Molar mass value of nitrogen, unit is in gram per mol (g/mol) [M (N) = 14];

m – Mass of taken sample, unit is in gram (g);

X_1 – Mass fraction moisture in sample, %;

6.25 – conversion ratio between nitrogen and protein.

Result should be presented in 2 decimal places.

6.7.6 Precision

Discrepancies between the results of two independent tests conducted under iterative conditions and the average value of the test results should not exceed the 4% range.

6.8 Full Kernels, Thin Kernels

6.8.1 Principle

Shake barley samples on a triple layer sieve plate that has holes of different sizes on each layer, sieve and segment kernels based on their sizes.

6.8.2 Apparatus

6.8.2.1 Balance: Sensitivity 0.1 g.

6.8.2.2 Kernel Classification Equipment: Powered by electricity and operated with crankshaft system, installed with triple layer sieve plate with distance between plate above and below at 12~25 mm. Comes with a tray at bottom and a lid. Equipment (whole) height 80~100 mm.

Kernel classification equipment should comply with the following requirements:

Sieve plate material: Manufactured with hard brass of thickness 1.3 mm±0.1 mm, strip-like holes on each plate, machining tolerance at 0.03 mm.

Plate dimension: Length 43 cm, width 15 cm.

Dimension of sieving holes: Length (top) 25 mm, length (bottom) 22 mm. Width, plate I at 2.8 mm, plate II at 2.5 mm, plate III at 2.2 mm.

Hole quantity: Plate I at 28 × 13, plate II at 30 × 13, plate III 32 × 13.

Rotation speed: 300 r/min~320 r/min.

Total length of that during plate movement: 18 mm~22 mm.

Plate surface should strictly maintain balance on both direction, while diameter of holes should be verified by the use of calipers.

6.8.3 Analysis Procedure

Weigh and extract 100 g (precision to 0.1 g), place on the top layer of the equipment, cover with li and start the equipment. Shake the plates for 5 mins with high level of precision. Weigh kernels with ventral diameter larger than 2.5 mm, represent result in percentage of total.

Result should be presented in 1 decimal place.

7. Testing Guidelines

7.1 Batches

Products of the same origin of production, same variety, same harvesting period, same grade of quality, same cargo, same truck or boat cabin will be group under a single batch.

7.2 Sampling Quantity

7.2.1 Sample quantity should be in accordance with Table 4.

Table 4 Sampling Table

Range of Batch Quantity / No. of Bags	Sample Quantity / No. of Bags	Acceptance Quantity, Ac	Rejection Quantity, Re
26~150	5	1	2
151~500	8	1	2
501~3,200	13	2	3
3,201~35,000	20	3	4
Note 1:"samples" series refer to products' largest packaging. Note 2: Bulk barley sampling should comply with GB/T 5491, unitary samples drawn each time should not less than 5kg in weight.			

7.2.2 Sampling should be conducted according to Table 4 and then from each sample draw 500 g of unitary samples (sample of the smaller packaging). Mix all the unitary samples drawn evenly, then use diagonal quartering to segment the mixture into two portions, designating one portion as backup and another for sensory and physical-chemical analysis.

7.3 Delivery & Acceptance Inspection

7.3.1 Products should be inspected batch-by-batch by corresponding quality inspection department according to the requirements listed in this standard during delivery and acceptance of the products.

7.3.2 Delivery & acceptance inspection items include: Net content, sensory requirements, impurities, rate of breakage, moisture, thousand kernels weight, 3-day germination rate, 5-day germination rate, protein, full kernel and thin kernel.

7.4 Judging Guidelines

7.4.1 Draw samples according to Table 4, package the products first and inspect their net content. If the inspection result does not meet or exceed rejection quantity value, entire batch will be deemed disqualified and rejected.

7.4.2 Moisture and 5-day germination rate under the list of physical-chemical inspection items form the basis as the key indexes required for quality grade classification. If all the other physical-chemical indexes fall under a certain grade category while the abovementioned two items fall in another grade category, then the latter will be used as the basis for decision.

7.4.3 If only a single index of the list of physical-chemical indexes (excl. moisture and 5-day germination rate) is below the minimum requirements of a specific grade while the rest of the indexes remain within the requirements of this grade classification, downgrade is not required. However if this particular index is below

the minimum requirements of the next lower grade, then product will be downgraded.

7.4.4 If two specific indexes of the list of physical-chemical indexes (excl. moisture and 5-day germination rate) are below the minimum requirements of a specific grade while the rest of the indexes remain in the same grade, the products will be downgraded.

8. Labelling, Packaging, Transportation & Storage

8.1 Labelling

8.1.1 Malting barley delivered to the warehouse or a stipulated location, should clearly indicate location of production, product name, date of harvest, date procured, classification and grade.

8.1.2 Products for sale should come with quality certification, which clearly indicate name of manufacturing factory, factory address, product name and classification, batch number, net content, code of standard that products comply with.

8.1.3 Logo of the shipping mark should comply with the relevant requirements of GB/T 191.

8.2 Packaging

8.2.1 Regardless of what packaging format is used, products of different species or location of production should not be stored together.

8.2.2 Malting barley can be stored in bulk, in silos, grain stacks.

8.2.3 Malting barley can also be packaged in sacks or woven bags to be stored in warehouse.

8.3 Transportation

Truck cabin or other modes of transportation dedicated for the transportation of malting barley should be kept clean, dry and should not have any external odor or contaminants.

8.4 Storage

8.4.1 Storage of barley should adopt a first-in-first-out strategy (i.e. barley that was stored at an earlier date should be released first), avoiding any mishandling that may cause financial losses during storage.

8.4.2 Warehouse should be kept clean, dry and well-ventilated. Inspection should be conducted regularly and measures should be taken to prevent moisture, fungi and pests from gathering. If problem is discovered, it should be resolved in a timely manner.

8.4.3 Every batch of barley should clearly indicate location of production, species, quantity, grade and date of procurement.

Appendix A

(Normative Appendix)

Analysis Methods for Technical Indexes under the Enterprises' Self-Control

A.1 Determination of Bacteria Count in Malt

A.1.1 Principle

Flush the microorganisms off from the barley with the use of sterilized water (zero bacteria), then cultivate the barley with a culture medium and determine the fungi contamination based on the total aerobic bacteria count within the barley sample.

A.1.2 Reagent and Solution

Rose Bengal medium (31.6 g/L): Weigh and extract 31.6 g rose Bengal medium, add in 1,000 mL water and dissolve the medium, packaged separately, then conduct high pressure sterilization for 20 mins at 121°C, prepare for use later.

A.1.3 Apparatus

A.1.3.1 Shaker: Rotation speed at 180 r/min~200 r/min.

A.1.3.2 Erlenmeyer Flask: 300 mL.

A.1.3.3 Culture Dish: Diameter at 10 cm.

A.1.3.4 Transfer Pipette: 0.2 mL.

A. 1. 4 Analysis Procedure

A.1.4.1 Weigh and extract 10 g sample kernels (precision 0.02 g) and pour them into a 90 mL sterilized Erlenmeyer flask. Fully cover the opening with cotton and place the flask on a shaker. Set the shaker to rotate at 180 r/min~200 r/min, 30°C for 30 mins.

A.1.4.2 Melt the rose Bengal medium and place into dish under sterile conditions, cool, solidify and prepare for use later.

A.1.4.3 Use a sterilized transfer pipette to extract 0.2 mL of solution prepared as in A.1.4.1 onto the culture dish under sterile conditions (3 individual culture dishes set up for concurrent testing on the samples), invert the dish and allow cultivation to take place over 7 days at 25°C.

A.1.4.4 Determine the total aerobic bacteria count.

A.2 Identification of Barley Species

A.2.1 Gel-electrophoresis

A.2.1 Principle

By the use of PolyAcrylamide Gel-Electrophoresis (PAGE) identify the specie of the barley, i.e. use the plate-category gel-electrophoresis to separate the ethanol soluble protein components within the barley.

A.2.1.2 Reagent and Solution

A.2.1.2.1 Extract Solution: Weigh and extract 18 g carbamide and 0.01 g methyl green, dissolve in water, then add 1 mL 2-hydrogen sulfide based ethanol and 20 mL 2-chloroethanol, fix volume to 100 mL by filling up with water.

A.2.1.2.2 Ferrous Sulfate solution (5 g/L): Formulate in accordance with GB/T 603.

A.2.1.2.3 Gel Stock Solution: Weigh and extract 115.3 g acrylamide, 4.6 g methylene double acrylamide, 69.2 g carbamide, 1.2 g glycine, 1.2 g ascorbic acid, dissolve all these in water, then add in 3 mL ferrous sulfate solution (freshly formulated), 23 mL ice acetic acid, mix evenly and fix volume by topping up to 1L. Place mixture into a brown-colored bottle after filtration, store at temperature below 4^{o}C and use it within a month's time.

A.2.1.2.4 Hydrogen Peroxide Solution: Extract 2 mL 30% hydrogen peroxide, fix volume to 100 mL by filling up with water.

A.2.1.2.5 Electrode Buffer Solution: Weigh and extract 2 g glycine, dissolve in water, add 20 mL ice acetic acid, fix volume to 5L by filling up with water.

A.2.1.2.6 Trichloroacetic Acid Solution: (10 g/L): Weigh and extract 10 g trichloroacetic acid, dissolve in water, fix volume to 100 mL by filling up with water

A.2.1.2.7 Coomassie Blue Solution (10 g/L): Weigh and extract 1 g coomassie blue, dissolve in 95% ethanol and fix volume to 100 mL.

A.2.1.2.8 Dye Reagent: Extract 20 mL trichloroacetic acid solution, add 1 mL coomassie blue solution, mix and set aside for use later.

A.2.1.3 Apparatus

A.2.1.3.1 Vertical Plate Gel-electrophoresis Apparatus

A.2.1.3.2 Balance for Analysis: Sensitivity 0.1 mg.

A.2.1.3.3 Centrifuge: Rotation speed 5,000 r/ min, centrifuge tube Φ9 mm × 35 mm.

A.2.1.4 Analysis Procedure

A.2.1.4.1 Sample quantity: Extract 100 barley kernels for the test.

A.2.1.4.2 Extract Hordein: Crush every single kernel individually and then place them into the centrifuge tube. Extract 0.4 mL extract solution and mix, then soak for at least 16 hours. Place the mixture into centrifuge and set rotation speed at 5,000 r/ min for 30 mins before use.

A.2.1.4.3 Gel formation: Add 0.15 mL hydrogen peroxide solution into 100 mL gel stock solution and mix evenly. Channel the evenly mixed solution into a gel mold (need to ensure gel is 1.5 mm thick, 10~15cm long) and then coagulation will occur in few minutes thereafter. Create grooves in the coagulated gel with a

comb so as to create spaces for sample placement (comb need to be placed into the gel solution at the point when the gel is being channeled into the mold).

A.2.1.4.4 Gel development: Remove the comb, extract appropriate amount (10 μL-20 μL) of extract solution and add that onto the top of the grooves (if the strips are not distinctly separated from each other, volume of extract used can be reduced). Fill each groove with samples and then place the entire gel glass panel vertically into the buffer solution, in such a way that positioned the grooves on top. Allow the tap water to flow through the cooling mechanism of the electrophoresis apparatus and maintain the buffer solution at 10°C~20°C. Allow gel development to happen at 200 V for 20 mins, then adjust to 500 V and continue the gel development process for a time that is double the required time for color ribbon (methyl green) to flow through gel.

A.2.1.4.5 Remove gel from glass panel after gel development process and immediately place the gel in dyeing reagent for dyeing, process can take up to one night.

A.2.1.4.6 Take photo: Soak gel in distilled water for 1 hour to bleach off colors after the dyeing process, thereafter place the gel in a lightbox and take a photo. Distance between gel panel and len ~400 mm.

A.2.1.4.7 Result presentation: Qualitatively clarify each of the fixed characteristics of the barley samples according to the comparison results between samples and pure specie reference samples. Use quantity of each of the species of barley kernels identified in the sample divided by the total number of barley kernels (100). Average value presentation (in percentages) should be used if concurrent experiments are being carried out, of which results should be rounded off to the nearest whole integer.

A.2.2 Polymerase Chain Reaction Method

A.2.2.1 Principle

A.2.2.2 Perform external enzymatic amplification on the barley DNA, through the use of polymerase chain reaction (PCR) amplification technology. Conduct comparison thereafter between the genetic profile of the sample and that of the original barley pure specie after the polyacrylamide gel electrophoresis process so as to identify the sample specie itself.

A.2.2.2 Reagent and Solution

A.2.2.2.1 Tris-Hydrochloric Acid Solution (1 mol/L, pH = 8.0): Weigh and extract 121.1 g hydroxymethyl aminomethane (Tris), dissolve in 800 mL deionized water and adjust PH value to 8.0 with concentrated hydrochloric acid solution (requires ~42 mL concentrated hydrochloric acid) after cooling to room temperature. Lastly, fill it up to 1L with water and then perform high pressure sterilization after being packaged into smaller individual packages.

A.2.2.2.2 EDTA Solution (0.5 mol/L, pH = 8.0): Weigh and extract 186.1 g ethylene diamine tetraacetic acid (EDTA, $C_{10}H_{14}N_2O_8Na_2 \cdot 2H_2O$), add 800 mL water and then stir the mixture with a magnetic stirrer equipment. Adjust the PH value to 8.0 with sodium hydroxide, (requires ~20 g NaOH particles). Lastly, fill it up to 1L with water and then perform high pressure sterilization after being packaged into smaller individual packages.

A.2.2.2.3 DNA Extract Solution: Weigh and extract 46.75 g sodium chloride and 20 g cetyltrimethyl ammonium bromide (CTAB), add 800 mL deionized water and shake the container until solutes completely dissolved. Thereafter, add 50 mL Tris-hydrochloric acid solution (prepared as in A.2.2.2.1) and 20 mL EDTA solution (prepared as in A.2.2.2.2). Lastly, fill it up to 1L with water and then perform high pressure sterilization after being packaged into smaller individual packages.

A.2.2.2.4 Trichloromethane-isoamylol Solution (24+1): Measure and extract 240 mL trichloromethane and 10 mL isoamylol, mix evenly.

A.2.2.2.5 Ribonuclease A (RNaseA, 10 mg/mL): Buy this from a biochemical reagent manufacturing company.

A.2.2.2.6 PCR Amplification Reagent: Buy this from a biochemical reagent manufacturing company [Reagent contains: Taq DNA polymerase, dNTP, magnesium chloride ($MgCl_2$), PCR buffer solution (contains $MgCl_2$) and Primer.

A.2.2.2.7 Electrophoretic Buffer Solution I (10 × TBE): Weigh and extract 108 g Tris-alkali, 55 g boric acid and 7.44 g EDTA, mix and dissolved in distilled water, fill it up to 1L volume.

A.2.2.2.8 Electrophoretic Buffer Solution II (50 × TBE): Weigh and extract 242 g Tris-alkali, 37.2 g EDTA, mix, add 57.1 mL ice acetic acid, dissolved in distilled water, fill it to 1L volume.

A.2.2.2.9 TE Buffer Solution: Add 10 mL Tris-hydrochloric acid solution (prepared as in A.2.2.2.1) and then 2 mL EDTA solution (prepared as in A.2.2.2.2) in 800 mL water. Lastly, fill it up to 1L with water and then perform high pressure sterilization after being packaged into smaller individual packages.

A.2.2.2.10 Sterilized Water (Bacteria-free): Take 100~200 mL re-distilled water for sterilization at 121°C for 20 mins.

A.2.2.2.11 Denaturing Buffer Solution: Weigh and extract 10 g sucrose, 20 mg bromphenol blue, 20 mg xylene cyanol and dissolved all in 90 mL deionized formamide, fill it up to 100 mL with re-distilled water.

A.2.2.2.12 Fixative Solution (10%): Measure and extract 100 mL ice acetic acid, add 900 mL re-distilled water and mix evenly.

A.2.2.2.13 Sodium Thiosulfate Solution (100%): Weigh and extract 10 g sodium thiosulfate, dissolved in 100 mL re-distilled water.

A.2.2.2.14 Gel Solution (6%): Weigh and extract 10 g acrylamide, 3.1 g methylene double acrylamide, 420 g carbamide and 50 mL electrophoretic buffer solution I (prepared as in A.2.2.2.7), mix, then dissolve in re-distilled water and fill it up to 1L volume.

A.2.2.2.15 Gel Dyeing Reagent: Weigh and extract 1 g silver nitrate, dissolve in 1,000 mL re-distilled water and then add 1.5 mL formaldehyde, mix evenly.

A.2.2.2.16 Gel Developing Solution: Weigh and extract 30 g anhydrous sodium carbonate, dissolve in 1,000 mL re-distilled water, then add 0.2 mL sodium thiosulfate (prepared as in A.2.2.2.13) and 1.5 mL formaldehyde, mix evenly.

A.2.2.2.17 Agarose Gel (0.8%): Weigh and extract 0.8 g agarose into 100 mL 1 × TAE electrophoretic buffer solution II, heat to dissolve.

A.2.2.2.18 Ethanol (70%): Extract 700 mL anhydrous ethanol and fill it up with water to 1L volume.

A.2.2.3 Apparatus

A.2.2.3.1 PCR Apparatus: Temperature gradient changes should be sensitive and accurate.

A.2.2.3.2 Electrophoresis Apparatus with Voltage Control: Voltage 10-3,000 V, current 2~200 mA, Power

5~200 W.

A.2.2.3.3 Centrifuge: Temperature can be lower to below 4°C, rotation speed 10,000 r/min.

A.2.2.3.4 Thermostatic Water Bath: Thermostatic precision ±0.1°C.

A.2.2.3.5 Micro Pipette: Precision 0.1 mL.

A.2.2.3.6 Gel Imager: Can be connected to computer to take photo.

A.2.2.3.7 Electrophoresis Tank: Vertical and horizontal electrophoresis tank.

A.2.2.3.8 Cyclotron Horizontal Shaker: Rotation speed 1,000 r/min~10,000 r/min.

A.2.2.3.9 X-ray Machine.

A.2.2.3.10 Glass Panel.

A.2.2.3.11 Centrifuge Tube: 1~2 mL.

A.2.2.3.12 PCR Thin-walled Tube.

A.2.2.3.13 Balance for Analysis: Sensitivity 0.1 mg.

A.2.2.4 Analysis Procedure

A.2.2.4.1 DNA Extraction (CTAB Method)

a) Extract appropriate amount of fresh leaves and then grind them in a mortar after adding liquid nitrogen. Be careful of frostbite during the procedure.

b) Take 0.5 g barley leaf tissue and place it in a 2 mL sterilized centrifuge tube. Add 800~900 µL DNA extract solution (prepared as in A.2.2.2.3), place the tube in a 65°C thermostatic water bath for 40 mins~1 hour after gently mixing the content in the tube by inverting the tube. Invert the tube once every 10 mins.

c) Remove the tube from the water bath and place it on ice for 5 mins, add trichloromethane-isoamylol solution (prepared as in A2.2.2.4) that has a volume similar to tube content, invert-mix (increasing mixing speed from slow to fast gradually) for 10 mins and put it on the centrifuge, setting rotation to 8,000~10,000 r/min for 10 mins at low temperature, 4°C.

d) Extract clear solution from tube content and transfer to another 2 mL sterilized centrifuge tube. Add 3 µL RNaseA and place the tube into a 37°C thermostatic water bath for 10 mins (so as to remove the RNA in DNA).

e) Add trichloromethane-isoamylol solution (prepared as in A2.2.2.4) that has a volume similar to tube content after the earlier process, then invert-mix (increasing mixing speed from slow to fast gradually) for 10 mins and put it on the centrifuge, setting rotation to 8,000~10,000 r/min for 10 mins at low temperature, 4°C.

f) Transfer clear liquid into another 2 mL sterilized centrifugal tube, add anhydrous ethanol that has volume double of the tube content (placed and frozen in -20°C), invert-mix evenly and let it settle for 3 mins at room temperature.

g) Extract DNA with sterilized pipette, then wash with 70% ethanol 2~3 times, dry at room temperature. Dissolve in 100 µL 1 × TE or sterilized water after ethanol vaporized.

h) Test with agarose gel (prepared as in A.2.2.2.17) (requires ~2 µL~3 µL), conduct gel electrophoresis and once gel has taken form, take photo. Store samples at 20°C for future use or references.

A.2.2.4.2 PCR Amplification

Use a micro pipette to add 12.8 µL sterilized water, 2 µL PCR buffer solution, 2 µL 200 µmol/L dNTP, 2 µL 500 µmol/L Primer, 0.2 µL 1 U/µL Taq DNA polymerase and lastly 1 µL barley DNA (concentration 30 ng/µL~50 ng/µL) in this specific order onto the PCR thin-walled tube till final volume reaches 20 µL. Place tube on centrifuge for 10s rotation after adding 5µL mineral oil and then place into the PCR amplification apparatus evenly.

After the barley template underwent predenaturation for 5 mins at 94°C, conduct 35 rounds of amplification cycle under the following conditions:

(1) 30s denaturation at 94°C; (2) 40s annealing at 55°C; (3) 40s extension at 72°C. Lastly, end the amplification procedure by maintaining temperature at 72°C for 10 mins. Remove amplified substance and place it in a 4°C refrigerator for use later.

A.2.2.4.3 Production of Polyacrylamide Gel Plate

a) First wash the glass panel and ear panel clean with tap water.

b) Scrub each panel with ethanol after taking specific note of the front and back of each of the two panels.

c) Once ethanol has vaporized, spread affinity silane evenly 2 times on one side of the glass panel, while spread peeling silane evenly on one side of the ear panel. (Perform this operation in a well-ventilated cabinet, be cautious of corrosion).

d) After completing the above procedure, insert two layering at each of the two sides of the glass panel (at the side where affinity silence was spread onto) respectively and then use the ear panel (the side covered with peeling silane) to cover the top of the glass panel, secure with clamps.

e) Slowly channel the gel stock solution (prepared as in A.2.2.2.14) along the gaps (one side of the ear panel) into the structure, ensuring that there is no air bubble formation during the process, so as to avoid material impact on the experiment (60 mL gel tock solution + 200 µL 10% ammonium persulfate + 100 µL TEMED).

f) After the gel is channeled in, insert a comb (with the end w/o teeth) into the gel surface, at an appropriate depth.

g) Leave the structure at room temperature for 1~2 hours (determine time for coagulation according to the environmental temperature).

A.2.2.4.4 Pre-electrophoresis Procedure

a) Remove the comb after gel coagulated and then place the panels into the electrophoresis apparatus with the one side of the glass panel facing outside and one side of the ear panel facing inside, secure with metal clamps.

b) Dilute the electrophoretic buffer solution I (prepared as in A.2.2.2.7) to 0.5 × TBE, then pour it into the electrophoresis tank vertically, while blowing off and clearing any shattered or broken gel pieces from the loading end of the gel panel.

c) Connect the power cord of the electrophoresis tank with the electrophoresis apparatus and turn the power on. Maintain 70 W in the electrophoresis apparatus for 30 mins.

A.2.2.4.5 Run Sample Electrophoresis

a) Conduct pre-electrophoresis procedure for 30 mins then cut the power and insert the comb (the side with teeth) into the gel panel at an appropriate depth.

b) After adding the PCR amplified substance into the denaturation loading buffer solution, run denaturation process on the PCR apparatus for 5 mins at 94°C and then swiftly transfer the substance into ice water for cooling.

c) Take 3 μL-5 μL denatured PCR amplification substance and add into the apparatus through the comb, turn on power and then run electrophoresis for 45 mins with a consistent 70 W power.

A.2.2.4.6 Developing Silver Stain

a) Separate the glass panels after electrophoresis, place panel (glass panel with gel attached) into an elution plate containing fixation solution (prepared as in A.2.2.2.12) and then shake the plate on a cyclotron horizontal shaker for 20~30 mins, so as to bleach off and fix the color.

b) After bleaching, wash with re-distilled water 2~3 times, 3~5 minutes each time.

c) Dye with gel dyeing solution (prepared as in A.2.2.2.15) for 20~30 mins.

d) Swiftly wash with re-distilled water for 8~10s.

e) Develop using gel developing solution (prepared as in A.2.2.2.16) until it is visibly clear.

f) Stabilized with 10% ice acetic acid for 3~5 mins.

g) Wash again with re-distilled water for 3~5 mins and then air dry at room temperature.

A.2.2.4.7 Result Presentation

Place air-dried glass panel in a X-ray machine and then conduct visual comparison between the genetic map of the sample and that of the known pure barley species. Make detailed records.

A.3 Determination of Water Sensitivity

A.3.1 Principle

Take two sets of samples and add 4 mL and 8 mL of water into each set respectively. Germinate under thermostatic conditions and take note of the percentage deviation of germinated kernels between the two sets of samples, i.e. the water sensitivity value.

A.3.2 Apparatus

A.3.2.1 Culture Dish: Diameter 10cm.

A.3.2.2 Graduated Pipette: Graduation value 0.1 mL.

A.3.3 Analysis Procedure

Place two piece of 9 cm filter papers at the bottom of each of the 2 culture dishes prepared. Add 4.0 mL and 8.0 mL water evenly onto the filter papers of each of the culture dishes respectively. Place 100 kernels onto filter papers of each of the culture dishes, ensuring that the abdomen area of every kernel make good direct contact with the filter paper and then cover the dishes. Seal the culture dishes in plastic bags so as to prevent evaporation. Allow cultivation to happen by setting the dishes in a dark corner at temperature 18^{o}C~20^{o}C. Remove and make record of the kernels that have germinated when it reaches the point of time 24 hours, 48 hours and 72 hours after the soaking/cultivation began.

A.3.4 Result Calculation

Add 4 mL water, germination rate after 120h (W_1) can be calculated with the following formula (A.1), % as unit.

$$W_1 = 100 - n \quad \text{..... (A.1)}$$

Add 8 mL water, germination rate after 120h (W_2) can be calculated with the following formula (A.2), % as unit.

$$W_2 = 100 - n \quad \text{..... (A.2)}$$

Water sensitivity of sample (W_3) can be calculated with the following formula (A.3), % as unit.

$$W_3 = W_1 - W_2 \quad \text{..... (A.3)}$$

In the formula:

n – Number of kernels that did not germinate;

W_3 – Water sensitivity of the sample;

Result should be presented in the nearest whole number.

A.3.5 Precision

Discrepancies between the results of two independent tests conducted under iterative conditions and the average value of the test results should not exceed the 3% range.

National Standards of People's Republic of China

GB/T 20369-2006

National Food Safety Standards

Hop Products

Issued on: 2006-01-23 Implemented on: 2006-10-01

Issued by the General Administration of Supervision, Inspections and Quarantine of the People's Republic of China and National Standardization Management Committee

Foreword

Appendix A in this standard is an informative appendix.

The standard was proposed by China Light Industry Union.

The standard is placed under the jurisdiction of the Brewing Technical Subommittee of the National Food Industry Standardization Committee.

The organizations involved in the drafting of this standard: China Food Fermentation Industry Research Institute, Xinjiang Hops Co.,Ltd., Xinjiang Entry-Exit Inspection and Quarantine Bureau of the People's Republic of China, Xinjiang Kerry Green Hops Co.Ltd, Xinjiang Gubei Sanbao Yue Hops Co.,Ltd, Tsingtao Brewery Co.,Ltd., Shenzhen Kingway Limited Co. and Beijing Yanjing beer Group Co., Ltd.

The key personnel involved in the drafting of this standard: Wujiu Zhang, Yongpu Kang, Qi Shan, Yandong Xu, Zhiming Gao, Jianjun Dong, Yongyang Wu, Jingzhang Feng, Xinguang Guo, Wenxian Xu, Changxin Song, Kuifang Lou, Mingde Duan, Ping Su and Jian Wang.

National Food Safety Standards

Hop Products

1. Scope

This standard specifies the details on the terms and definitions, product classifications, requirements, analysis methods, inspection guidelines, labeling, packaging, transportation and storage for hop products.

This standard applies to hops that are produced through baking and compressing, hop pellets produced from crushing and compressing, and carbonated hops produced through extraction.

2. Normative References

Clauses involved in the following documents constitute the ones in this standard through reference in this standard. If any reference is dated, the following amendment or revised versions (excluding errata) are not applicable to this standard. However, the study of whether the latest version of these documents can be used by all parties who reach agreement according to this standard is encouraged. Any latest version of the non-dated reference is applicable to this standard.

GB/T 191 *Illustration and Logo for Packaging, Storage and Transportation*

GB/T 601 *Chemical Reagents – Preparation of Standard Titration Solutions*

GB/T 603 *Chemical Reagents – Preparation of Reagents and Substances Used in Test Methods (GB/T 603-2002, ISO 6353-1:1982, NEQ)*

GB/T 6682-1992 *Specification and Test Method of Water for Analysis Conducting Laboratory (neq ISO 3696:1987)*

3. Terms and Definition

The following terms and definitions apply to this standard.

3.1 Compressed Hop Cone

Refer to product made from fresh hops cone undergoing the processes of baking, re-moisturizing, padding (with packaging materials) and packaging.

3.2 Type 90 Hop Pellet

Refer to pellet product that is made from the grinding, screening, mixing, pressing and packaging of compressed hops.

3.3 Type 45 Hop Pellet

Refer to enriched pellet product that is made from the grinding, deep chilling, mixing, pressing and packaging of compressed hops.

3.4 CO_2 Hop Extract

Refer to extract product made from functional components extracted from compressed hops or particle hops

using carbon dioxide.

3.5 Brownish Bracts

Refer to bracts that have light brown or dark brown portion of the bracts exceeding 1/3 of the entire bract surface area.

3.6 Dissolved Time

Refer to the time required for hop pellets to completely turn soft in boiling water.

3.7 Incomplete Pellets

Refer to scattered fragments of pellets or the pellets themselves with length lesser than 1/2 of a typical hop pellet.

3.8 Hop Storage Index, HSI

Refer to the light absorbance ratio of basic methanol leaching solution of hops at wavelength 275 nm and 325 nm.

3.9 Impurity

Refer to plant parts of the hops that are not a component of the compressed hop cones, e.g. the stem, roots, flowers of hops.

4. Product Classifications

Classify according to forms:

4.1 Compressed hop cone.

4.2 Hop pellets can be further classified according by processing methods:

a) Type 90 hop pellet;

b) Type 45 hop pellet.

4.3 CO_2 hop extract can be further classified according by extraction methods:

a) Supercritical CO_2 extraction hop extract;

b) Liquid CO_2 extraction of hop extract.

5. Requirements

5.1 Sensory Requirements

5.1.1 Compressed Hop Cones

Should comply with the requirements listed in Table 1.

Table 1 Sensory Requirements for Compressed Hop Cone

Items	Top class	1st class	2nd class
Color and Luster	Light yellow with luster		Light yellow
Aroma	Has obvious, fresh and normal hop aroma, without any unusual odor		Has normal hop aroma, without any unusual odor
Curlicue State	Basically perfect	Has some petal fragments broken off	Has many petal fragments broken off

5.1.2 Hop Cone Pellets

Should comply with the requirements listed in Table 2.

Table 2 Sensory Requirements for Hop Cone Pellets

Items	Type 90	Type 45
Color and Luster	Yellowish-green or green in color	
Aroma	Has obvious, fresh and normal hop aroma, without any unusual odor	

5.2 Physical-Chemical Requirements

5.2.1 Compressed Hop Cones

Should comply with the requirements listed in Table 3.

Table 3 Physical-Chemical Requirements for Compressed Hop Cones

Items		Top class	1st class	2nd class
Impurity[a] / (%)	≤	1.0		1.5
Brownish Bracts / (%)	≤	2.0	5.0	8.0
Moisture / (%)		7.0~9.0		
α-acid (dry)[b] / (%)	≥	7.0	6.5	6.0
β-acid (dry) [b] / (%)	≥	4.0	3.0	
Storage Indicator (HSI)	≤	0.35	0.40	0.45

[a] Should not contain any other harmful substances, e.g. metal, sand, mud except for plant parts.
[b] α-acid, β-acid and HSI indexes of aromatic hop specie(s) with high α-acid that is formally named is not restricted by this limit.

5.2.2 Hop Cone Pellets

Should comply with the requirements listed in Table 4.

Table 4 Physical-Chemical Requirements for Hop Cone Pellets

Items		Type 90		Type 45
		Top class	1st class	
Pellet Fragments (Evenness) / (%)	≤	4.0		
Disintegration Time / s	≤	15		
Moisture / (%)		6.5~8.5		
α-acid (dry)[a] / (%)	≥	6.7	6.2	11.0
β-acid(dry)[a] / (%)	≥	3.0		5.0
Storage Indicator (HSI)	≤	0.40	0.45	0.45

[a] α-acid, β-acid and HSI indexes of pellets made from aromatic hop specie(s) with high α-acid that is formally named is not restricted by this limit.

5.2.3 Carbon Dioxide Hop Extract

Should comply with the requirements listed in Table 5.

Table 5 Physical-Chemical Requirements for Carbon Dioxide Hop Extract

Items		Supercritical CO_2 extraction hop extract	Liquid CO_2 extraction of hop extract
α-acid (dry) / (%)	≥	35	30
Moisture / (%)	≤	5.0	

6. Analysis Methods

The water used in these methods, unless otherwise stated, should comply with the requirements for water of 3rd class (incl. 3rd class) and above specified in GB/T 6682-1992. All reagents, unless specifications otherwise stated, all are analytically pure (AR). Formulated “solutions”, unless otherwise stated, are all water soluble.

When there are two or more test methods available for the same inspection item, the laboratory can choose whichever method more appropriate according its situation but the first method listed will always be the method used for arbitration in case of dispute on test results.

Compressed hop cone, hop cone pellets, CO_2 hop extract samples used in the analysis are all drawn in accordance with the sampling methodology specified in Sections 7.2.3.1, 7.2.3.2, and 7.2.3.3.

6.1 Color and Luster

Take a compressed hop (or hop pellet) sample and inspect its color and aroma at a place with sufficient light (avoid direct sunlight) but without any odor. Make proper records of findings and evaluate color, luster and aroma of sample with reference to the requirements listed in Table 1 (or Table 2).

6.2 Curlicue State

Take compressed hop cone sample, observe the curlicue state, make proper record of findings, and evaluate the curlicue state with reference to the requirements listed in Table 1.

6.3 Brownish Bracts

Weigh and take 20g compressed hop cone sample, pick out the brownish bracts, weigh them on a balance (weight sensitivity ±0.1 g), present reading in weight fraction format, and evaluate according to the requirements listed in Table 3.

6.4 Impurity

Weigh and take 20g compressed hop cone sample, pick out impurities such as roots, leaves and stems, weigh them on a balance (weight sensitivity ±0.1 g), present reading in weight fraction format, and evaluate according to the requirements listed in Table 3.

6.5 Pellet Fragments (Evenness)

Weigh and take 20g compressed hop cone sample, observe the size consistency between the individual pellets and collect fragmented pellets or broken pieces with diameter less than 1/2 of a typical pellet. Weigh them on a balance (weight sensitivity ±0.1 g), present reading in weight fraction format, and evaluate

according to the requirements listed in Table 4.

6.6 Disintegration Time

Add 200 mL tap water into a 400 mL beaker, then heat beaker on an electric stove, and add in (2~3) hop pellet samples into the beaker when the water is in boiling state. Upon adding the samples, immediately start timing with a stopwatch and stop timing when the pellets soften completely in the boiling water. Record the time (unit in seconds).

6.7 Moisture

6.7.1 Principle

Percentage loss of mass when sample dried directly under temperature of 103~105°C will be the actual moisture content of the sample.

6.7.2 Apparatus

6.7.2.1 Analytic Balance: Sensitivity ±0.1 mg.

6.7.2.2 Electric Drying Oven: Temperature control precision ±1°C.

6.7.2.3 Glass Weighing Dish: 30 mm×70 mm.

6.7.2.4 Dryer: Use color-changing gel as desiccant.

6.7.3 Analysis Procedure

Weigh and take 3g compressed hop cone (or 4g grinded compressed hop pellet) sample, at precision 0.001g. Place the sample in a weighing dish that has been dried to the constant weight, then place the dish into a (104±1)°C electric oven along with its dish cover for 1 hour, cover the dish and remove from oven, transfer it into a dryer to cool it to room temperature, and weigh it.

Weigh and take 5g CO_2 hop extract sample, at precision 0.001g. Place the sample in a weighing dish that has been dried to the constant weight, then place the dish into a (60±1)°C electric oven along with its dish cover for 15 mins, cover the dish and remove from oven, transfer it into a dryer to cool it to room temperature, and weigh it.

6.7.4 Result Calculation

Weight fraction of moisture content in the sample can be calculated with the following formula (1), represented in unit %.

$$w_1 = \frac{m_1 - m_2}{m_1 - m} \times 100 \quad \cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots (1)$$

In the formula:

W_1 – Weight fraction of moisture in samples, %;

m_1 – Weight of weighing dish and sample before being dried, g;

m_2 – Weight of weighing dish and sample after being dried, g;

m – Weight of weighing dish, g.

Results should be presented in the closest one decimal place.

6.7.5 Discrepancy Allowed

Discrepancy between two tests using the same sample should not exceed 3% range of average.

6.8 α-acid and β-acid

6.8.1 UV Spectrophotometry (First Method)

6.8.1.1 Principles

Extract α-acid and β-acid from the hops using organic solutions, thereafter use an UV spectrophotometer to determine the light absorbance ratio at wavelengths of 275 nm, 325 nm, 355 nm and then calculate the α-acid and β-acid content values in sample using the appropriate formula.

6.8.1.2 Reagents and Materials

a) Toluene: Extract 1 mL of this reagent, then dilute it to 100 mL with basic methanol solution. Use a 1 cm cuvette to determine the light absorbance ratio (with reference to that of water) at the wavelength of 275 nm, of which the absorbance value should be less than 0.11;

b) Methanol: Use a 1 cm cuvette to determine the light absorbance ratio (with reference to that of water) at the wavelength of 275 nm, of which the absorbance value should be less than 0.06;

c) Saturated Sodium Hydroxide Solution: Formulate a saturated solution with sodium hydroxide, channel solution into a plastic bottle, seal and wait for the solution to turn clear;

d) Water without carbon dioxide content: Prepared according to GB/T 603;

e) Sodium Hydroxide Solution [c(NaOH)=6.0 mol/L]: Extract 31.2 mL saturated sodium hydroxide solution [prepared as in 6.8.1.2(c)], add it into CO_2-free water and fix volume to 100 mL;

f) Basic Methanol Solution: Add 0.2 mL sodium hydroxide solution [prepared as in 6.8.1.2(e)] into 100 mL methanol [prepared as in 6.8.1.2(b)], and such solution should be used before the end of the day of which it was prepared.

6.8.1.3 Apparatus

a) UV Spectrophotometer: Wavelength of 200 nm~800 nm, and comes with quartz cuvette of 1 cm diameter;

b) Analytic Balance: Sensitivity ±0.1 mg;

c) Grinder: 5000 r/min;

d) Erlenmeyer Flask with Stopper: 250 mL;

e) Oscillator.

6.8.1.4 Preparation of Samples

Compressed hop cone (or hop cone pellet): Take ~20g samples and grind it then mix powder evenly. Weigh and take 2 set of samples of ~5g each, precision 0.001g, and place them into a 250 mL Erlenmeyer flask with stopper respectively. Transfer 100 mL toluene into each flask with a pipette, cover flasks with stopper before weighing them. Thereafter, use an oscillator (or shake by hands) to shake the flasks for about 30 mins, then let the flasks rest in tilted position until the solution clears, prepare for use later (weigh them after being shake for 30 mins, if weight loss exceeds 0.3g, then new samples need to be drawn and prepared.)

6.8.1.4.2 CO_2 hop cone extract: Extract 1 can of samples, place it into 40°C water bath and maintain temperature for ~30 mins so as to change the paste-like extract into its liquid form. Thereafter open the can, mix the sample evenly with a sampling spoon, then weigh and extract 2 samples of ~0.5g each, precision 0.001g. Place the samples into a 250 mL Erlenmeyer flask with stopper respectively. Transfer 100 mL toluene into each flask with a pipette, cover flasks with stopper before weighing them. Thereafter, use an oscillator (or shake by hands) to shake the flasks for about 30 mins, then let the flasks rest in tilted position until the solution clears, prepare for use later (weigh them after being shake for 30 mins, if weight loss exceeds 0.3g, then new samples need to be drawn and prepared.)

6.8.1.5 Analysis Methods

a) Diluted Solution A: Extract 5.0 mL of sample extract, dilute the solution and fix its volume to 100 mL with methanol.

b) Diluted Solution B: Extract 5.0 mL of diluted solution A, dilute the solution and fix its volume to 50 mL with basic methanol.

c) Reference Solution: Extract 5.0 mL toluene and then dilute the solution and fix its volume to 100 mL with methanol. Thereafter extract 3.0 mL of this latter solution, dilute the solution and fix its volume to 50 mL with basic methanol.

d) Adjust the UV spectrophotometer to working conditions according to its user manual, then use quartz cuvette with 1 cm diameter, calibrate the light absorbance ratio reading to zero using the reference solution prepared earlier. Thereafter, determine the light absorbance A of diluted solution B respectively at the wavelength of 275 nm, 325 nm, 355 nm, and the read off immediately.

6.8.1.6 Result Calculation

6.8.1.6.1 Dilution factor can be calculated according to the following formula (2).

$$n = \frac{V_A \times V_B}{100 \times m \times V_1 \times V} \qquad \cdots\cdots\cdots\cdots\cdots\cdots (2)$$

In the formula:

n – Dilution factor;

V_A –Volume of diluted solution A, mL;

V_B – Volume of diluted solution B, mL;

100 – Conversion factor;

m – Weight of samples, g;

V_1 – Volume of sample liquid extract, mL;

V – Volume of diluted solution A absorbed during the preparation of diluted solution B, mL.

Results should be presented in the closest two decimal place.

6.8.1.6.2 Weight fraction of α-acid in sample can be calculated with the following formula (3) and (4), values represented in unit %.

$$w_2 = n \times [-(51.56 \times A_{355}) + (73.79 \times A_{325}) - (19.07 \times A_{275})] \quad \cdots\cdots(3)$$

$$w_3 = \frac{w_2}{1 - w_1} \times 100 \quad \cdots\cdots(4)$$

In the formula:

W_2 –Weight fraction of α-acid in sample, %;

n – Dilution factor;

A_{355} – Light absorbance ratio of diluted solution B at wavelength 355 nm;

A_{325} – Light absorbance ratio of diluted solution B at wavelength of 325 nm;

A_{275} – Light absorbance ratio of diluted solution B at wavelength of 275 nm;

W_3 – Weight fraction of α -acid in samples (dry), %;

W_1 – Weight fraction of moisture in samples, %.

Results should be presented in the closest one decimal place.

6.8.1.6.3 Weight fraction of β-acid in sample can be calculated with the following formula (5) and (6), values represented in unit %.

$$w_4 = n \times [+(55.57 \times A_{355}) - (47.59 \times A_{325}) + (5.10 \times A_{275})] \quad \cdots\cdots(5)$$

$$w_5 = \frac{w_4}{1 - w_1} \times 100 \quad \cdots\cdots(6)$$

In the formula:

W_4 –Weight fraction of α-acid in sample, %;

n – Dilution factor;

A_{355} – Light absorbance ratio of diluted solution B at wavelength 355 nm;

A_{325} – Light absorbance ratio of diluted solution B at wavelength of 325 nm;

A_{275} – Light absorbance ratio of diluted solution B at wavelength of 275 nm;

W_5 – Weight fraction of α -acid in samples (dry), %;

W_1 – Weight fraction of moisture in samples, %.

Results should be presented in the closest one decimal place.

6.8.1.7 Discrepancy Allowed

Discrepancy between two tests using the same sample should not exceed 5% range of average.

6.8.2 Conductometric Titration (Second Method)

6.8.2.1 Principles

Extract α-acid from the hops using organic solutions and then formulate with that into a compound/mixture solution. When the mixture solution is added with lead acetate solution, α-acid will form chemical complex with lead ions, resulting in a stable, unchanging conductivity ratio in the solution. Upon reaching the end point of the complex reaction, with the increase in the concentration of excess lead ions, conductivity of the solutions will also increase in tandem. Find the inflection point that is representative of the end point through proper graphing, then use these findings to calculate the α-acid content.

6.8.2.2 Reagents and Materials

a) Toluene;

b) Methanol;

c) Dimethylsulfoxide;

d) Glacial Acetic Acid;

e) Electrode Soaking Solution: Methanol + acetic acid = 1 +1, mix evenly, prepare for use;

f) Sulfuric Acid Standard Solution [$c(1/2H_2SO_4)$=0.1 mol/L]: Prepare and calibrate according to GB/T 601;

g) Lead Acetate Solution (2%):

Preparation: Weigh and take 10g lead acetate [$Pb(C_2H_3O_2)_2 \cdot 3H_2O$], precision 0.002g, place it into a small beaker, then add a small amount of methanol along with (2~3) drops of glacial acetic acid to dissolve it, and lastly dilute the solution and fix its volume to 500 mL with methanol, shake and prepare for use later;

Calibration: Add 4 mL sulfuric acid standard solution [prepared as in 6.8.2.2(f)] into 80 mL methanol, and then titrate with lead acetate [prepared as in 6.8.2.2(g)]. Record readings each time 0.1 mL or 0.2 mL lead acetate was added, and when conductivity soars drastically, titrate another (6~7) times and make proper records of each of the conductivity readings taken before. Plot the milliliter value of the 2% lead acetate consumed each time and the corresponding conductivity readings on graph paper, connect every point, and plot 2 lines, i.e. a straight line with start and end point near to the horizontal axis and a straight line illustrating the drastic increase of conductivity. The end point will be the point of intersection between the two lines.

Calculation: Concentration of lead acetate solution can be calculated according to the following formula (7), value is represented in unit %.

$$X = \frac{c \times 4 \times 189.67}{1\,000 \times V} \times 100 \qquad \text{.....(7)}$$

In the formula:

X – Concentration of lead acetate solution, %;

c – Concentration of sulfuric acid standard solution, mol/L;

4 – Volume of sulfuric acid standard solution added, mL;

189.67 – Molar mass of lead acetate [1/2Pb($C_2H_3O_2$)$_2$], g/mol;

V – Volume of lead acetate consumed during calibration, mL.

6.8.2.3 Apparatus

a) Conductivity Meter;

b) Magnetic Stirrer;

c) Microburette: 5 mL;

d) Analytic Balance: Sensitivity ±0.1 mg;

e) Conical flask with Stopper: 250 mL;

f) Beaker: 50 mL, 100 mL.

6.8.2.4 Preparation of Samples

Same as Section 6.8.1.4.

6.8.2.5 Analysis Procedure

6.8.2.5.1 Adjust the conductivity meter according to the user manual so as ensure that it is in proper working conditions.

6.8.2.5.2 Extract 10.0 mL clear extract solution into 50 mL or 100 mL clean beaker, add 40 mL methanol (when conducting test for aged hop cone, also add 10 mL dimethylsulfoxide) and add a rotor with glass core into the beaker. Place the beaker on the platform of a magnetic stirrer, insert platinum black electrodes deep into the surface of the solution and then start the magnetic stirrer. Add 0.1 mL or 0.2 mL of 2% lead acetic solution with microburette, and then record the conductivity reading. Record readings each time 0.1 mL or 0.2 mL lead acetate was added, and when conductivity soars drastically, titrate another (6~7) times and make proper records of each of the conductivity readings taken before, of which this whole process should be completed within 5 mins. After titration, insert the electrodes into the soaking solution [prepared as in 6.8.2.2(e)] for several minutes, wash with methanol and prepare for use in titration the next time.

6.8.2.5.3 Graphing: On a piece of Cartesian millimeter graph paper, set the millimeter values of 2% lead acetate solution for the horizontal axis and the conductivity values for the vertical axis. Plot points indicated by the volume of 2% lead acetate solution consumed each time and their corresponding conductivity values on the graph paper, connect the points and plot 2 lines, i.e. a straight line with start and end point near to the horizontal axis and a straight line illustrating the drastic increase of conductivity. Extend the 2 lines and draw a perpendicular line to the horizontal axis at the point of intersection of the 2 lines, read off the horizontal value to obtain the millimeter value of 2% lead acetate solution consumed at the specific end point.

6.8.2.5.4 Illustration: See Table 6 for the reading table for 2% lead acetate consumption and conductivity, and plot graph according to image (Image 1).

Table 6 Reading Table of Lead Acetate Consumption and Conductivity

2% Lead Acetate Solution / mL	Conductivity / (μΩ/cm)	2% Lead Acetate Solution / mL	Conductivity / (μΩ/cm)
0.4	0.62	2.6	0.67
0.8	0.65	2.8	0.72
1.0	0.67	3.0	0.79
1.2	0.67	3.2	1.00
1.4	0.67	3.4	1.34
1.6	0.67	3.6	1.65
1.8	0.67	3.8	1.95
2.0	0.67	4.0	2.20
2.2	0.67	4.2	2.50
2.4	0.67		

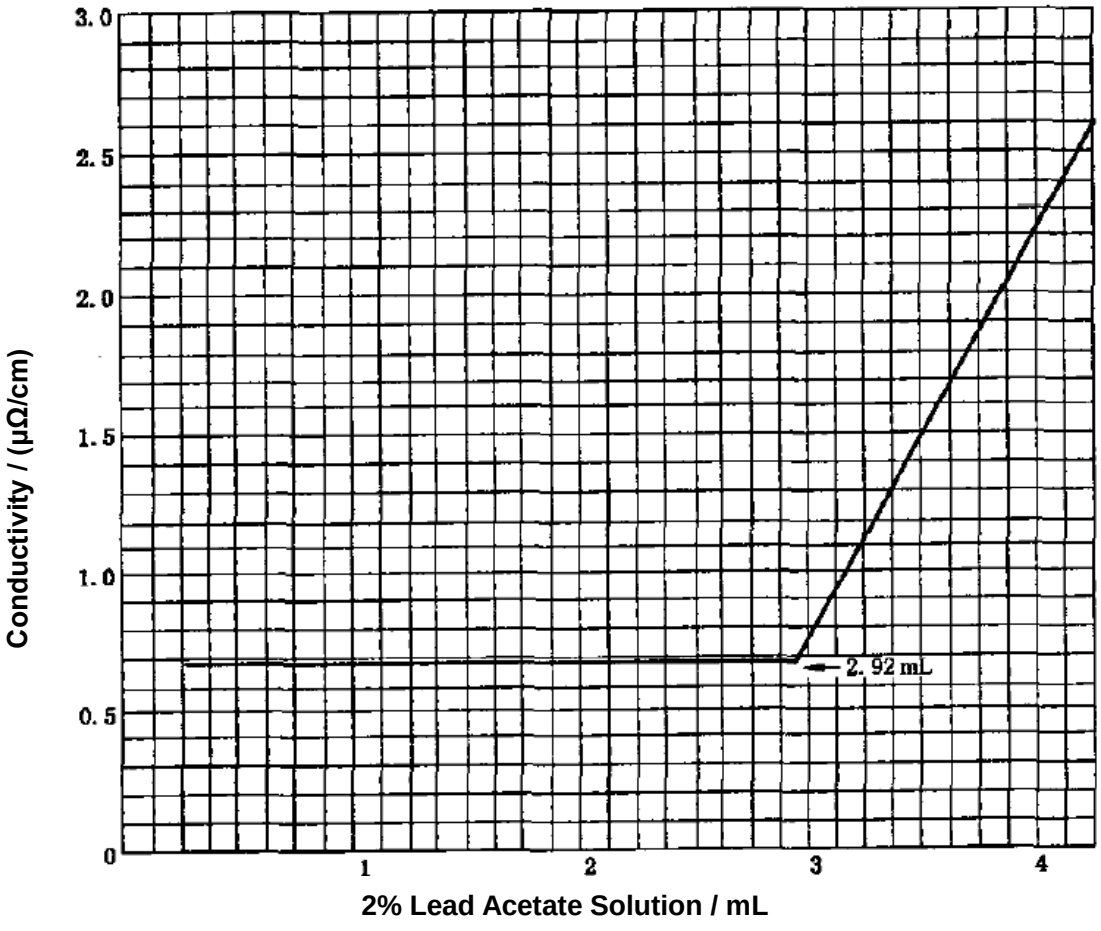


Image 1 Lead Acetate Titration End Point Graph

6.8.2.6 Result Calculation

Weight fraction of α-acid in sample can be calculated with the following formula (8) and (9), values represented in unit %.

$$w_7 = \frac{c \times V \times 179 \times V_1}{189.67 \times 5 \times 10} \times 100 \qquad \cdots\cdots(8)$$

$$w_8 = \frac{w_7}{1 - w_1} \qquad \cdots\cdots(9)$$

In the formula:

W_7 –Weight fraction of α-acid in sample, %;

c – Concentration of lead acetate solution, %;

V – Volume of lead acetate solution consumed at the titration end point, mL;

179 – ½ α-acid average molar mass, g/mol;

V_1 – Volume of sample extracted by adding toluene, V_1=100 mL;

189.67 – Molar mass of lead acetate [$1/2Pb(C_2H_3O_2)_2$], g/mol;

5 – Weight of sample, g;

10 – Volume of liquid extracts taken, mL;

W_3 – Weight fraction of α-acid in samples (dry), %;

W_1 – Weight fraction of moisture in samples, %.

Results should be presented in the closest one decimal place.

6.8.2.7 Discrepancy Allowed

Discrepancy between two tests using the same sample should not exceed 5% range of average.

6.9 Storage Indicator

6.9.1 Principles

HSI index value will increase due to oxidation of α-acid and β-acid if hop cones and pellets are being mishandled during processing procedure, storage and transportation as well as if aged hops are being mixed into their midst. Use an UV spectrophotometer to determine the light absorbance ratio of the basic methanol liquid extract of hop products at wavelengths of 275 nm, 325 nm and this value will be the HSI index value of the hop cones and pellets.

6.9.2 Reagents and Material

Same as Section 6.8.1.3.

6.9.3 Preparation of Samples

Same as Section 6.8.1.4.

6.9.5 Analysis Procedure

Same as Section 6.8.1.5.

6.9.6 Result Calculation

Storage indicator can be calculated according to the following formula (10).

$$w_9 = \frac{A_{275}}{A_{325}} \qquad \cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots (10)$$

In the formula:

W_9 – Storage indicator for samples;

A_{275} – Light absorbance ratio of sample at wavelength of 275 nm;

A_{325} – Light absorbance ratio of sample at wavelength of 325 nm;

Results should be presented in the closest one decimal place.

7. Inspection Guidelines

7.1 Batches

7.1.1 Compressed hops harvested, baked, remoisturized and packaged in the same time period, from the same factory (plant), of the same specie will be grouped as a single batch. For every factory (plant), tag the products in sequential order with continuous serial numbers from the first bag manufactured on the first day of work every year, of which the year of production should also be indicated. Batch of compressed hops with weight not exceeding 5 t (or packages equivalent to 5 t) will be grouped as a single inspection batch.

7.1.2 Hop pellets processed in the same time period, from the same factory (plant), using the same processing methodology will be grouped as a single batch, of which the processing date, hop specie and processing methodology (Type 90 or Type 45) should be labeled. Batch of hop pellets with weight not exceeding 5 t (or packages equivalent to 5 t) will be grouped as a single inspection batch.

7.1.3 CO_2 hop extracts processed in the same time period at the same factory will be grouped as a single batch, of which the processing date, extraction methodology and α-acid content should be indicated. Batch of CO_2 hop extracts with weight not exceeding 0.5 t~1.0 t (or cans equivalent to 0.5 t~1.0 t) will be grouped as a single inspection batch.

7.2 Sampling

7.2.1 Sampling Quantity for a Standard Batch

Sampling quantity for a standard batch should be derived with the principle of square root. Sampling quantity can be calculated based on the following formula (11):

$$N = \sqrt{P} \qquad \cdots\cdots(11)$$

In the formula:

N – Sampling Quantity;

P – Total quantity of products in this batch.

7.2.2 Sampling Quantity for Non-standard Batch or Standard Batch with Insufficient Quantity

Sampling quantity for non-standard batch or standard batch with insufficient quantity should be in accordance with Table 7.

Table 7 Sampling

Batch Quantity / Bags (or Boxes, Cans)	Sampling Quantity / Bags (or Boxes, Cans)
26~90	5
91~150	8
151~500	13
501~1,200	20

7.2.3 Sampling Methods and Inspection on Appearance

7.2.3.1 Compressed Hop Cones

Randomly draw samples at a certain quantity from the top, bottom, inner and outer parts of the product stack of the same batch in accordance with principle specified in Section 7.2. Before sampling, check the inspection checklist, verifying product batch, quantity, packaging, etc. Thereafter cut any of the sides of a bag of hops with a stainless steel knife, uncover the packaging material then retrieve 50g or more of the hops samples from depth of 50 mm~100 mm from the incision. Immediately transfer the sample retrieved into a sealed container (clean metal cylinder or airtight plastic bag), of which total mass taken for every batch should not be lesser than 600g. Appropriate increase in sampling quantity is allowed if actual sampling quantity is insufficient. Mix all hops samples drawn evenly, use quadratic method to divide sample into 2 portions (each ~300g) and transfer them into sealed containers, one as backup and another divided further into 2 portions (each ~150g) for sensory and physical-chemical analysis. Take note and make proper records of the appearance, smell, impurity and the differences between bags of products during the sampling process.

7.2.3.2 Hop Cone Pellets

Draw samples at random at a certain quantity from each batch in accordance with principle specified in Section 7.2. Before sampling, check the inspection checklist, verifying product batch, quantity, packaging, etc. Draw one bag (or one box) from every crate (barrel), use a small shovel to extract 25g~50g samples. Immediately transfer the sample retrieved into a sealed container (clean metal cylinder or airtight plastic bag), of which total mass taken for every batch should not be lesser than 600g. Appropriate increase in

sampling quantity is allowed if actual sampling quantity is insufficient. Mix all hops samples drawn evenly, use quadratic method to divide sample into 2 portions (each ~300g) and transfer them into sealed containers, one as backup and another divided further into 2 portions (each ~150g) for sensory and physical-chemical analysis. Take note and make proper records of the appearance, smell, impurity and the differences between bags of products during the sampling process.

7.2.3.3 CO_2 Hop Extracts

Draw samples at random at a certain quantity from each batch in accordance with principle specified in Section

7.2. Before sampling, check the inspection checklist, verifying product batch, quantity, packaging, etc. Use a small knife to open the can container, place the can in a 40^{o}C thermostatic water bath and heat up for 30 mins, stir evenly and extract sample not less than 10g per can, of which total amount should not be less than 200g. Mix the individual samples, heat up and stir evenly, extract sufficient amount for analysis and then keep the rest as backup for future references.

7.3 Out-factory Inspection

7.3.1 Products should be inspected by the factory's (plant's) in-house technical inspection department batch-by-batch in accordance with this standard before they are released. The results of inspection should comply with the requirements in this standard and specific inspection qualification certification should be issued for the products before they are allowed to be released from the factory (plant).

7.3.2 Inspection items:

Compressed hop cones – Impurity, moisture, α-acid, storage indicator

Hop pellets – Evenness, disintegration time, moisture, α-acid, storage indicator

CO_2 hop cone extraction – Moisture, α-acid

7.4 Type Inspection

7.4.1 Inspection items: All the items required in this standard

7.4.2 Under normal circumstances, type inspection should be carried out once half a year, or if any of the following situations arises:

a) When there are significant changes in raw material used;

b) When there are changes in key processes;

c) When there is new products put into product or upon resumption of production after 3 months of stoppage;

d) When there is a significant discrepancy between results of out-factory inspection and those of the last type inspection;

e) When specifically required by the national quality supervision and inspection authorities in accordance with relevant regulations.

7.5 Judgment Guidelines

7.5.1 If the inspection results have two or less (incl. two) items that fail to meet requirements, re-inspection is allowed to be conducted on twice the quantity of samples drawn from the same batch of products, of which the result of the re-inspection will be used as the final basis for judgment. If there still exist one unqualified item, then this batch of products will be deemed unqualified.

7.5.2 When there is disagreement between the opposite sides of the demand and supply of products, disagreement can be resolved through proper negotiations between parties involved, or through the conducting of an arbitration inspection by relevant authorities on behalf of the parties involved, of which the results of the arbitration inspection will be the final basis for judgment.

8. Labeling, Packaging, Transportation and Storage

8.1 Labeling

8.1.1 Products for sale should indicate name and address of products' manufacturing factory (plant), origin of production of hops and year of harvest, product name, specifications, grade, production date, gross weight, net weight and code of standard implemented.

8.1.2 Shipping and transportation label should comply with relevant requirements of GB/T 191, and should indicate phrases such as "prevent from getting wet", "avoid light" and "avoid high temperature" at a prominent position.

8.2 Packaging

8.2.1 Packaging materials should comply with relevant hygiene requirements.

8.2.2 Use brown paper linings and polyethylene plastic films to package compressed hops, then wrap the outside with white or linen cloth and place 3 pieces of bamboo each on the front and reverse side of the packaging, secured with 6 sets of blue grilled-style steel hoops. Packaging dimensions are 40 cm×60 cm×65 cm, with allowed discrepancy of ±1 cm. Packaging should be well-sealed, neat without any signs of holes or damages.

8.2.3 Use traditional packaging for compressed hops, of which net content of each bag is 30 kg, with allowed discrepancy of ±1 cm.

8.2.4 Use aluminum composite packaging bags with polyethylene linings to package hop pellets and bags should be filled with inert gas (e.g. nitrogen gas) after creating a vacuum within. Weight of each bag can be determined according to the size of bag (barrel) and quantity of pellets.

8.2.5 Packaging containers that are light proof and comply with food hygiene requirements should be used for packaging of CO_2 hop extracts.

8.3 Transportation

8.3.1 Sheltering canopy cover or sealed vehicle compartment should be used during transportation process, of which cargo in the sealed compartment should be elevated to a certain height with waterproof materials.

8.3.2 Should not be stored in the same warehouse, transported together in the same vehicle compartment as foul-smelling or poisonous substances.

8.3.3 Should be handled with care, while rain, moisture and sunlight exposure is strictly forbidden.

8.4 Storage

Should be stored in the dry environment at a temperature lower than 4°C, away from light. Should be stored in the open environment.

Appendix A

(Informative Appendix)

HPLC Determination for α-acid and β-acid

A.1 Principles

Use C_{18} analytical columns, a high performance liquid chromatography (HPLC) apparatus that come attached with ultraviolet (UV) or diode array detector, α-acid will disintegrate into composite humulones peaks and humulones peaks and adhumulone combined peaks; β-acid will disintegrate into composite lupulone peaks and lupulone peaks and lupulone combined peaks. Content of α-acid and β-acid can be determined through calculation.

A.2 Reagents and Materials

A.2.1 Methanol: Chromatographically pure;

A.2.2 Distilled water;

A.2.3 Phosphate;

A.2.4 Hydrochloric acid solution [c(HCl)=0.1 mol/L]: Formulated according to GB/T 601;

A.2.5 Toluene;

A.2.6 Ethyl ether;

A.2.7 α-acid and β-acid hop extract standard samples.

A.3 Apparatus and Equipment

A.3.1 HPLC apparatus: UV or diode array detector, automatic or manual injection valve;

A.3.2 Mono-or multi-pump;

A.3.3 Analytical column temperature maintaining box;

A.3.4 Chromatograph columns: C_{18} columns (e.g.: Nucleosil-5 C_{18} 250 mm×4.6 mm or ODS RP18), can also use other chromatograph columns with equivalent analytical effects;

A.3.5 Filtration device: 1000 mL vacuum suction filtration device, 0.2 μm or 0.45 μm membrane;

A.3.6 Degasser: Helium bottle or ultrasonic cleaner;

A.3.7 Dissolving and extraction device: Ultrasonic water bath and thermostat shaker;

A.3.8 Volumetric Flask: 50 mL, 100 mL;

A.3.9 Pipette: 20 mL, 100 mL;

A.3.10 Conical flask with stopper: 250 mL;

A.3.11 Micro-injector and plastic syringes;

A.3.12 Analytic balance: ±0.1 mg;

A.3.13 Hops grinder.

A.4 Liquidity Ratio and Processing Methodology

Methanol + distilled water + phosphate (85%) = 85+19+0.26. After formulation based on volume ratio, run mixture through vacuum suction filtration device and then degas using helium gas or ultrasonic cleaner.

A.5 Processing of Hop Extract Standard Samples and Analyte Samples

A.5.1 Hop Extract Standard Samples

Place hop extract standard sample into a 25~30ºC water bath, stir evenly. Weigh and take 0.5g of sample and place it into a 50 mL beaker, add 30 mL methanol to dissolve and place beaker into a ultrasonic water bath for 30 mins. Transfer the solution into a 100 mL volumetric flask, fix volume to full with methanol and mix evenly. Extract 20 mL of the solution into 50 mL volumetric flask, fix volume to full with methanol and mix evenly. Filter with 0.45 μm membrane and store in sample bottle, prepare sample for injection. Prepared sample should be stored away from light at low temperature, of which sample will stabilize within 24 hours.

A.5.2 Pre-processing of Compressed Hops and Hop Pellets Samples

Weigh and take 10g hop powder (or powder as a result of compressed hop cones or hop pellets being grinded), place in a 250 mL conical flask with stopper and use 20 mL methanol and 100 mL ethyl ether (or toluene) for extraction. Place the flask in a thermostatic 25ºC shaker for 30-min oscillations, add 40 mL hydrochloric acid solution (prepared as in A.2.4) then oscillate on shaker for another 10 mins and let it settle for 20 mins so as to separate the layers. Extract 20 mL of the ethyl ether on the top layers, fix volume to 50 mL with methanol and mix evenly. Filter with 0.45 μm membrane and store in sample bottle, prepare sample for injection. Prepared sample should be stored away from light at low temperature, of which sample will stabilize within 24 hours.

A.5.3 Pre-processing of CO_2 Hop Extract Samples

Place CO_2 hop extract sample into 25~30°C water bath, mix evenly, weigh and take 1g, and then go through the same operations in accordance with Section A.5.1.

A.6 Analysis Procedure

A.6.1 Apparatus Operating Conditions

Column temperature: Thermostatic 25~30°C;

Detection wavelength: 315 μm;

Sample injection volume: 20 μL.

A.6.2 Determination of Standard Calibration Factor

Hop extract standard sample (prepared as in A.5.1), inject 20 μL, repeat operation 6 times and calculate standard calibration factor.

A.6.3 Determination of Samples

Analytes (prepared as in A.5.1 or A.5.3), inject 20 μL, use external standard method to calculate the weight fractions of each component.

A.7 Result Calculation

Calibration factors of each component group can be calculated with the following formula (A.1).

$$f_i = \frac{m_i \times w_i'}{A_i} \qquad \cdots\cdots (A.1)$$

In the formula:

f_1 – Calibration factor for each component group;

m_1 – Weight of standard sample, g;

w_1' – Weight fraction of individual component group in sample, %;

A_1 – Peak area of each component group in sample.

Weight fraction of individual component group in sample can be calculated with the following formula (A.2).

$$w_i = f_i \times \frac{A \times n}{m} \times 100 \qquad \cdots\cdots (A.2)$$

In the formula:

w_1 – Weight fraction of individual component group in sample, %;

f_1 – Calibration factor for each component group;

A – Peak area of each component group in sample;

n – Dilution factor of sample;

m – Weight of samples, g.

Results should be presented in the closest one decimal place.

A.8 Discrepancy Allowed

Discrepancy between two tests using the same sample should not exceed 5% range of average.

Spirits

GBT 11858-2008 Vodka

National Standards of People's Republic of China

GB/T 11858-2008

National Food Safety Standards

Vodka

Issued on: 2008-10-19 Implemented on: 2009-06-01

Issued by the General Administration of Supervision, Inspections and Quarantine of the People's Republic of China and National Standardization Management Committee

Foreword

This standard took references from the Vodka section of the 1576/89 Regulation (EC) No. 110/2008 of the European Parliament and of the Council on the Definition, Description, Presentation, Labelling and the Protection of Spirit Drinks.

This standard replaces the earlier version GB/T 11858-2000 Vodka.

As compared with GB/T 11858-2000, key changes are as follows:

- Description of scope of application had been amended;
- Section on “Terms and Definition” was added;
- Requirements on raw and supplementary ingredients were removed;
- Made appropriate amendments to alcohol content index;
- Made appropriate amendments to inspection guidelines.

Appendix A and B in this standard are normative appendices.

This standard was proposed by the National Food Industry Standardization Management Committee.

This standard is under the jurisdiction of the National Brewers Standardization Management Committee.

The organizations involved in the drafting of this standard: China Food Fermentation Industry Research Institute, Jilin Tuopai Agricultural Product Development Co., Ltd.

The key personnel involved in the drafting of this this standard: Wei Zhang, Xuebo Bai, Yongpu Kang, Yuxing Liu and Xingguang Guo.

This standard will replace the earlier versions:

- GB/T 11858-1989, GB/T 11858-2000.

National Food Safety Standards

Vodka

1. Scope

This standard specified the terms and definition, requirements, analysis methods, inspection guidelines as well as labelling, packaging, transportation & storage for vodka.

This standard applies to the production, inspection and sales/distribution of vodka.

2. Normative References

Clauses involved in the following documents constitute the ones in this standard through reference in this standard. If any reference is dated, the following amendment or revised versions (excluding errata) are not applicable to this standard. However, the study of whether the latest version of these documents can be used by all parties who reach agreement according to this standard is encouraged. Any latest version of the non-dated reference is applicable to this standard.

GB/T 191 *Illustration and Logo for Packaging, Storage and Transportation* (GB/T 191-2008.ISO 780:1197, MOD)

GB/T 601 *Chemical Reagents – Preparation of Standard Titration Solution*

GB/T 603 *Chemical Reagents – Preparation of Reagents and Substances Used in Tests* (GB/T 603-2002, ISO 6353-1:1982, NEQ)

GB 2757 *Hygienic Standard for Distilled Spirits and Liquor*

GB/T 6682 *Specifications and Testing Methods for Water Used in Analysis Experiments* (GB/T 6682-2008, ISO 3696:1987, MOD)

GB 10344 *General Principles of Prepackaged Wine Beverage Labels*

3. Terms and Definition

The following terms and definitions will apply for this standard.

3.1 Vodka

Refers to distilled spirits, products of special refining processes of edible alcohol that is the result of fermentation and distillation of grains, tubers, molasses and other similar agricultural products as its key ingredients.

3.2 Flavored Vodka

Refers to vodka products that highlight the flavor of the specific food flavoring added with plain vodka described above as base alcohol.

4. Requirements

4.1 Sensory Requirements

Should comply with the requirements listed in Table 1.

Table 1 Sensory Requirements

Items	Vodka	Flavored Vodka
Appearance	Colorless, clear, transparent without any suspended substances or precipitation	
Smell	Aromatic, no unusual odor	Aromatic and has the smell of the food flavoring added
Taste	Gentle, fruity, distinct sweetness, no unusual taste	Has obvious flavor of the specific flavoring added
Style	Has the style unique to the product	

4.2 Physical-Chemical Index Requirements

Physical-chemical indexes should comply with the requirements listed in Table 2.

Table 2 Physical-Chemical Index Requirements

Items		Superior Grade	First Grade	Second Grade
Alcohol Content[a] / (%vol)	≥	37.0		
Alkalinity / mL	≤	2.5	3.0	3.5
Total Aldehyde (Acetaldehyde) / [mg/L (100%vol Ethyl Alcohol)]	≤	4	6	8
Total Ester (Ethyl Acetate) / [mg/L (100%vol Ethyl Alcohol)]	≤	10	15	25
Methyl Alcohol / [mg/L (100%vol Ethyl Alcohol)]	≤	50		
High Quality Alcohols / [mg/L (100%vol Ethyl Alcohol)]	≤	4	6	8
[a]Discrepancy between actual alcohol content and alcohol content value indicated on product label should be within the ±1.0 %vol range.				

4.3 Hygiene Requirements

Should comply with the requirements specified in GB 2757.

5. Analysis Methods

The water used in this standard, unless otherwise stated, all refers to water that complies with the requirements specified in GB/T 6682.

The chemical reagents used in this standard, unless otherwise stated, all are analytically pure (AR). The formulated “solutions”, unless otherwise stated, all are aqueous solutions.

If there are two or more methods of analysis for the same test item, laboratory can choose which method to adopt according to individual circumstances, although the first method is always the method to reference under situation of conflicting results.

Ethanol content (alcohol content) mentioned in this standard is represented in fraction of total volume (%vol), hereinafter simply indicated to as %.

5.1 Sensory Analysis

5.1.1 Preparation of Alcohol Samples

Mark each alcohol sample with a code number, then place the sample in a water bath adjusted to 20°C~25°C. Pour 45 mL of each alcohol samples into corresponding clean and dry tasting glasses.

5.1.2 Appearance

Place the tasting glass with alcohol samples in a bright area, and raise it up to eyebrow level. Observe the color, luster, degree of transparency and clarity of the sample in the glass as well as to check for the presence of precipitation and suspended substance with your sense of sight. Make proper records of the findings.

5.1.3 Smell

Hold by the stem of the tasting glass with your hands, slowly move the glass under your nostrils and smell the aroma emanating from the sample. Thereafter, slowly swirl the glass and smell the aroma again after the diffusion of air into the alcohol sample after the swirling. Add a lip to the cup and hold the bowl of the glass for 2 mins, smell the aroma again after swirling. Analyze and determine the aroma of the ingredients, flavorings added or if there is any unusual odor. Write a report on the analysis.

5.1.4 Taste

Drink and place a small amount of the sample (~2 mL) into the mouth, uniformly distribute the liquid across the entirety of the taste buds and taste carefully. Once a distinct impression has been formed, swallow to determine the palate and make appropriate records of the palate and taste features of the vodka.

5.1.5 Style

Analyze and evaluate the specific style and traditional level of strength/weakness of the alcohol collectively based on the appearance, aroma and taste characteristics determined as abovementioned. Write a report on the conclusion of the evaluation.

5.2 Alcohol Content

5.2.1 Density Bottle Method

5.2.1.1 Principle

Remove substances that are not volatile with distillation and then use the density bottle method, electronic density apparatus to determine the density of the sample (aqueous solution of alcohol) at 20°C. Match results against a table of specific fraction of volume of ethanol at 20°C in Appendix A and the value will be the alcohol content.

5.2.1.2 Apparatus

5.2.1.2.1 All-glass Distillation Apparatus: 500 mL.

5.2.1.2.2 Thermostatic Water Bath: Precision of Temperature Control ±0.1°C.

5.2.1.2.3 Density Bottle with Thermometer Attachment: 25 mL or 50 mL.

5.2.1.3 Preparation of Sample Solution

Use a clean and dry 100 mL volumetric flask to extract 100 mL of alcohol sample (solution temperature at 20°C) accurately into a 500 mL distillation flask. Use total 50 mL water to wash the volumetric flask 3 times and combine the washing solution together with the existing solution in the distillation flask. Add a few zeolites (or glass beads) and attach the flask with a condenser pipe. Use the original volumetric flask as the receiver (along with an ice bath) and start the cooling process (cooling water should be less than 15°C). Gradually increase the temperature and begin distillation, collect the distillates. When it is near full, detach the volumetric flask, cover it and keep its temperature maintained in a 20°C water bath for 30 mins. Add water to full, mix and prepare for use later.

5.2.1.4 Analysis Procedure

Wash the density bottle clean and heat it up repeatedly to dry it. Take weight after each attempt until its weight (m) stabilizes, i.e. does not change anymore.

Remove the cork that is attached with a thermometer and then fill the density bottle to full with water that had been previously boiled and then cooled to 15°C. Reattach the cork (ensure there is no air bubbles in the bottle), and immediately submerge the bottle into a thermostatic water batch at 20°C±0.1°C. Once temperature of the bottle's content reached and maintained at 20°C for 20 mins, swiftly removed any overflowing liquid from the sides of the tube with filter paper and immediately cover the small lid on the tube's side branch. Remove the density bottle, clean the external surfaces of the bottle of any liquid with filter paper and measure weight (m_1) immediately.

Pour away the water, use non-aqueous ethanol and then diethyl ether to wash the density bottle. Blow dry (or bake dry in an oven), then use test reagent (prepared as in 5.2.1.3) to wash the density bottle repeatedly for 3~5 times, and fill it up to full. Repeat abovementioned operation and weigh again (m_2).

5.2.1.5 Result Calculation

Density of sample solution at 20°C can be computed with the following formula (1) and (2).

$$\rho_{20}^{20} = \frac{m_2 - m + A}{m_1 - m + A} * \rho_0 \quad \text{..... (1)}$$

$$A = \rho_a * \frac{m_1 - m_2}{997.0} \quad \text{..... (2)}$$

In the formula:

ρ_{20}^{20} – Density of sample solution at 20°C, unit is gram per liter (g/L);

m_2 – Weight of density bottle with samples, unit is gram (g);

m – Weight of density bottle, unit is gram (g);

A – Air buoyancy correction value;

m_1 – Weight of density bottle with water, unit is gram (g);

ρ_0 – Density of distilled water in 20°C (998.20 g/L);

ρ_a – Density value of dry air at 20°C, 1013.25 hP_a (~1.2 g/L);

997.0 - Density deviation between that of distilled water and that of dry air at 20°C, unit is gram per liter (g/L).

According to the density of the sample solution ρ_{20}^{20} determined, refer to the corresponding alcohol content value of the sample listed in Appendix A at 20°C.

Result should be presented in one decimal place format.

5.2.1.6 Precision

Discrepancies between the results of two independent tests conducted under iterative conditions and the average value of the test results should not exceed the 0.5% range.

5.2.2 Digital Densimeter Method

5.2.2.1 Principle

Pour samples into a “U” shaped tube, compute the density value through the comparison of the vibration frequencies of the two standards at 20°C and thus calculate the fraction of volume of ethanol in the sample at 20°C, i.e. the alcohol content.

5.2.2.2 Apparatus

5.2.2.2.1 Digital Densimeter: Mettler/KEM DA-210 DMA 55D, with No.5771 connecting pipe, that can allow the sample to pass through the “U” shape tube continuously. Or use a digital densimeter with similar effect of analysis, then setting up, adjusting, calibrating and measuring according to specific instructions provided by its corresponding user manual.

5.2.2.2.2 Thermostatic Water Bath: Precision of temperature control ±0.01°C.

5.2.2.2.3 Injector: 10 mL, Lucr accessory No.15 needle.

5.2.2.3 Reagents and Solutions

Water: Redistilled water, filtered through a 0.2 μm film.

5.2.2.4 Instruments Calibration

5.2.2.4.1 Observe and make records of the “T” value of the air inside the “U” shaped tube (clean and dry) at temperature 20.00°C±0.01°C.

5.2.2.4.2 Connect the injector with no.15 needle with the plastic pipe at the outlet of the top end of the “U” shaped tube. Submerge the plastic pipe at the outlet of the bottom end of the “U” shaped tube in redistilled water that had previously been newly boiled, cooled and filtered. Inject the “U” shaped tube full with water (there should be no air bubbles) and then make records of the readings of the “T” value after the water temperature have stabilized at 20.00°C±0.01°C and the “T” value remained unchanged within a 2 min~3 min period.

5.2.2.4.3 Constants A, B of the apparatus can be computed with the following formula (3) and (4).

$$A = T_{\text{water}}^2 - T_{\text{air}}^2 \quad \text{..... (3)}$$

$$B = T_{\text{air}}^2 \quad \text{..... (4)}$$

Input values of constants A, B into the memory unit of the apparatus. Adjust the switch to the ρ(density) position. Inspect density value of water. Pour out the water in "U" shaped tube, dry the tube and inspect the density value of air. The readings should be at 1.00000 (density of water) and 0.00000 (density of air) respectively. If discrepancy between the above stated value and the actual value reading in any of the 1st to 5th decimal place is more than 1, then the temperature of the thermostatic water bath and the "T" values of water and air will need to be reevaluated.

5.2.2.5 Analysis Procedure

Inject the "U" shaped tube (ensure there is no air bubbles) to full with sample solution (prepared as in 5.2.1.3), make records of the density of the sample solution after the temperature of the water bath and the sample solution had stabilized (2 min~3 min). Match the density result with the table in Appendix A to attain the alcohol content of the sample at 20°C.

Result should be presented in one decimal place format.

5.2.2.6 Precision

Discrepancies between the results of two independent tests conducted under iterative conditions should be smaller or equal to ±0.000 01.

5.2.3 Alcohol Meter Method

5.2.3.1 Principle

Use a precise alcohol meter to determine the fractional value of volume of alcohol and then match the reading with the table in Appendix B to make adjustment for temperature to attain the fractional volume of ethanol in the sample at 20°C, i.e. the alcohol content.

5.2.3.2 Apparatus

Precise Alcohol Meter: Graduation at 0.1%.

5.2.3.3 Analysis Procedure

Inject sample solution (prepared as in 5.2.1.3) into a clean and dry measuring cylinder and let it settle for a few minutes. Wait for the air bubbles in the alcohol disappears and then transfer the measuring cylinder into a clean and dry alcohol meter. Press lightly, ensuring that there is no contact with the walls of the measuring cylinder, inserting in the thermometer at the same time. Balance the cylinder for ~5 mins and visually observe the water level. Read off and make records of the scale value at the tangent of the meniscus. According to the reading of the alcohol meter and the temperature, match the reading with the table in Appendix B to make adjustment for temperature to attain the fractional volume of ethanol in the sample at 20°C, i.e. the alcohol content.

Result should be presented in one decimal place format.

5.2.3.4 Precision

Discrepancies between the results of two independent tests conducted under iterative conditions and the average value of the test results should not exceed the 0.5% range.

5.3 Alkalinity

5.3.1 Principle

Conduct neutralization titration with acid to determine the amount of basic substances (such as carbonate, bicarbonate) in sample.

5.3.2 Apparatus

5.3.2.1 Micro Burette: 5 mL.

5.3.2.2 Conical Flask: 250 mL.

5.3.3 Reagents and Solutions

5.3.3.1 Hydrochloric Acid Standard Solution [c(HCl) = 0.1mol/L]: Formulate and label according to guidelines specified in GB/T 601.

5.3.3.2 Hydrochloric Acid Standard Titration Reagent [c(HCl) = 0.05mol/L]: Dilute the abovementioned hydrochloric acid standard solution to half its initial concentration.

5.3.3.3 Methyl Red Indicator Solution (2 g/L): Formulate according to guidelines specified in GB/T 603.

5.3.4 Analysis Procedure

Extract 100 mL of sample solution (prepared as in 5.2.1.3) into a 250 mL conical flask and then add 2 drops of methyl red indicator solution. Titrate with hydrochloric acid standard titration reagent (prepared as in 5.3.3.2) with the mixture turning pink as an end point. Record the volume of titration solution used.

5.3.5 Result Calculation

Alkalinity of sample can be computed with the following formula (5).

$$X = \frac{V * c}{0.1} \quad \text{..... (5)}$$

In the formula:

X – Volume of 0.1 mol/L hydrochloric acid standard solution used in 100 mL of sample solution, unit is milliliter (mL);

V - Volume of hydrochloric acid standard titration reagent used, unit is milliliter (mL);

c – Concentration of hydrochloric acid standard titration reagent, unit is mol per liter (mol/L);

Result should be presented in one decimal place format.

5.3.6 Precision

Discrepancies between the results of two independent tests conducted under iterative conditions and the average value of the test results should not exceed the 2% range.

5.4 Total Aldehyde

5.4.1 Gas Chromatography Method

5.4.1.1 Principle

Channel vaporized sample along with the carrier gas into the chromatography columns and then perform separation of individual components that are meant to be measured by the process of leveraging on the differences of partition coefficients between components while transiting between the two phases (gaseous-liquid) and the consequential discrepancies between the migration speeds of each component within the columns. Separated components will flow out of the chromatography column in a specific order into the hydrogen flame ionization detector. Conduct qualitative analysis by comparing sample standard values with the retention values of the peaks of individual components illustrated on the resultant chromatograph; quantify by internal standard method with the use of peak area (or peak height).

5.4.1.2 Apparatus

5.4.1.2.1 Gas Chromatography: With hydrogen flame ionization detector (FID).

5.4.1.2.2 Chromatography Columns: PEG20M cross-linked quartz capillary chromatography column, column length 25m~50m, inner diameter 0.25mm. Or any other capillary chromatography column with equal effect of analysis.

5.4.1.2.3 Micro Injector: 10 μL.

5.4.1.3 Reagents and Solutions

5.4.1.3.1 40% Ethanol Solution: Mix ethanol (chromatographically pure) with water.

5.4.1.3.2 Acetaldehyde Solution (2%): Use as standard sample. Extract 2 mL acetal (chromatographically pure) and then titrate it with 40% ethanol solution till it reaches 100 mL.

5.4.1.3.3 N-butanol Solution (2%): Use as internal standard. Extract 2 mL N-butyl alcohol (chromatographically pure) and then titrate it with 40% ethanol solution till it reaches 100 mL.

5.4.1.4 Chromatographic Conditions

Carrier Gas (Nitrogen Gas of High Purity): Flow rate at 0.5 mL/min~1.0 mL/min; diversion ratio ~37:1; make up gas flow rate at about 20 mL/min~30 mL/min.

Hydrogen Gas: Flow rate at 33 mL/min.

Air: Flow at 400 mL/min.

Temperature of Detector (T_0): 220°C.

Temperature of Sample Inlet (T_1): 220°C.

Column Temperature (T_C): Initial temperature at 70°C. Maintain temperature for 3 mins and then systematically increase the temperature at 5°C/min to 100°C. Maintain temperature for another 10 mins.

The flow rate of carrier gas, hydrogen and air may differ according to different chromatographic conditions between apparatus used. Experiments should be conducted to determine the best operating conditions, with the end goal of complete separation of internal standard peak and individual peaks of each component present in the alcohol sample achieved as the basis.

5.4.1.5 Analysis Procedure

5.4.1.5.1 Determination of Calibration Factor (f value)

Extract 1.00 mL acetaldehyde solution (as prepared in 5.4.1.3.2) and transfer into a 100 mL volumetric flask. Add 1.00 mL N-butanol solution (prepared as in 5.4.1.3.3) thereafter into the flask and then dilute the mixture with 40% ethanol solution to full. The concentration of acetaldehyde and N-butanol should both be 0.02%. Wait till the chromatographic basic line stabilized, then inject the sample with a micro injector, where the amount of sample injected will be dependent on the sensitivity of the apparatus. Make records of the retention time of acetaldehyde and the internal standard peak as well as their individual peak area (or peak height). Use these values to calculate the relative calibration factor (f value) of acetaldehyde.

The relative calibration factor (f value) of acetaldehyde to N-butanol is according to experience value, at about 1.56.

5.4.1.5.2 Determination of Sample Solution

Extract 10.0 mL of alcohol sample directly with a 10 mL volumetric flask and then add 0.10 mL N-butanol solution (prepared as in 5.4.1.3.3), mix evenly. Inject samples in under the same conditions as the f value test and then determine the positions of acetaldehyde and N-butanol according to the retention time. Determine the peak area (or peak height) of the acetaldehyde (or N-butanol) and internal standard peak, compute the difference between peak areas (or peak heights) and calculate the proportion of acetaldehyde (or N-butanol) in the sample respectively, with acetaldehyde as the basis of measurement.

5.4.1.6 Result Calculation

a) Calibration Factor (f value) can be calculated with the following formula (6).

$$f = \frac{A_1}{A_2} * \frac{d_2}{d_1} \quad \text{..... (6)}$$

b) Acetaldehyde (or Acetal) content in the sample can be calculated with the following formula (7).

$$X_1 = f * \frac{A_3}{A_4} * X_4 \quad \text{..... (7)}$$

c) Acetaldehyde (or Acetal) content in a liter of 100% ethanol can be calculated with the following formula (8).

$$X_2 = \frac{X_1 * 100}{E} \quad \text{..... (8)}$$

d) Total aldehyde (acetaldehyde) content in a liter of 100% ethanol can be calculated with the following

formula (9).

$$X_3 = X_5 + X_6 * 0.37 \quad \text{..... (9)}$$

In the formula:

f – Relative calibration factor of acetaldehyde (or acetal);

A_1 – Peak area (or peak height) of the internal standard during the determination of standard sample f value;

A_2 – Peak area (or peak height) of acetal during the determination of standard sample f value;

d_2 – Relative concentration of acetal;

d_1 - Relative concentration of internal standard;

x_1 – Acetaldehyde (or Acetal) content in sample, unit is milligram per liter (mg/L);

A_3 – Peak area (or peak height) of acetaldehyde (or acetal) in sample;

A_4 – Peak area (or peak height) of internal standard added in the alcohol sample;

X_4 – Internal standard (added in the alcohol sample) content, unit is milligram per liter (mg/L);

X_2 – Acetaldehyde (or Acetal) content in a liter of 100% ethanol in the sample, unit is milligram per liter (mg/L);

E – Actual alcohol content of the sample;

X_3 – Total aldehyde (acetaldehyde) content in a liter of 100% ethanol in the sample, unit is milligram per liter (mg/L);

X_5 – Acetaldehyde content in a liter of 100% ethanol in the sample, unit is milligram per liter (mg/L);

X_6 – Acetal content in a liter of 100% ethanol in the sample, unit is milligram per liter (mg/L);

0.37 – Conversion coefficient of acetal to acetaldehyde.

5.4.1.7 Precision

Discrepancies between the results of two independent tests conducted under iterative conditions and the average value of the test results should not exceed the 10% range.

5.4.2 Iodimetry

5.4.2.1 Principle

Sodium hydrogen sulfite will go through addition reaction with aldehyde, producing α-sodium phenolsulphonate in the process. Remove the excess sodium hydrogen sulfite by iodine oxidation. Add in excess amount of sodium bicarbonate into the resultant solution, so as to disintegrate the α-sodium phenolsulphonate and release sodium hydrogen sulfite. Titrate the resultant solution with iodine standard titration reagent.

5.4.2.2 Apparatus

Iodine Flask: 250 mL.

5.4.2.3 Reagents and Solutions

5.4.2.3.1 Hydrochloric Acid Solution [c(HCl) = 0.1mol/L]: Formulate in accordance with GB/T 601.

5.4.2.3.2 Sodium Hydrogen Sulfite Solution (12 g/L): Weigh and extract 6 g sodium hydrogen sulfite, dissolve in the water, fill up to 500 mL volume.

5.4.2.3.3 Sodium Bicarbonate Solution [c($NaHCO_3$) = 1mol/L].

5.4.2.3.4 Iodine Standard Reagent [c(1/2I_2) = 0.1mol/L]: Formulate and label according to GB/T 601.

5.4.2.3.5 Iodine Standard Titration Reagent [c(1/2I_2) = 0.1mol/L]: Dilute the above iodine standard solution to 10% of its original concentration.

5.4.2.3.6 Starch Indicator Solution (10 g/L): Formulate in accordance with GB/T 601.

5.4.2.4 Preparation of Sample Solution

In the same way as section 5.2.1.3.

5.4.2.5 Analysis Procedure

Extract 30.0 mL sample solution (prepared as in 5.2.1.3) into a 250 mL iodine flask, add 15 mL sodium hydrogen sulfite solution (prepared as in 5.4.2.3.2), 7 mL hydrochloric acid solution (prepared as in 5.4.2.3.1), shake evenly and set it aside in a dark place for 1 hour. Remove from dark place, wash the flask stopper with a minute amount of water and titrate with iodine standard reagent (prepared as in 5.4.2.3.4). Upon nearing the end point of the test, add 0.5 mL of starch indicator solution and start titration with the iodine standard titration reagent (prepared as in 5.4.2.3.5) instead till the appearance of a pale blue color (recording not required). Add 20 mL sodium bicarbonate solution (prepared as in 5.4.2.3.3), open the stopper slightly and shake for 0.5 min (appears colorless). Use the iodine standard titration reagent (5.4.2.3.5) till the mixture turns purplish-blue as the end point. Conduct a control experiment concurrently.

5.4.2.6 Result Calculation

a) Total acetaldehyde content in the sample can be calculated with the following formula (10).

$$X_1 = \frac{(V_1 - V_2) * c * 22}{V} * 1000 \quad \text{..... (10)}$$

b) Total acetaldehyde content in a liter of 100% ethanol can be calculated with the following formula (11).

$$X_2 = \frac{X_1 * 100}{E} \quad \text{..... (11)}$$

In the formula:

X_1 – Total acetaldehyde content, unit is milligram per liter (mg/L);

V_1 – Volume of iodine standard reagent used on the sample, unit is milliliter (mL);

V_2 – Volume of iodine standard reagent used on the control experiment, unit is milliliter (mL);

c – Concentration of the iodine standard titration reagent, unit is mol per liter (mol/L);

22 – Molar mass value of iodine, unit is mol per gram (g/mol) [M(I2) = 22];

V – Volume of sample absorbed, unit is milliliter (mL);

X_2 – Total acetaldehyde content in a liter of 100% ethanol of the sample, unit is milligram per liter (mg/L);

E – Actual alcohol content of sample determined.

Result should be presented in one decimal place format.

5.4.2.7 Precision

Discrepancies between the results of two independent tests conducted under iterative conditions and the average value of the test results should not exceed the 10% range.

5.5 Total Ester

5.5 .1 Gas Chromatography Method

5.5.1.1 Principle

Same as 5.4.1.1.

5.5.1.2 Apparatus

Same as 5.4.1.2.

5.5.1.3 Reagents and Solutions

5.5.1.3.1 40% Ethanol Solution: Mix ethanol (chromatographically pure) with water.

5.5.1.3.2 Ethyl Acetate Solution (2%): Use as standard sample. Extract 2 mL ethyl acetate (chromatographically pure), then titrate it with 40% ethanol solution till it reaches 100 mL volume.

5.5.1.3.3 N-butanol Solution (2%): Use as internal standard. Extract 2 mL N-butanol (chromatographically pure), then titrate it with 40% ethanol solution till it reaches 100 mL volume.

5.5.1.4 Chromatographic Conditions

Same as 5.4.1.4.

5.5.1.5 Analysis Procedure

Entirety of the analysis operation procedure is the same as what is described in section 5.4.1.5, with the specific exception that the standard sample used will be replaced by ethyl acetate solution (prepared as in 5.5.1.3.2) instead.

5.5.1.6 Result Calculation

Same as 5.4.1.6.

5.5.1.7 Precision

Same as 5.4.1.7.

5.5.2 Colorimetric Method

5.5.2.1 Principle

Esters and hydroxylamines will result in a quantitative reaction when added into basic solution, in the process producing hydroxamic acid. Hydroxamic acid in acidic solution will react with iron ions then to produce yellow complexes. Under certain alcohol concentration, light absorbance of ester concentration and the yellow complexes will be directly proportional to each other at a wavelength of 525 nm.

5.5.2.2 Apparatus

5.5.2.2.1 Spectrophotometer: Visible light range, cuvette at 1 cm.

5.5.2.2.2 All-glass Distillation Apparatus: Distillation Flask 500 mL.

5.5.2.2.3 All-glass Backflow Device: Conical flask 1000 mL, 250 mL (length of condenser pipe not shorter than 45 cm).

5.5.2.2.4 Colorimetric Tube with Stopper: 25 mL.

5.5.2.2.5 Micro Burette: 5 mL.

5.5.2.3 Reagents and Solutions

5.5.2.3.1 Hydroxylamine Hydrochloride Solution (2 mol/L): Weigh and extract 13.9 g hydroxylamine hydrochloride then dissolve in 100 mL water. Store in refrigerated container.

5.5.2.3.2 Sodium Hydroxide Solution [c(N_aOH) = 3.5 mol/L]: Formulate according to GB/T 601.

5.5.2.3.3 Hydrochloric Acid Solution [c(HCl) = 4 mol/L]: Formulate according to GB/T 601.

5.5.2.3.4 Ferric Chloride Solution [100 g/L]: Weigh and extract 50 g ferric chloride ($F_eCl_3 \cdot 6H_2O$), dissolve with 400 mL water, then add in 12.5 mL hydrochloric acid (prepared as in 5.5.2.3.3), lastly fill it to 500 mL with water (if precipitation is still observed in the mixture, filter before use).

5.5.2.3.5 40% Ethanol (Without Ester) Solution: Weigh and extract 600 mL 95% ethanol into 1000 mL conical flask and add in 5 mL sodium hydroxide solution (prepared as in 5.5.2.3.2). Perform heated backflow saponification on the mixture for 1 hour. Thereafter transfer the mixture into the distillation apparatus for re-distillation and then formulate into 40% ethanol solution.

5.5.2.3.6 Ethyl Acetate Standard Storage Reagent: Weigh and extract 0.1667 g ethyl acetate, fill it up to 500 mL with 40% ethanol solution. Formulated solution in this case should have 0.3334 mg of ethyl acetate per milliliter of the solution.

5.5.2.3 .7 Ethyl Acetate Series Standard Reagent: Use a micro burette to extract volumes of 0.0 mL, 0.75

mL, 1.5 mL, 2.25 mL, 3.0 mL, 4.5 mL ethyl acetate standard storage reagent (prepared as in 5.5.2.3.6) into six individual 100 mL conical flasks respectively. Dilute each solution with 40% ethanol solution till each flask is full and mix evenly. These newly formulated standard reagents should contain ethyl acetate at 0.0 mg/L, 2.50 mg/L, 5.00 mg/L, 7.50 mg/L, 10.00 mg/L and 15.00 mg/L.

5.5.2.4 Analysis Procedure

5.5.2.4.1 Preparation of Sample Solution

If alcohol sample does not contain any external substances, take sample directly during tests. Otherwise, distill the sample before any further tests.

5.5.2.4.2 Standard Curve Illustration

Extract 2.0 mL of each of the ethyl acetate series of standard reagents and place them individually in a 25 mL colorimetric tube with stopper. Add 2.0 mL hydroxylamine hydrochloride solution (prepared as in 5.5.2.3.1) and 2.0 mL sodium hydroxide solution (prepared as in 5.5.2.3.2), mix evenly and let it settle for the next 10 mins. Thereafter, add 2.0 mL hydrochloric acid solution (prepared as in 5.5.2.3.3), mix evenly. Then add 2.0 mL ferric chloride solution (prepared as in 5.5.2.3.4), mix evenly again. Use a 1 cm cuvette, recalibrate to zero with a control tube and then determine the light absorbance of each under a wavelength of 525 nm. Plot the standard curve.

5.5.2.4.3 Determination of Sample Solution

Extract 2.0 mL sample solution (prepared as in 5.5.2.4.1) into a 25 mL colorimetric tube with stopper and then operate in the same manner as in section 5.5.2.4.2. Determine the ethyl acetate content on the standard curve and that will be the total ester content. Alternatively, use linear regression to calculate the total ester content.

5.5.2.5 Precision

Discrepancies between the results of two independent tests conducted under iterative conditions and the average value of the test results should not exceed the 10% range.

5.6 Methanol

5.6.1 Principle

Same as 5.4.1.1.

5.6.2 Apparatus

Same as 5.4.1.2.

5.6.3 Reagents and Solution

5.6.3.1 40% Ethanol Solution: Mix ethanol (chromatographically pure) with water.

5.6.3.2 Methanol Solution (2%): Use as standard sample. Extract 2 mL methanol (chromatographically pure), then titrate it with 40% ethanol solution till it reaches 100 mL volume.

5.6.3.3 N-butanol Solution (2%): Use as internal standard. 2 mL N-butanol (chromatographically pure), then titrate it with 40% ethanol solution till it reaches 100 mL volume.

5.6.4 Chromatographic Conditions

Same as 5.4.1.4.

5.6.5 Analysis Procedure

Entirety of the analysis operation procedure is the same as what is described in section 5.4.1.5, with the specific exception that the standard sample used will be replaced by methanol solution (prepared as in 5.6.3.2) instead.

5.6.6 Result Calculation

Same as 5.4.1.6.

5.6.7 Precision

Same as 5.4.1.7.

5.7 High Quality Alcohols

5.7.1 Principle

Same as 5.4.1.1.

5.7.2 Apparatus

Same as 5.4.1.2.

5.7.3 Reagents and Solutions

5.7.3.1 40% Ethanol Solution: Mix ethanol (chromatographically pure) with water.

5.7.3.2 Isobutanol Solution (2%): Use as standard sample. Extract 2 mL isobutanol (chromatographically pure), then titrate it with 40% ethanol solution till it reaches 100 mL volume.

5.6.3.3 Isoamyl Ethanol Solution (2%): Use as internal standard. Extract 2 mL isoamyl ethanol (chromatographically pure), then titrate it with 40% ethanol solution till it reaches 100 mL volume.

5.7.4 Chromatographic Conditions

Same as 5.4.1.4.

5.7.5 Analysis Procedure

Entirety of the analysis operation procedure is the same as what is described in section 5.4.1.5, with the specific exception that the standard sample used will be replaced by isobutanol solution (prepared as in 5.7.3.2) and internal standard used will be replaced by isoamyl ethanol solution (prepared as in 5.7.3.3) instead.

5.7.6 Result Calculation

Same as 5.4.1.6, determine total content of isobutanol and isoamyl ethanol.

5.7.7 Precision

Same as 5.4.1.7.

6. Testing Methods

6.1 Batches

Products filled and manufactured during every shift, in the same product category, of same quality and specifications, packaged and meant for out-factory shipping will be classified under the same production batch.

6.2 Sampling

6.2.1 Draw samples (in boxes) according to guidelines listed in Table 3 and then draw unitary samples (in bottles) from random positions of each box. Sample quantity can be increased proportionally if unitary sample packaging net content is less than 500 mL or if total sampling volume does not meet the 1,500 mL mark.

Table 3 Sampling Table

Range of Batch Quantity / No. of Boxes	Sample Quantity / No. of Boxes	Unitary Sample Quantity / No. of Bottles
＜50	3	3
51~1,200	5	2
1,201~35,000	8	1
Above 35,000	13	1

6.2.2 After samples have been drawn, immediately label the samples with the following information indicated: sample name, product specifications, quantity, manufacturer name, sampling time and place, sampling personnel. Seal and safe keep 2 bottles of sample for the next 2 months for further reference. Other samples should be sent to the laboratory immediately for inspections on items such as sensory, physical-chemical, hygiene.

6.3 Inspection Classifications

6.3.1 Out-factory Inspection

6.3.1.1 Products should be inspected batch-by-batch by the manufacturing factory's internal quality supervision and inspection department according to this standard before out-factory shipping. If the products are qualified, qualified certification should be issued for the production batch before shipping out. The certificate can be placed in the packaging boxes or within individual product packaging. Alternatively, equivalence of stamping wordings like "qualified" or "qualified by inspection" on the labels or packaging boxes is also allowed.

6.3.1.2 Inspection items: Sensory requirements, alcohol content, alkalinity, total aldehyde, total ester, high quality alcohols.

6.3.2 Type Inspection

6.3.2.1 Inspection items: All inspection items required by this standard.

6.3.2.2 Under normal circumstances, type inspection for the same product category need only to be

conducted semiannually. Yet, type inspection should also be conducted if any of the following situations arises:

a) When there are significant changes in the main or supplementary ingredients used;

b) When key processes or equipment used changes;

c) When new products are being manufactured or when there is resumption of production after stoppage of routine production for 3 months or more;

d) When material discrepancies are observed between the results of the last type inspection and those of the out-factory inspection;

e) When it is specifically required by the State quality supervision and inspection institutions according to relevant regulations.

6.4 Judging Guidelines

6.4.1 If inspection results show that there are less than 2 test items (incl. 2) failing to meet the corresponding product requirements, a second round of inspection should be conducted on the same production batch, though with double the quantity of samples as compared to the first round. The basis of judging if this production batch is qualified will be the results of the second round of inspection and tests.

6.4.2 If there is still one (or more) item that fail to meet the corresponding requirement after the second round of inspection, the entire production batch will be deemed unqualified.

6.4.3 When there are disagreements on the results of the inspection between the supply and demand sides of the transaction, it can be resolved through negotiation between related parties or resolved by relevant authorities on behalf of related parties through the use of arbitration inspection methods, with the arbitration inspection results as the basis for the final decision.

7. Labelling, Packaging, Transportation & Storage

7.1 Labelling

7.1.1 Labels for prepackaged vodka products should comply with relevant requirements stipulated in the standard GB 10344.

7.1.2 Besides clearly indicating the product name, manufacturer name and address on the external packaging boxes, net content of unitary packaging and total quantity should also be shown clearly.

7.1.3 Transportation logos and shipping marks should comply with the requirements of GB/T 191.

7.2 Packaging

7.2.1 Packaging material should comply with food hygienic requirements.

7.2.2 Packaging container should be positioned upright, clean, tightly sealed with no signs of any leakage.

7.2.3 Qualified packaging materials should be used for external packaging, while there should be anti-shock buffers that comply with relevant standards incorporated within the container.

7.3 Transportation & Storage

7.3.1 Use cork (or similar substitutes) to seal the vodka bottles. The bottles should be stored and transported in an “upside down” or “lying down” position.

7.3.2 Products should be kept clean, avoiding any strong shaking, direct sunlight or rain and prevented from freezing during storage and transportation. They should be handled gently during loading and unloading.

7.3.3 Storage venues should be shady, cool, dry, well ventilated. Products should be kept strictly away from direct sunlight, rain or any potential fire hazard.

7.3.4 End products should not have direct contact with wet/moist floor and they should not be stored or transported together with poisonous, hazardous, foul-smelling and easily corrosive substances.

7.3.5 Temperature during transportation should be kept at 5^{o}C~35^{o}C, while storage temperature should be kept at 5^{o}C~25^{o}C.

Supplementary:

GB/T 11858-2008 Vodka

First Amendment Article of National Standard

This article of amendment was approved by the National Standardization Management Committee on the 27th, May 2009, and subsequently implemented on 1st, June 2009.

The specific content amended for the standard GB/T 11858-2008 *Vodka* is as follows:

Table 2 Physical-Chemical Index Requirements Covered in Section 4.2

Items		Superior Grade	First Grade	Second Grade
Total Ester (Ethyl Acetate) / [mg/L (100%vol Ethyl Alcohol)]	≤	4	6	8
Total Aldehyde (Acetaldehyde) / [mg/L (100%vol Ethyl Alcohol)]	≤	10	15	25

Amended to:

Table 2 Physical-Chemical Index Requirements

Items		Superior Grade	First Grade	Second Grade
Total Aldehyde (Acetaldehyde) / [mg/L (100%vol Ethyl Alcohol)]	≤	4	6	8
Total Ester (Ethyl Acetate) / [mg/L (100%vol Ethyl Alcohol)]	≤	10	15	25

Other Beverages

GB 2759.1-2003 Hygienic Standard for Frozen Drink

National Standards of People's Republic of China

GB 2759.1-2003

National Food Safety Standards

Hygienic Standard for Frozen Drink

Issued on: 2003-09-24 Implemented on: 2004-05-01

Issued by the Ministry of Health of the People's Republic of China and Standardization Administration Management Committee

Foreword

This standard is fully mandatory.

This standard substitutes GB 2759.1-1996 Hygienic Standard for Frozen Drinks.

As compared with GB 2759.1-1996, this standard has made major changes as follows:

- The standard text format is revised according to GB/T 1.1-2000;
- The structure of the original standard is revised, by adding the hygienic requirements for raw and auxiliary materials, food additives and process of production and processing and requirements for packing, labelling, storage and transport;
- In the microbial indicators of this standard , “frozen drinks containing more than 10% of milk protein” and “frozen drinks containing less than 10% of milk protein” are combined as “frozen drinks containing milk protein”.

As from the date of implementing this standard, GB 2759.1-1996 will be automatically abolished.

This standard is set forth and classified by Ministry of Health of the People’s Republic of China.

This standard is drafted by (institutions): Beijing Center for Disease Prevention and Control, Liaoning Institute of Health Inspection, Tianjin Health Bureau Public Health Inspection Institute, Hangzhou Wahaha Group Co., Ltd, MOH Health Inspection Center, Heilongjiang Institute for Food Control, Shanghai Institute for Food Control, and Guangdong Institute for Food Control.

This standard is mainly drafted by (persons): Xu Jikang, Wang Xutai, Cui Chunming, Gu Jingyu, He Qingqiong, and Wang Peng.

The previous versions of the standards substituted by this standard are as follows:

This standard was initially published in 1977 and amended for the first time in 1981 and for the second time in 1996.

National Food Safety Standards

Hygienic Standard for Frozen Drink

1. Scope

This standard specifies the indicator requirements of frozen drinks, hygienic requirements for food additives and process of production and processing, requirements for packing, identification, storage and transport and testing methods.

This standard is applicable to ice cream, popsicle, ice lolly, edible ice cube, etc.

2. Normative References

The provisions in the following documents become the provisions of this standard by being referred to herein. Where any reference is dated, all its subsequent amendments (excluding the content of correction) or revision shall not be applicable this standard, but the parties making an agreement according to this agreement are encouraged to study whether to use the latest versions of such documents. Where any reference is not dated herein, its latest version (inclusive of all the amendments) shall be applicable herein.

GB 2760 Hygienic Standard for Uses of Food Additives

GB/T 4789.21 Microbiological Examination of Food Hygiene—Examination of Cold Drinks

GB/T 5009.11 Determination of Total Arsenic and Abio-arsenic in Foods

GB/T5009.12 Determination of Lead in Foods

GB/T5009.13 Determination of Copper in Foods

GB 12695 Good Manufacturing Practices for Beverage Enterprises

3. Terms and Definitions

The following terms and definitions shall be applicable to this standard.

3.1 Frozen Drinks

Frozen solid drinks made with drinking water, sweeteners, milk product, fruit product, bean product, edible oil and so on as the main raw materials, added with appropriate amount of essence, colorant, stabilizer, emulsifier and other food additives, by mixing, sterilizing and freezing.

4. Indicator Requirement

4.1 Raw Material Requirement

In conformity to the relevant standards and related provisions.

4.2 Oranoleptic Requirements

With the color and flavor in compliance with the product name, without bad smell, taste and impurity visible with naked eye.

4.3 Physicochemical indicators

The physicochemical indicators shall conform to the provisions of Table 1.

Table 1 physicochemical indicators

Items	indicators
Total Arsenic (as per As)/ (mg/kg) ≤	0.2
Lead (PB)/ (mg/kg) ≤	0.3
Copper (Cu)/ (mg/kg) ≤	5.0

4.4 Microbial Indicators

Microbial indicators shall conform to the provisions of Table 2.

Table 2: Microbial Indicators

Items	Indicators		
	Total bacterial colony/ (cfu/mL)	Coliforms (MPN/100mL)	Pathogenic bacteria[a]
Frozen drinks containing milk protein ≤	25000	450	Should not be detected
Frozen drinks containing beans ≤	20000	450	Should not be detected
Frozen drinks containing starch or fruit ≤	3000	100	Should not be detected
Edible ice cube ≤	100	6	Should not be detected
[a] Pathogenic bacteria mean salmonella, shigella and staphylococcus aureus.			

5. Food Additives

5.1 The quality of food additives is in conformity to the relevant standard and related provisions.

5.2 Variety and usage of food additives shall conform to the provisions of GB2760

6. Hygienic Requirement for Process of Production and Processing

In conformity to the provisions of GB12695.

7. Packing

Packing containers and materials shall conform to the relevant hygienic standard and related provisions

8. Identification

The identification requirement for stereotype packing shall conform to the relevant provisions.

9. Storage and Transport

9.1 Storage

Products shall be stored a dry and well-ventilated place and shall not be stored together with toxic, harmful, smelly and corrosive articles.

9.2 Transport

Products shall be transported to avoid sunlight and rain and shall not be transported together with toxic,

harmful, smelly or quality-affecting articles.

10. Testing Method

10.1 Physicochemical Inspection

10.1.1 Total Arsenic

Determine as per method provided by GB/T5009.11.

10.1.2 Lead

Determine as per method provided by GB/T5000.12.

10.1.3 Copper

Determine as per provisions of GB/T 5009.13.

10.2 Microbial indicators

Inspect as per method provided in GB/T 4789.21.

National Standards of People's Republic of China

GB 2759.2-2003

National Food Safety Standards

Hygienic Standard for Carbonated Drinks

Issued on: 2003-09-24 Implemented on: 2004-05-01

Issued by the Ministry of Health of the People's Republic of China and National Standardization Management Committee

Foreword

The entirety of this standard is mandatory.

This standard replaces GB 2759.2-1996 Hygienic Standard for Carbonated Drinks.

As compared with GB 2759.2-1996, key changes are as follows:

- Amended the format and layout of the standard according to GB/T 1.1-2000;
- Amended the structure and the scope of application of the previous standard, i.e. added the hygiene requirements for main and supplementary ingredients, food additives and production and processing procedure as well as requirements for packaging, labelling, storage and transportation;
- Amended the product definitions with reference to GB 10789 Soft Drinks Classifications.

The previous version, GB 2759.2-1996 will be repealed with effect from the implementation date of this standard.

This standard was proposed by the Ministry of Health of the People's Republic of China and placed under its jurisdiction.

The organizations involved in the drafting of this standard: Beijing City Food Hygiene Supervision and Inspections Bureau, Wuhan City Food Hygiene Supervision and Inspections Bureau, Sichuan Province Food Hygiene Supervision and Inspections Bureau, Shandong Province Food Hygiene Supervision and Inspections Bureau, Tianjin City Public Hygiene Supervision and Inspections Bureau of the Ministry of Health, Liaoning Province Hygiene Supervision Bureau and Hangzhou Wahaha group Co.Ltd.

The key personnel involved in the drafting of this standard:: Jikang Xu,Qiuping Zhang,Huachun Liao,Yugeng Zhu,Chunming Cui, Xutai Wang and Ting Yu.

This standard will replace the earlier versions and amendements:

This standard was first issued in 1977, first amended in 1981 and amended a second time in 1996.

National Food Safety Standards

Hygienic Standard for Carbonated Drinks

1. Scope

This standard specifies the details on the index requirements, food additives, hygiene requirements on production and processing procedure as well as requirements for packaging, labelling, storage and transportation and corresponding testing methods for carbonated drinks.

This standard applies to drinks infused with carbon dioxide gas under certain conditions.

This standard is not applicable to tea beverages infused with carbon dioxide gas.

2. Normative References

Clauses involved in the following documents constitute the ones in this standard through reference in this standard. If any reference is dated, the following amendment or revised versions (excluding errata) are not applicable to this standard. However, the study of whether the latest version of these documents can be used by all parties who reach agreement according to this standard is encouraged. Any latest version of the non-dated reference is applicable to this standard.

GB 2760 *Hygienic Standard for Uses of Food Additives*

GB/T 4789.21 *Microbiological Examination of Food Hygiene – Inspection for Frozen Drinks, Beverages*

GB 5749 *Hygienic Standard for Drinking Water*

GB/T 5009.11 *Testing Method for Total Arsenic and Inorganic Arsenic in Foods*

GB/T 5009.12 *Testing Method for Lead in Foods*

GB/T 5009.13 *Testing Method for Copper in Foods*

GB 12695 *Beverage Industry Good Manufacturing Practices*

3. Terms and Definition

The following terms and definitions will apply to this standard.

4. Carbonated Drinks

Refer to products infused with carbon dioxide gas under certain conditions. These do not include drinks that produce carbon dioxide gas on their own due to fermentation processing. Carbon dioxide content in final products (volume fraction at 20^{o}C) should not be lower than 2.0 times. Index Requirements

4.1 Requirements for Raw Ingredients

Should comply with corresponding standards and relevant regulations.

4.2 Sensory Index

Products should possess pure color and luster, taste of its key ingredients, without any unusual taste, odor or external impurities.

4.3 Physical-Chemical Indexes

Physical-chemical indexes should comply with the requirements listed in Table 1.

Table 1 Physical-Chemical Indexes

Items		Index
Lead (Pb) / (mg/L)	≤	0.3
Total Arsenic (As) / (mg/L)	≤	0.2
Copper (Cu) (mg/L)	≤	5

4.4 Microorganism Indexes

Microorganism indexes should comply with the requirements listed in Table 2.

Table 2 Microorganism Indexes

Items		Index
Total Bacteria Count / (cfu/mL)	≤	100
Coliforms / (MPN/100mL)	≤	6
Mold / (cfu/mL)	≤	10
Yeast / (cfu/mL)	≤	10
Pathogenic Bacterium (Salmonella, Shigella, Staphylococcus aureus)		Should not be detected

5. Food Additives

5.1 Quality of food additives should comply with corresponding standards and relevant regulations.

5.2 Types and quantity of the food additives used should comply with the requirements of GB 2760.

6. Hygiene Requirements for Production and Processing

Should comply with the requirements of GB 12695.

7. Packaging

Packaging containers and materials used should comply with corresponding hygiene standards and relevant regulations.

8. Labeling

Labels of prepackaged products should comply with the requirements of relevant regulations.

9. Storage and Transportation

9.1 Storage

Products should be stored in dry, well-ventilated places. They should not be stored together with poisonous, harmful, foul-smelling, volatile and corrosive substances.

9.2 Transportation

Sunlight and rain should be avoided during product transportation process. Products should not be transported together with poisonous, harmful, foul-smelling substances or any substances that will have a material impact on the quality of the products.

10. Testing Methods

10.1 Sensory Index

10.1.1 Color and Luster, Transparency/Turbidity and Impurities

Take 50 mL of analyte (sample) mixed evenly and place it into a clean sample glass. Place the glass in a bright area, then use sense of sight to visually inspect the color, luster, transparency/turbidity of the sample as well as if there is any impurity in the sample. Results should comply with the requirements of section 4.2.

10.1.2 Smell and Taste

Pour analyte into a sampling glass after opening the container holding the analyte and then immediately use sense of smell to identify the smell of sample as well as use sense of taste to identify the taste of sample or if there is any unusual taste. Results should comply with the requirements of section 4.2.

10.2 Physical-Chemical Indexes

10.2.1 Lead

Test according to method specified in GB/T 5009.12.

10.2.1 Total Arsenic

Test according to method specified in GB/T 5009.11.

10.2.3 Copper

Test according to method specified in GB/T 5009.13.

10.3 Microorganism Indexes

Test according to method specified in GB/T 4789.21

National Standards of People's Republic of China

GB 15266-2009

National Food Safety Standards

Sports Beverage

Issued on: 2009-04-14 Implemented on: 2009-12-01

Issued by the General Administration of Supervision, Inspections and Quarantine of the People's Republic of China and National Standardization Management Committee

Foreword

Sections 4.1.2, 4.2, 4.3, 4.4.1, 4.5 in this standard are, while the rest are recommended.

This standard replaces GB 15266-2000 Sports Beverage.

As compared to GB 11673-1989, key changes are as follows:

- Amended the definition of sports beverage, it was the first time that the feature of sports beverage being rapidly absorbed by the body was emphasized;
- Removed the product classifications;
- Removed the requirements for net content;
- Made adjustments to the physical-chemical and hygienic indexes (e.g. removed the indexes for calcium and magnesium);
- Removed the appendix of the International Olympic Committee (IOC) Forbidden Substances, this standard only requires “forbidden substances in accordance with the latest version of forbidden substances issued by World Anti-Doping Agency (WADA) should not be added”.

Appendix A in this standard is an informational appendix.

This standard was proposed by China Light Industry Union.

This standard is placed under the jurisdiction of the Beverage Technical Committee Division of the National Food Industry Standardization Technical Committee.

The organizations involved in the drafting of this standard: China Beverage Industry Association Technical Committee, Third Medical College Sports Medicine Research Institute of Peking University, PepsiCo (China) Gatorade Sports Science Research Center, State General Administration of Sports Medicine Institute of Sports Nutrition Research Center, Hangzhou Wahaha Group Co.Ltd, Coca-Cola (China) Beverage Co.,Ltd, Master Kong Co., Ltd R&D Center, Guangdong Jianlibao Co.,Ltd, Nongfu Shanquan Co.,Ltd, Otsuka (China) Investment Co.,Ltd, Kraft Foods (China) Co.,Ltd, PepsiCo (China) Co.,Ltd, Robust (Guangdong) F&B Co.,Ltd and Red Bull Vitamin Drink Co.,Ltd.

The key personnel involved in the drafting of this standard:: Hua Ai, Xiaocai Shi, Yunan Li, Muqing Yi, Penggui Zhai, Wei Sun, Zhiming Chen, Xuemei Zhao, Yucai Yao, Tan Li, Wenling Zhao and Zhenjun Wu.

This standard replaces the earlier versions: GB 15266-1994, GB 15266-2000.

National Food Safety Standards

Sports Beverage

1. Scope

This standard specifies the details on the definitions, technical requirements, testing methods, testing guidelines as well as the requirements on labeling, packaging, transportation and storage for sports beverage.

This standard applies to sports beverage as defined in Chapter 3.

2. Normative References

Clauses involved in the following documents constitute the ones in this standard through reference in this standard. If any reference is dated, the following amendment or revised versions (excluding errata) are not applicable to this standard. However, the study of whether the latest version of these documents can be used by all parties who reach agreement according to this standard is encouraged. Any latest version of the non-dated reference is applicable to this standard.

GB 2759.2 *Hygienic Standards for Carbonated Drinks*

GB 2760 *Hygienic Standards for the Use of Food Additives*

GB/T 5009.84 *Determination of Thiamine (Vitamin B_1) in Foods*

GB/T 5009.85 *Determination of Riboflavin in Foods*

GB/T 5009.91 *Determination of Potassium and Sodium in Foods*

GB 7101 *Hygienic Standards for Beverage Solids*

GB 7718 *General Principles of the Prepackaged Food Labels*

GB/T 12143 *General Analysis Methods for Beverages*

GB 13432 *General Principles of the Prepackaged Special Dietary Food Labels*

GB 14880 Hygienic *Standards for Use of Nutritional Supplements in Food*

GB 16322 *Hygienic Standards for Plant Protein Beverage*

3. Terms and Definition

The following terms and definitions apply to this document.

3.1 Sports Beverage

Refer to nutritional beverage and its content that specifically cater to the biological characteristics and needs of individuals participating in sports or physical activities, which can replenish water, electrolytes and energy and can be rapidly absorbed by the body.

4. Technical Requirements

4.1 Main and Supplementary Ingredients

4.1.1 Should comply with the standards corresponding to the ingredients used and relevant regulations.

4.1.2 Forbidden substances in accordance with the latest version of forbidden substances issued by World Anti-Doping Agency (WADA) should not be added.

4.2 Sensory Index

Products should have color, luster and taste that they should have and should not have any unusual smell, odor and visible external impurities.

4.3 Physical-Chemical Indexes

4.3.1 Physical-chemical indexes should comply with the requirements listed in Table 1.

Table 1 Physical-Chemical Indexes

Items	Indexes
Soluble Solids (Refractometer Method at 20°C) / %	3.0~8.0
Sodium / (mg/L)	50~1,200
Potassium / (mg/L)	50~250

4.3.2 Products that are required to be diluted or brewed should comply with the requirements listed in Table 1 after water has being added and mixed evenly with the products according to the dilution or brewing factor indicated on product labels.

4.4 Food Additives and Nutritional Supplements

4.4.1 Should comply with the requirements listed in GB 2760 and GB 14880.

4.4.2 Ascorbic acid, thiamine and its derivatives, riboflavin and its derivatives are optional components to be added, of which in the products that are drinkable directly, ascorbic acid should not exceed 120 mg/L; thiamine and its derivatives should be 3 mg/L~5 mg/L; riboflavin and its derivatives should be 2 mg/L~4 mg/L.

4.5 Hygienic Index

Solid form products should comply with the requirements of GB 7101, gasless liquid form products should comply with the requirements of GB 16322 and gasified liquid products should comply with the requirements of GB 2759.2.

5. Testing Methods

5.1 Sensory Inspection

Take ~50 mL analyte (sample) mixed evenly and place them into a colorless, transparent container. Place the container in bright places, observe analyte's color, luster and clarity facing the source of light and then smell and taste it at room temperature.

5.2 Physical-Chemical Inspection

5.2.1 Soluble Solids

Test in accordance with method specified in GB/T 12143

5.2.2 Potassium and Sodium

Test in accordance with method specified in GB/T 5009. 91

5.2.3 Ascorbic Acid

Test in accordance with method specified in GB 12143

5.2.4 Thiamine

Test in accordance with method specified in GB/T 5009. 84

5.2.5 Riboflavin

Test in accordance with method specified in GB/T 5009. 85

6. Testing Guidelines

6.1 Sampling Method and Quantity

Randomly draw 12 smallest unitary packages per batch during out-factory inspection, of which dedicate 6 for inspection on sensory indexes, physical-chemical indexes, 2 for inspection on microorganism indexes and lastly 4 for backup. Randomly draw 12 smallest unitary packages per batch during type inspection, of which dedicate 6 for inspection on sensory indexes, physical-chemical indexes, 2 for inspection on microorganism indexes and lastly 4 for backup.

6.2 Out-factory Inspection

In-house quality control department of manufacturing enterprise should identify the batch number in accordance with this standard, conducting inspections on sensory properties, soluble solids, potassium and sodium, total bacteria count, coliforms for every batch of products leaving the factory for shipping and distribution.

6.3 Type Inspection

All the items specified in the technical requirements in this standard are the inspection items required for type inspection. Type inspection should be conducted once every year, or if any of the following situations arises:

a) When there are significant changes in ingredients, processes;

b) Upon resumption of production after a long period of stoppage;

c) When results of out-factory inspection differs significantly from the routine records.

6.4 Judgment Guidelines

If ant of the inspection items fails to meet requirements of this standard, with the exception of microorganism indexes, conduct re-inspection on specific unqualified items with double the quantity of samples used in the initial round of inspection. If there is still one item that fails to meet requirements, this batch of products will be deemed disqualified or unqualified. If any of the microorganism indexes fails to meet requirements, this batch of products will be deemed disqualified or unqualified and no chance will be given for re-inspection.

7. Labeling, Packaging, Transportation and Storage

7.1 Labeling

Should comply with the relevant requirements of GB 7718, GB 13432; should indicate range of content of soluble solids, potassium and sodium.

7.2 Packaging, Transportation and Storage

7.2.1 Packaging materials and containers should comply with relevant standards or regulations.

7.2.2 Avoid source of heat, direct sunlight and freezing during the process of transportation and during storage.

Appendix A

(Quoted appendix)

Latest Version of Substances Banned by World Anti-Doping Agency (WADA)

The latest version of substances banned by World Anti-Doping Agency (WADA) can be found on the following webpages:

World Anti-Doping Agency (WADA) webpage: http://www.wada-ama.org/;

China Anti-Doping Center webpage: http://www.cocadc.cn/.

National Standards of People's Republic of China

GB/T 21733-2008

National Food Safety Standards

Tea Beverage

Issued on: 2008-04-21 Implemented on: 2008-11-01

Issued by the General Administration of Supervision, Inspections and Quarantine of the People's Republic of China and National Standardization Management Committee

Foreword

The previous standard QB/T 2499-2000 Tea Beverages will be repealed with effect from the implementation date of this standard.

Appendix A in this standard is a normative appendix.

This standard was proposed by the China Light Industry Union.

This standard is placed under the jurisdiction of the Beverage Technical Committee Division under the National Food Industry Standardization Technical Committee.

The organizations involved in the drafting of this standard: China Beverage Industry Association Technical Committee, Damin Food (Zhangzhou) Co.,Ltd, Master Kong Beverage Holding Co.,Ltd, Shenzhen City Deep Treasure Huacheng Food Co.,Ltd, Unified Enterprise (China) Investment Co.,Ltd and Hangzhou Wahaha Group Co.Ltd.

The key personnel involved in the drafting of this standard: Pengxiang Yue, Xiaojun Qian, Yuyi Dai, Penggui Huo and Yunan Li.

National Food Safety Standards

Tea Beverage

1. Scope

This standard specifies the details on the product classifications, technical requirements, testing methods, testing guidelines, labelling, packaging, transportation and storage for tea beverages.

This standard applies to liquid beverages, product of processing with water extract of tea leaves or its concentrate liquid, tea powder as key ingredients and the possible addition of supplementary ingredients such as water, sugar, acidulant, food flavoring, fruit juice, dairy products, plant (grain) extracts.

2. Normative References

Clauses involved in the following documents constitute the ones in this standard through reference in this standard. If any reference is dated, the following amendment or revised versions (excluding errata) are not applicable to this standard. However, the study of whether the latest version of these documents can be used by all parties who reach agreement according to this standard is encouraged. Any latest version of the non-dated reference is applicable to this standard.

GB 2760 *Hygienic Standard for Uses of Food Additives*

GB 2763 *Maximum Limits for Pesticide Residues in Foods*

GB/T 4789.21 *Microbiological Examination of Food Hygiene – Inspection for Frozen Drinks, Beverages*

GB/T 4789.26 *Microbiological Examination of Food Hygiene – Inspection of Canned Food Commercial Sterility*

GB/T 5009.5 *Test of Protein in Food*

GB/T 5009.11 *Testing Method for Total Arsenic and Inorganic Arsenic in Foods*

GB/T 5009.12 *Testing Method for Lead in Foods*

GB/T 5009.13 *Testing Method for Copper in Foods*

GB/T 5009.139 *Testing Method for Caffeine in Foods*

GB/T 6682 *Specifications and Testing Methods for Water Used in Analysis Experiments*

GB 7718 *General Standard for the Labeling of Prepackaged Foods*

GB/T 10792 *Carbonated Beverages (Soda Water)*

GB 13432 *General Standard for Labeling of Prepackaged Special Dietary Foods*

GB/T 13738.1 *First Set for Black Tea (Pieces)*

GB/T 13738.2 *Second Set for Black Tea (Pieces)*

GB/T 13738.4 *Fourth Set for Black Tea (Pieces)*

GB/T 14456 *Green Tea*

GB/T 16771 *Determination of Fruit Juice Content in Citrus Sinensis, Citrus Reticulate, Orange Juice and Their Beverages*

GB 19296 *Hygiene Standards for Fruit, Vegetable Juice Beverages*

NY 659 *Limits of Chromium, Cadmium, Mercury, Arsenic and Fluoride in Tea Leaf*

3. Terms and Definition

The following terms and definitions will apply for this standard.

3.1 Tea Beverage

Refer to liquid beverage that retains the original flavor of tea liquid, product of processing procedures using water extracts of tea leaves or their concentrates, tea powder as key ingredients. Minute amount of sugar and (or) sweetener can be added.

3.2 Blended Tea Beverage

Refer to liquid beverage that possesses the blended flavors of tea and plant (grain) ingredients, product of processing procedures using water extracts of both tea and plant (grain) or their concentrates, powders as key ingredients.

3.3 Fruit Juice Tea Beverage and Fruit Flavored Tea Beverage

Refer to liquid beverage that is formulated with the addition of one or more types of flavor enhancing ingredients, such as fruit juice, sugar and (or) sweetener, edible fruit flavorings with water extracts of tea leaves or their concentrates, tea powder as key ingredients.

3.4 Milk Tea Beverage and Flavored Milk Tea Beverage

Refer to liquid beverage that is formulated with the addition of one or more types of flavor enhancing ingredients, specifically dairy or dairy products, sugar and (or) sweetener, edible milk flavoring with water extracts of tea leaves or their concentrates, tea powder as key ingredients.

3.5 Carbonated Tea Beverage

Refer to liquid beverage that is formulated with the addition of supplementary ingredients, specifically carbon dioxide gas, sugar and (or) sweetener, edible food flavoring with water extracts of tea leaves or their concentrates, tea powder as key ingredients.

3.6 Other Flavored Tea Beverage

Refer to liquid beverage, besides formulated with fruit juice and dairy, is supplemented with one or more other edible ingredients such sugar and (or) sweetener, edible acidulant, edible food flavoring with water extracts of tea leaves or their concentrates, tea powder as key ingredients.

3.7 Concentrated Tea Beverage

Refer to liquid product that will gain the typical flavor of the original tea liquid after reconstitution with water. This is produced with proper processing after the extraction and removal of certain proportion of water from water extract of tea leaves through physical methods.

4. Product Classifications

4.1 Classify products according to flavor: tea beverage (tea soup), flavored tea beverage, blended tea beverage, concentrated tea beverage.

4.1.1 Tea beverage (tea soup) can be further segmented into: red tea beverage, green tea beverage, Oolong tea beverage flower tea beverage and other tea beverage.

4.1.2 Flavored tea beverage can be further segmented into: fruit juice tea beverage, fruit flavored tea beverage, milk tea beverage, milk flavored tea beverage, carbonated tea beverage and other flavored tea beverage.

5. Technical Requirements

5.1 Key and Supplementary Ingredients

5.1.1 Tea leaves should comply with the requirements of relevant standards such as GB 2763, GB/T 13738.1, GB/T 13738.2, GB/T 13738.4, GB/T 14456 and NY 659.

5.1.2 Tea polyphenols and caffeine should not be used for the formulation of tea beverage.

5.2 Sensory Index

Has color, luster, smell and taste that such products should have, allowing turbidity and precipitation attributed to the content added into the tea, without any visible impurities from external sources.

5.3 Physical-Chemical Indexes

Physical-chemical indexes should comply with the requirements listed in Table 1.

Table 1 Physical-Chemical Indexes

<table>
<tr><th colspan="2" rowspan="2">Items</th><th rowspan="2">Tea Beverage (Tea Soup)</th><th colspan="6">Flavored Tea Beverage</th><th rowspan="2">Compound (Mix) Tea Beverage</th></tr>
<tr><th>Fruit Juice</th><th>Fruit Flavored</th><th>Milk</th><th>Milk Flavored</th><th>Carbonated</th><th>Others</th></tr>
<tr><td rowspan="5">Tea Polyphenols / (mg/kg) ≥</td><td>Red Tea</td><td>300</td><td colspan="2" rowspan="5">200</td><td colspan="2" rowspan="5">200</td><td rowspan="5">100</td><td rowspan="5">150</td><td rowspan="5">150</td></tr>
<tr><td>Green Tea</td><td>500</td></tr>
<tr><td>Oolong Tea</td><td>400</td></tr>
<tr><td>Flower Tea</td><td>300</td></tr>
<tr><td>Other Tea</td><td>300</td></tr>
<tr><td rowspan="5">Caffeine / (mg/kg) ≥</td><td>Red Tea</td><td>40</td><td colspan="2" rowspan="5">35</td><td colspan="2" rowspan="5">35</td><td rowspan="5">20</td><td rowspan="5">25</td><td rowspan="5">25</td></tr>
<tr><td>Green Tea</td><td>60</td></tr>
<tr><td>Oolong Tea</td><td>50</td></tr>
<tr><td>Flower Tea</td><td>40</td></tr>
<tr><td>Other Tea</td><td>40</td></tr>
<tr><td>Juice Content (Weight Fraction) / %</td><td colspan="3">–</td><td>≥5.0</td><td>–</td><td colspan="5">–</td></tr>
<tr><td>Protein Content (Weight Fraction) / %</td><td colspan="4">–</td><td>≥0.5</td><td>–</td><td colspan="3">–</td></tr>
<tr><td>Carbon Dioxide Content (Volume Fraction)</td><td colspan="6">–</td><td>≥1.5</td><td>–</td></tr>
<tr><td colspan="10">Note: If it is indicated that product contains low caffeine content, it needs to comply with Section 5.3.4.</td></tr>
</table>

5.3.2 Tea polyphenol and caffeine content in concentrated tea beverage that has been diluted according to the dilution factor indicated on its product label should comply with the abovementioned requirements corresponding to its specific product classification.

5.3.3 Products with low sugar and zero sugar content should comply with GB 13432 and other relevant standards and regulations.

5.3.4 Caffeine content, of products with low caffeine content should not exceed 50% value of the maximum caffeine content limit allowed on products of similar category listed in Table 1.

5.4 Food Additives

Amount used and scope of use should comply with the requirements of GB 2760.

5.5 Hygiene Index

Should comply with the requirements of GB 19296.

6. Testing Methods

6.1 Sensory Inspection

Take ~50 mL analyte (sample) mixed evenly and place it into a colorless, transparent container. Place the container in bright places, observe sample's color, luster and clarity and then smell and taste sample at room temperature.

6.2 Physical-Chemical Indexes

6.2.1 Tea Polyphenols

Test in accordance with method specified in Appendix A.

6.2.2 Caffeine

Test in accordance with method specified in GB/T 5009.139.

6.2.3 Carbon Dioxide Content

Test in accordance with method specified in GB/T10792.

6.2.4 Fruit Juice Content

Orange juice content in accordance with method specified in GB/T 16771.

6.2.5 Protein Content

Test in accordance with method specified in GB/T5009.5.

6.3 Hygienic Inspection

6.3.1 Arsenic, Lead and Copper

Test in accordance with method specified in GB/T 5009.11, GB/T 5009.12 and GB/T 5009.13 respectively.

6.3.2 Total Bacteria Count, Coliforms, Mold, Yeast and Pathogenic Bacteria

Tests in accordance with methods specified in GB/T 4789.21.

6.3.3 Commercial Sterility

Test in accordance with method specified in GB/T4789.26.

7. Testing Guidelines

7.1 Sampling Method and Quantity

Randomly draw 12 smallest unitary packages from every batch during out-factory inspection, of which dedicate 6 for sensory index and physical-chemical index inspections, 2 for microorganism index inspections and last 4 as backup. Randomly draw 12 smallest unitary packages from every batch during type inspection, of which dedicate 6 for sensory index and physical-chemical index inspections, 2 for microorganism index inspections and last 4 as backup.

7.2 Out-factory Inspection

In-house quality control departments of manufacturing enterprises should identify batch number according to corresponding regulations; conduct inspections on items such sensory characteristics, tea polyphenols, total bacteria count, coliforms for every batch of products leaving the factory facilities for shipping and delivery.

7.3 Type Inspection

Type inspection items include all items specified in the technical requirements in this standard. Type inspection should be conducted once every year, or if any of the following situations arises:

- When there is significant changes in raw materials, processes and equipment;
- Upon resumption of production after a long period of stoppage;
- Results of out-factory inspection differs materially from those of routine production;
- When specifically required by State Quality Supervision Authorities.

7.4 Judgment Guidelines

If any inspection item(s) does not meet requirements of this standard, with the exception of microorganism indexes, conduct re-inspection for the particular item(s) albeit with double the quantity of samples used in the initial inspection. If there is still one item that fails to meet requirements, this batch of products will be deemed disqualified or unqualified. However if any of the microorganism indexes fails to meet requirements, this product batch will be deemed disqualified or unqualified immediately without being given any chance for re-inspection.

8. Labelling, Packaging, Transportation and Storage

8.1 Labels should comply with requirements of GB 7718 and GB 13432, at the same time comply with the following requirements:

- Fruit juice content should be labeled on fruit juice tea beverage;
- Protein content should be labeled on milk tea beverage;
- Dilution factor should be labeled on concentrated tea beverage;
- Tea beverage that complies with Section 5.3.3 can indicate as “low sugar” or “no sugar”;
- Tea beverage that complies with Section 5.3.4 can indicate as “low caffeine”.

8.2 Packing materials and containers should comply with the requirements of relevant standards.

8.3 Sunlight and rain exposure should be avoided during production transportation and products should not be transported together with poisonous, foul-smelling, volatile and corrosive substances.

8.4 Products should be stored in clean, dry, well-ventilated warehouses without insect and rat infection.

Appendix A

(Normative Appendix)

Test Methods for Tea Polyphenols in Tea Beverages

A.1 Methods Summary

Tea polyphenol in tea leaves will react with ferrous ions to form purplish blue complexes. Measure its content using spectrophotometer method.

A.2 Apparatus and Reagents

A.2.1 Apparatus

Conventional apparatus and the following items are used.

A.2.1.1 Analysis Balance (Sensitivity 0.001 g)

A.2.1.2 Spectrophotometer

A.2.2 Reagents

All reagents used should be analytically pure (AR); water used in the experiments should comply with the third grade water specifications in GB/T 6682.

A.2.2.1 Ferrous Tartrate Solution: Weigh and take 0.1 g ferrous sulfate and 0.5 g sodium potassium tartrate tetrahydrate, dissolve in water and fill it up to 100 mL (store under low temperature conditions and it will be valid for 10 days).

A.2.2.2 pH 7.5 Phosphate Buffer Solution.

A.2.2.2.1 23.87 g/L Disodium Hydrogen Phosphate: Weigh and take 23.87 g sodium dihydrogen phosphate, dissolve in water and fill up to 1 L volume.

A.2.2.2.2 9.08 g/L Monopotassium Phosphate: Weigh and take 9.08 g monopotassium phosphate that had been de-moisturized for 2 hours at 110^{o}C, dissolve in water and fill it up to 1 L volume. Take 85 mL abovementioned disodium hydrogen phosphate (prepared as in A.2.2.2.1) and 15 mL monopotassium phosphate (prepared as in A.2.2.2.2) and mixed evenly.

A.3 Analysis Procedure

A.3.1 Preparation of Sample Solution

A.3.1.1 Partially transparent sample solution (fruit flavored tea beverage, etc.)

Shake the sample solution evenly, prepare for use.

A.3.1.1 Partially turbid sample solution (fruit juice tea beverage, milk tea beverage, etc.)

Weigh and take 25.00 g sample solution mixed evenly into a 50 mL volumetric flask, add 15 mL 95% ethanol and shake evenly. Left the solution to settle for 15 mins and fix volume with filling up with water. Filter with slow speed filter paper and prepare for use.

A.3.1.3 Sample solution containing carbon dioxide gas

Weigh and take 100.00 g sample solution mixed evenly into a 250 mL beaker and weigh its total weight. Place the beaker onto an electric stove and heat to boil, continue heating for 10 mins in its slight boiling state so as to remove the carbon dioxide content. After it has cooled, add water to top up back to its initial weight before boiling. Shake evenly and prepare for use.

A.3.2 Determination

Accurately weigh and take 1~5 g abovementioned sample solution (prepared as in A.3.1) and place into a 25 mL volumetric flask. Add 4 mL water, 5mL ferrous tartrate solution (prepared as in A.2.2.1), shake to mix and fill it up to full with pH 7.5 phosphate buffer (prepared as in A.2.2.2). Use a 10 mm colorimetric dish, measure its absorbency (A_1) at wave length of 540 mm, with reference to a control experiment. At the same time, weigh and extract reagent (prepared as in A.3.1) of equivalent volume into a 25 mL volumetric flask, add 4 mL water and fill it up to full with pH 7.5 phosphate buffer (A.2.2.2). Measure its absorbency (A_2) with reference to a control experiment.

Tea polyphenol content in sample can be calculated with the following formula (A.1).

$$X = \frac{(A_1 - A_2) * 1.957 * 2 * K}{m} * 1000 \quad \text{.....(A.1)}$$

In the formula:

X – Tea polyphenol content in sample, unit in milligram per kilogram（mg/kg);

A_1 – Absorbency after coloration of sample solution;

A_2 – Absorbency base color of sample solution;

1.957 – Use 10 mm colorimetric dish, when absorbency is 0.50, tea polyphenol content in 1 mL tea soup is equivalent to 1.957 mg;

K – Dilution factor;

m – Weight of sample liquid weighed during determination, unit in gram (g).

A.4 Allowed Deviation

Discrepancies between the results of two parallel tests conducted with the same sample should not exceed the 5% range.

National Standards of People's Republic of China

GB 19297-2003

National Food Safety Standards

Hygienic Standard for Fruit and Vegetable Juice

Issued on: 2008-04-21 Implemented on: 2008-11-01

Issued by the General Administration of Supervision, Inspections and Quarantine of the People's Republic of China and National Standardization Management Committee

Foreword

The entirety of this standard is mandatory.

This standard corresponds to the Codex Stan 45-1998 Hygienic Standard for Orange Juice, Codex Stan 45-1981 Hygienic Standard for Grape Fruit Juice, Codex Stan 47-1981 Hygienic Standard for Lemon Juice, Codex Stan 49-1981 Hygienic Standard for Tomato Juice, Codex Stan 82-1981 Hygienic Standard for Grape Juice, Codex Stan 85-1981 Hygienic Standard for Pineapple Juice, Codex Stan 120-1981 Hygienic Standard for Black Currant, Codex Stan 164-1989 Hygienic Standard for Other Juices and Codex Stan 179-1991 Hygienic Standard for Vegetable Juice published by The Codex Alimentarius Commission (CAC). Despite that, they are non-equivalent; there are differences between this standard and the international Codex Standards, in terms of technical content and text formatting.

This standard was proposed by the Ministry of Health of the People's Republic of China and also placed under its jurisdiction.

The organization involved in the drafting of this standard: Liaoning Province Health Supervision and Inspections Authority, Beijing City Health and Epidemic Prevention Services, Public Health Supervision and Inspections Services of the Tianjin City Health Bureau, Hangzhou Wahaha Group Co.,Ltd., Public Health Supervision and Inspections Services of the Shanghai City Health Bureau, Shandong Province Food Hygiene Supervision and Inspections Bureau and Sichuan Food Hygiene Supervision and Inspections Bureau.

The key personnel involved in the drafting of this standard: Xutai Wang, Ruogang Huang, Chunming Cui, Ting Yu, Xin Xu, Liufa Xu and Ruiying Lee.

National Food Safety Standards

Hygienic Standard for Fruit and Vegetable Juice

1. Scope

This standard specifies the details on the index requirements, food additives, hygiene requirements on the production and processing procedures as well as requirements on packaging, labelling, storage and transportation with their corresponding inspection methods for fruit and vegetable juices.

This standard applies to beverages that are drinkable directly, produced with corresponding processing of key ingredients like fruits, vegetables or other concentrated fruits, vegetable juices (pulps) and possibly adding other supplementary ingredients in the process. This standard also applies to the low-temperature reconstituted fruit juices.

2. Normative References

Clauses involved in the following documents constitute the ones in this standard through reference in this standard. If any reference is dated, the following amendment or revised versions (excluding errata) are not applicable to this standard. However, the study of whether the latest version of these documents can be used by all parties who reach agreement according to this standard is encouraged. Any latest version of the non-dated reference is applicable to this standard.

GB 2760 *Hygienic Standard for Uses of Food Additives*

GB/T 4789.21 *Microbiological Examination of Food Hygiene - Examination of Frozen Drinks and Cold Drinks*

GB/T 4789.26 *Microbiological Examination of Food Hygiene – Commercial Sterilized Testing of Canned Foods*

GB/T 5009.11 *Testing Method for Total Arsenic in Foods*

GB/T 5009.12 *Testing Method for Lead in Foods*

GB/T 5009.13 *Testing Method for Copper in Foods*

GB/T 5009.14 *Testing Method for Zinc in Foods*

GB/T 5009.16 *Testing Method for Tin in Foods*

GB/T 5009.34 *Testing Method for Nitrites in Foods*

GB/T 5009.90 *Testing Methods for Iron, Magnesium, Manganese in Foods*

GB/T 5009.185 *Determination of Patulin in Apple and Hawthorn Products*

GB 12695 *Beverage Industry Good Manufacturing Practices*

3. Definitions

The following definition will apply for this standard.

3.1 Low-temperature Reconstituted Juice

Refers to juice that has the color, luster and taste of the meat of original fruits it is based on, containing a specific amount of soluble solids and is drinkable directly. It is produced by adding water at an amount equal to the water content lost during the enrichment process of concentrated fruit juice (pulp) of the specific fruit specie into the concentrated fruit juice (pulp) itself under temperature condition 0~10°C, without putting the product of this process through any heating procedure. Juice end product should be stored at temperature 0~4°C.

4. Index Requirements

4.1 Ingredient Requirements

Should comply with corresponding standards and relevant regulations.

4.2 Sensory Index

Has the color, luster, aroma and taste of what the fruit, vegetable ingredients included should have, no unusual odor or visible foreign objects.

4.3 Physical-Chemical Indexes

Physical-chemical indexes should comply with the requirements listed in Table 1.

Table1 Physical-Chemical Indexes

Items		Index
Total Arsenic (As) / (mg/L)	≤	0.2
Lead (Pb) / (mg/L)	≤	0.05
Copper (Cu) / (mg/L)	≤	5
Zinc (Zn)[a] / (mg/L)	≤	5
Iron (Fe)[a] / (mg/L)	≤	15
Tin (Sn)[a] / (mg/L)	≤	200
Zinc, Bronze, Iron Subtotal[a] / (mg/L)	≤	20
Sulfur Dioxide Residues (SO_2) / (mg/kg)	≤	10
Patulin[b] / (μg/L)	≤	50
[a]only applies to metal can packaging.		
[b]only applies to apple juice and hawthorn juice.		

4.4 Microorganism Indexes

4.4.1 Canned fruit, vegetable juices, produced with canned food processing technology should comply with the commercial sterility requirements.

4.4.2 Fruit and vegetable juice of other packaging formats should comply with the microorganism index requirements listed in Table 2.

Table 2 Microorganism Indexes

Items		Index	
		Low-temperature Reconstituted Juice	Others
Total Bacteria Count / (cfu/mL)	≤	500	100
Coliform / (MPN/100mL)	≤	30	3
Mold / (cfu/mL)	≤	20	20
Yeast / (cfu/mL)	≤	20	20
Pathogens (Salmonella, Shigella, Staphylococcus aureus)		Should not be detected	

5. Food Additives

5.1 Quality of food additives should comply with corresponding standard and relevant regulations.

5.2 Type and quantity of food additives used should comply with the requirements of GB 2760.

6. Hygiene Requirements on the Production and Processing Procedures

Should comply with the requirements of GB 12695.

7. Packaging

Packaging container and material should comply with corresponding standard and relevant regulations.

8. Labelling

Label of prepackaged products should comply with relevant regulation.

9. Storage and Transportation

9.1 Storage

Products should be stored at dry, well-ventilated places. They should not be stored together with poisonous, harmful, foul-smelling, volatile and corrosive substances.

9.2 Transportation

Sunlight and rain should be avoided during product transportation. Products should not be transported together with poisonous, harmful, foul-smelling and any other substances that may have material impact on the quality of the products.

10. Inspection Methods

10.1 Sensory Indexes

Take an appropriate amount of low-temperature reconstituted fruit juice and pour it into a cup (bottle) with a cap, place the cup at room temperature so as to allow the temperature of juice to rise to ~20^{o}C then open the cap and inspect the aroma of the juice. For fruit juices of other packaging formats, inspect the aroma and taste immediately after opening the packaging, of which should comply with the requirements in section 4.2. Extract 50 mL analyte mixed evenly into a sampling glass (or more or less a small 100 mL beaker), place glass in bright area then inspects the color, luster or if there is any visible contaminant visually.

10.2 Physical-Chemical Indexes

10.2.1 Lead

Should be inspected according to GB/T 5009.12.

10.2.2 Total Arsenic

Should be inspected according to GB/T 5009.11.

10.2.3 Copper

Should be inspected according to GB/T 5009.13.

10.2.4 Zinc

Should be inspected according to GB/T 5009.14.

10.2.5 Tin

Should be inspected according to GB/T 5009.16.

10.2.6 Carbon Dioxide

Should be inspected according to GB/T 5009.34.

10.2.7 Iron

Should be inspected according to GB/T 5009.90.

10.3.1 Patulin

Should be inspected according to GB/T 5009.185.

10.3 Microorganism Indexes

10.3.2 Total Bacterial Count, Coliform, Mold, Yeast, Pathogen

Should be inspected according to GB/T 4789.21.

10.3.3 Commercial Sterility

Should be inspected according to GB/T 4789.26.

GBT 27305-2003 Food Safety Management System – Requirements for Fruit and Vegetable Juices Producing Establishments

National Standards of People's Republic of China

GB/T 27305-2003

National Food Safety Standards

Food Safety Management System – Requirements for Fruit and Vegetable Juices Producing Establishments

Issued on: 2008-09-10 Implemented on: 2009-01-04

Issued by the General Administration of Supervision, Inspections and Quarantine of the People's Republic of China and National Standardization Management Committee

Foreword

Appendix A in this standard is an informative appendix.

This standard was proposed by China National Accreditation Service for Conformity Assessment and Shaanxi China Inspection & Quarantine Services of the People’s Republic of China.

This standard is placed under the jurisdiction of the Standardization Technical Committee of the Certification and Accreditation Administration of the People’s Republic of China (SAC/TC 261).

The organizations involved in the drafting of this standard: China National Accreditation Service for Conformity Assessment, Shaanxi China Inspection & Quarantine Services of the People's Republic of China, Registration Management Department of the Certification and Accreditation Administration of the People’s Republic of China, Qingdao China Inspection & Quarantine Services of the People's Republic of China, China Beverage Industry Association, Beijing Zhongda Huayuan Certification Center, Beijing Huiyuan F&B Group Co.,Ltd., Shaanxi Evergreen Fruit Juice Beverage Co.,Ltd. And Dalian Haisheng Fruit Industry Co.,Ltd.

This key personnel involved in the drafting of this standard: Weiqun Cen , Shuangmin Wu, Shaoping Gu , Aidong Lin, Litian Ma , Junlan Li , Xiaosheng Wu, Jun Hu, Qingmou Yu, Xiaoxia Dai and Jie Ma.

Introduction

This standard aims to tackle the key food safety issues present with regards to products of the fruit juice and vegetable juice category in China, adopting innovative and active approaches in introducing principles with equal emphasis, integrating the industry characteristics of fruit juice and vegetable juice manufacturing enterprises and thus proposing the establishment of specific requirements for food safety management system used by enterprises manufacturing fruit and vegetable juice type products.

This standard was drafted based on "*Food Safety Management System – Requirements for Fruit and Vegetable Juice Manufacturing Enterprises*", one of the research results of the major science and technology project "*Establishment and Implementation of Food Enterprises and Restaurant Industry HACCP System*" determined in the tenth 5-year plan set up by the incumbent government.

GB/T 22000-2006 *Food Safety Management System – Requirements for All Types of Organizations in the Food Supply Chain* provides a standardized set of requirements for all the different types of organizations in the food supply chain. Fruit and vegetable juice manufacturing enterprises and related parties raised the need for further refinements on the standardized requirements specifically in accordance with the professional production characteristics of such product types.

In view of the differences in the production and processing procedures between fruit juice and vegetable juice manufacturing enterprises, this standard also specially proposed "critical control point" requirements on top of the usual list of standardized requirements stipulated so as to ensure product safety. This mainly includes hygiene controls, allergens, controls on special ingredients used such as genetically modified ingredients for processes such as inspection, acceptance and storage of main, supplementary ingredients, selection of main fruit and vegetable ingredients, supplementary ingredients, sterilization and packaging (packing) so as to prevent product cross contamination and ensure they are safe to consume by consumers.

National Food Safety Standards

Food Safety Management System – Requirements for Fruit and Vegetable Juices Producing Establishments

1. Scope

This standard specifies a set of requirements specially dedicated towards food safety management systems in enterprises that process and manufacture fruit juice and vegetable juice category products, including on aspects such as human resources, prerequisite programs, critical control points, inspection, product traceability and recalls.

This standard, together with GB/T 22000 applies to the establishment, implementation as well as self-evaluation of food safety management systems in fruit juice and vegetable juice manufacturing enterprises, and it also applies to external evaluation and certification for food safety management systems of manufacturing enterprises of such product categories.

This standard should be used in tandem with GB/T 22000 when it is used for the certification purposes. See Appendix A for the corresponding relationship between the two standards.

2. Normative References

Clauses involved in the following documents constitute the ones in this standard through reference in this standard. If any reference is dated, the following amendment or revised versions (excluding errata) are not applicable to this standard.

GB 2760	*Standards for Uses of Food Additives*
GB 2761	*Limits of Mycotoxins in Foods*
GB 5719	*Hygienic Standards for Drinking Water*
GB 7718	*General Principle for Prepackaged Food Label*
GB 10789-2007	*General Standard for Beverage*
GB/T 10791	*Requirements for Raw Materials of Soft Beverages*
GB 12695-2003	*Beverage Industry Good Manufacturing Practices*
GB 13432	*General Principles of Labels for Prepackaged Products for Special Dietary Uses*
GB 14880	*Standards for the Use of Nutritional Fortification Substances in Foods*
GB 16740	*General Standards for Health (Functional) Foods*
GB 17325	*Hygienic Standards for Fruit and Vegetable Juice (Pulp) Used in Food Industry*
GB/T 22000- 2006	*Food Safety Management System – Requirements for Fruit and Vegetable Juice Manufacturing Enterprises (ISO 22000: 2005, IDT)*

3. Terms and Definition

Terms and definitions established in GB/ T 22000-2006 as well as the following terms and definitions will apply to this standard.

3.1 Fruit and Vegetable Juices

Refer to beverages produced from processing and fermentation of main ingredients such as fruits and (or) vegetables (incl. edible roots, stems, leaves, flowers and fruits).

[GB 10789-2007, Definition 5.2]

3.2 Culled

Refer to the process of filtering out and removing fruits and vegetables that have rotted, deteriorated in quality, damaged or are in any other conditions that render them unsuitable for processing.

3.3 5-log Pathogen Reduction

Refer to the process of reducing the quantity of relevant pathogens (pathogenic bacteria) present in fruit juice and vegetable juice category products by 100,000 times (5-log).

3.4 Clear in Place, CIP

Refer to circulation style flush-washing process conducted in closed-circuit food equipment and the interiors of their connecting pipelines with relevant facilities together with water, detergents, disinfectants, etc.

3.5 Clear off Place, COP

Refer to open style flush-washing process conducted dismantled, opened equipment and their pipelines with relevant facilities together with water, detergents, disinfectants, etc.

4. Human Resources

4.1 Composition of Food Safety Team

Composition of the food safety team should be in accordance with the professional coverage requirements of fruit juice and vegetable juice category manufacturing enterprises, made up mainly of professional employees in aspects such as procurement, inspection and acceptance of raw materials, process development, equipment maintenance, food quality control, product processing, inspection, sales and if needs arise, specialists can also be employed.

4.2 Capacity, Awareness and Training

4.2.1 Food safety team should be familiar with:

a) Laws, regulations and standards for products of fruit juice and vegetable juice categories;

b) Principles of HACCP as well as any knowledge applicable to food safety management systems;

c) Fundamental knowledge and processing technologies on products of fruit juice and vegetable juice categories.

4.2.2 Employees involved in operations such as procurement, inspection and acceptance of raw materials, process development, equipment maintenance, food quality control, product processing, inspection, sales should possess the corresponding capabilities. Inspection personnel should also possess the corresponding qualifications required for posting.

5. Prerequisite Programs

5.1 Infrastructure and Maintenance

Infrastructure and maintenance of manufacturing enterprises should comply with the requirements listed in Chapter 4, 5 and 6 of GB 12695-2003.

5.2 Hygienic Standard Operating Procedure

5.2.1 Enterprises should identify, assess and determine degree of hygiene contamination throughout production, processing procedures, establish a set of hygienic standard operating procedure, set up files as well as implement effective supervision of the entire procedure (incl. supervision frequency and personnel), establishing corresponding preventive and remedial measures. Records should be maintained for the supervision and remedial procedures.

5.2.2 Water that have direct contact with products (incl. raw materials, intermediate products and finished products) or processing facilities and equipment should comply with the requirements of GB 5749.

5.2.3 Surface of other items such as facilities, equipment and work clothes that have direct contact with products should comply with hygiene requirements.

5.2.4 Should ensure that products are protected from risk of cross contamination.

5.2.5 Hands and other parts of the body that may have direct contact with products of personnel that will be entering the production plants should be washed and disinfected. Should keep the hygiene chamber and facilities in good conditions and clean.

5.2.6 Prevent potential harm on products due to lubricants, fuel, detergents, disinfectants, condensed water and other contaminants.

5.2.7 Label, store and use each type of chemical substances correctly.

5.2.8 Take measures to prevent and eliminate insect, rat infection.

5.2.9 Products' storage and transportation conditions should comply with the requirements according to products' characteristics. Products that require freezing should be stored and transported under temperature conditions of $-18^{o}C$ and below.

5.2.10 Cleaning and disinfection controls should satisfy the following requirements:

a) Detergents and disinfectants used should comply with food hygiene requirements;

b) Clear in Place (CIP) or Clear off Place (COP) method can be adopted for the cleaning and disinfection of equipment and pipelines, and verification should be conducted regularly on the effectiveness of the cleaning and disinfection process;

c) Conduct regular cleaning and disinfection of production sites, tools, containers, etc. Should establish cleaning and disinfection sites with dedicated equipment in plants;

d) Equipment and parts used in the processes such as washing, sorting, grinding (powder), squeezing (extracting) juice, enzymatic hydrolysis, enrichment, formulation, filtration, sterilization, filling, sealing, chilling should undergo stringent cleaning and disinfection procedures in accordance with regulations;

e) Internal packaging materials will have direct contact with products should undergo disinfection treatment before filling, so as to ensure compliance with their corresponding hygiene requirements.

5.3 Personnel Health and Hygiene

5.3.1 Personnel engaged in production, inspection and management as well as personnel that may have direct contact with products should comply with the requirements listed in Sections 8.5 and 8.6 of GB 12695-2003.

5.3.2 Production zones with different level of hygiene requirements or production personnel with different responsibilities should be distinguished with obvious markings or tags, and personnel of another zone should not enter zones that they are not under.

6. Critical Control Points

6.1 Raw Material Inspection, Acceptance & Storage

6.1.1 Manufacturing enterprises should establish inspection, acceptance guidelines for raw materials and take proper measures to inform supplying parties. Raw materials should comply with the requirements of Section 9.2 of GB 12695-2003 and those of GB/T 10791, while pesticide and veterinary drugs residues in raw materials should comply with relevant regulations. Raw materials can only be used after being qualified during the inspection and acceptance process.

6.1.2 Concentrated fruit and vegetable juice (pulp) used by manufacturing enterprises should comply with GB 17325 and other relevant requirements.

6.2 Selection of Fruit Raw Ingredients

Fruits and vegetables should be properly selected, filtering out parts that are rotted, deteriorated, damaged or not suitable for processing before being crushed (grinded). Mycotoxin level control should comply with the requirements of GB 2761.

6.3 Supplementary Ingredients

6.3.1 Use of supplementary ingredients such as food additives, processing aids, nutritional supplements should comply with the requirements of GB 2760 and GB 14880.

6.3.2 Conduct verification with regards to the quality and usage quantity of each type of supplementary ingredients before inputting ingredients, of which proper records should be made.

6.4 Sterilization

Effectiveness of sterilization process procedure established and implemented for products that require such processes should comply with the 5-log pathogen reduction requirements, of which proper records should be made.

6.5 Packaging (Filling)

6.5.1 Internal packaging materials used in packaging (filling) should comply with requirements of corresponding quality and hygienic standards.

6.5.2 Area dedicated for packaging (filling) should be effectively isolated, packaging (filling) environment should comply with safety and hygiene requirements of the respective products.

6.5.3 Should implement checks on the sealing performance of product containers after the packaging (filling) process.

7. Inspection

7.1 Inspection Capability

7.1.1 Institutions and Personnel

Manufacturing enterprises should have in-house inspection departments that correspond to their individual production capabilities, of which the departments should be made up of inspection personnel that comply with the requirements of Section 4.2.2.

7.1.2 Facilities and Equipment

Facilities and equipment of manufacturing enterprise should meet inspection requirements, while equipment should be inspected or calibrated in accordance with requirements.

7.1.3 Entrusted Inspection

When external test institutions are entrusted by manufacturing enterprises with the responsibility to conduct proper inspection works, such test institutions should be accredited with the qualifications and capabilities in conducting the required test items being entrusted.

7.2 Inspection Requirements

7.2.1 Inspection Methods

In-house inspection departments of manufacturing enterprises and inspection parties should satisfy requirements of their clients, the laws and regulations as well as relevant standards, while relevant inspection methods should be accredited before they are being used.

7.2.2 Sampling

Manufacturing enterprises should specify sampling procedure and methods, while sampling personnel should undergo specialized training and should be proficient in sampling operations.

8. Product Traceability and Recalls

8.1 Labeling

Prepackaged product labels should comply with the requirements of relevant laws and regulations as well as GB 7718, GB 10789, GB 13432, GB 16740, etc. Product packaging that is applicable should indicate key contents such as product name, name of manufacturing enterprise, hygiene registration number, batch, date of production, inspection and quarantine logo, allergens, genetically modified components and irradiated

treatment.

8.2 Product Traceability

8.2.1 Manufacturing enterprises should establish and implement product traceability system, of which the system should include contents such as inspection, acceptance and usage of raw materials, out-warehouse batch records for intermediate products and finished products and management of markings, so as to realize proper tracing and records maintaining for the entire process from raw material inspection, acceptance to product sales, establishing traceability.

8.2.2 Manufacturing enterprises should establish record control procedure, including records of laws and regulations, products' intended use and client requirements, of which all records should be retained for at least 3 years.

8.3 Recalls

Manufacturing enterprises should establish a proper product recall system when situations of unsafe product batches arise and simulated, actual recalls or other product recall methods should be used to evaluate the overall effective of recalls.

Appendix A

(Informative Appendix)

Corresponding Relationship between GB/T 22000-2006 & GB/T 27305-2008

Table A.1 Corresponding Relationship between GB/T 22000-2006 & GB/T 27305-2008

GB/T 22000-2006		GB/T 27305-2008	
Introduction			Introduction
Scope	1	1	Scope
Normative References	2	2	Normative References
Terms and definitions	3	3	Terms and Definition
Food Safety Management System	4		
General Requirements	4.1		
Document Requirements General Principles Document Control Record Control	4.2 4.2.1 4.2.2 4.2.3		
Management Responsibility	5		
Management Commitment	5.1		
Food Safety Policy	5.2		
Food Safety Management System Planning	5.3		
Responsibility and Authority	5.4		
Food Safety Team Leader	5.5		
Communications External Communications Internal Communications	5.6 5.6.1 5.6.2		
Emergency Preparedness and Responses	5.7		
Management Review General Principles Review Input Review Output	5.8 5.8.1 5.8.2 5.8.3		
Resource Management	6		
Resource Supply	6.1	7.1	Inspection Capability
Human Resources General Principle Capability, Awareness and Training	6.2 6.2.1 6.2.2	4 4.2	Human Resources Capability, Awareness and Training
Infrastructure	6.3	5.1	Infrastructure and Maintenance
Work Environment	6.4		
Planning and Realizing Safe Products	7	6	Critical Control Points
General Principles	7.1		
Prerequisite Programs (PRPs)	7.2 7.2.1 7.2.2 7.2.3	5 5.1 5.2 5.3	Prerequisite Programs Infrastructure and Maintenance Hygienic Standard Operating Procedures Personnel Health and Hygiene
Preliminary Steps for Analysis of Implementation Hazard General Provisions Food Safety Team Product Characteristics Intended Use Flowchart, Procedure Steps and Control Measures	7.3 7.3.1 7.3.2 7.3.3 7.3.4 7.3.5	4.1	Composition of Food Safety Team

Table A.1 Continued

GB/T 22000-2006		GB/T 27305-2008	
Hazard Analysis General Principles Hazard Identification and Determination of Acceptable Level Hazard Assessment Selecting and Evaluation Control Measures	7.4 7.4.1 7.4.2 7.4.3 7.4.4	6	Critical Control Points
Establishment of Operation Prerequisite Programs (PRPs)	7.5	6	Critical Control Points
HACCP Plan Establishment HACCP Plan Determination of Critical Control Points (CCPs) Determination of Key Limits for CCPs Monitoring System for CCPs Measures Undertaken if Monitored Results Exceed Key Limits	7.6 7.6.1 7.6.2 7.6.3 7.6.4 7.6.5	6 6.1 6.2 6.3 6.4 6.5	Critical Control Points Raw Material Inspection, Acceptance and Storage Selection of Fruit Raw Ingredients Supplementary Ingredients Sterilization Packaging (Filling)
Preliminary Information Updates, Specifying Prerequisite Programs and HACCP Plan Document Updates	7.7		
Validation Plan	7.8	7	Inspection
Traceability System	7.9	8.1 8.2	Labeling Product Traceability
Unqualified Controls Corrections Corrective Measures Disposal of Potential Hazardous Products Recalls	7.10 7.10.1 7.10.2 7.10.3 7.10.4 7.10.5	 8.3	 Recalls
Verification, Validation and Improvement of Food Safety Management System	8		
General Principles	8.1		
Verification of Control Measure Groups	8.2		
Monitoring and Measurement of Controls	8.3	7	Inspection
Validation of Food Safety Management System Internal Audit Evaluation of Single Item Validation Results Analysis of Results of Validation Activities	8.4 8.4.1 8.4.2 8.4.3		
Improvements Continuous Improvements Food Safety Management System Updates	8.5 8.5.1 8.5.2		

References

[1] GB 4803-1994 Hygienic standard for polyvinyl chloride resin used as food container and packaging material

[2] GB 7105-1986 The sanitary specifications of perchloravinyl interior coatings for food container

[3] GB 9681-1988 Hygienic standard of products of polyvinyl chloride for food packaging

[4] GB 9683-1988 Hygienic standard for composite laminated food packaging bag.

[5] GB 9685-2003 Hygienic standard for adjuvants and processing aids in food containers and packaging materials.

[6] GB 9687-1988 Hygienic standard for polyethylene products used as food containers and tablewares.

[7] GB 9687-1988 Hygienic standard for polyethylene products used as food containers and tablewares.

[8] GB 9689-1988 Hygienic standard for polystyrene products used as food containers and tablewares .

[9] GB 9691-1988 Hygienic standard for polyethylene resin used as food packaging material.

[10] GB 9692-1988 Hygienic standard for polystyrene resin used as food packaging material.

[11] GB 9693-1988 Hygienic standard for polystyrene resin used as food packaging material.

[12] GB 11677-1989 Hygienic standard for water soluble epoxy internal coatings of beverage cans.

[13] GB 11680-1989 Hygienic standard of paper used for food packaging .

[14] GB 13113-1991 Hygienic standard for polyethylene terephthalate products used as food containers and packaging materials.

[15] GB 13114-1991 Hygienic standard for polyethylene terephthalate resin used as food containers and packaging materials.

[16] GB 14942-1994 Hygienic standard for polycarbonate products used as food containers and packaging materials.

[17] GB 14944-1994 Hygienic standard for bottle sheet and granular materials of polyvinyl chloride for food packaging.

[18] GB 16331-1996 Hygienic standard of nylon 6 resins for food packaging material.

[19] GB 17326-1998 Hygienic standard for rubber--modified acrylonitrile--butadiene--polystyrene products used as food containers and packing materials.

[20] GB 17327-1998 Hygienic standard for acrylonitrile--styrene products used as food containers and packing materials.

[21] GBT 22004-2007 Food safety management systems - Guidance on the application of GB/T 22000-2006.

[22] The State General Administration of quality supervision, inspection and quarantine. Export food production enterprises hygiene registration management regulations.

[23] The State General Administration of quality supervision, inspection and quarantine. Export food production enterprises hygiene requirements

[24] The State General Administration of quality supervision, inspection and quarantine. Food recall management regulations.

[25] The State General Administration of quality supervision, inspection and quarantine. Food labeling provisions of the bamboo.2007 orders 102.

[26] National attestation approves supervisory management committee. Food production enterprises of hazard analysis and critical control point (HACCP) management system certification management provisions of.2002 Third Announcement.

[27] National attestation approves supervisory management committee. The food safety management system certification I Certification Implementation Rules.

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[32] Shuangmin Wu , Wenjie Wang. Fruit and vegetable juice, harm and control and its production enterprise HACCP system establishment and implementation guidelines. Beijing: Chinese Standard Press, 2008.

National Standards of People's Republic of China

GB/T 21730-2008

National Food Safety Standards

Concentrated Orange Juice

Issued on: 2008-04-21 Implemented on: 2008-11-01

Issued by the General Administration of Supervision, Inspections and Quarantine of the People's Republic of China and National Standardization Management Committee

Foreword

This standard corresponds to the Codex Alimentarius Commission (CAC) CODEX STAN 247-2005 Fruit Juice and Nectar Beverage Applied Standard and European Fruit Juice Association (A. I.J. N.) Technical Specifications of Fruit Juice Evaluation Standard.

Appendix A in this standard is a normative appendix.

This standard was proposed by China Light Industry Union.

This standard is placed under the jurisdiction of the Beverage Technical Committee Division of the National Food Industry Standardization Technical Committee.

The organizations involved in the drafting of this standard: China Food Fermentation Industry Research Institute, Shandong Jiamei Food Industry Co,.Ltd, Jiaji Trade (Shanghai) Company and Beijing Huiyuan F&B Group Co.,Ltd.

The key personnel involved in the drafting of this standard: Huiyi Li, Xiaomei Yuan, Mingzhou Li, Hui Mao, Xiaobing Li and Shaozhen Li.

National Food Safety Standards

Concentrated Orange Juice

1. Scope

This standard specifies the details on technical requirements, testing methods and testing guidelines for concentrated orange juice.

This standard applies concentrated orange juice as defined in Chapter 3 of this standard.

2. Normative References

Clauses involved in the following documents constitute the ones in this standard through reference in this standard. If any reference is dated, the following amendment or revised versions (excluding errata) are not applicable to this standard. However, the study of whether the latest version of these documents can be used by all parties who reach agreement according to this standard is encouraged. Any latest version of the non-dated reference is applicable to this standard.

GB/T 6682 *Specifications and Test Method for Water Used in Laboratory for Analysis*

GB/T 12143.1 *Testing Method for Soluble Solids in Soft Beverages – Refractometer Method* (GB/T 12143.1-1989, neq ISO 2173:1978)

GB/T 16771 *Determination of Fruit Juice Content in Citrus Sinensis, Citrus Reticulate, Orange Juice and Their Beverages*

GB 17325 *Hygienic Standards of Concentrated Fruit and Vegetable Juice (Pulp) in Food Industry*

3. Terms and Definition

The following terms and definitions will apply to this standard.

3.1 Concentrated Orange Juice

Refer to product which will take on the characteristics that normal orange juice (pulp) should have after reconstitution by adding water. It is produced by removing a certain proportion of water from orange juice (pulp) by physical means.

4. Technical Requirements

4.1 Sensory Requirements

Should comply with the requirements listed in Table 1.

Table 1 Sensory Requirements

Items	Requirements
Texture/Structure	Liquid appears evenly distributed, precipitation like meat or pulps of fruits is allowed
Color and Luster	Orange yellow to orange red in color
Smell and Taste	After reconstitution, has aroma and flavor that orange juice should have, no unusual odor
Impurities	No visible external impurity

4.2 Physical-Chemical Indexes

Should comply with the requirements listed in Table 2.

Table 2 Physical-Chemical Indexes

Items		Index
Soluble Solids (20ºC, Acidity Unadjusted) / %	≥	20.0
Sucrose (Reconstituted) / (g/kg)	≤	50.0
Glucose (Reconstituted) / (g/kg)		20.0~35.0
Fructose (Reconstituted) / (g/kg)		20.0~35.0
Glucose (Reconstituted) / Fructose	≤	1.0
Juice Content (Reconstituted) / (g/kg)		100

4.3 Hygienic Index

Comply with the requirements in GB 17325.

4.4 Fruit Juice Content

Test in accordance with the method specified in GB/T 16771.

5. Testing Methods

5.1 Preparation of Reconstituted Orange Juice

Use third grade water that complies with requirements of GB/T 6682 to dilute the concentrated orange juice into juice with soluble solids content at 11.2% (20ºC).

5.2 Sensory Inspection

5.2.1 Texture/Structure, Color and Luster and Impurities

Take ~50 mL of reconstituted juice (prepared as in 5.1) evenly mixed and place it into a colorless and transparent 100 mL container, place container in a bright area and inspect the texture, color and if there is any impurities.

5.2.2 Smell and Taste

Take a specific amount of reconstituted juice (prepared as in 5.1) evenly mixed and inspect using sense of smell and taste under room temperature conditions.

5.3 Physical-Chemical Tests

5.3.1 Soluble Solids

Test in accordance with GB/T 12143.1.

5.3.2 Sucrose, Glucose and Fructose

Test reconstituted orange juice (prepared as in 5.1) in accordance with method specified in Appendix A.

5.3.3 Orange Juice

Test reconstituted orange juice (prepared as in 5.1) in accordance with method specified in GB/T 16771.

5.4 Hygiene Inspection

Tests for hygienic indexes should be conducted in accordance with the requirements of GB 17325.

6. Testing Guidelines

6.1 Confirmation of Batch Number

Product batch number should be determined by the quality control department of the manufacturing enterprise according to corresponding regulations.

6.2 Out-factory Inspection

Inspection on various items should be conducted, such as for sensory requirements, soluble solids content, coliforms, mold and yeast before releasing each batch of products from the factory, into the market.

6.3 Type Inspection

All inspection items listed in this standard are all included as required items for any type inspection. Type inspection should be conducted semiannually, or if any of the following circumstances arises:

- When there are significant changes in raw ingredients, processes;
- Upon the resumption of production after long period of stoppage;
- When there are significant discrepancies between results of the out-factory inspection and those of the routine operations;

6.4 Judgment Guidelines

If any of the test items (with the exception of microorganism index items) fails to meet the requirements of this standard, conduct a second round of inspection for that particular item with two times the amount of samples used in the initial round. If there is still one item that fails to meet the requirements after re-inspection, the entire batch of products will be deemed disqualified. If any of the microorganism index fails to meet requirements, the entire batch of products will be deemed disqualified without any chance for re-inspection.

Appendix A

(Normative Appendix)

Determination of Sucrose, Glucose and Fructose (Efficient Liquid Phase Chromatography)

A.1 Method Summary

Take sample, fix volume with water, conduct centrifuge rotations, filter, use liquid chromatography differential refraction detector to measure and then quantify by computing with external standard peak areas illustrated on the chromatograph.

A.2 Reagents and Solutions

a) Water: First grade water comply with requirements of GB/T 6682.

b) Standard substance of sucrose, glucose and fructose: Purity not lower than 99%.

c) Standard mixture solutions of sucrose, glucose, fructose: Weigh and extract 0.4 g sucrose, 0.25 g glucose, 0.3 g fructose respectively, precision 0.0001 g, dissolve in water then fix volume of solution to 100 mL, shake evenly and lastly filter with a 0.45μm filtering film.

A.3 Apparatus and Equipment

a) Efficient liquid chromatograph, attached with differential refraction detector;

b) Balance for Analysis: Sensitivity ±0.1 mg;

c) Centrifuge.

A.4 Analysis Procedure

A.4.1 Preparation of Sampling Solution

Accurately weigh and extract 10 g sample (precision 0.0001 g), transfer it into a 100 mL volumetric flask, fill up to full with water and then shake evenly. Run centrifuge rotations so as to make the solution clear, extract clear liquid on surface layer, then filter with 0.45 μm filter film and prepare for use later.

A.4.2 Determination

A.4.2.1 Chromatography Reference Conditions

a) Chromatographic column: Exchange the calcium cation with polystyrene-divinylbenzene copolymer as base substance with resin column or its equivalence.

b) Mobile phase: Water.

c) Flow speed: 0.5 mL/min.

d) Column temperature: 80°C.

e) Volume of Sample Channeled in: 10 µL.

A. 4.2.2 Quantification

Once the liquid chromatograph reaches the above stipulated conditions, channel the standard mixture solutions and sample solution, quantify using external standard peak area method according to the retention time measured. Reference retention times for sucrose, glucose and fructose are 11.3 mins, 13.6 mins and 17.0 mins respectively.

A.5 Result Calculation

Result can be calculated with the following formula (A.1).

$$X = \frac{c*V}{m}*1000 \quad \text{..... (A.1)}$$

In the formula:

X – Content of analyte components in the sample, unit in gram per kilogram (g/kg);

c – Concentration analyte components of sample solutions channeled into the chromatography apparatus, unit in gram per milliliter (g/mL);

V – Fixed volume of sample solution, unit in milliliter (mL);

m – Weight of sample weighed during the preparation of sample solution, unit in gram (g).

A.6 Allowed Deviation

Discrepancies between the results of two independent tests conducted under iterative conditions and the average value of the test results should not exceed the 5% range.

National Standards of People's Republic of China

GB/T 21731-2008

National Food Safety Standards

Orange Juice and Orange Juice Beverages

Issued on: 2008-04-21 Implemented on: 2008-11-01

Issued by the General Administration of Supervision, Inspections and Quarantine of the People's Republic of China and National Standardization Management Committee

Foreword

This standard corresponds to the Codex Alimentarius Commission (CAC) CODEX STAN 247-2005 Fruit Juice and Nectar Beverage Applied Standard and European Fruit Juice Association (A. I.J. N.) Technical Specifications of Fruit Juice Evaluation Standard.

This standard was proposed by China Light Industry Union.

This standard is placed under the jurisdiction of the Beverage Technical Committee Division of the National Food Industry Standardization Technical Committee.

The organizations involved in the drafting of this standard: China Food Fermentation Industry Research Institute, Shandong Jiamei Food Industry Co,.Ltd, Uni-President Enterprises (China) Investment Co,.Ltd Kunshan R&D Center, Master Kong Beverage Holding Co,.Ltd and Beijing Huiyuan F&B Group Co., Ltd.

The key personnel involved in the drafting of this standard: Huiyi Li, Wei Sun, Xiaomei Yuan, Mingzhou Li, Yingping Huang, Guanrong Chen and Shaozhen Li.

National Food Safety Standards

Orange Juice and Orange Juice Beverages

1. Scope

This standard specifies the details on product classifications, technical requirements, testing methods and inspection guidelines as well as labelling, packaging, transportation and storage for orange juice and orange juice beverages.

This standard applies to prepackaged orange juice and orange juice beverages.

2. Normative References

Clauses involved in the following documents constitute the ones in this standard through reference in this standard. If any reference is dated, the following amendment or revised versions (excluding errata) are not applicable to this standard. However, the study of whether the latest version of these documents can be used by all parties who reach agreement according to this standard is encouraged. Any latest version of the non-dated reference is applicable to this standard.

GB 2760 *Hygienic Standard for Uses of Food Additives*

GB 7718 *General Standard for the Labeling of Prepackaged Foods*

GB/T 21730-2008 Concentrated Orange Juice

GB/T 12143.1 *Testing Method for Soluble Solids in Soft Beverages – Refractometer Method* (GB/T 12143.1-1989, neq ISO 2173:1978)

GB 13432 *General Standard for Labeling of Prepackaged Special Dietary Foods*

GB 14880 *Hygienic Standard for the Use of Nutritional Supplements in Foods*

GB/T 16771 *Determination of Fruit Juice Content in Citrus Sinensis, Citrus Reticulate, Orange Juice and Their Beverages*

GB 19296 *Hygiene Standards for Fruit, Vegetable Juice Beverages*

3. Terms and Definition

The following terms and definitions will apply to this standard.

3.1 Orange Juice

Refers to unfermented juice (despite it can be fermented) produced and processed from orange fruits through the use of physical methods, adding a small amount of sugar or acidulant to adjust its taste is allowed. Adding mandarin orange juice and orange, mandarin orange meat or pulps that are produced from appropriate physical methods are also allowed.

3.2 Concentrated Orange Juice

Refers to product which will take on the characteristics that normal orange juice (pulp) should have after reconstitution by adding water. It is produced by removing a certain proportion of water from orange juice (pulp) by physical means.

4. Products Classifications

4.1 Orange Juice

4.1.1 Non-reconstituted Orange Juice

Refers to juice produced from the processing of orange fruits by physical methods.

4.1.2 Reconstituted Orange Juice

Refers to product that will possess the color, luster, taste and soluble solids content of orange juice after its concentrate has been added with the amount of water equivalent to the amount of water loss during its enrichment process into concentrate form.

4.2 Orange Juice Beverage

Refers to beverage produced by adding ingredients like water, sugar and (or) sweetener, acidulant into orange juice (pulp) or concentrated orange juice (pulp), of which its fruit juice (pulp) content (weight fraction) is not lower than 10%. Mandarin orange pulps can also be added.

5. Technical Requirements

5.1 Sensory Requirements

Should comply with the requirements listed in Table 1.

Table 1 Sensory Requirements

Items	Characteristics
Texture/Structure	Liquid appears evenly distributed, precipitation like meat or pulps of fruits is allowed
Color and Luster	Has color that orange juice should have, slight browning is allowed
Smell and Taste	Has aroma and flavor that orange juice should have, no unusual odor
Impurities	No visible external impurity

5.2 Physical-Chemical Index

Should comply with the requirements listed in Table 2.

Table 2 Physical-Chemical Index

Items		Non-reconstituted	Reconstituted	Orange Juice Beverage
Soluble Solids (20°C, Acidity Unadjusted) / %	≥	10.0	11.2	–
Sucrose / (g/kg)	≤	50.0		–
Glucose / (g/kg)		20.0~35.0		–
Fructose / (g/kg)		20.0~35.0		–
Glucose / fructose	≤	1.0		–
Juice Content / (g/kg)		100		≥10

5.3 Food Additives and Nutritional Supplements

Usage quantity and range should comply with the requirements of GB 2760 and GB 14880.

5.4 Hygiene Index

Should comply with the requirements of GB 19297.

5.5 Other Requirements

5.5.1 Sugar and acidulant should not be added into the orange juice at the same time.

5.5.2 Mandarin orange juice or meat and pulp added into the orange juice as supplementary ingredients should not exceed 10% of the soluble solids content.

6. Testing Methods

6.1 Sensory Inspection

6.1.1 Texture/Structure, Color, Luster and Impurities

Take ~50 mL of analyte evenly mixed and place it into a colorless and transparent container, place container in a bright area and inspect the texture, color and if there is any impurities facing the light source.

6.1.2 Smell and Taste

Take a specific amount of analyte evenly mixed and inspect using sense of smell and taste under room temperature conditions.

6.2 Physical-Chemical Tests

6.2.1 Soluble solid

Test in accordance with GB/T 12143.1.

6.2.2 Sucrose, Glucose, Fructose

Test in accordance with Appendix A included in GB/T 21730-2008.

6.2.3 Juice Content

Test in accordance with GB/T 16771.

6.3 Hygienic Inspection

Tests for hygienic indexes should be conducted in accordance with the requirements of GB 19297.

7. Testing Guidelines

7.1 Confirmation of Batches

Product batch number should be determined by the quality control department of the manufacturing enterprise according to corresponding regulations.

7.2 Out-factory Inspection

Inspection on various items should be conducted, such as for sensory requirements, soluble solids content, coliform before releasing each batch of products from the factory, into the market.

7.3 Type Inspection

All inspection items listed in this standard, with the exception of juice content are all included as required items for any type inspection, as juice content is classified as a non-routine inspection item. Type inspection is conducted semiannually, or if any of the following circumstances arises:

- When there are significant changes in raw ingredients, processes and (or) equipment;
- Upon the resumption of production after long period of stoppage;
- When there are significant discrepancies between results of the out-factory inspection and those of the routine operations;
- When inspection is specifically required by National Quality Supervision and Inspection Authorities.

7.4 Judgment Guidelines

If any of the test items (with the exception of microorganism index items) fails to meet the requirements of this standard, conduct a second round of inspection for that particular item with two times the amount of samples used in the initial round. If there is still one item that fails to meet the requirements after re-inspection, the entire batch of products will be deemed disqualified. If any of the microorganism index fails to meet requirements, the entire batch of products will be deemed disqualified without any chance for re-inspection.

8. Labeling, Packaging, Transportation and Storage

8.1 Product labels should comply with the requirements of GB 7718, GB 13432 as well as the following requirements:

- Phrase like “sugar added” should be indicated clearly in Chinese on labels for orange juice that has sugar added;

- Orange juice beverages should indicate content value (proportion) of orange juice.

8.3 Packing material and container should comply with the requirements of relevant standards.

8.3 Sunlight and rain should be avoided during product transportation and products should not be transported together with poisonous, foul-smelling, volatile and corrosive substances.

8.4 Products should be stored in clean, dry and well-ventilated places. Measures should be taken to keep such places free of insects and rats. Products that required chilling/freezing should be stored in places that meet the requirements for product’s transportation and storage conditions.

National Standards of People's Republic of China

GB 11673-2003

National Food Safety Standards

Hygienic Standard for Milk Beverages

Issued on: 2003-09-24 Implemented on: 2004-05-01

Issued by the Ministry of Health of the People's Republic of China and National Standardization Management Committee

Foreword

The entirety of this standard is mandatory.

This standard replaces GB 11673-1989 *Hygienic Standard for Milk Beverage*.

As compared to GB 11673-1989, key changes are as follows:

- Amended the format and layout of this standard according to GB/T 1.1-2000;
- Amended the structure and scope of application of the original standard, i.e. added the requirements for raw ingredients, food additives, production and processing procedure, packaging, labeling and transportation;
- Added total arsenic index with reference to GB 4810 *Hygienic Standard of Arsenic Content Limits in Foods*; added lead index with reference to GB 14395 *Hygienic Standard of Lead Content Limits in Food*;
- Amended the requirements for saccharin sodium salt and thickener index to: “Implemented in accordance with GB2760”;
- Amended the scope of application of the “fats” index to “only applies to beverages with fresh milk as ingredients”.

GB 11673-1989 will be repealed with effect from the implementation date of this standard.

This standard was proposed by the Ministry of Health of the People's Republic of China and placed under its jurisdiction.

The organizations involved in the drafting of this standard: Shanghai City Food Hygiene Supervision and Inspections Institute, Hangzhou Wahaha Group Co.Ltd, Beijing Hygiene and Disease Prevention Institute, Hygiene Supervision Institute of the Tianjin City Public Hygiene Bureau and Liaoning Province Hygiene Supervision Institute.

The key personnel involved in the drafting of this standard: Xing Xu, Meiling Wang, Ting Yu, Chunming Cui, Xutai Wang, Jin Liang and Zheng Zhang.

This standard will replace previous versions: GB 11673-1989.

National Food Safety Standards

Hygienic Standard for Milk Beverage

1. Scope

This standard specifies details on the index requirements, food additives, hygiene requirements for production and processing procedures as well as requirements for packaging, labeling, storage and transportation and corresponding testing methods for milk beverage.

This standard applies to milk beverage that has the corresponding flavor, formulated using fresh dairy or dairy powder as the ingredients, adding appropriate amount of supplementary ingredients.

2. Normative References

Clauses involved in the following documents constitute the ones in this standard through reference in this standard. If any reference is dated, the following amendment or revised versions (excluding errata) are not applicable to this standard. However, the study of whether the latest version of these documents can be used by all parties who reach agreement according to this standard is encouraged. Any latest version of the non-dated reference is applicable to this standard.

GB 2760 *Hygienic Standards for the Use of Food Additives*

GB/T 4789.21 *Microbiological Examination of Food Hygiene – Inspection for Frozen Drinks, Beverages*

GB/T 5009.5 *Test of Protein in Food*

GB/T 5009.6 *Test of Fats in Food*

GB/T 5009.11 *Testing Method for Total Arsenic and Inorganic Arsenic in Foods*

GB/T 5009.12 *Testing Method for Lead in Foods*

GB/T 5009.13 *Testing Method for Copper in Foods*

GB 12695 *Beverage Industry Good Manufacturing Practices*

3. Index Requirements

3.1 Requirements for Raw Ingredients

Comply with the requirements of corresponding standards and relevant regulations.

3.2 Sensory Index

Has color, luster, smell and taste corresponding to the ingredients added, no unusual odor, with even quality and without any visible external foreign objects.

3.3 Physical-Chemical Indexes

Physical-chemical indexes should comply with the requirements listed in Table 1.

Table 1 Physical-Chemical Indexes

Items		Index
Protein / (g/100mL)	≥	1.0
Fats[a] / (g/100mL)	≥	1.0
Total Arsenic (by As) / (mg/L)	≤	0.2
Lead (Pb) / (mg/L)	≤	0.05
Copper (Cu) / (mg/L)	≤	5.0
[a]only applies to beverages with fresh milk as ingredients.		

3.4 Microorganism Indexes

Microorganism indexes should comply with the requirements listed in Table 2.

Table 2 Microorganism Indexes

Items		Index
Total Bacteria Count / (cfu/mL)	≤	10,000
Coliform / (MPN/100mL)	≤	40
Fungi / (cfu/mL)	≤	10
Yeast / (cfu/mL)	≤	10
Pathogenic Bacterium (Salmonella ,Shigella ,Staphylococcus aureus)		Should not be detected

4. Food Additives

4.1 Quality of food additives should comply with the requirements of corresponding standards and relevant regulations.

4.2 Types and quantity of the food additives used should comply with the requirements of GB 2760.

5. Hygiene Requirements for Production and Processing Procedure

Comply with the requirements of GB 12695.

6. Packaging

Packaging containers and materials used should comply with the requirements of corresponding standards and relevant regulations.

7. Labeling

Prepackaged labels should comply with relevant regulations.

8. Storage and Transportation

8.1 Storage

Products should be stored at a dry, well-ventilated place, Should not be stored together with poisonous, harmful, foul-smelling, volatile, corrosive substances.

8.2 Transportation

Avoid direct sunlight and rain during transportation or products. Should not be transported together with poisonous, harmful, foul-smelling substances or any substance that will have a material impact on the quality of the products.

9. Testing Methods

9.1 Physical-Chemical Indexes

9.1.1 Protein

Test in accordance with method specified in GB/T 5009.5.

9.1.2 Fats

Test in accordance with method specified in GB/T 5009.6.

9.1.3 Lead

Test in accordance with method specified in GB/T 5009.12.

9.1.4 Total Arsenic

Test in accordance with method specified in GB/T 5009.11.

9.1.5 Copper

Test in accordance with method specified in GB/T 5009.13.

9.2 Microorganism Indexes

Test in accordance with method specified in GB/T 4789.21.

National Standards of People's Republic of China

GB 21732-2008

National Food Safety Standards

Milk Beverages

Issued on: 2008-04-21 Implemented on: 2008-11-01

Issued by the General Administration of Quality Supervision, Inspections and Quarantine of the People's Republic of China and National Standardization Management Committee

Foreword

QB/T 1554-1992 Lactobacillus Beverages will be repealed upon the implementation of this standard.

This standard was proposed by the China Union of Light Industry.

This standard was placed under the jurisdiction of the Beverage Technical Committee of the National Food Industry Standardization Committee.

The organizations involved in the drafting of this standard: China Beverage Industry Association Technical Committee, Hunan Taizinai Group Biological Technology Co.,Ltd, Hangzhou Wahaha Group Co.Ltd, Robust (Guangdong) Food & Beverage Co.,Ltd, Xi 'An Yinqiao Biological Science and Technology Co.,Ltd, Chongqing Sangao Dairy Co.,Ltd, Shijiazhuang Sankuang Group Co.,Ltd, Otsuka (China) Investment Co.,Ltd, Inner Mongolia Yili Industrial Group Stock Co.,Ltd, Inner Mongolia Mengniu Dairy (Group) Co.,Ltd, Nestle (China) Co.,Ltd, Weiwei Food & Beverage Co.,Ltd and Shandong Bugs Bunny Group Co.,Ltd.

The key personnel involved in the drafting of this standard: Yanling, Sheng, Penggui Huo, Zhengsheng Qu, Shuying Liu, Tao He, Guihai Zhang, Xuetuo Li, Qin Li, Weixing Liu, Xuefeng Di, Xin Sun, Bo Luo and Yunan Li.

National Food Safety Standards

Milk Beverage

1. Scope

This standard specified details on product classifications, technical requirements, test methods, test guidelines, labelling, packaging, transportation and storage for milk beverages.

This standard applies to beverages with dairy content.

2. Normative References

Clauses involved in the following documents constitute the ones in this standard through reference in this standard. If any reference is dated, the following amendment or revised versions (excluding errata) are not applicable to this standard. However, the study of whether the latest version of these documents can be used by all parties who reach agreement according to this standard is encouraged. Any latest version of the non-dated reference is applicable to this standard.

GB 2760 *Hygienic Standard for Uses of Food Additives*

GB/T 4789.35 *Microbiological Examination of Food Hygiene - Examination of Lactic Acid Bacteria in Lactobacillus Beverages*

GB/T 5009.5 *Testing Method for Protein in Foods*

GB/T 5009.29 *Testing Method for Sorbic Acid and Benzoic Acid in Food*

GB/T 5009.46 *Analysis Methods of Hygienic Standard for Milk and Milk Products*

GB 7718 *General Standard for the Labeling of Prepackaged Foods*

GB 11673 *Hygienic Standard for Milk Beverages*

GB 13432 *General Standard for Labeling of Prepackaged Special Dietary Foods*

GB 14880 *Hygienic Standard for the Use of Nutritional Supplements in Foods*

GB 16321 *Hygienic Standard for Lactobacillus Beverages*

3. Terms and Definition

The following terms and definitions will apply to this standard.

3.1 Milk Beverage

Refers to beverage product that is a result of formulation or fermentation processes with dairy or dairy products as key ingredients, along with water and appropriate amount of supplementary ingredients. Beverage with milk content can also be called dairy (milk) beverage, dairy (milk) drinks.

4. Products Classifications

4.1 Formulated Milk Beverage

Refers to beverage that is formulated with water, sugar and one or more types of supplementary ingredients, such as sweeteners, acidulants, fruit juice, tea, coffee, plant extracts with dairy or dairy products as the base ingredient.

4.2 Fermented Milk Beverage

Refers to beverage, e.g. lactobacillus beverage, that is formulated with milk emulsion as a result of fermentation (with probiotics like lactic acid bacteria), water, sugar and one or more types of supplementary ingredients, such as sweeteners, acidulants, fruit juice, tea, coffee, plant extracts with dairy or dairy products as the base ingredient. It can be classified into sterilized (non-active bacteria) category and unsterilized (active bacteria) category according to whether sterilization procedure is being carried out.

Such products can also be called sour milk (yogurt) beverage, sour milk (yogurt) drink.

4.3 Lactobacillus Beverage

Refers to beverage, e.g. lactobacillus beverage, that is formulated with milk emulsion as a result of fermentation (with lactic acid bacteria), water, sugar and one or more types of supplementary ingredients, such as sweeteners, acidulants, fruit juice, tea, coffee, plant extracts with dairy or dairy products as the base ingredient. It can be classified into sterilized (non-active bacteria) category and unsterilized (active bacteria) category according to whether sterilization procedure is being carried out.

5. Technical Requirements

5.1 Sensory Index

Sensory index should comply with the requirements listed in Table 1.

Table 1 Sensory Index

Items	Requirements
Taste and Smell	Has the mastic taste and aroma that product should have or has the taste and aroma of the corresponding supplementary ingredients added; fermented products has the fermented taste and aroma that product should have; no unusual taste or smell
Color and Luster	Even milky white or milky yellow hue or has the corresponding color of the supplementary ingredients added
Texture/Structure	Even and smooth emulsion w/o layers formed in the emulsion, though minute amount of precipitation is allowed, while there should be no visible external contaminants

5.2 Physical-Chemical Indexes

Physical-chemical index should comply with the requirements listed in Table 2.

Table 2 Physical-Chemical Indexes

Items		Formulated Milk Beverage	Fermented Milk Beverage	Lactobacillus Beverage
Protein[a] / (g/100mL)	≥	1.0	1.0	0.7
Benzoic Acid[b] / (g/kg)	≤	-	0.03	0.03
[a]Protein in milk beverage refers to lactoprotein. [b]Refers to benzoic acid that is produced from fermentation process; benzoic acid added in as raw ingredient should comply with requirements listed in GB 2760.				

5.3 Lactobacillus Index

Lactobacillus index in both unsterilized (active bacteria) fermented milk beverage and unsterilized (active bacteria) lactobacillus beverage should comply with the requirements listed in Table 3.

Table 3 Lactobacillus Index

Testing Phases	Unsterilized (Active Bacteria) Fermented Milk Beverage	Unsterilized (Active Bacteria) Lactobacillus Beverage
Out-factory Phase	≥1 × 10^6CFU/mL	
Sales/Distribution Phase	Conform to the marked lactic acid (living bacteria) quantity on the label	

5.4 Hygienic Index

Hygienic index for formulated mike beverage should comply with the requirements of GB 11673. Hygienic index of fermented and lactobacillus beverage should comply with the requirements of GB 16321.

5.5 Food Additives and Food Nutritional Supplements

Should comply with the requirements of GB 2760 and GB 14880.

5.6 Bacteria for Fermentation

Should use bacteria varieties that are approved by standards or regulations set by other countries, e.g. lactobacillus bulgaricus (Bulgarialactobacillus), Streptococcus thermophilus.

6. Test Methods

6.1 Sensory Inspection

Extract ~50 mL evenly mixed samples and place in colorless, transparent container. Place the container in a bright area, observe the color, luster and texture/structure facing the light source. Following that, smell the sample at room temperature as well as taste it.

6.2 Physical-Chemical Tests

6.2.1 Protein

Test in accordance with GB/T 5009.5.

6.2.2 Benzoic Acid

Test in accordance with GB/T 5009.29.

6.3 Hygienic Index

Test in accordance with GB 11673, GB 16321 and GB/T 5009. 46.

6.4 Lactobacillus Index

Test in accordance with GB/T 4789.35.

7. Testing Guidelines

7.1 Sampling Method and Quantity

Randomly draw 12 independent unitary packages of products during the out-factory inspection. Set aside 6 samples for inspection on sensory index and physical-chemical index, 2 samples for inspection on microorganism index, 4 as backup samples. Randomly draw 12 independent unitary packages of products during the type inspection. Set aside 6 samples for inspection on sensory index and physical-chemical index, 2 samples for inspection on microorganism index, 4 as backup samples.

7.2 Out-factory Inspection

7.2.1 Quality control department in the manufacturing enterprise should determine the batch allocation of products based on corresponding regulations.

7.2.2 Out-factory inspection items include: Protein, sensory aspects, lactic acid bacteria count (active bacteria product category), aerobic bacteria count (non-active bacteria product category), coliform.

7.2.3 Every batch should undergo out-factory inspection, and subsequently products can only be released for distribution after they are qualified by appropriate tests.

7.3 Type Inspection

7.3.1 Type inspection items include: technical requirement items in section 5.1~5.4.

7.3.2 Type inspection should be conducted once every year, or when the any of the following situations arises:

a) When there is significant changes in raw materials, processes or equipment;

b) When production resumes after long time of stoppage;

c) When results of out-factory inspection differs significantly from conditions of routine production;

d) When required by State Quality Inspection authorities.

7.4 Test for Unsterilized (Live Bacteria) Type Samples

Should be conducted in a timely manner; samples that cannot be tested in a timely manner should be store at temperature 2^{o}C~10^{o}C.

7.5 Judging Guidelines

If results of inspection on aerobic bacterial count, coliform, fungi, yeast, pathogenic bacteria index do not meet the requirements of this standard, this entire production batch will be deemed disqualified and the chance of a second round of inspection will not be given. Other than the abovementioned items, if result of any test items that does not meet requirements of this standard, a second round of inspection can be carried out with double the quantity of samples drawn in the initial tests. Under the circumstance that there is still one item that failed to meet requirements, this production batch will be deemed disqualified.

8. Labelling, Packaging, Transportation & Storage

8.1 Labelling

8.1.1 Product labels should comply with the requirements of GB 7718, GB 13432.and other relevant regulations; protein content should be indicated.

8.1.2 Product labels for fermented and lactobacillus milk beverage should indicate whether they are unsterilized (active bacteria) type or sterilized (non-active bacteria) type.

8.1.3 Product labels for fermented and lactobacillus milk beverage should indicate active lactic acid bacteria count; should indicate temperature of transportation and storage.

8.2 Packaging

Packaging material and container used should comply with the requirements of relevant standards.

8.3 Transportation

Products should be transported in a manner, avoiding direct sunlight exposure, rain and they should be transported separated from poisonous, foul-smelling, volatile substances or substances that rot easily.

8.4 Storage

Products should be stored in clean, dry, well-ventilated warehouse that does not have any pest problems.

Unsterilized (active bacteria) type products should be transported and stored under low temperature conditions, at temperature 2^{o}C~10^{o}C.

National Standards of People's Republic of China

GB 16321-2003

National Food Safety Standards

Hygienic Standard for Lactobacillus Beverage

Issued on: 2003-09-24 Implemented on: 2004-05-01

Issued by the Ministry of Health of the People's Republic of China and National Standardization Management Committee

Foreword

The entirety of this standard is mandatory.

This standard will replace GB 16321-1996 Hygienic Standard for Lactobacillus Beverage.

As compared with GB 16321-1996, key changes are as follows:

- Formatting of this standard had been amended in accordance with GB/T 1.1-2000;
- Structure and definition used in the original standard had been amended, while hygiene requirements on raw ingredients, food additives, production & processing procedure as well as requirements on packaging, labeling, storage & transportation were added;
- Index requirements on total sugar, total solids and acidity were removed;
- Index requirement on total arsenic content was added with reference to GB 4810 Hygienic Standard on the Limits of Arsenic in Foods; index requirement on lead content was also amended with reference to GB 14935 Hygienic Standard on the Limits of Lead in Foods.

The earlier version GB 16321-1996 will be repealed upon the implementation of this version.

This standard was proposed the Ministry of Health of the People's Republic of China and will be under its jurisdiction.

The organization involved in the drafting of this standard: Tianjin City Hygiene Supervisory Authority and Liaoning Province Hygiene Supervisory Authority of the Ministry of Health, Hangzhou Wahaha Group Co. Ltd, Shanghai City Food Hygiene Supervisory Authority, Guangdong Province Food Hygiene Supervisory Authority, Nanjing City Food Hygiene Supervisory Authority.

The key personnel involved in the drafting of this standard: Chunming Cui, Xutai Wang, Ting Yu, Peizhen Jiang, Zhikun Hu, Shouying Zeng, Zhong Yin.

This standard will replace the earlier version:

This standard was first issued in 1996.

National Food Safety Standards

Hygienic Standard for Lactobacillus Beverage

1. Scope

This standard specified the details on index requirements, food additives, hygiene requirements on production & processing procedure as well as requirements on packaging, labeling, storage & transportation and corresponding testing methods for lactobacillus beverage.

This standard applies to both unsterilized and sterilized beverage infused with the corresponding flavors of the product itself as a result of lactobacillus fermentation processing of key ingredients such as fresh milk, milk powder, supplementary plant protein powder.

2. Normative References

Clauses involved in the following documents constitute the ones in this standard through reference in this standard. If any reference is dated, the following amendment or revised versions (excluding errata) are not applicable to this standard. However, the study of whether the latest version of these documents can be used by all parties who reach agreement according to this standard is encouraged. Any latest version of the non-dated reference is applicable to this standard.

GB 2760 *Hygienic Standard for Uses of Food Additives*

GB/T 4789.21 *Microbiological Examination of Food Hygiene - Examination of Frozen Drinks and Cold Drinks*

GB /T 5009.5 *Testing Method for Protein in Foods*

GB/T 5009.11 *Testing Method for Total Arsenic in Foods*

GB/T 5009.12 *Testing Method for Lead in Foods*

GB/T 5009.13 *Testing Method for Copper in Foods*

GB 12695 *Beverage Industry Good Manufacturing Practices*

3. Terms and Definition

The following terms and definitions will apply for this standard.

3.1 Unsterilized Lactobacillus Beverage

Refers to product that is not sterilized after blending and lactobacillus fermentation processing.

3.2 Sterilized Lactobacillus Beverage

Refers to product that is sterilized after blending and lactobacillus fermentation processing.

4. Index Requirements

4.1 Requirements on Raw Ingredients

Comply with corresponding standards and regulations.

4.2 Sensory Index

4.2.1 Color and Luster

Appears to have a consistent, uniformly distributed milky-white color, with a slight tint of yellow or the corresponding color and luster of the fruits added as ingredient.

4.2.2 Taste and Smell

Possesses a delicate taste, with moderated amount of sweetness that is sour but not astringent. Hat the typical taste and smell atypical of lactobacillus beverages, without unusual odor.

4.2.3 Texture/Structure

Appears milky-opaque with consistent and uniform layers. Allows to have a minute amount of precipitation, but without air bubbles or any foreign objects.

4.3 Physical-Chemical Indexes

Physical-chemical indexes should comply with the requirements listed in Table 1.

Table 1 Physical-Chemical Indexes

Items		Index
Protein / (g/100 g)	≥	0.70
Total Arsenic (As) / (mg/L)	≤	0.2
Lead (Pb) / (mg/L)	≤	0.05
Copper (Cu) / (mg/L)	≤	5.0
Urease Test		Negative

4.4 Microorganism Indexes

Microorganism indexes should comply with the requirements listed in Table 2.

Table 2 Microorganism Indexes

Items		Index	
		Unsterilized Beverage	Sterilized Beverage
Lactic Acid Bacteria / (cfu/mL) Out-factory Sales & Distribution	≥	 1×10^6 Live Bacteria Detected	 – –
Total Aerobic Bacterial Count / (cfu/mL)	≤	–	100
Mucedine / (cfu/mL)	≤	30	30
Yeast / (cfu/mL)	≤	50	50
Coliform / (MPN/100 mL)	≤	3	
Pathogenicbacterium (Aalmonella ,Shigella ,Staphylococcus aureus)		Cannot be detected	

5. Food Additives

5.1 Quality of food additives used should comply with corresponding standards and regulations.

5.2 Variety and quantity of food additives used should comply with the requirements of GB 2760.

6. Hygiene Requirements on Production & Processing Procedure

Should comply with the requirements of GB 12695.

7. Packaging

Packaging containers and materials should comply with corresponding hygiene standards and relevant regulations.

8. Labeling

Labeling for fixed packaging should comply with relevant regulations.

9. Storage and Transportation

9.1 Storage

Products should be stored in dry, well ventilated places, separated from poisonous, hazardous, foul-smelling, volatile items or items that may be easily rotted or corroded.

9.2 Transportation

Products should be sheltered from rain and direct sunlight during transportation, separated from poisonous, hazardous foul-smelling items that may have material influences on the quality of the products.

10. Test Methods

10.1 Sensory Index

Remove the lid of the plastic cup (bottle) containing the beverage, inspect the smell and then taste the beverage and check if it tastes normal. Following that, slowly pour the beverage into a clean beaker (or a colorless glass cup) and then observe the color, luster and texture/structure of the beverage and determine if it is normal. Results of such inspection should comply with the requirements stipulated in section 4.2.

10.2 Physical-Chemical Index

10.2.1 Protein: Determine according to the methods required in GB/T 5009.5.

10.2.2 Total Arsenic: Determine according to the methods required in GB/T 5009.11.

10.2.3 Lead: Determine according to the methods required in GB/T 5009.12.

10.2.4 Copper: Determine according to the methods required in GB/T 5009.13.

10.2.5 Urease Test: Determine according to the methods required in GB/T 5009.186.

10.3 Microorganism Index

Determine according to the methods required in GB/T 4789.21.

National Standards of People's Republic of China

GB 16322-2003

National Food Safety Standards

Hygienic Standard for Vegetable Protein Beverage

Issued on: 2003-09-24 Implemented on: 2004-05-01

Issued by the Ministry of Health of the People's Republic of China and Standardization Administration Management Committee

Foreword

This standard is fully mandatory.

This standard substitutes GB 16322-1996 Hygienic Standard for Vegetable Protein Beverage.

As compared with GB 16322-1996, this standard has made major changes as follows:

- The standard text format is revised according to GB/T 1.1-2000;
- The structure of the original standard is revised, by adding the hygienic requirements for raw and auxiliary materials, food additives and process of production and processing and requirements for packing, identification, storage and transport;
- This standard adds definitions for different types of products with reference to GB 10789 Classification of Soft Drinks.
- Protein indicator is added;
- Appendix A: Method for Qualitative Determination of Urease of the original standard is deleted;
- eference standards are added with GB/T 5009.183 Qualitative Analysis of Urease in Vegetable Protein Drinks.

As from the date of implementing this standard, GB 1 6322-1996 will be automatically abolished.

This standard is set forth and classified by Ministry of Health of the People's Republic of China.

This standard is drafted by (institutions): Liaoning Hygienic Supervision Institute, Beijing Institute for Food Hygienic Supervision and Inspection, Tianjin Health Bureau Public Health Inspection Institute, and Hangzhou Wahaha Group Co., Ltd.

This standard is mainly drafted by (persons): Wang Xutai, Xu Jikang, Cui Chunming, Yu Ting, Yang Yuzhi, Xu Liufa and Lu Shouzheng.

This standard was initially published in 1996 and is currently amended for the first time.

National Food Safety Standards

Hygienic Standard for Vegetable Protein Beverage

1. Scope

This standard specifies the indicator requirements of vegetable protein beverage, hygienic requirements of food additives and process of production and processing, requirements for packing, identification, storage and transport, and testing method.

This standard is applicable to milky beverage made with vegetable nuts, flesh and soybean (such as soybean, peanut, almond, walnut seed and coconut) as raw materials, by processing and blending before high-press sterilization or aseptic packaging.

2. Normative References

The provisions in the following documents become the provisions of this standard by being referred to herein. Where any reference is dated, all its subsequent amendments (excluding the content of correction) or revision shall not be applicable this standard, but the parties making an agreement according to this agreement are encouraged to study whether to use the latest versions of such documents. Where any reference is not dated herein, its latest version (inclusive of all the amendments) shall be applicable herein.

GB 2760 Hygienic Standard for Uses of Food Additives

GB/T 4789.21 Microbiological Examination of Food Hygiene—Examination of Cold Drinks

GB/T 4789.26 Microbiological Examination of Food Hygiene—Examination of Commercial Sterilization of Canned Food

GB/T5009.5 Determination of Protein in Foods

GB/T 5009.11 Determination of Total Arsenic and Abio-arsenic in Foods

GB/T5009.12 Determination of Lead in Foods

GB/T5009.13 Determination of Copper in Foods

GB/T 5009.48 Method for Analysis of Hygienic Standard of Distilled Wines and Mixed Wines

GB/T 5009.183 Qualitative Analysis of Urease in Vegetable Protein Drinks

GB 12695 Good Manufacturing Practices for Beverage Enterprises

3. Terms and Definitions

The following terms and definitions shall be applicable to this standard.

3.1 Soybean milk beverage

Milky beverage made with soybean as the main raw material by adding water and sugar fluid into serous fluid obtained by processes of grinding, pulping and, such as pure soybean milk, mixed soybean milk and soybean milk drinks.

3.2 Coconut Milk (Juice) beverage

Beverage made with fresh and appropriately mature coconut as raw material, by adding water and sugar fluid into coconut milk-like juice processed from coconut meat.

3.3 Almond milk (essence) beverage

Beverage mixed with almond as the raw material by adding water and sugar fluid into the serous fluid obtained by soaking and grinding.

3.4 Other vegetable protein beverages

Beverage mixed with walnut, peanut, pumpkin seeds or sunflower seeds as the raw material by adding water and sugar fluid into the serous fluid obtained by soaking and grinding.

4. Indicator Requirement

4.1 Raw Material Requirement

In conformity to the relevant standard and related provisions.

4.2 Oranoleptic Requirements

With relevant colors, fragrance and forms of different candies, but without peculiar smells, odour and impurities seeable with naked eye and with a limited amount of fat suspension and protein sediment allowed

4.3 Physicochemical indicators

Physicochemical indicators shall conform to the provisions of Table 1.

Table 1 physicochemical indicators

Items		Indicators
Total Arsenic (as per As)/(mg/L)	≤	0.2
Lead (PB)/ (mg/l)	≤	0.3
Protein/(g/1 00 mL)	≥	0.5
Cyanide[a] (as per HCN)/ (mg/L)	≤	0.05
Urease test[B]		Negative
[a]. Limited to beverage with almond as raw material. b Limited to beverage with soybean as raw material.		

4.4 Microbial indicators

4.4.1 The canned vegetable protein beverage produced by the canning process shall conform to the requirement of commercial sterilization.

4.4.3 Other packaged vegetable protein beverages shall conform to the provisions of Table 2.

Table 2 Microbial indicators

Items	Indicators
Total bacterial colony/ (cfu/mL) ≤	100
Coliforms/ (MPN/100mL) ≤	3
Mould and yeast (cfu/ML) ≤	50
Pathogenic bacteria (salmonella, shigella, staphylococcus aureus)	Should not be detected

5. Food Additives

5.1 The quality of food additives is in conformity to the relevant standard and related provisions.

5.2 Variety and usage of food additives shall conform to the provisions of GB2760.

6. Hygienic Requirement for Process of Production and Processing

In conformity to the provisions of GB 1 2695.

7. Packing

Packing containers and materials shall conform to the relevant hygienic standard and related provisions.

8. Identification

The identification requirement for stereotyp packing shall conform to the relevant provisions.

9. Storage and Transport

9.1 Storage

Products shall be stored a dry and well-ventilated place and shall not be stored together with toxic, harmful, smelly, evaporative and corrosive articles.

9.2 Transport

Products shall be transported to avoid sunlight and rain and shall not be transported together with toxic, harmful, smelly or quality-affecting articles.

10. Testing Method

10.1 Oranoleptic Indicators

10.1.1 Color and Impurity

Take 50 mL of evenly mixed sample to be tested for putting into a clean sample glass (or 100mL flask), and keep the glass in the well-lit place for observing, with naked eye, its color and seeable impurity. The result shall conform to the provisions of Section 4.2.

10.1.2 Fragrance and Taste

Smell and taste immediately after unpacking. The result shall conform to the provisions of Section 4.2.

10.2 Physicochemical indicators

10.2.1 Total Arsenic

Determine as per method provided by GB/T 5009.11.

10.2.2 Lead

Determine as per method provided by GB/T 5009.12.

10.2.3 Protein

Determine as per method provided by GB/T5009.5.

10.2.4 Cyanide

Determine as per method provided by GB/T 5009.48.

10.2.5 Urease Test

Determine as per method provided by GB/T5009.183.

10.3 Microbial indicators

10.3.1 Total bacterial colony, Coliforms, Mould, Yeast, Pathogenic bacteria

Determine as per method provided by GB/T 4789.21.

10.3.2 Commercial Sterilization

Determine as per method provided by GB/T4789.26.

National Standards of People's Republic of China

GB 7101-2003

National Food Safety Standards

Hygienic Standard for Solid Drink

Issued on: 2003-09-24 Implemented on: 2004-05-01

Issued by the Ministry of Health of the People's Republic of China and Standardization Administration Management Committee

Foreword

This standard is fully mandatory.

This standard substitutes GB 7101-1994 Hygienic Standard for Solid Drink.

As compared with GB 7101-1994, this standard has made major changes as follows:

- The standard text format is revised according to GB/T 1.1-2000;
- The structure and definition of the original standard is revised, by adding the hygienic requirements for raw materials, food additives and process of production and processing and requirements for packing, identification, storage and transport;
- This standard revises the scope and definition with reference to GB 1 0789-1996;
- This standard cancels the bakery (instant coffee) variety and relevant indicators.

As from the date of implementing this standard, GB 7101-1 994 will be automatically abolished.

This standard is set forth and classified by Ministry of Health of the People's Republic of China.

This standard is drafted by (institutions): Liaoning Institute of Health Inspection, Tianjin Health Bureau Public Health Inspection Institute, Shandong Institute for Food Hygienic Supervision and Inspection, MOH Health Inspection Center, Guangdong Institute for Food Hygienic Supervision and Inspection, Wuhan Institute for Food Hygienic Supervision and Inspection, and Sichuan Institute for Food Hygienic Supervision and Inspection.

This standard is mainly drafted by (persons): Xu Xin, Wang Xutai, Cui Chunming, Gu Jingyu, Wen Yan, Yuan Sanxi and Wei Renjun.

The previous versions of the standards substituted by this standard are as follows:

This standard was initially published in 1986 and amended for the first time in 1994.

National Food Safety Standards

Hygienic Standard for Solid Drink

1. Scope

This standard specifies the terms and definitions, indicator requirements of solid drink, hygienic requirements for food additives and process of production and processing, requirements for packing, identification, storage and transport and testing methods.

This standard is applicable to solid drinks made with fruit juice, animal and vegetable protein, vegetable extracts and so on as raw materials, with the moisture below 5.0g/100g.

This standard is not applicable to solid drinks processed and made with cocoa as raw material, without braking.

2. Normative References

The provisions in the following documents become the provisions of this standard by being referred to herein. Where any reference is dated, all its subsequent amendments (excluding the content of correction) or revision shall not be applicable this standard, but the parties making an agreement according to this agreement are encouraged to study whether to use the latest versions of such documents. Where any reference is not dated herein, its latest version (inclusive of all the amendments) shall be applicable herein.

GB 2760 Hygienic Standard for Uses of Food Additives

GB/T 4789.21 Microbiological Examination of Food Hygiene—Examination of Cold Drinks

GB/T 5009.3 Determination of Moisture in Foods

GB/T 5009.5 Determination of Protein in Foods

GB/T 5009.11 Determination of Total Arsenic and Abio-arsenic in Foods

GB/T 5009.12 Determination of Lead in Foods

GB/T 5009.13 Determination of Copper in Foods

GB 12695 Good Manufacturing Practices for Beverage Enterprises

3. Terms and Definitions

The following terms and definitions shall be applicable to this standard.

3.1 Protein-type solid drinks

Products made with milk and milk products, egg and egg products and other animal and vegetable protein as main raw materials, added or not added with auxiliary materials, with the protein content of ≥ 4%.

3.2 Ordinary solid drinks

Products made with fruit juice or baked coffee, tea, chrysanthemum, couchgrass root and other vegetable extracts as main raw materials, added or not added with other auxiliary materials, with the protein content of < 4%.

4. Indicator Requirement

4.1 Raw Material Requirement in conformity to the relevant standard and related provisions.

4.2 Oranoleptic Requirements

With the color and flavor in compliance with the variety, without caking, stimulating, burnt, rancidity and other peculiar smells, in clear or evenly mixed suspension after mixing and without impurity visible with naked eye.

4.3 Physicochemical indicators

Physicochemical indicators shall conform to the provisions of Table 1.

Table 1 Physicochemical Indicators

Items		Indicators	
		Protein	Ordinary
Protein/(g/100g)	≥	4.0	-
Moisture /(g/100g)	≤	5.0	
Total Arsenic (as per As)/ (mg/kg)	≤	0.5	
Lead (PB)/ (mg /kg)	≤	1.0	

4.4 Microbial indicators

Table 2 microbial indicators

Items	Indicators	
	Protein	Ordinary
Total bacterial colony/ (cfu/G) ≤	30000	1000
Coliforms/ (MPN/100G) ≤	90	40
Mould count (cfu/G) ≤	50	
Pathogenic bacteria (salmonella, shigella, staphylococcus aureus)	Should not be detected	

5. Food Additives

5.1 The quality of food additives is in conformity to the relevant standard and related provisions.

5.2 Variety and usage of food additives shall conform to the provisions of GB2760.

6. Hygienic Requirement for Process of Production and Processing

In conformity to the provisions of GB 12695.

7. Packing

Packing containers and materials shall conform to the relevant hygienic standard and related provisions.

8. Identification

The identification requirement for stereotyp packing shall conform to the relevant provisions.

9. Storage and Transport

9.1 Storage

Products shall be stored a dry and well-ventilated place and shall not be stored together with toxic, harmful, smelly, evaporative and corrosive articles.

9.2 Transport

Products shall be transported to avoid sunlight and rain and shall not be transported together with toxic, harmful, smelly or quality-affecting articles.

10. Testing Method

10.1 Oranoleptic Requirements

Take about 5g of the tested sample for placing in one clean white enamel vessel, observe its color and lustre and appearance with naked eye under the natural light, immediately after thinning with distilled water of about 80 ℃ in a transparent glass flask according to the intake instruction described on the label, smell its fragrance and identity its taste, and see whether there is any impurity at the bottom of the flask after stewing for 2 min.

10.2 physicochemical indicators

10.2.1 Protein

Determine as per method provided by GB/T5009.5.

10.2.2 Moisture

Determine as per method provided by GB/T 5009.3.

10.2.3 Total Arsenic

Determine as per method provided by GB/T 5009.11.

10.2.4 Lead

Determine as per method provided by GB/T5009.12.

10.3 Microbial indicators

Determine as per method provided by GB/T4789.21.