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COUNCIL DIRECTIVE

of 25 July 1978

laying down specific criteria of purity for emulsifiers, stabilizers, thickeners and gelling agents for use in foodstuffs

(78/663/EEC)

(OJ L 223, 14.8.1978, p. 7)

Amended by:

	Official Journal		
	No	page	date
► <u>M1</u> Council Directive 82/504/EEC of 12 July 1982	L 230	35	5.8.1982
► <u>M2</u> Commission Directive 90/612/EEC of 26 October 1990	L 326	58	24.11.1990
► <u>M3</u> Commission Directive 92/4/EEC of 10 February 1992	L 55	96	29.2.1992

Corrected by:

- **C1** Corrigendum, OJ L 296, 21.10.1978, p. 50 (78/663)
- **C2** Corrigendum, OJ L 91, 10.4.1979, p. 7 (78/663)

▼B**COUNCIL DIRECTIVE****of 25 July 1978****laying down specific criteria of purity for emulsifiers, stabilizers,
thickeners and gelling agents for use in foodstuffs**

(78/663/EEC)

THE COUNCIL OF THE EUROPEAN COMMUNITIES,

Having regard to the Treaty establishing the European Economic Community,

Having regard to Council Directive 74/329/EEC of 18 June 1974 on the approximation of the laws of the Member States relating to emulsifiers, stabilizers, thickeners and gelling agents for use in foodstuffs ⁽¹⁾, as last amended by Directive 78/612/EEC ⁽²⁾, and in particular Article 7 (1) thereof,

Having regard to the proposal from the Commission,

Whereas under Article 6 of Directive 74/329/EEC emulsifiers, stabilizers, thickeners and gelling agents must satisfy specific criteria of purity established in accordance with Article 7 (1) of that Directive,

HAS ADOPTED THIS DIRECTIVE:

Article 1

The specific criteria of purity referred to in Article 6 (1) (b) of Directive 74/329/EEC are given in the Annex to this Directive.

▼M1*Article 2*

As regards the substances referred to in the Annex under E 477, Member States may, until 31 December 1984, authorize for use in foodstuffs a product containing not more than 4 % dimer and trimer of propane-1,2-diol.

▼B*Article 3*

Member States shall bring into force the laws, regulations and administrative provisions necessary to comply with this Directive not later than 18 months after the notification of this Directive. They shall forthwith inform the Commission thereof.

Article 4

This Directive is addressed to the Member States.

⁽¹⁾ OJ No L 189, 12. 7. 1974, p. 1.⁽²⁾ OJ No L 197, 22. 7. 1978, p. 22.

▼B

ANNEX

SPECIFIC CRITERIA OF PURITY FOR EMULSIFIERS, STABILIZERS, THICKENERS AND GELLING AGENTS FOR USE IN FOODSTUFFS**General observations**

- (a) Where interpretation of the criteria set out below requires the definition of certain technical details, reference should be made to the methods of analysis established pursuant to Article 7 (2) of Directive 74/329/EEC.
- (b) Unless otherwise stated, the quantities and percentages shall be calculated in terms of weight of the product as such.
- (c) The specific criteria of purity applicable to substances E 322, E 339 (i), (ii) and (iii), E 340 (i), (ii) and (iii) and E 341 (i) and (ii) are laid down by Council Directive 78/664/EEC of 25 July 1978 laying down specific criteria of purity for antioxidants which may be used in foodstuffs intended for human consumption⁽¹⁾. The regime applicable to hydrolysed lecithins is set out in the same Directive.

E 341 — (iii) Tricalcium orthophosphate

<i>Chemical description</i>	— tricalcium diorthophosphate; $\text{Ca}_3(\text{PO}_4)_2$, — hydroxyapatite; $\text{Ca}_5(\text{PO}_4)_3\text{OH}$.
<i>Appearance</i>	Impalpable white powder.
<i>Content</i>	Not less than 90 % expressed as $\text{Ca}_3(\text{PO}_4)_2$ after calcination at 800 ± 25 °C to constant weight.
<i>Volatile matter</i>	Not more than 10 % determined by calcination at 800 ± 25 °C to constant weight.
<i>Fluoride</i>	Not more than 50 mg/kg expressed as fluorine.

E 400 — Alginic acid

<i>Chemical description</i>	Linear glycuronoglycan consisting mainly of beta (1-4) linked D-mannuronic and alpha (1-4) linked L-guluronic acid units in pyranose ring form. Hydrophilic colloidal carbohydrate extracted by the use of dilute alkali from various species of brown seaweeds.
<i>Description</i>	Nearly odourless, tasteless, white to yellowish fibrous powder.
<i>Content</i>	Yields, on a volatile matter-free basis, not less than 20 % and not more than 23 % of carbon dioxide corresponding to not less than 91.0 % and not more than 104.5 % of alginic acid (equivalent weight 200).
<i>Ash</i>	Not more than 4 % on a volatile matter-free basis determined at 600 °C after drying at 105 °C for four hours.

▼M1

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<i>Volatile matter</i>	Not more than 15 % determined by drying at 105 °C for four hours.
<i>Acid-insoluble ash (insoluble in approximately 3 N hydrochloric acid)</i>	► M1 Not more than 2 %. ◀

⁽¹⁾ OJ No L 223, 14. 8. 1978, p. 30.

▼B**E 401 — Sodium alginate**

<i>Chemical name</i>	Sodium salt of alginic acid.
<i>Description</i>	Nearly odourless, tasteless white to yellowish fibrous or granular powder.
<i>Content</i>	Yields, on a volatile matter-free basis, not less than 18 % and not more than 21 % of carbon dioxide corresponding to not less than 90.8 % and not more than 106.0 % of sodium alginate (equivalent weight 222).
<i>Ash</i>	Not less than 18.0 % and not more than 27.0 % on a volatile matter-free basis determined at 600 °C after drying at 105 °C for four hours.

▼M1

▼B

Volatile matter Not more than 15 % determined by drying at 105 °C for four hours.

Acid-insoluble ash (insoluble in approximately 3 N hydrochloric acid) ►**M1** Not more than 2 %. ◀

E 402 — Potassium alginate

<i>Chemical name</i>	Potassium salt of alginic acid.
<i>Description</i>	Nearly odourless, tasteless white to yellowish fibrous or granular powder.
<i>Content</i>	Yields, on a volatile matter-free basis, not less than 16.5 % and not more than 19.5 % of carbon dioxide corresponding to not less than 89.2 % and not more than 105.5 % of potassium alginate (equivalent weight 238).
<i>Ash</i>	Not less than 23 % and not more than 32 % on a volatile matter-free basis determined at 600 °C after drying at 105 °C for four hours.

▼M1

▼B

Volatile matter Not more than 15 % determined by drying at 105 °C for four hours.

Acid-insoluble ash (insoluble in approximately 3 N hydrochloric acid) ►**M1** Not more than 2 %. ◀

E 403 — Ammonium alginate

<i>Chemical name</i>	Ammonium salt of alginic acid.
<i>Description</i>	White to yellowish fibrous or granular powder.
<i>Content</i>	Yields, on a volatile matter-free basis, not less than 18 % and not more than 21 % of carbon dioxide corresponding to not less than 88.7 % and not more than 103.6 % of ammonium alginate (equivalent weight 217).
<i>Ash</i>	Not more than 4% on a volatile matter-free basis determined at 600 °C after drying at 105 °C for four hours

▼M1

▼B

Volatile matter Not more than 15% determined by drying at 105 °C for four hours.

▼B

Acid-insoluble ash (insoluble in approximately 3 N hydrochloric acid) ►**M1** Not more than 2 %. ◀

E 404 — Calcium alginate

<i>Chemical name</i>	Calcium salt of alginic acid.
<i>Description</i>	Nearly odourless, tasteless white to yellowish fibrous or granular powder.
<i>Content</i>	Yields, on a volatile matter-free basis, not less than 18 % and not more than 21 % of carbon dioxide corresponding to not less than 89.6 % and not more than 104.5 % of calcium alginate (equivalent weight 219).
<i>Ash</i>	Not less than 15 % and not more than 24 % on a volatile matter-free basis determined at 600 °C after drying at 105 °C for four hours.

▼M1**▼B**

<i>Volatile matter</i>	Not more than 15 % determined by drying at 105 °C for four hours.
<i>Acid-insoluble ash (insoluble in approximately 3 N hydrochloric acid)</i>	► M1 Not more than 2 %. ◀

E 405 — Propane-1,2-diol alginate

<i>Chemical description</i>	Propane-1,2-diol ester of alginic acid; varies in composition according to its degree of esterification and the percentage of free and neutralized carboxyl groups in the molecule.
<i>Description</i>	Nearly odourless and tasteless, white to yellowish fibrous or granular powder.
<i>Content</i>	Yields, on a volatile matter-free basis, not less than 16 % and not more than 20 % of carbon dioxide.
<i>Ash</i>	Not more than 10 % on a volatile matter-free basis determined at 600 °C after drying at 105 °C for four hours.
<i>Total propane-1,2-diol content</i>	Not less than 15 % and not more than 36 %.
<i>Free propane-1,2-diol content</i>	Not more than 12 %.

▼M1**▼B**

<i>Volatile matter</i>	Not more than 20 % determined by drying at 105 °C for four hours.
<i>Acid-insoluble ash (insoluble in approximately 3 N hydrochloric acid)</i>	► M1 Not more than 2 %. ◀

E 406 — Agar

<i>Chemical description</i>	A hydrophilic colloidal polygalactoside, about 90 % of the galactose molecules being of the D-form and 10 % of the L-form. On about every tenth D-galactopyranose unit one of the hydroxyl groups is esterified with sulphuric acid which is neutralized by calcium, magnesium, potassium or sodium. It is extracted from certain marine algae of the families <i>Gelidiaceae</i> and <i>Sphaerococcaceae</i> and related red algae of the class <i>Rhodophyceae</i> .
<i>Description</i>	It occurs as white to pale yellow powder, fibres or flakes and is either odourless, or has a slight characteristic odour and a mucilaginous taste.

▼B

<i>Ash</i>	Not more than 6.5 % determined at 550 °C on a volatile matter-free basis.
<i>Acid-insoluble ash (insoluble in approximately 3 N hydrochloric acid)</i>	Not more than 0.5 % determined at 550 °C on a volatile matter-free basis.
<i>Gelatin and other proteins</i>	Dissolve about 1 g of agar in 100 ml of boiling water and allow to cool to about 50 °C. To 5 ml of the solution add 5 ml of trinitrophenol solution (1 g of anhydrous trinitrophenol/100 ml of hot water). No turbidity appears within 10 minutes.
<i>Insoluble matter (in hot water)</i>	Not more than 1 %.
<i>Volatile matter</i>	Not more than 20 % determined by drying at 105 °C for five hours.
<i>Starch and dextrans</i>	Boil 100 mg of agar in 100 ml of water. Cool and add a few drops of iodine solution (14 g I ₂ in a solution of 36 g KI in 100 ml H ₂ O, add three drops of HCL and dilute to 1 000 ml). No blue or red colour is produced.
<i>Water absorption</i>	Place 5 g of agar in a 100 ml graduated cylinder, fill to the mark with water, mix and allow to stand at about 25 °C for 24 hours. Pour the contents of the cylinder through moistened glass wool, allowing the water to drain into a second 100 ml graduated cylinder. Not more than 75 ml of water is obtained.

E 407 — Carrageenan

<i>Chemical description</i>	Carrageenan is obtained by aqueous extraction of seaweeds of <i>Gigartinaceae</i> , <i>Solieriaceae</i> , <i>Hypneaceae</i> and <i>Furcellariaceae</i> , families of the class <i>Rhodophyceae</i> (red seaweeds). No organic precipitants shall be used other than methanol, ethanol and isopropanol. Carrageenan consists chiefly of the potassium, sodium, magnesium and calcium salts of polysaccharide sulphate esters which, on hydrolysis, yield galactose and 3,6-anhydrogalactose. Carrageenan shall not be hydrolysed or otherwise chemically degraded.
<i>Description</i>	Yellowish to colourless, coarse to fine powder which is practically odourless and has a mucilaginous taste.
<i>Volatile matter</i>	Not more than 12 % determined by drying at 105 °C for four hours.
<i>Sulphate</i>	Not less than 15 % and not more than 40 % on a volatile matter-free basis, expressed as SO ₄ .

▼M2

<i>Acid-insoluble ash (insoluble in 10 % w/v hydrochloric acid)</i>	Not more than 1 % dry matter.
<i>Acid-insoluble matter (insoluble in 1 % v/v sulphuric acid)</i>	Not more than 2 % dry matter.

▼B

<i>Ash</i>	Not less than 15 % and not more than 40 % determined at 550 °C on a volatile matter-free basis.
<i>Methanol, ethanol, isopropanol content</i>	Not more than 1 % singly or in combination.
<i>Viscosity of a 1.5 % solution at 75 °C</i>	Not less than five centipoises.

E 410 — Locust bean gum

<i>Chemical description</i>	Consists mainly of a high molecular weight hydrocolloidal polysaccharide, composed of galactopyranose and mannopyranose units combined through glycosidic linkages, which may be described chemically as galactomannan.
<i>Description</i>	Locust bean gum is the ground endosperm of the seeds of the carob tree, <i>Ceratonia siliqua</i> (L.) Taub. (Fam. <i>Leguminosae</i>). It is a white to yellowish-white, nearly odourless powder.

▼B

<i>Galactomannan content</i>	Not less than 75 %.
<i>Insoluble matter (in 0.4 N sulphuric acid)</i>	Not more than 4 % after digestion for six hours.
<i>Ash</i>	Not more than 1.2 % determined at 800 °C.
<i>Volatile matter</i>	Not more than 14 % determined by drying to constant weight at 102 to 105 °C (three to five hours).
<i>Protein (N × 6.25)</i>	Not more than 7 %.

E 412 — Guar gum

<i>Chemical description</i>	Consists mainly of a high molecular weight hydrocolloidal polysaccharide composed of galactopyranose and mannopyranose units combined through glycosidic linkages, which may be described chemically as galactomannan.
<i>Description</i>	Guar gum is the ground endosperm of the seeds of the guar plant, <i>Cyamopsis tetragonolobus</i> (L.) Taub. (Fam. <i>Leguminosae</i>). It is a white to yellowish-white, nearly odourless powder.
<i>Galactomannan content</i>	Not less than 75 %.
<i>Insoluble matter (in 0.4 N sulphuric acid)</i>	Not more than 4 % after digestion for six hours.
<i>Ash</i>	Not more than 1.5 % determined at 800 °C.
<i>Volatile matter</i>	Not more than 14 % determined by drying to constant weight at 102 to 105 °C (three to five hours).
<i>Protein (N × 6.25)</i>	Not more than 7 %.

E 413 — Tragacanth

<i>Chemical description</i>	Consists mainly of high molecular weight polysaccharides composed of galacto-arabans and acidic polysaccharides containing galacturonic acid groups.
<i>Description</i>	Tragacanth is a dried gummy exudate obtained from <i>Astragalus gummifer</i> Labillardiere, or other Asiatic species of <i>Astragalus</i> (Fam. <i>Leguminosae</i>). <i>Unground tragacanth</i> occurs as flattened, lamellated, frequently curved fragments or straight or spirally twisted linear pieces from 0.5 to 2.5 mm in thickness. It is white to pale yellow in colour. It is odourless and has an insipid, mucilaginous taste. <i>Powdered tragacanth</i> is white to yellowish-white in colour.
<i>Viscosity of a 1 % solution at 25 °C</i>	Not less than 250 centipoises.
<i>Ash</i>	Not more than 3.5 % determined at 550 °C.
<i>Acid-insoluble ash (insoluble in approximately 3 N hydrochloric acid)</i>	Not more than 0.5 % determined at 550 °C.
<i>Karaya gum</i>	Boil 1 g with 20 ml of water until a mucilage is formed. Add 5 ml of hydrochloric acid and again boil the mixture for five minutes. No permanent pink or red colour develops.

E 414 — Acacia

<i>Chemical description</i>	Consists mainly of high molecular weight polysaccharides and their calcium, potassium and magnesium salts, which on hydrolysis yield arabinose, galactose, rhamnose and glucuronic acid. It is obtained as a dried gummy exudate from the stems and branches of <i>Acacia senegal</i> (L) Willd. or of related species of <i>Acacia</i> (Fam. <i>Leguminosae</i>).
<i>Description</i>	Unground acacia occurs as white, yellowish-white or pale pinkish spheroidal tears of varying sizes or in angular fragments. It is also available commercially in the form of white or yellowish-white flakes, granules or powder.

▼B

<i>Ash</i>	Not more than 4 % determined at 550 °C.
<i>Acid-insoluble ash (insoluble in approximately 3 N hydrochloric acid)</i>	Not more than 0.5 % determined at 550 °C.
<i>Insoluble matter (in approximately 3 N hydrochloric acid)</i>	Not more than 1 %.
<i>Volatile matter</i>	Not more than 15 % determined by drying at 105 °C for five hours.
<i>Starch or dextrin</i>	Boil a 1 in 50 solution of the gum and cool. To 5 ml add one drop of iodine solution (14 g of iodine in a solution of 36 g of potassium iodide in 100 ml of water, add three drops of hydrochloric acid and dilute to 1 000 ml). No bluish or reddish colour is produced.
<i>Tannin</i>	To 10 ml of a 1 in 50 solution add about 0.1 ml of ferric chloride solution (9 g FeCl ₃ , 6H ₂ O made up to 100 ml with water). No blackish colouration or blackish precipitate is formed.

▼M1**E 415 — Xanthan gum**

<i>Chemical description</i>	Xanthan gum is a high molecular weight polysaccharide gum produced by pure-culture fermentation of a carbohydrate with <i>Xanthomonas campestris</i> , purified by recovery with ethanol or isopropanol, dried and milled. It contains D-glucose and D-mannose as the dominant hexose units, along with D-glucuronic acid and pyruvic acid, and is prepared as the sodium, potassium or calcium salt. Its solutions are neutral.
<i>Description</i>	Cream-coloured powder.
<i>Content</i>	Xanthan gum yields, on a volatile matter-free basis, not less than 4.2 % and not more than 5.0 % of carbon dioxide.
<i>Volatile matter</i>	Not more than 15 % determined by drying at 105 °C for 2 1/2 hours.
<i>Ash</i>	Not more than 16% on a volatile-matter-free basis determined at 600 °C after drying at 105 °C for four hours.
<i>Pyruvic acid</i>	Not less than 1.5 %.
<i>Nitrogen</i>	Not more than 1.5 %.
<i>Isopropanol</i>	Not more than 750 mg/kg.
<i>Microbiological criteria</i>	Viable cells of <i>Xanthomonas campestris</i> shall be absent.

▼B**E 420 — (i) Sorbitol**

<i>Chemical name</i>	D-sorbitol.
<i>Description</i>	White hygroscopic crystalline powder, flakes or granules, having a sweet taste.
<i>Content</i>	Sorbitol contains not less than 98 % of glycitols and not less than 91 % of D-sorbitol, on a dry-matter basis in each case. Glycitols are compounds with the structural formula CH ₂ OH (CHOH) _n CH ₂ OH where 'n' is an integer. That part of the product which is not D-sorbitol is composed mainly of mannitol, together with small quantities of other glycitols, where n ≤ 4, and minor quantities of hydrogenated oligosaccharides.
<i>Water</i>	Not more than 1 % (Karl Fischer).
<i>Reducing sugars</i>	Not more than 0.3 % on a dryweight basis, expressed as dextrose.

▼ B

<i>Total sugars</i>	Not more than 1 % on a dryweight basis, expressed as dextrose.
<i>Sulphated ash</i>	Not more than 0.1 % at 800 ± 25 °C on a dryweight basis.
<i>Sulphate</i>	Not more than 0.01 % on a dryweight basis, expressed as SO ₄ .
<i>Chloride</i>	Not more than 0.005 % on a dryweight basis, expressed as Cl.
<i>Nickel</i>	Not more than 2 mg/kg, expressed as Ni.

E 420 — (ii) Sorbitol syrup

<i>Description</i>	Clear, colourless and sweet-tasting aqueous solution of sorbitol and hydrogenated oligosaccharides. That part of the product which is not D-sorbitol is composed mainly of hydrogenated oligosaccharides formed by the hydrogenation of glucose syrup used as raw material (in which case the syrup is non-crystallizing) or mannitol. Minor quantities of glycitols where $n \leq 4$ may be present. Glycitols are compounds with the structural formula CH ₂ OH (CHOH) _n CH ₂ OH, where 'n' is an integer.
<i>Content</i>	Not less than 69 % total solids and not less than 50 % of D-sorbitol.
<i>Reducing sugars</i>	Not more than 0.3 % on a dryweight basis, expressed as dextrose.
<i>Sulphated ash</i>	Not more than 0.1 % on a dryweight basis (after ignition at 800 ± 25 °C).
<i>Sulphate</i>	Not more than 0.01 % on a dryweight basis, expressed as SO ₄ .
<i>Chloride</i>	Not more than 0.005 % on a dryweight basis, expressed as Cl.
<i>Nickel</i>	Not more than 2 mg/kg, expressed as Ni.

E 421 — Mannitol

<i>Chemical name</i>	D-mannitol.
<i>Description</i>	White crystalline solid which is odourless and has a sweet taste.
<i>Content</i>	Not less than 98 % of D-mannitol (C ₆ H ₁₄ O ₆) on a volatile matter-free basis.
<i>Melting range</i>	165 to 169 °C.
<i>Specific rotation</i> [α] _D ²⁵	Not less than + 23.0° and not more than + 24.3°.
<i>Volatile matter</i>	Not more than 0.3 % determined by drying at 105 °C for four hours.
<i>Reducing sugars</i>	Not more than 0.05 %, expressed as dextrose.
<i>Sulphate</i>	Not more than 0.01 %, expressed as SO ₄ .
<i>Chloride</i>	Not more than 0.007 %, expressed as Cl.
<i>Ash</i>	Not more than 0.1 % determined at 800 ± 25 °C.
<i>Nickel</i>	Not more than 2 mg/kg, expressed as Ni.

E 422 — Glycerol

<i>Description</i>	Clear, colourless hygroscopic syrupy liquid with a sweet taste accompanied by a sensation of heat to the tongue.
<i>Content</i>	Not less than 98 % of glycerol (C ₃ H ₈ O ₃).
<i>Specific gravity (25/25 °C)</i>	Not less than 1.257.
<i>Refractive index</i> [n] _D ²⁰	1.471 to 1.474.

▼B

<i>Acrolein, glucose and ammonium compounds</i>	Heat a mixture of 5 ml of glycerol and 5 ml of potassium hydroxide solution (1 in 10) at 60 °C for five minutes. It neither becomes yellow nor emits an odour of ammonia.
<i>Butanetriols</i>	Not more than 0.2 %.
<i>Chlorinated compounds (expressed as Cl)</i>	Not more than 0.003 %.
<i>Fatty acids and esters</i>	Not more than 0.1 % calculated as butyric acid.
<i>Sulphated ash</i>	Not more than 0.01 % determined at 800 ± 25 °C.

E 440 (a) — Pectin

<i>Chemical description</i>	Pectin consists mainly of the partial methyl esters of polygalacturonic acid and their sodium, potassium, calcium and ammonium salts. Pectin is obtained by aqueous extraction of appropriate edible plant material, usually citrus fruits or apples. No organic precipitants shall be used other than methanol, ethanol and isopropanol.
<i>Description</i>	White, light yellow, light grey or light brown powder.
<i>Galacturonic acid</i>	Not less than 65 % calculated on an ash and volatile matter-free basis after washing with acid and alcohol.

▼C2

<i>Volatile matter</i>	Not more than 12 % determined by drying at 105 °C for two hours.
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<i>Acid-insoluble ash (insoluble in approximately 3 N hydrochloric acid)</i>	Not more than 1 %.
<i>Free methanol, ethanol and isopropanol content</i>	Not more than 1 %, singly or in combination, on a volatile matter-free basis.
<i>Sulphur dioxide residue</i>	Not more than 50 mg/kg on a volatile matter-free basis.
<i>Nitrogen content</i>	Not more than 0.5 % determined after washing with acid and alcohol (kjeldahl).

E 440 (b) — Amidated pectin

<i>Chemical description</i>	Amidated pectin consists mainly of the partial methyl esters and amides of polygalacturonic acid and their ammonium, sodium, potassium and calcium salts. It is obtained by aqueous extraction of appropriate edible plant material, usually citrus fruits or apples and treatment with ammonia under alkaline conditions. No organic precipitants shall be used other than methanol, ethanol and isopropanol.
<i>Description</i>	White, light yellow, light grey or light brown powder.
<i>Degree of amidation</i>	Not more than 25 % of total carboxyl groups.
<i>Galacturonic acid</i>	Not less than 65 % calculated on an ash and volatile matter-free basis determined after washing with acid and alcohol.

▼C2

<i>Volatile matter</i>	Not more than 12 % determined by drying at 105 °C for two hours.
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<i>Acid-insoluble ash (insoluble in approximately 3 N hydrochloric acid)</i>	Not more than 1 %.
<i>Free methanol, ethanol and isopropanol content</i>	Not more than 1 %, singly or in combination, on a volatile matter-free basis.
<i>Sulphur dioxide residue</i>	Not more than 50 mg/kg on a volatile matter-free basis.
<i>Nitrogen content</i>	Not more than 2.5 % after washing with acid and alcohol (kjeldahl).

▼B**E 450 (a) — (i) Disodium dihydrogen diphosphate**

<i>Description</i>	White powder or grains.
<i>Content</i>	Not less than 95.0 % of $\text{Na}_2\text{H}_2\text{P}_2\text{O}_7$.
<i>Content in P_2O_5</i>	Not less than 63.0 % and not more than 64.0 %.
<i>Volatile matter</i>	Not more than 0.5 % determined by drying at 105 °C for four hours.
<i>pH of 1 % solution</i>	Not less than 3.7 and not more than 4.4.
<i>Water insoluble matter</i>	Not more than 0.6 %.
<i>Fluoride</i>	Not more than 10 mg/kg expressed as fluorine.

E 450 (a) — (ii) Trisodium diphosphate

<i>Description</i>	White powder or grains. Occurs anhydrous or as a monohydrate.
<i>Content</i>	Not less than 95.0 % of $\text{Na}_3\text{HP}_2\text{O}_7$ or of $\text{Na}_3\text{HP}_2\text{O}_7 \cdot \text{H}_2\text{O}$.
<i>Content in P_2O_5</i>	Not less than 57.5 % and not more than 58.5 % for the anhydrous salt. Not less than 53.6 % and not more than 54.6 % for the monohydrate.
<i>pH of a 1 % solution</i>	Not less than 6.7 and not more than 7.3.
<i>Volatile matter</i>	Not more than 0.5 % determined by drying at 105 °C for four hours.
<i>Water insoluble matter</i>	Not more than 0.2 %.
<i>Fluoride</i>	Not more than 10 mg/kg expressed as fluorine.

E 450 (a) — (iii) Tetrasodium diphosphate

<i>Description</i>	White, crystalline or granular powder. Occurs anhydrous or as a decahydrate.
<i>Content</i>	Not less than 95.0 % of $\text{Na}_4\text{P}_2\text{O}_7$ or of $\text{Na}_4\text{P}_2\text{O}_7 \cdot 10\text{H}_2\text{O}$.
<i>Content in P_2O_5</i>	Not less than 52.5 % and not more than 54.0 % for the anhydrous salt. Not less than 31.5 % and not more than 32.5 % for the decahydrate.
<i>Loss on ignition</i>	Not more than 0.5 % for the anhydrous salt, not less than 38 % and not more than 42 % for the decahydrate, in both cases determined after drying at 105 °C for four hours, followed by ignition at 550 °C for 30 minutes.
<i>pH of a 1 % solution</i>	Not less than 9.9 and not more than 10.7.
<i>Water insoluble matter</i>	Not more than 0.2 %.
<i>Fluoride</i>	Not more than 10 mg/kg expressed as fluorine.

E 450 (a) — (iv) Tetrapotassium diphosphate

<i>Description</i>	Colourless crystals or white, very hygroscopic powder.
<i>Content</i>	Not less than 95.0 % of $\text{K}_4\text{P}_2\text{O}_7$.
<i>Content in P_2O_5</i>	Not less than 42.0 % and not more than 43.7 %.
<i>Loss on ignition</i>	Not more than 2 % after drying at 105 °C for four hours followed by ignition at 550 °C for 30 minutes.

▼B

<i>pH of a 1 % solution</i>	Not less than 10.0 and not more than 10.7.
<i>Water insoluble matter</i>	Not more than 0.2 %.
<i>Fluoride (expressed as F)</i>	Not more than 10 mg/kg.

E 450 (b) — (i) Pentasodium triphosphate

<i>Description</i>	White, slightly hygroscopic granules or powder. Occurs anhydrous or as a hexahydrate.
<i>Content</i>	Not less than 85.0 % of $\text{Na}_5\text{P}_3\text{O}_{10}$ or of $\text{Na}_5\text{P}_3\text{O}_{10} \cdot 6\text{H}_2\text{O}$, the remainder being principally other sodium phosphates (E 450).
<i>Content in P_2O_5</i>	Not less than 56.0 % and not more than 58.0 % for the anhydrous salt. Not less than 43.0 % and not more than 45.0 % for the hexahydrate.
<i>Loss on ignition</i>	Not more than 0.5 % for the anhydrous salt and not more than 23.5 % for the hexahydrate, in both cases determined after drying at 105 °C for four hours followed by ignition at 550 °C for 30 minutes.
<i>pH of a 1 % solution</i>	Not less than 9.3 and not more than 10.1.
<i>Water insoluble matter</i>	Not more than 0.2 %.
<i>Fluoride (expressed as F)</i>	Not more than 10 mg/kg.

E 450 (b) — (ii) Pentapotassium triphosphate

<i>Description</i>	White, very hygroscopic powder.
<i>Content</i>	Not less than 85.0 % of $\text{K}_5\text{P}_3\text{O}_{10}$, the remainder being principally other potassium phosphates (E 450).
<i>Content in P_2O_5</i>	Not less than 46.5 % and not more than 48.0 %.
<i>Loss on ignition</i>	Not more than 0.5 % calculated on the P_2O_5 content after drying at 105 °C for four hours, followed by ignition at 550 °C for 30 minutes.
<i>pH of a 1 % solution</i>	Not less than 9.3 and not more than 10.1.
<i>Water insoluble matter</i>	Not more than 2 %.
<i>Fluoride (expressed as F)</i>	Not more than 10 mg/kg.

E 450 (c) — (i) Sodium polyphosphates

<i>Chemical description</i>	Heterogeneous mixtures of sodium salts of linear condensed polyphosphoric acids of general formula $\text{H}_{(n+2)}\text{P}_n\text{O}_{(3n+1)}$ where 'n' is not less than 2.
<i>Description</i>	Fine white powders or crystals or colourless glassy platelets.
<i>Content in P_2O_5</i>	Not less than 59.5 % and not more than 70.0 %, calculated on the ignited basis.
<i>Loss on ignition</i>	Not more than 0.5 % after drying at 105 °C for four hours followed by ignition at 550 °C for 30 minutes.
<i>pH of a 1 % solution</i>	Not less than 3.6 and not more than 9.0.
<i>Water insoluble matter</i>	Not more than 0.2 %.
<i>Fluoride</i>	Not more than 10 mg/kg expressed as fluorine.
<i>Cyclic phosphates</i>	Not more than 8 %.

E 450 (c) — (ii) Potassium polyphosphates

<i>Chemical description</i>	Heterogeneous mixtures of potassium salts of linear condensed polyphosphoric acids of general formula $\text{H}_{(n+2)}\text{P}_n\text{O}_{(3n+1)}$ where 'n' is not less than 2.
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▼ B

<i>Description</i>	Fine white powders or crystals or colourless glassy platelets.
<i>Content in P₂O₅</i>	Not less than 53.5 % and not more than 61.5 %, calculated on the ignited basis.
<i>Loss on ignition</i>	Not more than 2 % after drying at 105 °C for four hours followed by ignition at 550 °C for 30 minutes.
<i>pH of a 1 % solution</i>	Not more than 7.8 (1).
<i>Water insoluble matter</i>	Not more than 0.2 % (1).
<i>Fluoride</i>	Not more than 10 mg/kg expressed as fluoride.
<i>Cyclic phosphates</i>	Not more than 8 %.

► M1 E 460 — (i) ◀ Microcrystalline cellulose

<i>Chemical description</i>	Microcrystalline cellulose is purified partially depolymerized cellulose prepared by acid hydrolysis of alpha-cellulose obtained directly from fibrous plant material. It has a molecular weight of about 36 000.
<i>Description</i>	A fine white or almost white odourless powder.
<i>Volatile matter</i>	Not more than 5 % determined by drying to constant weight at 105 °C.
<i>pH</i>	Shake about 5 g with 40 ml of carbon dioxide-free water for 20 minutes and centrifuge. The pH of the supernatant liquid is between 5.5 and 7.
<i>Sulphated ash</i>	Not more than 0.1 % determined at 800 ± 25 °C.
<i>Water soluble substances</i>	Not more than 0.16 %.
<i>Diethyl ether extractable matter</i>	Not more than 200 mg/kg.
<i>Chloride</i>	Not more than 350 mg/kg expressed as Cl.
<i>Sulphate</i>	Not more than 600 mg/kg expressed as SO ₄ .

▼ M1**E 460 — (ii) Powdered cellulose**

<i>Chemical description</i>	Powdered cellulose is purified mechanically disintegrated cellulose prepared by processing alpha-cellulose obtained directly from fibrous plant material. It has a molecular weight of 1.6 × 10 ⁵ or greater.
<i>Description</i>	A white, odourless powder.
<i>Content</i>	Not less than 92 % (C ₁₂ H ₂₀ O ₁₀) _n .
<i>Volatile matter</i>	Not more than 7 % determined by drying at 105 °C for three hours.
<i>pH</i>	Shake about 5 g with 40 ml of carbon-dioxide-free water for 20 minutes and centrifuge. The pH of the supernatant liquid is between 5.0 and 7.5.
<i>Sulphated ash</i>	Not more than 0.3 % determined at 800 ± 25 °C.
<i>Water-soluble substances</i>	Not more than 1 %.

▼ B**E 461 — Methylcellulose**

<i>Chemical description</i>	Methylcellulose is cellulose obtained directly from fibrous plant material and partially etherified with methyl groups.
<i>Description</i>	Slightly hygroscopic white or slightly yellowish or greyish-odourless and tasteless, granular or fibrous powder.

▼ **B**

<i>Chemical formula</i>	The polymers contain substituted anhydroglucose units with the following general formula: $C_6H_7O_2 (OR_1) (OR_2) (OR_3)$ where R_1, R_2, R_3 each may be — H, — CH_3 , or — $CH_2 CH_2 OH$.
<i>Molecular weight</i>	From about 20 000 to 380 000.
<i>Content of substituted groups</i>	Not less than 25 % and not more than 33 % of methoxyl groups ($-OCH_3$). Not more than 5 % of hydroxyethoxyl groups ($-OCH_2CH_2OH$).
<i>Volatile matter</i>	Not more than 10 % determined by drying to constant weight at 105 °C.
<i>Sulphated ash</i>	Not more than 1.5 % determined at 800 ± 25 °C.
<i>pH of a 1 % solution</i>	Not less than 5 and not more than 8.

E 463 — Hydroxypropylcellulose

<i>Chemical description</i>	Hydroxypropylcellulose is cellulose obtained directly from fibrous plant material and partially etherified with hydroxypropyl groups.
<i>Description</i>	Slightly hygroscopic white or slightly yellowish or greyish odourless and tasteless, granular or fibrous powder.
<i>Chemical formula</i>	The polymers contain substituted anhydroglucose units with the following general formula: $C_6H_7O_2 (OR_1) (OR_2) (OR_3)$ where R_1, R_2, R_3 each may be any one of the following: — H, — $CH_2CHOHCH_3$, — $CH_2CHO (CH_2CHOHCH_3) CH_3$, — $CH_2CHO [CH_2CHO (CH_2CHOHCH_3) CH_3] CH_3$.
<i>Molecular weight</i>	From about 30 000 to 1 000 000.
<i>Content of substituted groups</i>	Not more than 80.5 % of hydroxypropoxyl groups ($-OCH_2CHOHCH_3$) on a volatile matter-free basis, equivalent to not more than 4.6 hydroxypropyl groups per anhydroglucose unit.
<i>pH of a 1 % solution</i>	Not less than 5.0 and not more than 8.0.
<i>Volatile matter</i>	Not more than 10 % determined by drying to constant weight at 105 °C.
<i>Sulphated ash</i>	Not more than 0.5 % determined at 800 ± 25 °C.

E 464 — Hydroxypropylmethylcellulose

<i>Chemical description</i>	Hydroxypropylmethylcellulose is cellulose obtained directly from fibrous plant material and partially etherified with methyl groups and containing a small degree of hydroxypropyl substitution.
<i>Description</i>	Slightly hygroscopic white or slightly yellowish or greyish odourless and tasteless, granular or fibrous powder.
<i>Chemical formula</i>	The polymers contain substituted anhydroglucose units with the following general formula: $C_6H_7O_2 (OR_1) (OR_2) (OR_3)$ where R_1, R_2 and R_3 each may be any one of the following: — H, — CH_3 , — $CH_2CHOHCH_3$,

▼ **B**

	— CH ₂ CHO (CH ₂ CHOHCH ₃) CH ₃ , — CH ₂ CHO [CH ₂ CHO (CH ₂ CHOHCH ₃)CH ₃] CH ₃ .
<i>Molecular weight</i>	From about 13 000 to 200 000.
<i>Content of substituted groups</i>	Not less than 19 % and not more than 30 % of methoxyl groups (-OCH ₃) and not less than 3 % and not more than 12 % hydroxypropoxyl groups (-OCH ₂ CHOHCH ₃) on a volatile matter-free basis.
<i>pH of a 1 % solution</i>	Not less than 5.0 and not more than 8.0.
<i>Volatile matter</i>	Not more than 10 % determined by drying to constant weight at 105 °C.
<i>Sulphated ash</i>	Not more than 1.5 % for products with viscosities greater than 50 cP and not more than 3.0 % for products with viscosities of 50 cP or less, determined at 800 ± 25 °C.

E 465 — Ethylmethylcellulose

<i>Chemical description</i>	Ethylmethylcellulose is cellulose obtained directly from fibrous plant material and partially etherified with methyl and ethyl groups.
<i>Description</i>	Slightly hygroscopic white or slightly yellowish or greyish odourless and tasteless, granular or fibrous powder.
<i>Chemical formula</i>	The polymers contain substituted anhydroglucose units with the following general formula: C ₆ H ₇ O ₂ (OR ₁) (OR ₂) (OR ₃) where R ₁ , R ₂ and R ₃ each may be any one of the following: — H, — CH ₃ , — CH ₂ CH ₃ .
<i>Molecular weight</i>	From about 30 000 to 40 000.
<i>Content of substituted groups</i>	Not less than 14.5 % and not more than 19.0 % of ethoxyl groups (-OC ₂ H ₅) and not less than 3.5 % and not more than 6.5% of methoxyl groups (-OCH ₃) on a volatile matter-free basis.
<i>Volatile matter</i>	Fibrous form: not more than 15 %. Powdered form: not more than 10 %, determined by drying to constant weight at 105 °C in each case.
<i>Sulphated ash</i>	Not more than 0.6 % determined at 800 ± 25 °C.
<i>pH of a 1 % solution</i>	Not less than 5 and not more than 8.

E 466 — Carboxymethylcellulose

<i>Chemical description</i>	Carboxymethylcellulose is the partial sodium salt of a carboxymethyl ether of cellulose, the cellulose being obtained directly from fibrous plant material.
<i>Description</i>	Slightly hygroscopic white or slightly yellowish or greyish odourless and tasteless, granular or fibrous powder.
<i>Chemical formula</i>	The polymers contain substituted anhydroglucose units with the following general formula: C ₆ H ₇ O ₂ (OR ₁) (OR ₂) (OR ₃) where R ₁ , R ₂ and R ₃ each may be any one of the following: — H, — CH ₂ COONa, — CH ₂ COOH.
<i>Molecular weight</i>	► M2 Higher than approximately 17 000 (degree of polymerization approximately 100). ◀
<i>Content</i>	Not less than 99.5 % of carboxymethylcellulose calculated on a volatile matter-free basis.

▼B

<i>Sodium chloride and sodium glycolate</i>	Not more than 0.5 % total, and not more than 0.4 % of sodium glycolate.
<i>Degree of substitution</i>	Not less than 0.2 and not more than 1.0 carboxymethyl groups (-CH ₂ COOH) per anhydroglucose unit.
<i>Sodium</i>	Not more than 9.7 % on a volatile matter-free basis.
<i>Volatile matter</i>	Not more than 12 % determined by drying to constant weight at 105 °C.
<i>pH of a 1 % solution</i>	Not less than 6 and not more than 8.5.

E 470 — Sodium, potassium and calcium salts of fatty acids

<i>Chemical description</i>	Sodium, potassium and calcium salts of fatty acids occurring in food oils and fats, these salts being obtained either from edible fats or from distilled food fatty acids.
<i>Description</i>	White or creamy white light powders, flakes, or semi-solids.
<i>Unsatifiable matter</i>	Not more than 2 %.
<i>Free fatty acids</i>	Not more than 3 % estimated as oleic acid.
<i>Total glycerol (combined and free)</i>	Not more than 10 %.
<i>Free alkali</i>	Not more than 0.1 % expressed as NaOH.
<i>Matter insoluble in alcohol</i>	Not more than 0.2 % (sodium and potassium salts only).
<i>Volatile matter</i>	Not more than 3 %.
<i>Content of sodium, or potassium, or calcium</i>	Sodium Not less than 9.0 % and not more than 14.0 % expressed as Na ₂ O. Potassium Not less than 13.0 % and not more than 21.5 % expressed as K ₂ O. Calcium Not less than 8.5 % and not more than 13.0 % expressed as CaO.

E 471 — Mono- and diglycerides of fatty acids

<i>Chemical description</i>	Mono- and diglycerides of fatty acids consist of mixtures of glycerol mono-, di- and tri-esters of fatty acids occurring in food fats. They may contain small amounts of free fatty acids and glycerol.
<i>Description</i>	The product varies from a pale yellow to pale brown oily liquid to a white or slightly off-white hard waxy solid. The solids may be in the form of flakes, powders or small beads.
<i>Mono- and di-ester content</i>	Not less than 70 %.
<i>Free fatty acids</i>	Not more than 3 % estimated as oleic acid.
<i>Free glycerol</i>	Not more than 7 %.
<i>Total glycerol</i>	Not less than 16 % and not more than 33 %.
<i>Polyglycerols</i>	Not more than 4 % diglycerol and not more than 1 % higher polyglycerols both based on total glycerol content.
<i>Water</i>	Not more than 2 % (Karl Fischer).
<i>Sulphated ash</i>	Not more than 0.5 % determined at 800 ± 25 °C.

Note: These criteria are based on the product without E 470.

E 472 (a) — Acetic acid esters of mono- and diglycerides of fatty acids

<i>Chemical description</i>	Esters of glycerol with acetic acid and fatty acids occurring in food fats. They may contain small amounts of free glycerol, free fatty acids, free acetic acid and free glycerides.
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▼B

<i>Description</i>	Clear, mobile liquids to solids, from white to pale yellow in colour.
<i>Total acetic acid content</i>	Not less than 9 % and not more than 32 %.
<i>Free fatty acids (and acetic acid)</i>	Not more than 3 % estimated as oleic acid.
<i>Free glycerol</i>	Not more than 2 %.
<i>Total glycerol</i>	Not less than 14 % and not more than 31 %.
<i>Sulphated ash</i>	Not more than 0.5 % determined at 800 ± 25 °C.

E 472 (b) — Lactic acid esters of mono- and diglycerides of fatty acids

<i>Chemical description</i>	Esters of glycerol with lactic acid and fatty acids occurring in food fats. They may contain small amounts of free glycerol, free fatty acids, free lactic acid and free glycerides.
<i>Description</i>	Soft to hard waxy solids.
<i>Total lactic acid content</i>	Not less than 13 % and not more than 45 %.
<i>Free fatty acids</i>	Not more than 3 % estimated as oleic acid.
<i>Free glycerol</i>	Not more than 2 %.
<i>Total glycerol</i>	Not less than 13 % and not more than 30 %.
<i>Sulphated ash</i>	Not more than 0.5 % determined at 800 ± 25 °C.

Note: These criteria are based on the product without E 470.

E 472 (c) — Citric acid esters of mono- and diglycerides of food fatty acids

<i>Chemical description</i>	Esters of glycerol with citric acid and fatty acids occurring in food oils and fats. They may contain small amounts of free glycerol, free fatty acids, free citric acid and free glycerides. They may be partially or wholly neutralized with sodium hydroxide or with potassium hydroxide.
<i>Description</i>	Yellowish or light brown liquids to waxy solids or semi-solids.
<i>Total citric acid content</i>	Not less than 13 % and not more than 50 %.
<i>Free fatty acids</i>	Not more than 3 % estimated as oleic acid.
<i>Free glycerol</i>	Not more than 2 %.
<i>Total glycerol</i>	Not less than 11 % and not more than 29 %.
<i>Sulphated ash</i>	Not more than 0.5 % for the non-neutralized products and not more than 10.0 % for the partially or wholly neutralized products determined at 800 ± 25 °C.
<i>pH of a 1 % solution</i>	Not less than 3 and not more than 7.3.

E 472 (d) — Tartaric acid esters of mono- and diglycerides of food fatty acids

<i>Chemical description</i>	Esters of glycerol with tartaric acid (E 334) and fatty acids occurring in food fats. They may contain small amounts of free glycerol, free fatty acids, free tartaric acid and free glycerides.
<i>Description</i>	Sticky viscous yellowish liquids to hard yellow waxes.
<i>Total tartaric acid content</i>	Not less than 15 % and not more than 50 %.
<i>Free fatty acids</i>	Not more than 3 % estimated as oleic acid.
<i>Free glycerol</i>	Not more than 2 %.
<i>Total glycerol</i>	Not less than 12 % and not more than 29 %.
<i>Sulphated ash</i>	Not more than 0.5 % determined at 800 ± 25 °C.

E 472 (e) — Mono- and diacetyl tartaric acid esters of mono- and diglycerides of fatty acids

▼B

<i>Chemical description</i>	Esters of glycerol with mono- and diacetyl tartaric acids (obtained from E 334 tartaric acid) and fatty acids occurring in food fats. They may contain small amounts of free glycerol, free fatty acids, free tartaric and acetic acids and their combinations, and free glycerides.
<i>Description</i>	Sticky viscous liquids through a fat-like consistency to yellow waxes which hydrolyse in moist air to liberate acetic acid.
<i>Total tartaric acid content</i>	Not less than 10 % and not more than 40 %.
<i>Total acetic acid content</i>	Not less than 8 % and not more than 32 %.
<i>Free fatty acids</i>	Not more than 3 % estimated as oleic acid.
<i>Free glycerol</i>	Not more than 2 %.
<i>Total glycerol</i>	Not less than 11 % and not more than 28 %.
<i>Sulphated ash</i>	Not more than 0.5 % determined at 800 ± 25 °C.

E 472 (f) — Mixed acetic and tartaric acid esters of mono- and diglycerides of fatty acids

<i>Chemical description</i>	Esters of glycerol with acetic and tartaric (E 334) acids and fatty acids occurring in food fats. They may contain small amounts of free glycerol, free fatty acids, free acetic and tartaric acids, and free glycerides.
<i>Description</i>	Clear mobile liquids to solids, from white to pale yellow in colour.
<i>Total acetic acid</i>	Not less than 10 % and not more than 20 %.
<i>Total tartaric acid</i>	Not less than 20 % and not more than 40 %.
<i>Free acetic acid</i>	Not less than 5.5 % and not more than 8.5 %.
<i>Free tartaric acid</i>	Not more than 1 %.
<i>Free fatty acids</i>	Not more than 3 % estimated as oleic acid.
<i>Free glycerol</i>	Not more than 2 %.
<i>Total glycerol</i>	Not less than 12 % and not more than 27 %.
<i>Sulphated ash</i>	Not more than 0.5 % determined at 800 ± 25 °C.

E — 473 Sucrose esters of fatty acids

<i>Chemical description</i>	Essentially the mono- and di-esters of sucrose with fatty acids occurring in food fats. They may be prepared from sucrose and the methyl and ethyl esters of food fatty acids or by extraction from sucroglycerides. ►M3 No organic solvent other than dimethylsulphoxide, dimethylformamide, ethyl acetate, isopropanol, isobutanol and methylethylketon may be used in their preparation. ◀
<i>Description</i>	Soft solids, stiff gels or white to greyish-white powders.
<i>Total sucrose fatty acid ester content</i>	Not less than 80 %.
<i>Total glyceride content</i>	Not more than 20 %.
<i>Free sucrose content</i>	Not more than 5 %.
<i>Free fatty acid content</i>	Not more than 3 % estimated as oleic acid.
<i>Sulphated ash</i>	Not more than 2 % determined at 800 ± 25 °C.

▼M2

Dimethylsulphoxide content Not more than 2 mg/kg.

▼B

Dimethylformamide content Not more than 1 mg/kg.

▼B

Methanol content Not more than 10 mg/kg.

▼M2

Isobutanol content Not more than 10 mg/kg.

▼M3

Methylethylketon content Not more than 10 mg/kg.

Total ethyl acetate and isopropanol content Not more than 350 mg/kg singly or in combination.

Note: These criteria are based on the product without E 470.

E 474 — Sucroglycerides

Chemical description Sucroglycerides are produced by reacting sucrose with an edible fat or oil to produce a mixture of essentially mono- and di-esters of sucrose and fatty acids together with residual mono-, di- and tri-glycerides from that fat or oil. ►**M1** No organic solvents shall be used in their preparation other than cyclohexane, dimethylformamide, ethyl acetate, isobutanol and isopropanol. ◀

Description Soft solid masses, stiff gels or white to off-white powders.

Total sucrose fatty acid ester content Not less than 40 % and not more than 60 %.

Total glyceride content Not less than 40 % and not more than 60 %.

Free sucrose content Not more than 5 %.

Free fatty acid content Not more than 3 % estimated as oleic acid.

Sulphated ash Not more than 2 % determined at 800 ± 25 °C.

Dimethylformamide content Not more than 1 mg/kg.

Methanol content Not more than 10 mg/kg.

Total ethyl acetate and isopropanol content Not more than 350 mg/kg singly or in combination.

▼M1

Total cyclohexane and isobutanol content Not more than 10 mg/kg singly or in combination.

▼B

Note: These criteria are based on the product without E 470.

E 475 — Polyglycerol esters of non-polymerized fatty acids

Chemical description Polyglycerol esters of fatty acids are produced by the esterification of polyglycerol with food fats or with fatty acids occurring in food fats. The polyglycerol moiety is predominantly di-, tri- and tetra-glycerol and contains not more than 10 % of polyglycerols equal to or higher than heptaglycerol.

Description Yellow or light brown liquids or semi-solids.

Total fatty acid ester content Not less than 90 %.

Free fatty acids Not more than 6 % estimated as oleic acid.

Total glycerol and polyglycerol Not less than 18 % and not more than 60 %.

Free glycerol and polyglycerol Not more than 7 %.

Sulphated ash Not more than 0.5 % determined at 800 ± 25 °C.

Note: These criteria are based on the product without E 470.

E 477 — Propane-1,2-diol esters of fatty acids

Chemical description Consists chiefly of mixtures of propane-1,2-diol mono- and di-esters of fatty acids occurring in food fats. The alcohol moiety is exclusively propane-1,2-diol together with dimer and traces of trimer. Organic acids other than food fatty acids are absent.

▼B

<i>Description</i>	Waxy white flakes, beads or solids.
<i>Total fatty acid ester content</i>	Not less than 85 %.
<i>Free propane-1,2-diol</i>	Not more than 5 %.
<i>Dimer and trimer of propane-1,2-diol</i>	► M1 Not more than 0.5 %. ◀
<i>Free fatty acids</i>	Not more than 6 % estimated as oleic acid.
<i>Sulphated ash</i>	Not more than 0.5 % determined at 800 ± 25 °C.
<i>Total propane-1,2</i>	Not less than 11 % and not more than 31 %.

Note: These criteria are based on the product without E 470.

E 481 — Sodium stearyl-2-lactylate

<i>Chemical description</i>	A mixture of the sodium salts of stearyl lactic acids and minor amounts of sodium salts of other related acids, manufactured by the reaction of stearic acid and lactic acid. Other food fatty acids may also be present, free or esterified, due to their presence in the stearic acid used.
<i>Description</i>	Cream coloured powder or brittle solid with a characteristic odour.
<i>Sodium content</i>	Not less than 2.5 % and not more than 5 %.
<i>Ester value</i>	Not less than 90 and not more than 190 mg KOH/g.
<i>Total lactic acid (free and combined)</i>	Not less than 15 % and not more than 40 %.
<i>Acid value</i>	Not less than 60 and not more than 130 mg KOH/g.

E 482 — Calcium stearyl-2-lactylate

<i>Chemical description</i>	A mixture of calcium salts of stearyl lactic acids with minor amounts of calcium salts of other related acids, manufactured by the reaction of stearic acid and lactic acid. Other food fatty acids may also be present, free or esterified due to their presence in the stearic acid used.
<i>Description</i>	White or slightly yellowish powder or brittle solid with a characteristic odour.
<i>Calcium content</i>	Not less than 1.0 % and not more than 5.2 %.
<i>Ester value</i>	Not less than 125 and not more than 190 mg KOH/g.
<i>Total lactic acid (free and combined)</i>	Not less than 15 % and not more than 40 %.
<i>Acid value</i>	Not less than 50 and not more than 130 mg KOH/g.

E 483 — Stearyl tartrate

<i>Chemical description</i>	Stearyl tartrate is produced by the esterification of tartaric acid (E 334) with stearyl alcohol. It consists chiefly of the di-ester with minor amounts of mono-ester, tartaric acid and stearyl alcohol. Other esters may also be present due to the presence in the stearyl alcohol used of alcohols derived from food fatty acids other than stearic acid.
<i>Description</i>	Cream coloured unctuous solid (at 25 °C).
<i>Total ester content</i>	Not less than 90 %.
<i>Total tartaric acid content</i>	Not less than 18 % and not more than 35 %.
<i>Unsaponifiable matter</i>	Not less than 77 % and not more than 83 %.
<i>Melting range</i>	67 to 77 °C.
<i>Ester value</i>	Not less than 163 and not more than 180 mg KOH/g.

▼B

<i>Iodine value</i>	Not more than 4 (Wijs).
<i>Acid value</i>	Not more than 6 mg KOH/g.
<i>Sulphated ash</i>	Not more than 0.5 % determined at 800 ± 25 °C.

(¹) A special method of analysis is required to determine this.