Sub-Chapter XIII

OTHER ORGANIC COMPOUNDS

29.40 - Sugars, chemically pure, other than sucrose, lactose, maltose, glucose and fructose; sugar ethers, sugar acetals and sugar esters, and their salts, other than products of heading 29.37, 29.38 or 29.39.

(A) SUGARS, CHEMICALLY PURE

This heading covers **only chemically pure** sugars. The term "sugars" covers monosaccharides, disaccharides and oligosaccharides. Each saccharide unit must consist of at least four, but not more than eight, carbon atoms and, as a minimum, must contain a potential reducing carbonyl group (aldehydic or ketonic) **and** at least one asymmetric carbon atom bearing a hydroxyl group and a hydrogen atom. The heading **excludes** :

a) Sucrose, this, **even when chemically pure**, falls in **heading 17.01**.

b) Glucose and lactose; these, **even when chemically pure**, fall in **heading 17.02**.

c) Maltose which, **even when chemically pure**, falls in **heading 17.02**. Isomeric with sucrose. Crystalline mass. Used in medicine.

d) Fructose (laevulose) which, **even when chemically pure**, falls in **heading 17.02**. Isomeric with glucose. Yellowish crystals in the pure state. Used in medicine (for diabetic diets).

e) Aldol (**heading 29.12**) and acetoin (3-hydroxy-2-butanone) (**heading 29.14**), which, though they meet the criteria for being saccharide units, are not sugars.

The following are included among the chemically pure sugars falling under this heading :

(1) **Galactose**. Isomeric with glucose. Obtained by hydrolysing lactose. Found in pectin substances and mucilages. Crystalline when pure.

(2) **Sorbose** (sorbenose). Isomeric with glucose. White crystalline powder, very soluble in water. Used in the synthesis of ascorbic acid (vitamin C), and in the preparation of culture media.

(3) **Xylose** (wood sugar) ($C_5H_{10}O_5$). White crystals. Used in pharmacy.

(4) **Trehalose**, isomeric with sucrose. **Ribose** and **arabinose**, isomeric with xylose. **Raffinose** ($C_{18}H_{32}O_{16}$). **Fucose**, **rhamnose** ($C_6H_{12}O_5$), **digitoxose** ($C_6H_{12}O_4$) and other deoxy sugars. These sugars are all essentially laboratory products.

The sugars of this heading may be in the form of aqueous solutions.

(B) SUGAR ETHERS, SUGAR ACETALS AND SUGAR ESTERS, AND THEIR SALTS

Heading 29.40 also covers sugar ethers, sugar acetals and sugar esters, as well as their salts. Sugar acetals may be formed between any two hydroxy groups of the sugar, or at the anomeric carbon to give a glycoside. However, natural glycosides **are excluded (heading 29.38)**. Sugar ethers, acetals and esters which are constituent parts of products of headings 29.37, 29.38, 29.39 or any heading later than heading 29.40 are also **excluded** (see General Explanatory Note to this Chapter, Part (E)).

29.40

These products, which fall in the heading **whether or not they are chemically defined**, include :

(1) **Hydroxypropyl sucrose**. A sugar ether.

(2) **Phosphoric esters of sugars** (e.g., glucose and fructose phosphates) **and their salts** (e.g., their barium, potassium, etc. salts). They are crystalline or amorphous powders, and are used in organic synthesis.

(3) **Sucrose octa-acetate**. White hygroscopic powder. Used as an alcohol denaturant, in preparing adhesives, plasticisers and insecticides, in the paper industry and as a textile stiffener.

(4) **Sucrose mono-acetate**. Has surface-active properties.

(5) **Sucrose acetate isobutyrate**. Used as a modifying agent in varnishes.

(6) **Lactitol** (INN) (4-O-ß-D-galactopyranosyl-D-glucitol). Used as a sweetening agent.

(7) **Non-natural glycosides** (**other than** products of **heading 29.37, 29.38** or **29.39**) in which the glycosidic linkage is an acetal function formed by etherification at the anomeric carbon atom (e.g., α-methyl glucoside, tribenoside (INN)).

This heading, however, **does not cover** deliberate intermixtures of sugar ethers, sugar acetals, sugar esters or their salts, **nor does it cover** products which have been deliberately prepared or manufactured from starting materials in which the non-sugar components are mixtures, e.g., sugar esters made from fatty acids of heading 38.23. In addition, the heading **excludes** sugar anhydrides, thio sugars, amino sugars, uronic acids and other sugar derivatives, which generally are classifiable elsewhere in Chapter 29, according to their chemical structure.