# BELIZE NATIONAL STANDARD

**BZS 16: 2007**

## BELIZE NATIONAL STANDARD
## SPECIFICATION FOR CARBONATED BEVERAGES

**BBS**
**BELIZE BUREAU OF STANDARDS**
**Government Complex Building**
**Mahogany Street Extension**
**P.O. Box 1647**
**Belize City, Belize**
**CENTRAL AMERICA**

**2007**

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# BELIZE NATIONAL STANDARD SPECIFICATION FOR CARBONATED BEVERAGES

**Committee Representation**

The preparation of this standard for the Standards Advisory Council established under the Standards Act 1992, was carried out under the supervision of the Bureau's Technical Committee for Food and Food Related Products, which at the time comprised of the following members:

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**TECHNICAL SECRETARY**
Mrs. Helen Reynolds-Arana
Belize Bureau of Standards

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# BELIZE NATIONAL STANDARD SPECIFICATION

# FOR CARBONATED BEVERAGES

## 0 FOREWORD

0.1 The carbonated beverage industry within CARICOM, is one of the largest segments of the local food processing sector, in each island. Its products are among those likely to be extensively traded within the region. This standard has been developed to ensure uniformity in the quality of these products.

0.2 The quality of a carbonated beverage depends on the quality of the various ingredients that go into its manufacture – water, acidulants, sweetening agents, flavours, colours and carbon dioxide being the most important ones. The hygienic conditions of the units producing carbonated beverages also need vigilant control to safeguard public health. In this standard an effort has been made to lay down requirements for the various ingredients as well as the end product. The minimum hygienic conditions, which need to be maintained in a carbonated beverage establishment, have also been stipulated.

0.3 This standard is adopted from the Caribbean Community Standard Specification for Carbonated Beverages, approved by the Caribbean Community Council of Ministers for implementation as a regional mandatory standard with effect from March 01, 2004.

## 1 SCOPE

1.1 This standard prescribes the requirements and the methods of test for carbonated beverages.

## 2 TERMINOLOGY

For the purposes of this standard, the following definitions shall apply:

2.1 **Artificial flavouring substances** - means synthetic flavouring substances, which have not yet been identified in natural products intended for human consumption, either processed or not.

2.2 **Carbonated beverages** – means non-alcoholic beverages (containing not more than 0.5 percent by volume of alcohol) in which carbon dioxide is dissolved. The beverage should be produced under sanitary conditions and packaged in containers, which are properly sealed, in accordance with recognized good

manufacturing practice. The provision for sealing of the final consumer container is specifically waived with respect to fountain beverages sold in cups; the syrups and/or sweetening agents dispensed therein being entirely subject to this standard.

2.3 **Fruit juice** - means the unfermented fluid derived from fruit (including concentrated or dehydrated juice) to which no ingredients, other than permitted preservatives, have been added. Such juice may contain reduced quantities of pulp, acid, pectin, salts, water, oil and essence, removed through generally recognized industrial processes.

2.4 **Gas volume** - means the volume of carbon dioxide gas, expressed at standard conditions ($0^{o}$C and 1 atmosphere of pressure) dissolved in an equal volume of liquid. When a given volume of carbon dioxide gas, expressed at these standard conditions, is dissolved in the same volume of liquid, that liquid is said to have "one volume" of carbonation. The volume of dissolved carbon dioxide may be increased by lowering the liquid temperature and/or increasing the pressure of the gas.

2.5 **Natural flavours and flavouring substances** – means preparations and single substances respectively, acceptable for human consumption, obtained exclusively by physical processing from vegetable, and sometimes animal, raw materials, either in their natural state or processed for human consumption.

2.6 **Natural-identical** - means substances, chemically isolated from aromatic raw materials, which are obtained synthetically. They are chemically identical to substances present in natural products intended for human consumption.

2.7 **Potable water** – means any water which is suitable for drinking purposes.

## 3 CLASSIFICATION

3.1 Carbonated beverages shall be of the following types:

(a) **Non-flavoured carbonated beverages** – may contain any of the ingredients listed in paragraph 4 except sweetening and flavouring agents;

(b) **Flavoured carbonated beverages with natural extracts** – may contain from zero to 10% (v/v) fruit juice and any of the ingredients listed in paragraph 4 except "natural identical" and "artificial flavouring agents";

(c) **Flavoured carbonated beverages** – may contain from zero to 10% (v/v) fruit juice and any of the ingredients listed in paragraph 4;

(d) **Carbonated beverages with fruit juice** – shall contain not less than 10% (v/v) fruit juice and any of the ingredients listed in paragraph 4 except "natural identical and artificial flavouring agents".

## 4 INGREDIENTS

### 4.1 Composition of Carbonated Beverages

The carbonated beverage shall be prepared from potable water, carbon dioxide, and any of the other ingredients listed, used singly or in combination. All the ingredients used in the preparation of carbonated beverages shall be clean, pure and fit for human consumption.

#### 4.1.1 Potable Water

4.1.1.1 Potable water shall conform to the requirements given in Table 1. In addition, it shall be clear and pleasant to the taste. Water used in the preparation of carbonated beverages shall not be less than those contained in the National Drinking Water Quality Standard Regulation.

4.1.1.2 Microbiological Specifications – Water used for making carbonated beverages shall conform to the following microbiological requirements:

(a) The total number of bacteria developing on a standard agar plate, incubated for 24 hours at $37^{o}$C, shall not exceed 25 per milliliter; and

(b) The coliform count shall be less than 1 per 100 milliliters.

#### 4.1.2 Carbon Dioxide

In addition to the requirements listed in Table 2, the carbon dioxide used shall conform to the following:

4.1.2.1 It shall be odourless, non-toxic and non-combustible.

4.1.2.2 The odour and flavour of the gas, as well as the odour and flavour of the distilled water saturated with it shall have the characteristics of carbonic acid.

4.1.2.3 It shall not contain extraneous matter, mineral or organic substances (for example nitrogen dioxide, sulphur dioxide, hydrogen sulphide,etc.) above the current internationally accepted limits published by the International Society of Beverage Technologists (ISBT).

#### 4.1.3 Nutritive Sweeteners

Any approved nutritive sweetener may be used, consistent with good manufacturing practice (GMP). A list of approved sweeteners is given in Appendix C.

# TABLE 1
# REQUIREMENTS FOR POTABLE WATER

| **CHARACTERISTIC** | **REQUIREMENT (max)** |
|---|---|
| Turbidity | 5 NTU * |
| Colour | Colourless |
| Odour | None |
| Free chlorine | 0.02 mg/kg (ppm) |
| Total alkalinity as calcium Carbonate | 85 mg/kg (ppm) |
| Sulphate as $SO_4$ | 250 mg/kg (ppm) |
| Chloride as Cl | 250 mg/kg (ppm) |
| Iron and manganese | 0.3 mg/kg (ppm) |
| Copper | 2.0 mg/kg (ppm) |
| Calcium as calcium carbonate | 150 mg/kg (ppm) |
| Magnesium | 80 mg/kg (ppm) |
| Fluorine | 1.0 mg/kg (ppm) |
| Lead | 0.2 mg/kg (ppm) |
| Arsenic | 0.1 mg/kg (ppm) |
| Total soluble solids | 500 mg/kg (ppm) |
| **Nitrates | 50 mg/kg (ppm) |
| **Nitrites | 3 mg/kg |

**NTU: Nephelometric Turbidity Unit.*

*** When both nitrates and nitrates are present, the following relationship applies:*

$$\frac{\text{Nitrate (mg/kg)}}{50} + \frac{\text{Nitrite (mg/kg)}}{3} \leq 1$$

## TABLE 2
## REQUIREMENTS FOR CARBON DIOXIDE

| CHARACTERISTIC | REQUIREMENT |
|---|---|
| Carbon dioxide, percent by volume, min | 99.9 |
| Carbon monoxide, ppm, max | 10.0 |
| Moisture, percent by volume, max | 0.1 |

4.1.4 **Intense Non-nutritive Sweeteners**

When nutritive and non-nutritive sweeteners are used together, the caloric content of the beverage shall be not greater than two-thirds of the caloric content of the same beverage made only with nutritive sweeteners.

A list of approved artificial or non-nutritive sweeteners, with maximum usage levels, is given in Appendix D. *When combinations of products within this category are used, in the absence of nutritive sweeteners, the sum of the ratios of the quantities of each sweetener to the maximum level permitted for its use shall not exceed unity. The quantities may be calculated as follows;*

$$\frac{A}{600} + \frac{B}{1000} + \frac{C}{1500} + \frac{D}{406} + \frac{E}{600} < 1$$

*Where* *A = mg Ace sulfame K per Kg of product*
*B = mg Aspartame per Kg per Kg of product*
*C = mg Cyclamate per Kg of Product*
*D = mg Saccharin per Kg of Product*
*E = mg Sucralose per Kg of Product.*

***Note:*** *Where new products are approved for addition to, or products deleted from, this category in the most recent revision of the Codex Alimentarius General Standard for Food Additives, the above equation shall be appropriately amended to reflect current regulatory requirements.*

A list of approved artificial or non-nutritive sweeteners, with maximum usage levels, is given in Appendix D.

4.1.5 **Flavouring Agents**

These are natural flavouring compounds obtained from fruits or plants by extraction with suitable solvents, such as ethanol, glycerine, propylene glycol and iso-propanol; by distillation; by expression; or by any other suitable process; or those obtained from chemical processes and called “natural identical or artificial”. All of these flavouring agents are used at levels determined by GMP, with the exception of:

(a) quinine [maximum = 85 mg/kg (ppm)], and

(b) caffeine [maximum = 200 mg/kg ( ppm)].

4.1.6 **Bittering Agents**

Natural bittering substances, obtained as extracts from botanical sources, may be used at levels consistent with GMP, except where restrictions are placed on the levels of specific constituents of the extracts by Codex Standards.

4.1.7 **Flavour Enhancers**

The naturally occurring substance, maltol, may be used as a flavouring agent. The maximum permitted level is 20 mg/kg (ppm).

4.1.8 **Food Colours**

Any chemical additive, approved for this purpose by Codex Alimentarius, may be used. A list of approved colours is given in Appendix E.

4.1.9 **Acidulants**

A list of approved acidulants is given in Appendix F.

4.1.10 **Clouding Agents and Emulsifiers**

A list of approved clouding agents and emulsifiers is given in Appendix G.

4.1.11 **Stabilizers and Thickeners**

A list of approved stabilizers and thickeners is given in Appendix H.

4.1.12 **Vitamins and Minerals**

These may be added to carbonated beverages if permitted by national regulations and if:

(a) the intake of the nutrient is below the recommended level in the diet of a significant segment of the population;

(b) the carbonated beverage is likely to be consumed in quantities that will make a significant contribution to the diet of the population;

(c) the addition of the nutrients is not likely to create an imbalance of essential nutrients; and

(d) there is reasonable assurance against excessive intake to the level of toxicity.

4.1.13 **Acidity Regulators (Buffering Agents)**

Calcium, sodium and potassium salts of approved acidulants are permitted at levels consistent with GMP. A list of approved acidity regulators is provided in Appendix I.

4.1.14 **Preservatives**

Two or more different preservatives may be used, provided that the sum of the ratios of the quantities of each preservative present in the product to the maximum level permitted, does not exceed unity. The quantities may be calculated as follows:

$$\frac{e}{1500} + \frac{a+b+c}{1000} + \frac{f}{100} + \frac{d}{70} \leq 1$$

where

a = ppm of benzoic acid
b = ppm of methy- l-p-hydroxybenzoate
c = ppm of propyl-p-hydroxybenzoate
d = ppm of sulphur dioxide
e = ppm of sorbic acid
f = ppm of formic acid

The list of approved chemical compounds, from which these functional groups can be obtained, is given in Appendix J.

4.1.15 **Antioxidants**

A list of approved antioxidants is given in Appendix K.

***NOTE:*** *Antioxidant concentrations are based on the quantity of fat in the product, derived primarily from flavour emulsions employed in the formulation. When a combination of antioxidants is used, the following restrictions shall apply.*

(a) The gallate concentration shall not exceed 100 mg/kg;

(b) The aggregate shall not exceed 200 mg/kg.

4.1.16 **Antifoaming Agents**

A list of approved antifoaming agents is given in Appendix L.

4.1.17 **Foaming Agents**

A list of approved foaming agents is given in Appendix M.

# 5 REQUIREMENTS

## 5.1 Sanitary Conditions

5.1.1 Carbonated Beverages shall be manufactured in accordance with the most recent Revision of the Codex Alimentarius Recommended International Code of Practice – General Principles of Food Hygiene and as detailed in Section 8.

5.1.2 A Food Safety System based on the application of HACCP Principles (or other approved system which provides equivalent safety assurance) shall be used in the production of carbonated beverages.

5.1.3 Asbestos fibre filters shall not be used at any stage in the manufacture of carbonated beverages.

## 5.2 Flavour and Appearance

### 5.2.1 Flavour

Carbonated beverages shall have a well-balanced and pleasant flavour. The carbonated beverages of the flavoured type shall be free from off-flavours and off-odours.

### 5.2.2 Appearance

Carbonated beverages should be free from dust, extraneous fibre particles, dirt, insects and rodent contamination, skins, seeds, rag particles or cork, glass or other foreign matter. Clear carbonated beverages should be of sparkling clarity and shall remain so (for a reasonable period of time) when stored under normal conditions. The cloudy beverages should be stable. Reasonable limits of tolerance in accordance with good manufacturing practice shall be accepted.

## 5.3 Composition

### 5.3.1 Sugar Content

Naturally sweetened carbonated beverages, when tested after removal of the carbon dioxide, shall record a Brix hydrometer value of not less than 5 degrees at 20ºC.

***NOTE:*** *This requirement shall not apply to dry ginger ale and tonic water.*

### 5.3.2 Carbonation

The beverage shall be carbonated to a pressure in accordance with their character. It shall, however, contain a minimum of one volume and a

maximum of five volumes of carbon dioxide. A recommended method for the measurement of gas is given in Appendix A.

5.4 **Microbiological and Toxic Residues**

The beverage shall conform to the following specifications:

5.4.1 **Microbiological**

Total Plate Count -- less than 50 CFU/100 ml

Coliform count -- less than 1CFU/100 ml

Yeast/ mould count -- less than 10 CFU/20 ml

***NOTE:*** *CFU: Colony Forming Unit*

5.4.2 **Toxic Residues**

Tolerance levels for toxic residues are given in Table 3.

**TABLE 3**
**TOLERANCE LEVELS FOR TOXIC RESIDUES IN CARBONATED BEVERAGES**

| **RESIDUE** | **TOLERANCE** (mg/kg, max) |
|---|---|
| Arsenic | 0.25 |
| Lead | 0.50 |
| Copper | 1.50 |
| Iron | 2.00 |
| Mercury | 0.05 |

## 6 PACKAGING

Only containers made of material not liable to alter the chemical or organoleptic characteristics of the beverage, or to render it harmful to health, are authorized for the packaging of soft drinks. Such containers shall also be in accordance with packaging regulations. Provided they meet these requirements, such containers may be of the following materials: glass, metal or plastic. The containers shall be sealed so as to prevent the entrance of contaminants into the product, before the containers are opened by consumers.

6.1 **Washing and Rinsing**

All containers in which carbonated beverages are packed shall be washed or rinsed immediately before filling and shall be clean and sanitary. All returnable glass containers, used in the manufacture or bottling of carbonated beverages, shall be washed immediately before being filled. This process shall consist of exposure to conditions, equivalent to a three percent (3%) (m/m) alkali solution, of which not less than sixty percent (60%) is caustic soda (sodium hydroxide), for a period of not less than five minutes, at a temperature of not less than 55$^{o}$C. This shall be followed by thorough rinsing in potable water, until free from alkali.

6.2 **Filling and Capping**

The containers shall be filled, under strictly sanitary conditions, by means of equipment maintained and operated in a clean state. The mouths of bottles shall not be touched by hand. After filling, the containers shall be sealed with clean, new closures. The capping machine shall be kept clean. Contamination from detached particles of lacquer, cork or other matter shall be avoided. The preparation and packing of the product shall ensure a product life of at least 45 days under normal storage conditions.

6.3 **Inspection of Empty and Filled Containers**

Containers, both before and after filling, shall be subjected to an inspection process which results in the rejection of defective containers or products.

***NOTE:*** *In the case of slow filling lines, manual inspection, before a suitably illuminated background, under magnification, if necessary, shall be permitted. In the case of fast filling lines, electronic inspection devices should be used in addition to manual inspection.*

## 7 LABELLING

7.1 Labels shall be clean, neat and pasted securely to the container.

7.2 In addition to the *general* requirements of the most recent revision of the Codex Alimentarius Standard for the Labeling of Pre-packaged Foods, the following information shall appear legibly on each container, closure or label:

*(a) the name of the product in accordance with the classification in paragraph 3;*
*(b) any brand name or trade name;*
*(c) the list of ingredients;*

*(d) a declaration of the net contents of the retail container as an average quantity in terms of milliliters (ml);*

*(e) the name and address of the manufacturer, packer, distributor, importer or vendor;*

*(f) lot identification, in code or in clear, to identify the producing factory and the lot;*

*(g) "Best Before" date and any special conditions for storage if the validity of the date depends thereon.*

## 8 SANITARY REQUIREMENTS FOR CARBONATED BEVERAGES UNIT

### 8.1 Construction and Maintenance

#### 8.1.1 Roof and Processing Rooms

The roof shall be leak-proof, and shall fit tightly on the walls. The processing rooms (final syrup and bottling rooms) shall be kept reasonably free from dust.

#### 8.1.2 Floors

The floor shall be constructed of non-skid impervious material and shall be smooth and graded to sewers or drains.

#### 8.1.3 Wall Surfaces

The inside surfaces of the walls of all processing rooms shall be impervious to water, smooth and well drained and shall be maintained in this condition.

#### 8.1.4 Drainage

Where waste and overflow of water occur, they shall be drained away.

#### 8.1.5 Litter and Waste

Litter and waste shall not be allowed to accumulate and shall be removed and discarded as promptly as possible.

#### 8.1.6 Illumination

Adequate illumination shall be maintained to promote effective processing and cleansing.

#### 8.1.7 Ventilation

In order to prevent drippings into the product or on to equipment used in the handling of the product and to prevent the growth of mould, adequate, positive pressure, and/or ventilation shall be maintained for the removal of excess steam.

8.1.8 **Mould Growth**

Adequate measures shall be taken to inhibit or remove mould growth on equipment and internal structures of the processing and storage rooms.

8.1.9 **Insect Pests**

Adequate measures shall be taken to keep the production unit free from flies and other insects.

8.1.10 **Use of Insecticides and Germicides**

Under no circumstances shall insecticides or germicides be used during production periods. When used, care shall be taken to prevent contamination of finished products, equipment, raw materials or packing materials.

8.1.11 **Protection from Rodents**

All the premises in which those activities connected with the production and storage of carbonated beverages take place, shall be rodent-proofed and kept free from rodents and other animals.

8.1.12 **Use of Syrup Rooms**

Syrup rooms shall be used exclusively for activities directly connected to the production and storage of syrups.

8.1.13 **Cleaning of Floors and Drains**

Floors and drains shall be kept clean by regular flushing with water.

8.1.14 **Chimney Location**

The factory chimney shall be so constructed or situated that smoke is not emitted in a quantity or in a manner which is offensive, injurious or dangerous to the health of workers, or cause contamination of the product at any stage in its preparation.

8.1.15 **Protection from Contamination by Waste**

No lavatory, sink, cesspool or garbage heap shall be so situated or maintained that odours or fumes therefrom pervade any room where the products or raw materials are prepared or stored.

8.1.16 **Surrounding Environment**

The grounds around the carbonated beverage plant shall be free of uncut weeds, and adjacent roads or parking lots shall be paved so as to prevent dust from entering the plant.

8.2 **Equipment**

8.2.1 **Cleaning and Sterilization**

All equipment coming into contact with raw materials or the product in the course of manufacture shall be kept clean. An ample supply of steam and water, hoses, brushes and other equipment necessary for the proper cleaning of machinery and equipment shall be available. The equipment shall be sterilized by the application of hypochlorite or other suitable sterilizing agent.

After chemical sterilization, the equipment shall be rinsed with potable water to remove all traces of the sterilizing agent. Suitable tests shall be performed to ensure compliance with this requirement.

8.2.2 **General Cleaning**

The entire processing system shall be cleaned at the close of an operation and rinsed out prior to its use again.

8.2.3 **Container Use, Repair and Storage**

Boxes, bottles, pails and other containers used to transport or store raw materials shall be kept clean and shall not be used for any other purpose. The containers shall be maintained in a state of good repair. They shall not be stacked in a manner which allows contamination of the product.

8.2.4 **Equipment**

Every bottling plant shall be equipped with mechanical and sanitary machines for bottling and for carbonating.

8.2.5 **General Sanitation**

All machinery and equipment, used in the manufacture of carbonated beverages, shall be kept under sanitary conditions at all times. Ingredients, packaging containers and closures shall be kept in a clean and sanitary environment at all times. Tanks or vessels used for syrup preparation or storage shall be made only from materials approved for use in direct contact with foods.

8.2.6 **Repair of Equipment**

All equipment shall be kept in good repair.

8.2.7 **Storage**

General supplies, spare parts inventory and surplus machinery shall be stored in an area separate from the processing and raw materials storage areas.

8.3 **Comfort Features**

8.3.1 **Employee Accommodation**

Dressing rooms and lavatory facilities shall be ample and shall be provided with running water, soap and clean towels. Disposable single-use towels are recommended.

8.3.2 **Bathing Facilities**

It is recommended that shower facilities be provided and that employees be encouraged to use them daily.

8.4 **Personal Hygiene of Employees**

8.4.1 **Employee Indisposition**

An employee who is suffering from a hand or face injury, suppurating skin infection or clinically recognizable infectious disease, or who is wearing a bandage, plaster, or other protective covering for a hand injury or suppurating skin infection, shall not be allowed to handle raw materials or the unprotected product.

8.4.2 **Medical Examination of Employees**

Periodical medical examination of the employees engaged in the production of the beverages shall be carried out at least once a year. The examination shall comply with the Public Health Regulations.

8.4.3 **Prohibition of Spitting and Use of Tobacco**

Spitting and the use of tobacco in any form shall be prohibited within the manufacturing area of the factory. Notices to this effect shall be prominently displayed.

8.4.4 **Employee Attire**

Employees shall always wear clean uniforms and shall in addition wear suitable, clean caps to cover their hair. All protective clothing shall be maintained in good repair. Clothing shall not be stored in workrooms.

Employees shall remove jewelry, which is insecurely attached, and cannot be sanitized before entering workrooms.

8.4.5 **Hand Care**

Employees shall keep their fingernails short and clean, and shall wash their hands before commencing work and after each absence from the work station.

8.4.6 **Personal Effects**

Food and personal belongings shall not be stored in the carbonated beverage processing area. Employees shall take every precaution to prevent contamination of the beverage and ingredients with perspiration, hair, cosmetics, medication, etc.

## 9 SAMPLING OF CARBONATED BEVERAGES

### 9.1 Scale of Sampling

9.1.1 **Lot**

All containers in a consignment belonging to the same batch of manufacture shall constitute a lot. If the consignment is declared to consist of different batches of manufacture, containers of the same batch shall be grouped together and each group so formed shall constitute a separate lot.

Samples shall be tested from each lot for ascertaining conformity to the requirements of the standard.

9.1.2 **Sample Size**

The number of containers to be selected from a lot for testing for the microbiological and other requirements shall depend on the size of the lot and shall be in accordance with Table 4.

9.1.3 **Random Selection**

The containers to be selected for testing shall be chosen at random from the lot and for this purpose random number tables shall be used. In case such tables are not available, the following procedure may be adopted:

Starting from any container, count them as 1, 2, 3 .....r. Every $r^{th}$ container shall be withdrawn; r being the integral part of N/n, where N is the total number of bottles in the lot and n the total number of containers to be chosen.

## TABLE 4
## NUMBER OF BOTTLES TO BE SELECTED FOR TESTING

| NO. OF BOTTLES IN THE LOT | NO. TO BE SELECTED FOR MICROBIOLOGICAL TESTS | NO. TO BE SELECTED FOR OTHER TESTS |
|---|---|---|
| Up to 1 300 | 12 | 18 |
| 1 300 to 3 200 | 18 | 24 |
| 3 201 and above | 24 | 30 |

9.2 **Test Samples and Referee Samples**

9.2.1 **Samples for Microbiological Tests**

The containers selected for microbiological tests (see Table 4) shall be divided at random into three equal parts and labelled with all particulars of sampling. One sub-sample shall be for the purchaser, another for the vendor and the third for the referee.

9.2.2 **Samples for Other Tests**

The containers selected for other tests (see Table 4) shall be divided at random into three equal parts and labelled with all the particulars of sampling. One sub-sample shall be for the purchaser, another for the vendor and the third for the referee.

9.2.3 **Referee Samples**

Referee samples shall consist of a set of containers for microbiological tests (see 9.2.1) and a set of containers for other tests (see 9.2.2). They shall bear the seals of the purchaser and the vendor (or their representatives), and shall be kept at a place agreed to between the two.

9.3 **Testing of Samples**

9.3.1 **Test for Microbiological Requirements**

The containers obtained as in 9.2.1 shall be tested for all microbiological requirements.

9.3.2 **Test for other Requirements**

Containers obtained as in 9.2.2 shall be tested for all other requirements.

9.4 **Criteria for Conformity**

9.4.1 A lot shall be considered as conforming to the requirements of this standard if the sample tested satisfies the requirements specified in the standard.

9.4.2 Where the manufacturers of Carbonated Beverages have instituted Quality Management Systems which incorporate HACCP procedures or other Food Safety System providing the same degree of safety assurance, a satisfactory audit by the official Regulatory Agency having jurisdiction, shall be accepted as an alternative to Sections 9.2 and 9.3.

## APPENDIX A
(Clause 5.3.2)

## DETERMINATION OF CARBON DIOXIDE VOLUME

### A-1 CHOICE OF METHOD

Either Method I (see A-2) or Method II (see A-3) may be used. However, Method I shall be the referee method in case of dispute.

### A-2 METHOD I

A-2.1 **Apparatus**

(a) Chittick gasometric carbon dioxide apparatus.

A-2.2 **Reagents**

Displacement Solution - To a solution of 100 g of sodium chloride or sodium sulphate in 350 ml of water, add 1 g of sodium bicarbonate and 2 ml of methyl orange, then dilute with sulphuric acid (1:5 v/v) until the solution becomes a decidedly pink colour and stir until all carbon dioxide is removed. The solution seldom needs replacing.

A-2.3 **Procedure**

Cool the carbonated beverage to 0ºC and pour 100 ml into the evolution flask carefully so as to avoid splashing or loss of carbon dioxide and connect with the double bore stopper. Open the stop-cock and by means of the levelling bulb (containing the displacement solution) adjust the level of the liquid in the gasometer to 10 ml above 0. Allow 1 to 2 minutes for equalizing the temperature and barometric pressure within, then close the stop-cock and lower the levelling bulb to reduce the internal pressure. Slowly run into the evolution flask, from the burette (F), 10 ml of 1:5 sulphuric acid, always keeping the levelling solution in the bulb below that in the gasometer.

To secure complete evolution, first rotate and then vigorously agitate the evolution flask. After allowing to stand for 5 minutes, adjust the liquid in the gasometer so as to be on a level with that in the bulb. Read the volume of gas on the gasometric rube at room temperature and pressure. Bring this volume to STP.

A-2.4 **Calculation**

$$\frac{P_1V_1}{T} = \frac{P_2V_2}{T}$$

where

$P_1$ = pressure at the time of reading the volume of carbon dioxide
$V_1$ = volume of carbon dioxide in the gasometric tube
$P_2$ = 760 mm Hg (normal pressure)

$V_2$ = volume of carbon dioxide at STP
$T_1$ = room temperature in K ($^oC$ + 273)
$T_2$ = 273 K

$$\text{Gas volume of carbon dioxide} = \frac{V_2 \times 288.56}{273 \times 100}$$

## A-3 METHOD II

### A-3.1 **Apparatus**

The apparatus consists of a pressure gauge having a shallow spike with holes in the side. The bottle is inserted from the side into the slot provided in the neck of the carbon dioxide tester and is secured in place by tightening with a thread system. The pressure gauge is inserted until the needle point touches the enclosure. The reading is noted on the gauge.

### A-3.2 **Procedure**

Clamp the bottle in the frame of the gas volume tester. Pierce the enclosure but do not shake the bottle. Sniff off the top gas quickly until the gauge reading drops to zero. Make certain to close the valve the instant the needle touches zero in the pressure gauge. Shake the bottle vigorously until the gauge gives a reading that additional shaking does not change. Record the pressure. Note the temperature and record it. Obtain the volume of gas from the appropriate Table provided with the apparatus.

## APPENDIX B

## DETERMINATION OF MICROBIOLOGICAL QUALITY

### B-1 CHOICE OF METHOD

Either Method I (B-2) or Method II (B-3) may be used. Method II shall be the referee method in case of dispute.

### B-2 METHOD I

B-2.1 **Media**

B-2.1.1 Nutrient Agar, of the following composition: (AS 1766.5 - 1994*)

| | |
|---|---|
| Peptone | 5.0 g |
| Beef extract | 3.0 g |
| Agar (bacteriological quality) | 15.0 g |
| Sodium chloride- | 5.0 g |
| Distilled water | 1.0 litres |

Suspend the ingredients in the water. Heat to boiling until solution is complete. Cool to between 50$^{o}$C and 60$^{o}$C and adjust the pH to 7.2. Dispense 15 ml quantities into test tubes. Autoclave at 121$^{o}$C for 15 minutes. Final pH should be 7.0 ± 0.1.

B-2.1.2 Violet Red Bile Agar, of the following composition (AS 1766.5 - 1994*)

| | |
|---|---|
| Yeast extract | 3.0 g |
| Peptone | 7.0 g |
| Sodium chloride | 5.0 g |
| Bile salts #3 | 1.5 g |
| Lactose | 10.0 g |
| Neutral red (10g/l aq. solution) | 3.0 ml |
| Crystal violet (1.0g/l aq. solution) | 2.0 ml |
| Agar | 15.0 g |
| Water | 1.0 litres |

Add the ingredients to the water, heat to boiling until solution is complete. Cool to between 50$^{o}$C and 60$^{o}$C and adjust the pH so that the final sterile medium has a pH of 7.4 ± 0.1. Boil for 2 minutes and dispense as required. This medium should be used soon after preparation and should not be autoclaved as this reduces the selectivity.

B-2.1.3 Lauryl tryptose broth, of the following composition: (AS 1766.5 - 1994)

| | |
|---|---|
| Tryptose | 20.0 g |
| Lactose | 5.0 g |
| Disodium hydrogen phosphate | 2.75 g |
| Potassium di-hydrogen phosphate | 2.75 g |
| Sodium chloride | 5.0 g |
| Sodium Lauryl Sulphate | 0.1 g |
| Water | 1.0 litres |

Dissolve the ingredients in the water. Dispense in tubes with inverted Durham fermentation tubes so that liquid covers the inverted tube. Autoclave at 121$^{o}$C for 15 minutes.

B-2.1.4 Potato Dextrose Agar, of the following composition: (AS 1766.5 - 1994)

| | |
|---|---|
| Potato: 50 g, dehydrated; or 200 g, fresh; or 4 g, extract. | |
| Dextrose | 20.0 g |
| Agar | 15.0 g |
| Water | 1.0 litres |

Cook or steam potatoes 20 minutes. Strain off liquid, filter and make up to volume. Add dextrose and dissolve. Add agar and steam until agar is dissolved. Dispense as required and autoclave at 121$^{o}$C for 15 minutes.

***NOTE:*** *In order to suppress bacterial growth, it is usually desirable to acidify the medium to pH 3.5. This can be done by adding 1.0 ml of 10% tartaric acid to each 100 ml of sterilized medium at 50$^{o}$C. The medium shall not be heated after the addition of the acid, as this would result in hydrolysis of the agar and destroy its gelling properties.*

B-2.2 **Glassware**

All glassware used in the microbiological examination of carbonated waters shall be sterile. Sterilization shall be performed preferably by dry heat at 170$^{o}$C for one hour, or by autoclaving.

B-2.3 **Pre-sampling Procedures**

Note and record all marks of identification appearing on the container, crown cork or label. Record physical defects such as imperfect closure. Clean the container with soap and water. If it is greasy, it may be found helpful to apply petroleum ether, naphtha or other suitable solvent. Invert the container 25 times by a rapid rotary movement of the wrist to get the contents distributed uniformly throughout.

For sterilization at the site of opening, clean the top of the container with 70% alcohol. Remove the crown cork and immediately place a sterile 50 ml or 100 ml beaker over the opening.

B-2.4 **Procedure**

B-2.4.1 **Total Colony Count**

By means of a sterile 1 ml pipette, deliver into each of a set of two sterile petri dishes, one millilitre of the samples from a single container. Add to each petri dish a sufficient quantity of nutrient agar (see B-2.1) which has been melted and cooled to 41$^{o}$C. Mix the contents of the Petri dish by a swirling motion of the hand and allow to set.

Incubate the petri dishes at 35,0 ± 2,0$^{o}$C for 24 hr to 48 hours. Count the number of colonies on each of the two plates. If the number of colonies on the two plates does not show undue variation and if the distribution of colonies on the two plates is satisfactory then report their average as the number of colonies per millilitre.

***NOTE:*** *If the number of colonies on any plate differs from the other very much, or if the distribution of colonies is not satisfactory, the test should be repeated.*

B-2.4.2 **Presumptive Coliform Organisms**

Using 1 ml of undiluted product, prepare pour plates with violet red bile agar as the medium. When the medium sets, overlay with an additional 4.0 ml of the agar. Incubate at 30 ± 1$^{o}$C for 24 ± 2 hours.

Presumptive coliform colonies are usually 1 mm to 2 mm in diameter, but may be as small as 0.5 mm. They are dark red in colour and surrounded by a reddish zone. The size of the colony will be influenced by the number of colonies on the plate.

***NOTE:*** *Because of the variability in size and colour of colonies with different batches of this medium, special care needs to be taken to ensure that colonies counted are coliforms. Count typical colonies on the test plates and record as presumptive coliforms. Plates counted should not contain more than 150 colonies.*

B-2.4.2.1 *Confirmatory Test for Coliforms*

Select randomly 10 typical colonies, if plate count exceeds 100. If the count is less than 100, select a number which approximates the square root of the count. Subculture each selected colony into a tube of lauryl tryptose broth. Incubate the tubes at 30 ± 1$^{o}$C for < 48 hours.

A positive reaction is indicated by the production of sufficient gas to fill the concavity of the Durham tube. Approximately 30 minutes before examination, gently tap the tubes to guard against false negative results due to gas supersaturation.

B-2.4.3 **Viable Yeast and Moulds**

Using standard techniques, prepare pour plates using 1 ml of well-mixed, undiluted sample and 15 ml of potato dextrose agar, which has been melted and cooled to 45$^{o}$C. When set, invert the petri dish and incubate for 4 days at 25$^{o}$C to 30$^{o}$C. Examine it for the presence of viable yeast and moulds and count the number of growths. Report it as the number of yeast and moulds per millilitre.

## B-3 METHOD II - COLONY COUNT (MEMBRANE FILTRATION METHOD)

### B-3.1 Application

The membrane filtration method is most suitable when the microorganisms are in low concentration, e.g. in rinse waters collected from cleaned and sanitized pipelines or tanks. The method is suited for microbiological assessment of water supplies to processing plants.

The method is applicable only to liquids which can be efficiently filtered without causing a build-up on the filter.

### B-3.2 Principle of Method

The method involves passing a liquid sample through a membrane of known physical properties. Micro-organisms in the sample are retained on the membrane which is then placed on a filter pad saturated with liquid medium, or on solid medium and incubated. Colonies, corresponding to the viable organisms collected on the filter, are then counted.

### B-3.3 General Techniques

The optimum volume of liquid to be used will depend upon the amount of un-dissolved solids in the sample and the expected count. If the expected count is high, suitable dilution of the sample to be assessed should be made. Where the

expected count is uncertain, it is recommended that two determinations be made using two different volumes. In this way, the probability will be increased that at least one count will be within the range 10-200. The optimum number of colonies on the filter is about 50.

B-3.4 **Apparatus**

(a) Membrane filtration apparatus

***NOTE:*** *Various types of apparatus suitable for the membrane filtration method are available commercially.*

(b) Grid-marked membrane filters, of 47 mm to 50 mm diameter, to fill the apparatus and having a porosity appropriate to the organism or organisms to be assessed.

***NOTE:*** *Sterile membrane filters are commercially available.*

(c) Filter flask, of capacity appropriate to the volume of liquid to be filtered.

(d) Source of vacuum.

(e) Forceps, with rounded tips and unserrated flat blades.

(f) Petri dishes.

(g) Graduated measuring cylinder, suitable for measuring the volume of sample to be filtered.

(h) Graduated pipettes, 5 ml.

(j) Tally counter.

(k) Filter pads, diameter either equal to or slightly greater than the diameter of the membrane filter with which they are to be used.

(m) Pasteur pipettes.

(n) Diluents and culture media, which shall be as specified in the relevant methods of AS 1095* and AS 1766†, according to the product under examination and the micro-organisms to be counted.

B-3.5 **Reagents**

Where the medium is of a non- indicating type, the following stain is required:

(a) Malachite green oxalate 0.01 percent (m/v) aqueous solution.

B-3.6 **Preparation of Apparatus and Materials**

B-3.6.1 **Sterilization**

The apparatus and materials listed under B-3.4 and B-3.5 shall be sterilized in accordance with the following procedure:

Wrap in kraft paper or other suitable material, the base of the membrane filtration apparatus with stopper attached and with the membrane support in position. Wrap the filter funnel separately. Sterilize by autoclaving. Sterilize incubating tins and the remainder of the glassware by dry heat as described in B-2.2.

In a petri dish capable of being autoclaved, interleave the membrane filters with filter pads; add extra filter pads where necessary until the dish can just be closed. Close the dish. Wrap in kraft paper and sterilize by autoclaving under the conditions recommended by the supplier of the membranes.

***NOTES:***

*(1) This method of packing will prevent 'rolling' of the membrane; the packing should not be so tight as to prevent penetration of steam.*

*(2) Sterile membrane filters are commercially available.*

B-3.6.2 **Medium**

The medium used, which may be either liquid or solid, shall be appropriate to the particular organism or organisms to be assessed.

B-3.6.2.1 *Use of Liquid Medium*

Liquid medium shall be introduced into a filter pad as follows:

Using sterile forceps, place a filter pad in an incubating tin or petri dish. Add sufficient liquid medium to saturate the pad and to result in a small excess.

***NOTE:*** *A 5-cm filter pad will require 2,0 ml to 2,5 ml medium.*

B-3.6.2.2 *Use of Solid Medium*

Where a solid medium is used, pour sufficient volume of the molten medium at a minimum temperature of 45ºC into a Petri dish to give a

depth of approximately 5 mm. As soon as the medium has set, dry as described in B-3.11.

B-3.7 **Procedure for Filtration**

Assemble the funnel base in the filter flask and connect the flask to the source of vacuum. Apply a slight vacuum. Using sterile forceps, centre a membrane filter on the membrane support with the grid-marked side upwards. Place the funnel in position and having tightened it, turn off the vacuum. Pour a measured volume of sample into the filter funnel. Gently apply vacuum and gradually increase it to that recommended by the supplier of the membrane. Where no such value is indicated, adjust the vacuum to 40 kPa (300 mm Hg) below atmospheric pressure.

***NOTE:*** *When the volume to be filtered is less than 10 ml, add at least 20 ml of sterile diluent to the funnel before addition of the sample, to aid in uniform dispersion of the bacteria over the entire surface of the membrane during filtration.*

When the level of the sample has fallen to within about 6 mm of the membrane, reduce the vacuum to approximately 10 kPa below atmospheric pressure. Rinse the sides of the funnel with 20 ml to 30 ml of diluent added from the graduated cylinder, used to measure the volume of the sample.

Remove any liquid medium in the petri dish over that required to saturate the filter pad. A Pasteur pipette is convenient for this operation.

Immediately after filtration has ceased, turn off the vacuum at the control top, disconnect the funnel and remove the membrane using sterile forceps. Roll the membrane grid-marked side upwards on to the filter pad or on to the solid medium taking care to avoid entrapping air bubbles between the membrane and the substrate. Replace the lid on the tin or Petri dish.

***NOTE:*** *When a control tap directly under the funnel is absent, it may be necessary to release the vacuum just before the completion of filtration, to avoid excessive drying of the membrane filter.*

B-3.8 **Incubation**

Transfer the Petri dishes or tins to the incubator. Distribute the dishes or tins in such a manner that overcrowding is avoided and there is no contact with the sides of the incubator. Incubate the dishes or tins in the inverted position at the temperature and for the period specified for the organism to be estimated.

B-3.9 **Staining, Counting and Identification** (see Note 1)

B-3.9.1 Where the medium that has been used is not of an indicator type, the membrane shall be stained by gently flooding the surface with a 0.01 per cent aqueous solution of malachite green oxalate, and after five to six seconds contact, pouring off the excess dye.

***NOTE:***

*(1) If the colonies are to be sub-cultured, they shall be removed from the membrane before any staining operation.*

*(2) Colonies normally remain unstained and the filter area not covered by colonies is stained a light green.*

B-3.9.2 The presumptively identified colonies, which have developed, shall be counted and confirmed. Where spreaders occur, each shall be counted as a single colony, provided that the outer edge of each spreader can be defined. A tally counter shall be used.

B-3.9.3 If the count is greater than 80, the test shall be repeated where possible, using either a smaller volume or a dilution designed to produce a count in the range of 20 – 80.

B-3.10 **Calculation and Report**

From the actual count calculate the number of organisms per specified volume or mass of the sample, making due allowance for any dilution factor involved.

Where two tests have been done involving two different volumes or dilutions (B-3.4) and each membrane has a count within the range 20 – 80, calculate the two counts separately and report the mean of the two as the result.

The report shall contain the following information:

(a) Reference to this standard;

(b) The number, and identity if confirmed, of colony-forming units (CFU's) per unit volume or per unit mass of sample, stating that the count was determined by the membrane filtration method;

(c) The presence of spreading organisms, if encountered;

(d) The membrane filters used and the supplier's specification of pore size;

(e) The culture medium used;

(f) The conditions of incubation; and

(g) Details of confirmation tests, if used.

B-3.11 **Drying of Plated Medium**

Remove excess moisture from the plates by one of the following methods:

B-3.11.1 **Method 1**

Incubate the plates open with the internal surfaces of both the base and the lid facing downwards and with the base resting on the lid, for the minimum time necessary to obtain plates free from condensate, e.g. about 2 hrs at 37ºC or 1 hr at 45$^{o}$C.

B-3.11.2 **Method 2**

Incubate at 37$^{o}$C for 16 hrs in the inverted position with the lids on. If the plates are not then free of condensate open them and incubate as described above until dry.

***NOTE:*** *In humid climates either extend the drying time or place a tray of desiccant, such as silica gel, in the base of the drying oven.*

## APPENDIX C

APPROVED NUTRITIVE SWEETENERS

| **INGREDIENT** | **INS #** | **MAXIMUM LEVEL** |
|---|---|---|
| Dextrose | - | GMP |
| Fructose | - | GMP |
| High Fructose Corn Syrup | - | GMP |
| Honey | - | GMP |
| Hydrolyzed Starch Syrup | - | GMP |
| Invert Sucrose | - | GMP |
| Lactose | - | GMP |
| Sucrose | - | GMP |
| BULK NUTRITIVE SWEETENERS | | |
| **INGREDIENT** | **INS #** | **MAXIMUM LEVEL** |
| Isomalt | 953 | GMP |
| Maltitol | 965 | GMP |
| Mannitol | 421 | GMP |
| Sorbitol | 420 | GMP |
| Xylitol | 967 | GMP |

## APPENDIX D

INTENSE NON-NUTRITIVE SWEETENERS

| **INGREDIENT** | **INS #** | **MAXIMUM LEVEL** |
|---|---|---|
| Ace Sulfame K | 950 | 600 mg/kg |
| Aspartame | 951 | 1000 mg/kg |
| Cyclamates | 952 | 1500 mg/kg |
| Saccharin | 954 | 406 mg/kg |
| Sucralose | 955 | 600 mg/kg |

## APPENDIX E

PERMITTED COLOURS

| INGREDIENT | INS # | MAXIMUM LEVEL |
|---|---|---|
| Allura Red AC | 129 | 200 mg/kg |
| Amaranth | 123 | 100 mg/kg |
| Annatto Extracts | 160 b | GMP |
| Antho Cyanins | 1631 | GMP |
| Azorubine | 122 | 100 mg/kg |
| Beet Red | 162 | GMP |
| Brilliant Black PN | 151 | 100 mg/kg |
| Brilliant Blue FCF | 133 | 100 mg/kg |
| Brown HT | 155 | 100 mg/kg |
| Cantha Xanthin | 161 g | GMP |
| Caramel Colour, Class I | 150 a | GMP |
| Caramel Colour, Class III | 150 c | GMP |
| Caramel Colour, Class IV | 150 d | GMP |
| Carmines | 120 | GMP |
| Carotenal Beta – Apo – 8 | 160 e | 100 mg/kg |
| Carotene, Beta – (Synthetic) | 160 a (i) | 100 mg/kg |
| Carotenes (Algal and Natural) | 160 a ii | GMP |
| Carotenoids | 160 ai, e,f | GMP |
| Chlorophylls | 140 | GMP |
| Chlorophylls, Copper Complexes | 141 i, ii | GMP |
| Cochineal Extract | 120 | GMP |
| Circumin | 100 I | GMP |
| Circumin (Colouring Principle of Tumeric) | 100 i | 100 mg/kg |
| Erythrosine | 127 | 100 mg/kg |
| Fast Green | 143 | 100 mg/kg |
| Grape Skin Extract | 163 ii | GMP |
| Green S | 142 | 100 mg/kg |
| Indigotine | 132 | 100 mg/kg |
| Lycopene | 160 d | GMP |
| Ponceau 4 R | 124 | 100 mg/kg |
| Sunset Yellow FCF | 110 | 100 mg/kg |
| Tartrazine | 102 | 100 mg/kg |

## APPENDIX F

APPROVED ACIDULANTS

| **INGREDIENT** | **INS #** | **MAXIMUM LEVEL** |
|---|---|---|
| Acetic Acid | 260 | GMP |
| Adipic Acid | 355 | 50 mg/kg |
| Citric Acid | 330 | GMP |
| Fumaric Acid | 297 | GMP |
| Lactic Acid | 270 | GMP |
| Malic Acid | 296 | GMP |
| Ortho Phosphoric Acid | 338 | 700 mg/kg |
| Succinic Acid | 363 | GMP |
| Tartaric Acid | 334 | 3000 mg/kg |

## APPENDIX G

EMULSIFIERS AND CLOUDING AGENTS

| **INGREDIENT** | **INS #** | **MAXIMUM LEVEL** |
|---|---|---|
| Alginates | 401-404 | GMP |
| Brominated Vegetable Oil | 443 | 15 mg/kg |
| Carob Bean Gum | 410 | GMP |
| Carageenan (including furcelleran) | 407 | GMP |
| Modified Celluloses | 466 | 5000 mg/kg |
| Dextrins (white and yellow, roasted starch) | 1400 | GMP |
| Diacetyl Tartaric and Fatty Acid Esters of Glycerol | 472 L | GMP |
| Glycerol Ester of wood rosin | 445 | 100 mg/kg |
| Guar Gum | 412 | GMP |
| Gum Arabic | 414 | GMP |
| Hydroxypropyl Starch | 1440 | GMP |
| Lecithin/Partly Hydrolysed | 322 | GMP |
| Modified Starches | | GMP |
| Mono-and Di-Glycerides | 471 | GMP |
| Oxidised Starch | 1404 | GMP |
| Pectins (amidated and non-amidated) | 440 | GMP |
| Phosphates | 452 i | GMP |
| Starch Sodium Octenyl Succinate | 1450 | 30,000 mg/kg |
| Stearyl Citrate | 484 | GMP |
| Sucro Glycerides | 479 | 5000 mg/kg |
| Sucrose Acetate Isobutyrate | 444 | 500 mg/kg |
| Tragacanth Gum | 413 | GMP |
| Xanthan Gum | 415 | GMP |

## APPENDIX H

STABILISERS AND THICKENERS

| **INGREDIENT** | **INS #** | **MAXIMUM LEVEL** |
|---|---|---|
| Dioctyl Sodium Sulfosuccinate | 480 | 10 mg/kg |
| Glycerol Ester of wood rosin | 445 | 150 mg/kg |
| Polysorbates -20 | 432 | 50 mg/kg |
| -80 | 433 | 50 mg/kg |
| -40 | 434 | 50 mg/kg |
| -60 | 435 | 50 mg/kg |
| -65 | 436 | 50 mg/kg |
| Processed Eucheuma Seaweed | 407 a | GMP |
| Phosphates: | | |
| Di-Sodium Hydrogen | 339 ii | 500 mg/kg |
| Calcium Di-Hydrogen | 341 i | 500 mg/kg |
| Tetra Potassium Pyro - | 450 v | 500 mg/kg |
| Penta Potassium Tri - | 451 i | 500 mg/kg |
| Penta Sodium Tri - | 451 ii | 500 mg/kg |
| Calcium Poly - | 452 iv | 1000 mg/kg |
| Sodium Hexameta - (Sodium Polyphosphate Glassy) | 452 i | 1000 mg/kg |
| Carboxymethyl cellulose (CMC) | | GMP |

## APPENDIX I

ACIDITY REGULATORS (BUFERING AGENTS) AND OTHER SALTS

| **INGREDIENT** | **INS #** | **MAXIMUM LEVEL** |
|---|---|---|
| Calcium Acetate | 263 | GMP |
| Calcium Bicarbonate | 170 ii | GMP |
| Calcium Chloride | 509 | GMP |
| Calcium Citrate | 333 | GMP |
| Calcium Gluconate | 578 | GMP |
| Calcium Lactate | 327 | GMP |
| Calcium Phosphate | 341 | 3000 mg/kg |
| Di-Potassium Hydrogen Phosphate | 340 ii | GMP |
| Di- Sodium Hydrogen Phosphate | 339 ii | GMP |
| Magnesium Bicarbonate | 504 ii | GMP |
| Magnesium Carbonate | 504 i | GMP |
| Magnesium Chloride | 511 | GMP |
| Potassium Acetate | 261 I | GMP |
| Potassium Adipate | 357 | GMP |
| Potassium Bicarbonate | 501 ii | GMP |
| Potassium Chloride | 508 | GMP |
| Potassium Citrate | 332 | GMP |
| Potassium Phosphate | 340 ii | 1000 mg/kg |
| Potassium Sodium tartrate | 337 | 300 mg/kg |
| Sodium Acetate | 262 I | GMP |
| Sodium Adipate | 356 | GMP |
| Sodium Bicarbonate | 500 ii | GMP |
| Sodium Chloride | | GMP |
| Sodium Citrate | 331 | GMP |
| Sodium Phosphate | 339 | GMP |

## APPENDIX J

PRESERVATIVES

| INGREDIENT | INS # | MAXIMUM LEVEL |
|---|---|---|
| Benzoic Acid | 210 | 1000 mg/kg |
| Benzoate - Sodium | 211 | 1000 mg/kg |
| - Potassium | 212 | 1000 mg/kg |
| - Calcium | 213 | 1000 mg/kg |
| Sorbic Acid | 200 | 1500 mg/kg |
| Sorbate Acid - Sodium | 201 | 1500 mg/kg |
| - Potassium | 202 | 1500 mg/kg |
| - Calcium | 203 | 1500 mg/kg |
| Sulphur Dioxide | 220 | 115 mg/kg |
| Sodium Sulphite | 221 | 115 mg/kg |
| Sodium Hydrogen Sulphite | 222 | 115 mg/kg |
| Sodium Metabisulphite | 223 | 115 mg/kg |
| Potassium Metubisulphite | 224 | 115 mg/kg |
| Potassium Sulphite | 225 | 115 mg/kg |
| Potassium Hydrogen Sulphite | 228 | 115 mg/kg |
| Calcium Sulphite | 226 | 70 mg/kg |
| Calcium Hydrogen Sulphite | 227 | 70 mg/kg |
| Propyl-p-Hydroxybenzoate | 216 | 1000 mg/kg |
| Methyl-p-Hydroxybenzoate | 218 | 1000 mg/kg |
| Formic Acid | 236 | 100 mg/kg |
| Sodium Formate | 237 | 100 mg/kg |
| Calcium Formate | 238 | 100 mg/kg |

***NOTE:***

*(1) Maximum levels for Sodium, Potassium and Calcium benzoates are based on benzoic acid derived therefrom and expressed as such.*

*(2) Maximum levels for Sodium, Potassium and Calcium Sorbates are based on Sorbic acid derived therefrom and expressed as such.*

*(3) Maximum levels of Sulphite Salts are based on the levels of sulphur dioxide derived empirically therefrom and expressed as such.*

*(4) Maximum levels of formate salts are based on the formic acid derived therefrom and expressed as such.*

## APPENDIX K

ANTI-OXIDANTS

| INGREDIENT | INS # | MAXIMUM LEVEL |
|---|---|---|
| Ascorbic Acid (L-) | 300 | GMP |
| Ascorbate - Sodium | 301 | GMP |
| - Calcium | 302 | GMP |
| - Potassium | 303 | GMP |
| Ascorbyl Palmitate | 304 | 200 mg/kg |
| Ascorbyl Stearate | 305 | 200 mg/kg |
| Butylated Hydroxyanisole (BHA) | 320 | 2 mg/kg |
| Butylated Hydroxytoluene (BHT) | 321 | 200 mg/kg |
| Erythorbic Acid (Isoascobic acid) | 315 | GMP |
| ISO Propyl Citrate | 384 | GMP |
| Propyl Gallate | 310 | 200 mg/kg |
| Tertiary Butylhydroquinone (TBHQ) | 319 | 200 mg/kg |
| Calcium Di-Sodium EDTA | 385 | 100 mg/kg |
| Di-Sodium EDTA | 386 | 100 mg/kg |
| Mixed Tocopherols Concentrate | 306 | 200 mg/kg |
| Alpha – Tocopherol | 307 | 200 mg/kg |

## APPENDIX L

ANTI-FOAMING AGENTS

| INGREDIENT | INS # | MAXIMUM LEVEL |
|---|---|---|
| Polydimethl Siloxane | 900 a | 10 mg/kg |
| Methyl Phenyl Polys iloxane | 900 b | 10 mg/kg |

## APPENDIX M

FOAMING AGENTS

| **INGREDIENT** | **INS #** | **MAXIMUM LEVEL** |
|---|---|---|
| Enzyme modified Soy Protein In a carnier of Propylene Glycol | NIL | GMP |
| Hops Extracts ( flavour) | NIL | GMP |
| Licorice or glycrrhiza (flavour) | NIL | GMP |
| Quilla ia (soap bark) *(Quillaia Soponaria* Mol.) | 999 | 1000 mg/kg |
| Yucca (Joshua tree or Mohave) (flavour) | NIL | GMP |