Substance name: Tetraboron disodium heptaoxide, hydrate
EC number: 235-541-3
CAS number: 12267-73-1

MEMBER STATE COMMITTEE
DRAFT SUPPORT DOCUMENT FOR IDENTIFICATION OF

TETRABORON DISODIUM HEPTAOXIDE, HYDRATE

AS A SUBSTANCE OF VERY HIGH CONCERN BECAUSE OF ITS CMR PROPERTIES

Adopted on 9 June 2010

CONTENTS

Substance name: Tetraboron disodium heptaoxide, hydrate

EC number: 235-541-3

CAS number: 12267-73-1

In addition, this support document covers the substance Disodium tetraborate, anhydrous, with EC number 215-540-4 and CAS number 1330-43-4, as well as substances / hydrates with the following CAS numbers which are covered by the EINECS entry of anhydrous form:

CAS number 12179-04-3: Disodium tetraborate pentahydrate, [CAS name: boron sodium oxide ($B_4Na_2O_7$), pentahydrate]

CAS number 1303-96-4: Disodium tetraborate decahydrate, [CAS name: Borax ($B_4Na_2O_7.10H_2O$)]

- *Tetraboron disodium heptaoxide, hydrate* is identified as a substance meeting the criteria of Article 57 (c) of Regulation (EC) 1907/2006 (REACH) owing to its classification as toxic for reproduction (category 2)[1].

Summary of how the substance meets the CMR[2] (Cat 1 or 2), PBT[3] or vPvB[4] criteria or is considered to be a substance giving rise to an equivalent level of concern

This support document covers tetraboron disodium heptaoxide, hydrate (CAS 12267-73-1) and also disodium tetraborate anhydrous (CAS 1330-43-4) and the hydrates disodium tetraborate pentahydrate (CAS 12179-04-03), disodium tetraborate decahydrate (CAS 1303-96-4). In aqueous solution, the hydrates form the same substances as disodium tetraborate anhydrous and are therefore comparable in their toxicological properties.

Pursuant to Annex V of Commission Regulation (EC) No 790/2009[5] as of 1 December 2010 *tetraboron disodium heptaoxide, hydrate* will be listed in Table 3.2 (the list of harmonised classification and labelling of hazardous substances from Annex I to Directive 67/548/EEC) of Annex VI, part 3, of Regulation (EC) No 1272/2008[6] as toxic for reproduction category 2[7], R60-61 (May impair fertility. May cause harm to the unborn child).

Therefore, this classification of the substance in Commission Regulation (EC) No 790/2009 shows that the substance meets the criteria for classification as toxic for reproduction in accordance with Article 57 (c) of REACH.

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[1] Category in accordance with Annex I to Council Directive 67/548/EEC

[2] CMR means carcinogenic, mutagenic or toxic for reproduction

[3] PBT means persistent, bioaccumulative and toxic

[4] vPvB means very persistent and very bioaccumulative

[5] Commission Regulation (EC) No 790/2009 of 10 August 2009 amending, for the purposes of its adaptation to technical and scientific progress, Regulation (EC) No 1272/2008 of the of the European Parliament and of the Council on classification, labelling and packaging of substances and mixtures (1st ATP)

[6] Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006.

[7] This corresponds to a classification Repr. 1B; H360-FD (May damage fertility. May damage the unborn child) in Annex VI, part 3, Table 3.1 of Regulation (EC) No 1272/2008 (list of harmonised classification and labelling of hazardous substances).

Registration number(s) of the substance or of substances containing a given constituent/impurity or leading to the same transformation or degradation products:

No registration dossiers for the substances were submitted to ECHA by the publication date of this dossier (*March 2010*).

JUSTIFICATION

1 IDENTITY OF THE SUBSTANCE AND PHYSICAL AND CHEMICAL PROPERTIES

1.1 Name and other identifiers of the substance

Three disodium tetraborates are covered by the EINEC entry of the anhydrous form:

Disodium tetraborate anhydrous, CAS number 1330-43-4; EC number 215-540-4

Disodium tetraborate pentahydrate, CAS 12179-04-3

Disodium tetraborate decahydrate, CAS 1303-96-4.

This dossier covers also the substance with the EC number 235-541-3, Tetraboron disodium heptaoxide, hydrate, CAS number 12267-73-1.

EC number:	215-540-4	---	---	235-541-3
CAS number:	1330-43-4	12179-04-3	1303-96-4	12267-73-1
Chemical name:	Disodium tetraborate, anhydrous; boric acid, disodium salt	Disodium tetraborate pentahydrate; borax pentahydrate	Disodium tetraborate decahydrate; borax decahydrate	Tetraboron disodium heptaoxide, hydrate
IUPAC name:	Disodium tetraborate anhydrous	Disodium tetraborate pentahydrate	Disodium tetraborate decahydrate	Tetraboron disodium heptaoxide, hydrate
Synonyms:	Anhydrous borax; Sodium tetraborate; Boron sodium oxide ($B_4Na_2O_7$); Boric acid ($H_2B_4O_7$), disodium salt; Sodium borate, Borax, fused	Borax 5-mol; Sodium borate ($Na_2B_4O_5(OH)_4$) trihydrate; Sodium tetraborate pentahydrate; Boron sodium oxide ($B_4Na_2O_7$), pentahydrate; Boric acid ($H_2B_4O_7$), Disodium salt, pentahydrate	Borax; Sodium tetraborate decahydrate; Borax decahydrate; Sodium biborate decahydrate; Sodium pyroborate decahydrate; Boron sodium oxide ($B_4Na_2O_7$), decahydrate; Boric acid ($H_2B_4O_7$), Disodium salt decahydrate; Tetrasodium salts, decahydrate	$Na_2B_4O_7 \cdot xH_2O$ Boric acid ($H_2B_4O_7$), disodium salt, hydrate; Boron sodium oxide ($B_4Na_2O_7$), hydrate
Index number in Annex VI of the CLP Regulation	005-011-00-4	005-011-02-9	005-011-01-1	005-011-00-4

1.2 Composition of the substance

EC number:	215-540-4	---	---	235-541-3
CAS number:	1330-43-4	12179-04-3	1303-96-4	12267-73-1
EC name:	Disodium tetraborate, anhydrous; boric acid, disodium salt	Disodium tetraborate pentahydrate; borax pentahydrate	Disodium tetraborate decahydrate; borax decahydrate	Tetraboron disodium heptaoxide, hydrate
IUPAC name:	Disodium tetraborate anhydrous	Disodium tetraborate pentahydrate	Disodium tetraborate decahydrate	Tetraboron disodium heptaoxide, hydrate
Molecular formula:	$Na_2B_4O_7$	$Na_2B_4O_7 \cdot 5H_2O$	$Na_2B_4O_7 \cdot 10H_2O$	$Na_2B_4O_7 \cdot xH_2O$
Molecular weight range:	201.22	291.35	381.37	201.22 + x •18.02
Typical concentration (% w/w)	100	100	100	No information

1.3 Physico-chemical properties

The physico-chemical properties for tetraboron disodium heptaoxide, hydrate are considered herein to be described by the physico-chemical properties for the pentahydrate (CAS 12179-04-3) and the decahydrate (CAS 1303-96-4) forms of disodium tetraborate.

Disodium tetraborate anhydrous			
REACH ref Annex, §	**Property**	**Value**	**Comment/reference**
VII, 7.1	Physical state at 20°C and 101.3 kPa	White, crystalline, odourless solid	
VII, 7.2	Melting/freezing point	737°C	Cordia JA *et al.* (2003b) cited in Austria 2008
VII, 7.3	Boiling point	Not required	Melting point is >300°C
VII, 7.5	Vapour pressure	Not required	Melting point is >300°C
VII, 7.7	Water solubility (mg/L)	27.0 ± 2.7 g/L at 20 ± 0.5°C Derived from studies with the pentahydrate and decahydrate	The water solubility for disodium tetraborate anhydrous as such cannot be determined because the substance is converted into boric acid/borate upon dissolution in water: $Na_2B_4O_7 + 7\ H_2O \rightarrow 2\ NaB(OH)_4 + 2\ B(OH)_3$. The water solubility found will be the water solubility for boric acid in the presence of sodium ions. The water solubility for disodium tetraborate anhydrous is equal to an equivalent amount of disodium tetraborate pentahydrate or disodium tetraborate decahydrate. Cordia JA *et al.* (2003b and c) cited in Austria, 2008.
VII, 7.14	Granulometry	d_{50} = 210 – 850 µm	Disodium tetraborate anhydrous is sold in both granular and powder forms. The range given here describes both granular and powder products.
VII, 7.16	Dissociation constant	Boric acid is a Lewis acid (hydroxide ion acceptor) rather than a Brønsted acid (proton donator). For this purpose the formula for boric acid is best written as $B(OH)_3$. pKa = 9.0 at 25°C for boric acid in dilute solutions only (B ≤ 0.025 M). At higher boron concentrations, polynuclear complexes are formed and several dissociation/formation constants apply.	The dissociation constant for disodium tetraborate anhydrous as such cannot be determined because disodium tetraborate anhydrous is converted into boric acid/borate upon dissolution in water: $Na_2B_4O_7 + 7H_2O \rightarrow 2\ NaB(OH)_4 + 2\ B(OH)_3$. The dissociation constant found will be the dissociation constant for boric acid in the presence of sodium ions. At low boron concentrations (B ≤ 0.025 M), the following equilibrium is found: $B(OH)_3 + 2H_2O \leftrightarrow [B(OH)_4]^- + H_3O^+$ pKa = 9.0 at 25°C At these concentrations, boric acid exists as undissociated boric acid $B(OH)_3$ at pH < 5, whereas at pH > 12.5, the metaborate ion $-[B(OH)_4]^-$ becomes the main species in solution. Both species are present at pH 5-12.5 at concentrations B ≤ 0.025 M. At higher boron concentrations (B > 0.025 M), an equilibrium is formed between $B(OH)_3$, polynuclear complexes of $B_3O_3(OH)_4^-$, $B_4O_5(OH)_4^{2-}$, $B_3O_3(OH)_5^{2-}$, $B_5O_6(OH)_4^-$ and $B(OH)_4^-$. In short: $B(OH)_3 \leftrightarrow$ polynuclear anions $\leftrightarrow B(OH)_4^-$. Again at pH<5, boron is mainly present as $B(OH)_3$ and in alkaline solution at pH>12.5, boron is mainly present as $B(OH)_4^-$. At in between values (pH 5-12), polynuclear anions are found as well as $B(OH)_3$ and $B(OH)_4^-$. The dissociation constant depends on temperature, ionic strength and presence of group I metal ions (Na, K, Cs). In the presence of metal ions (e.g. Na, Mg, Ca), ion pair complexes are formed, which

Disodium tetraborate anhydrous			
			further reduce the undissociated boric acid concentration: $M^{n+} + B(OH)_4^- \leftrightarrow MB(OH)_4^{(n-1)+}$ These ion pair complexes are expected to be present in solutions of disodium tetraborate, disodium octaborate and buffered solutions of boric acid and boric oxide. Ingri N (1963) cited in Austria 2008.

Disodium tetraborate pentahydrate			
REACH ref Annex, §	**Property**	**Value**	**Comment/reference**
VII, 7.1	Physical state at 20°C and 101.3 kPa	White, crystalline, odourless solid	
VII, 7.2	Melting/freezing point	No melting point can be defined because of decomposition of the substance	When disodium tetraborate pentahydrate is heated, it gradually loses water of crystallisation, forming disodium tetraborate anhydrous, $Na_2B_4O_7$. An endothermal peak is observed at 131°C due to the loss of water. Due to a phase transition, an exothermal peak is observed at 524/527°C. The crystal form of $Na_2B_4O_7$ melts at 737°C. Cordia JA *et al.* (2003b) cited in Austria 2008.
VII, 7.3	Boiling point	Not required	Melting point of disodium tetraborate anhydrous is >300°C
VII, 7.5	Vapour pressure	Not required	Melting point of disodium tetraborate anhydrous is >300°C
VII, 7.7	Water solubility (mg/L)	40.06 ± 2.70 g/L at 20 ± 0.5°C 35.9 g/L at 20°C (literature value)	The difference between the determined water solubility (Cordia JA *et al*. (2003b)) and the literature value (35.9 g/L, Mellor (1980)) could be explained by the fact that the two protocol methods used in each case were different. Mellor's Comprehensive Treatise on Inorganic and Theoretical Chemistry, Volume V Boron, Part A: Boron-Oxygen Compounds, Longman London and New York, (1980), ISBN 0-582-46277-0, page 254.
VII, 7.14	Granulometry	d_{50} = 460 – 520µm	
VII, 7.16	Dissociation constant	Boric acid is a Lewis acid (hydroxide ion acceptor) rather than a Brønsted acid (proton donator). For this purpose, the formula for boric acid is best written as $B(OH)_3$. pKa = 9.0 at 25°C for boric acid in dilute solutions only (B ≤	The dissociation constant for disodium tetraborate pentahydrate as such cannot be determined because disodium tetraborate pentahydrate is converted into boric acid/borate upon dissolution in water: $Na_2B_4O_7 \cdot 5H_2O + 2H_2O \rightarrow 2\ NaB(OH)_4 + 2\ B(OH)_3$. The dissociation constant found will be the dissociation constant for boric acid in the presence of sodium ions. At low boron concentrations (B ≤ 0.025 M), the following equilibrium is found: $B(OH)_3 + 2H_2O \leftrightarrow [B(OH)_4]^- + H_3O^+$ pKa = 9.0 at 25°C

Disodium tetraborate pentahydrate			
		0.025 M). At higher boron concentrations, polynuclear complexes are formed and several dissociation/formation constants apply.	At these concentrations, boric acid exists as undissociated boric acid $B(OH)_3$ at pH < 5, whereas at pH > 12.5, the metaborate ion $-[B(OH)_4]^-$ becomes the main species in solution. Both species are present at pH 5-12.5 at concentrations B ≤ 0.025 M. At higher boron concentrations (B > 0.025 M), an equilibrium is formed between $B(OH)_3$, polynuclear complexes of $B_3O_3(OH)_4^-$, $B_4O_5(OH)_4^{2-}$, $B_3O_3(OH)_5^{2-}$, $B_5O_6(OH)_4^-$ and $B(OH)_4^-$. In short: $B(OH)_3 \leftrightarrow$ polynuclear anions $\leftrightarrow B(OH)_4^-$. Again at pH<5, boron is mainly present as $B(OH)_3$ and in alkaline solution at pH>12.5, boron is mainly present as $B(OH)_4^-$. At in between values (pH 5-12), polynuclear anions are found as well as $B(OH)_3$ and $B(OH)_4^-$. The dissociation constant depends on temperature, ionic strength and presence of group I metal ions (Na, K, Cs). In the presence of metal ions (e.g. Na, Mg, Ca), ion pair complexes are formed, which further reduce the undissociated boric acid concentration: $M^{n+} + B(OH)_4^- \leftrightarrow MB(OH)_4^{(n-1)+}$ These ion pair complexes are expected to be present in solutions of disodium tetraborate, disodium octaborate and buffered solutions of boric acid and boric oxide. Ingri N (1963) cited in Austria 2008.

Disodium tetraborate decahydrate			
REACH ref Annex, §	**Property**	**Value**	**Comment/reference**
VII, 7.1	Physical state at 20°C and 101.3 kPa	White, crystalline, odourless solid	
VII, 7.2	Melting/freezing point	No melting point detected below 1000°C	Cordia JA (2003c) cited in Austria 2008
VII, 7.3	Boiling point	Not required	Melting point of disodium tetraborate anhydrous is >300°C
VII, 7.5	Vapour pressure	Not required	Melting point of disodium tetraborate anhydrous is >300°C
VII, 7.7	Water solubility (mg/L)	49.74 ± 3.63 g/L at 20 ± 0.5°C 47.0 g/L at 20°C (literature value)	The difference between the determined water solubility (Cordia JA (2003c) cited in Austria, 2008) and the literature value (47.0 g/L, Mellor (1980) cited in Austria 2008) could be explained by the fact that the two protocol methods used in each case were different. Mellor's Comprehensive Treatise on Inorganic and Theoretical Chemistry, Volume V Boron, Part A: Boron-Oxygen Compounds, Longman London and New York, (1980), ISBN 0-582-46277-0, page 254.
VII, 7.8	Partition coefficient n-octanol/water (log value)	-1.53 ± 0.05 (22 ± 1°C)	Although not required as this is an inorganic substance, an end point has been derived in Cordia JA (2003c) Cited in Austria 2008

Disodium tetraborate decahydrate			
VII, 7.14	Granulometry	d_{50} = 90 – 400µm	Disodium tetraborate decahydrate is sold in both granular and powder forms. The range given here describes both granular and powder products.
VII, 7.16	Dissociation constant	Boric acid is a Lewis acid (hydroxide ion acceptor) rather than a Brønsted acid (proton donator). For this purpose the formula for boric acid is best written as $B(OH)_3$. pKa = 9.0 at 25 °C for boric acid in dilute solutions only (B ≤ 0.025 M). At higher boron concentrations, polynuclear complexes are formed and several dissociation/formation constants apply.	The dissociation constant for disodium tetraborate decahydrate as such cannot be determined because disodium tetraborate decahydrate is converted into boric acid/borate upon dissolution in water: $Na_2B_4O_7 \cdot 10H_2O \rightarrow 2\ NaB(OH)_4 + 2\ B(OH)_3 + 3H_2O$. The dissociation constant found will be the dissociation constant for boric acid in the presence of sodium ions. At low boron concentrations (B ≤ 0.025 M), the following equilibrium is found: $B(OH)_3 + 2H_2O \leftrightarrow [B(OH)_4]^- + H_3O^+$ pKa = 9.0 at 25°C At these concentrations, boric acid exists as undissociated boric acid $B(OH)_3$ at pH < 5, whereas at pH > 12.5, the metaborate ion -$[B(OH)_4]^-$ becomes the main species in solution. Both species are present at pH 5-12.5 at concentrations B ≤ 0.025 M. At higher boron concentrations (B > 0.025 M), an equilibrium is formed between $B(OH)_3$, polynuclear complexes of $B_3O_3(OH)_4^-$, $B_4O_5(OH)_4^{2-}$, $B_3O_3(OH)_5^{2-}$, $B_5O_6(OH)_4^-$ and $B(OH)_4^-$. In short: $B(OH)_3 \leftrightarrow$ polynuclear anions $\leftrightarrow B(OH)_4^-$. Again at pH<5, boron is mainly present as $B(OH)_3$ and in alkaline solution at pH>12.5, boron is mainly present as $B(OH)_4^-$. At in between values (pH 5-12), polynuclear anions are found as well as $B(OH)_3$ and $B(OH)_4^-$. The dissociation constant depends on temperature, ionic strength and presence of group I metal ions (Na, K, Cs). In the presence of metal ions (e.g. Na, Mg, Ca), ion pair complexes are formed, which further reduce the undissociated boric acid concentration: $M^{n+} + B(OH)_4^- \leftrightarrow MB(OH)_4^{(n-1)+}$ These ion pair complexes are expected to be present in solutions of disodium tetraborate, disodium octaborate and buffered solutions of boric acid and boric oxide. Ingri N (1963) cited in Austria 2008.

2 HARMONISED CLASSIFICATION AND LABELLING

2.1 Classification in Annex VI of Regulation (EC) No 1272/2008

Disodium tetraborate anhydrous has index number 005-011-00-4 in Annex VI, part 3, Tables 3.1 and 3.2 of Regulation (EC) No 1272/2008 amended by Regulation (EC) No 790/2009.

The classification of disodium tetraborate (anhydrous, pentahydrate and decahydrate forms) and tetraboron disodium heptaoxide, hydrate according to Annex VI, part 3, Table 3.2 (the list of harmonised classification and labelling of hazardous substances from Annex I to Directive 67/548/EEC) of Regulation (EC) No 1272/2008 as amended by Regulation (EC) No 790/2009 is:

Toxic for reproduction, Repr. Cat 2, R60-61.

See Table 2.1 for further details and specific concentration limits.

Table 2.1: Classification of disodium tetraborates according to Annex VI, part 3, Table 3.2 of Regulation (EC) No. 1272/2008 amended by Regulation (EC) No 790/2009

Substance	CAS no	Index no	Classification	Concentration limits
Disodium tetraborate, anhydrous	1330-43-4	005-011-00-4	Repr. Cat 2, R60-61	Repr. Cat 2, R60-61 C≥4.5%
Disodium tetraborate, pentahydrate	12179-04-3	005-011-02-9	Repr. Cat 2, R60-61	Repr. Cat 2, R60-61 C≥6.5%
Disodium tetraborate, decahydrate	1303-96-4	005-011-01-1	Repr. Cat 2, R60-61	Repr. Cat 2, R60-61 C≥8.5%
Tetraboron disodium heptaoxide, hydrate	12267-73-1	005-011-00-4	Repr. Cat 2, R60-61	Repr. Cat 2, R60-61 C≥4.5%
Key: Repr. Cat 2: Toxic for reproduction in category 2 R60-61: May impair fertility. May cause harm to the unborn child				

The harmonised classification of disodium tetraborate (anhydrous, pentahydrate and decahydrate forms) and tetraboron disodium heptaoxide, hydrate according to Annex VI, part 3, Table 3.1 of Regulation (EC) No 1272/2008, as amended by Regulation (EC) No 790/2009, is:

Toxic to reproduction, Repr.1B, H360FD.

See Table 2.2 for further details and specific concentration limits.

Table 2.2: Classification of disodium tetraborates according to Annex VI, part 3, Table 3.1 of Regulation (EC) No. 1272/2008 amended by Regulation (EC) No 790/2009

Substance	CAS no	Classification		Labelling		Specific Conc. Limits M-factors
		Hazard Class and Category Code(s)	Hazard statement Code(s)	Pictogram, Signal Word Code(S)	Hazard statement Code(s)	
Disodium tetraborate, anhydrous	1330-43-4	Repr. 1B	H360FD	GHS08 Dgr	H360FD	Repr. 1B; H360FD: C≥4.5%
Disodium tetraborate, pentahydrate	12179-04-3	Repr. 1B	H360FD	GHS08 Dgr	H360FD	Repr. 1B; H360FD: C≥6.5%
Disodium tetraborate, decahydrate	1303-96-4	Repr. 1B	H360FD	GHS08 Dgr	H360FD	Repr. 1B; H360FD: C≥8.5%
Tetraboron disodium heptaoxide, hydrate	12267-73-1	Repr. 1B	H360FD	GHS08 Dgr	H360FD	Repr. 1B; H360FD: C≥4.5%
Key: Repr.1B: Toxic to reproduction H360-FD: May damage fertility. May damage the unborn child GHS08: Health hazard; Dgr: Danger						

3 ENVIRONMENTAL FATE PROPERTIES

Not relevant for this dossier

4 HUMAN HEALTH HAZARD ASSESSMENT

Information on hazard to human health relevant for the assessment as to whether disodium tetraborate (anhydrous, pentahydrate and decahydrate forms) and tetraboron disodium heptaoxide, hydrate meet criteria of Article 57 of the REACH-Regulation is provided in section 2 of this report (classification information).

5 HUMAN HEALTH HAZARD ASSESSMENT OF PHYSICOCHEMICAL PROPERTIES

Not relevant for this dossier

6 ENVIRONMENTAL HAZARD ASSESSMENT

Not relevant for this dossier

7 PBT, VPVB AND EQUIVALENT LEVEL OF CONCERN ASSESSMENT

Not relevant for this dossier

OTHER INFORMATION

A number of compounds related to boric acid, i.e. boric acid itself, boric oxide, sodium borate and sodium perborate are classified as toxic for reproduction in Category 2/ Repr. 1B.

It is clear from the available data and the known chemistry of borates that in aqueous solutions inorganic borate salts are likely to produce the borate ion, $B(OH)_4^-$, largely irrespective of the metal salt[8]. Thus, the toxicity of borates is largely independent of the identity of the solid state borate salts in question.

The borate ion, $B(OH)_4^-$, is the principal anion in solutions of 1:1 alkali borates. Mixtures of $B(OH)_3$ and $B(OH)_4^-$ appear to form classical buffer systems. When additional boric acid is added to borate solutions, polyborates are formed. These include the triborate ion, $B_3O_3(OH)_4^-$, the tetraborate ion, $[B_4O_5(OH)_4^{2-}]$ and the pentaborate ion, $B_5O_6(OH)_4^-$. A rapid equilibrium exists among the various polyborate species in aqueous solution (Kirk Othmar).

This dossier covers disodium tetraborate anhydrous (CAS 1330-43-4). However, since disodium tetraborate pentahydrate (CAS 12179-04-03) and disodium tetraborate decahydrate (CAS 1303-96-4) are hydrates of disodium tetraborate anhydrous, they are also addressed in this report. In aqueous solution, the latter two substances form the same substances as disodium tetraborate anhydrous. Since the presented borates differ only in their amount of water of crystallisation and contain disodium tetraborate as a compound, they can equally well be used for many applications.

[8] This anion can be produced from a number of different borate compounds, including triborates, tetraborates, pentaborates, octaborates, metaborates and perborates (Kirk Othmar)

REFERENCES

Austria (2008): Transitional Annex XV Dossier. Disodium tetraborate anhydrous (December 2008). Rapporteur: Austria. Documentation of the work done under the Existing Substance Regulation (EEC) No 793/93 and submitted to the European Chemicals Agency according to Article 136(3) of Regulation (EC) No 1907/2006. Published by the European Chemicals Agency at: http://echa.europa.eu/doc/trd_substances/disodium_tetraborate_anhydrous/ann_xv_trd/trd_austria_trisodiumtetraborate.pdf

Kirk-Othmar (1994): Encyclopedia of Chemical Technology. 4th edition, New York: John Wiley & Sons.