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**COMMITTEE OF EXPERTS ON THE TRANSPORT OF
DANGEROUS GOODS AND ON THE GLOBALLY
HARMONIZED SYSTEM OF CLASSIFICATION
AND LABELLING OF CHEMICALS**

Sub-Committee of Experts on the
Transport of Dangerous Goods

Twenty-ninth session
Geneva, 3-12 (a.m.) July 2006
Item 6 of the provisional agenda

LISTING, CLASSIFICATION AND PACKING

Amendments to provisions for chlorosilanes

Transmitted by the International Council of Chemical Associations (ICCA)

1. Background

Chlorosilanes are intermediates used to manufacture siloxanes and silanes, the building blocks for many silicone products. Chlorosilanes are therefore not found in final applications. All chlorosilanes react readily with water to form corrosive and toxic hydrogen chloride gas and hydrochloric acid. These substances therefore need to be handled and transported with care by producers and customers.

In order to further enhance the safe transport of chlorosilanes, the silicone manufacturers of Europe (CES: Centre Européen des Silicones), of North-America (SEHSC: Silicones Environmental, Health and Safety Council) and of Japan (SIAJ: Silicone Industry Association of Japan) are of the opinion that a number of provisions related to chlorosilanes should be revisited.

2. Discussion

The list of substances concerned can be found in Annex 1.

2.1 *Packing group (Column 5)*

Whereas all chlorosilanes of class 3 are classified as Class 3, subsidiary risk 8, PG II, there are currently two chlorosilanes, Methyltrichlorosilane (UN1250) and Vinyltrichlorosilane (UN 1305), which are classified as Class 3, subsidiary risk 8, PG I.

Their flammability properties (flashpoint respectively 3 °C and 13 °C, and boiling point respectively 66 °C and 92 °C) put them in PG II.

There is further no evidence that these 2 chlorosilanes are more corrosive than all the other chlorosilanes of class 3 i.e. UN 1162, 1196, 1298 and 2985. Indeed all these substances release hydrogen chloride in contact with water and form hydrochloric acid through hydrolysis. Hydrochloric acid (UN 1789) itself is PG II or III.

In view of this and in accordance with the table of precedence of hazards (2.0.3.3) the 2 chlorosilanes (UN 1250 and UN 1305) should be classified as Class 3, subsidiary risk 8, PG II (see Annex 3 and Annex 4 for the completed Data Sheets).

2.2 *Limited Quantities (Column 7)*

Whereas all other entries in the list of Annex 1 have “NONE” as entry in column 7 of the Dangerous Goods List, Silicon tetrachloride (UN 1818) has an entry of “1 L”.

No reason can be found why this substance should be allowed for transport as limited quantity, in particular because of the less demanding requirements for the packagings.

Therefore the entry in column 7 for UN 1818 should be aligned to those of the other chlorosilanes and be amended into “NONE”

2.3 *Packing instructions for packagings except IBC's (Column 8)*

Chlorosilanes of classes 3, 6.1 and 8 have been assigned packing instruction P001. However this packing instruction shows a very broad variety of types of packagings. Many of these packagings are in the opinion of the chemical industry not recommended for the transport of chlorosilanes e.g. steel drums with removable head (1A2), aluminium drums with non-removable head (1B1) or with removable head (1B2), plastic drums with non-removable head (1H1) or with removable head (1H2)

It is therefore proposed to create a new specific packing instruction Pxxx, limiting the number of suitable types of packagings, and to put it in column 8 of the entries for chlorosilanes of classes 3, 6.1 and 8 in Annex 1.

It is further proposed to prohibit the use of plastics inner packagings and to reduce the maximum content of glass inner packagings from 10 l to 1 l.

The current assignment of packing instruction P401 to the other chlorosilanes i.e. the chlorosilanes belonging to division 4.3, is considered as being adequate.

2.4 Packing instructions for IBC's (Column 8)

Chlorosilanes of classes 3 and 8 have been assigned packing instruction IBC02 whereas chlorosilanes of division 6.1 have been assigned packing instruction IBC01. The chemical industry is concerned about the risk of accidents during the transport of chlorosilanes for a number of reasons: IBC's have bottom discharge connections, they have no flange connections and are equipped with screw caps (plastic IBC's) or lift-up lids with clamp screws (metal IBC's). An overturn of an IBC (metal) may lead to an opening of the lift-up lid and the sudden release of 1,000 litres of chlorosilanes, which would constitute a major disaster

It is therefore proposed to remove current packing instructions IBC01 and IBC02 from column 8 for the entries of classes 3, 6.1 and 8 in Annex 1

The chlorosilanes of division 4.3 have not been assigned an IBC packing instruction and this should be maintained.

2.5 Portable tank instructions (Column 10)

For most of the chlorosilanes bottom discharge openings are currently allowed (portable tank instruction T7 in column 10 of the dangerous goods list). As part of a voluntary initiative to enhance safety, the silicone manufacturers agreed to use only portable tanks without bottom discharge connections. Furthermore they recommend the general use of bursting disks preceding a pressure-relief valve (as described in 6.7.2.8.3).

In line with these recommendations, it is therefore proposed to replace portable tank instruction T7, where present in column 10 of Annex 1, by portable tank instruction T10. This concerns the entries for classes 3 and 8, with the exception of the n.o.s. entries of these classes.

This also means that, if the proposed change from PG I into PG II is adopted for UN 1250 and UN 1305, T10, instead of T11, should be assigned to both substances.

For the entries of division 4.3 and the n.o.s. entries for classes 3, 6.1 and 8, the silicone manufacturers propose the general assignment of portable tank instruction T14 rather than T10 or T11, as is already the case for UN 1295 and UN 2987.

2.6 Portable tank special provisions (Column 11)

With respect to the proposal made under 2.5, it is proposed to assign portable tank special provision TP27 (allowing a test pressure of 4 bar instead of 6 bar if acceptable according to the test pressure definition in 6.7.2.1) to all chlorosilanes of classes 3, 6.1 and 8 with portable tank instruction T14 i.e. the respective n.o.s. entries.

As is already currently the case this portable tank special provision TP27 should not be assigned to entries for division 4.3 because of the higher risk of a possible release of a flammable gas. There is currently no consistent assignment of portable tank special provision TP7 (air shall be eliminated from the vapour space by nitrogen or other means), which the silicone manufacturers consider to be essential for chlorosilanes. It is therefore proposed to enter TP7 in column 11 to all entries in Annex 1, if not already present.

At the same time it is proposed to allocate TP13 (need for self-contained breathing apparatus) consistently to all chlorosilanes.

3. Proposal

- The following changes in the Dangerous Goods List in Chapter 3.2 are proposed:

3.1 Column 5 (Packing Group):

- replace PG I by PG II for UN 1250 and UN 1305

3.2 Column 7 (Limited Quantities):

- replace "1 L" by "NONE" for UN 1818

3.3 Column 8 (Packing instructions):

- replace P001 by Pxxx for UN 1162-1196-1250-1298-1305-1724-1728-1747-1753-1762-1763-1766-1767-1769-1771-1781-1784-1799-1800-1801-1804-1816-1818-2434-2435-2437-2985-2986-2987-3361-3362

3.4 Column 8 (Packing instructions – IBC's):

- remove IBC02 for UN 1162-1196-1298-1724-1728-1747-1753-1762-1763-1766-1767-1769-1771-1781-1784-1799-1800-1801-1804-1816-1818-2434-2435-2437-2985-2986-2987
- remove IBC01 from UN 3361-3362

3.5 Column 10 (Portable tank instructions):

- replace T7 by T10 for UN 1162-1196-1298-1724-1728-1747-1753-1762-1763-1766-1767-1769-1771-1781-1784-1799-1800-1801-1804-1816-1818-2434-2435-2437
- replace T11 by T10 for UN 1250-1305
- replace T10 by T14 for UN 1183-1242-2988
- replace T11 by T14 for UN 2985-2986-3361-3362

3.6 Column 11 (Portable tank special provisions)

- add TP27 to UN 3361-3362
- add TP7 to UN 1162-1196-1250-1298-1305-1724-1728-1747-1753-1762-1763-1766-1767-1769-1771-1781-1784-1799-1800-1801-1804-1816-2434-2435-2437-2985-2986-2987-3361-3362
- add TP13 to UN 1781-1804-1818-2986-2987

See Annex 2 where all changes have been highlighted.

Insert the following new packing instruction Pxxx in 4.1.4.1:

Note that if the proposal to reclassify UN 1250 and 1305 as PG II is adopted, the column with values for PG I could be deleted.

PXXX		PACKING INSTRUCTION		PXXX
The following packagings are authorized provided the general provisions of 4.1.1 and 4.1.3 are met:				
Combination packagings			Maximum capacity / Net mass (see 4.1.3.3)	
Inner packagings	Outer packagings	Packing group I	Packing group II	
Glass 1 l Steel 40 l	Drums steel (1A2) plastics (1H2) plywood (1D) fibre (1G)	250 kg 250 kg 150 kg 75 kg	400 kg 400 kg 400 kg 400 kg	
	Boxes steel (4A) natural wood (4C1, 4 C2) plywood (4D) reconstituted wood (4F) fibreboard (4G) expanded plastics (4H1) solid plastics (4H2)	250 kg 150 kg 150 kg 75 kg 75 kg 60 kg 150 kg	400 kg 400 kg 400 kg 400 kg 400 kg 60 kg 400 kg	
<u>Single packagings</u>				
	<u>Drums</u> steel, non-removable head (1A1)	250 l	450 l	
	<u>Jerricans</u> steel, non-removable head (3A1)	60 l	60 l	
	<u>Composite packagings</u> plastics receptacle in steel drum (6HA1)	250 l	250 l	

4. Justification

The chemical industry is of the opinion that these changes will increase the level of safety for the transport of chlorosilanes for the reasons given above.

* * *

Annex 1 (in ENGLISH ONLY)

List of chlorosilanes (current provisions of UN Model Regulations 14th revised edition)

UN No.	Name and description	Class or division	Subsidiary risk	UN packing group	Special provisions	Limited quantities	Packagings and IBCs		Portable tanks and bulk containers	
							Packing instruction	Special packing provisions	Instructions	Special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1162	DIMETHYLDICHLOROSILANE	3	8	II		NONE	P001 IBC02		T7	TP2 TP13
1183	ETHYLDICHLOROSILANE	4.3	3 8	I		NONE	P401		T10	TP2 TP7 TP13
1196	ETHYLTRICHLOROSILANE	3	8	II		NONE	P001 IBC02		T7	TP2 TP13
1242	METHYLDICHLOROSILANE	4.3	3 8	I		NONE	P401		T10	TP2 TP7 TP13
1250	METHYLTRICHLOROSILANE	3	8	I		NONE	P001		T11	TP2 TP13
1295	TRICHLOROSILANE	4.3	3 8	I		NONE	P401		T14	TP2 TP7 TP13
1298	TRIMETHYLCHLOROSILANE	3	8	II		NONE	P001 IBC02		T7	TP2 TP13
1305	VINYLTRICHLOROSILANE	3	8	I		NONE	P001		T11	TP2 TP13
1724	ALLYLTRICHLOROSILANE, STABILIZED	8	3	II		NONE	P001 IBC02		T7	TP2 TP13
1728	AMYLTRICHLOROSILANE	8		II		NONE	P001 IBC02		T7	TP2 TP13
1747	BUTYLTRICHLOROSILANE	8	3	II		NONE	P001 IBC02		T7	TP2 TP13
1753	CHLOROPHENYLTRICHLORO- SILANE	8		II		NONE	P001 IBC02		T7	TP2
1762	CYCLOHEXYL- TRICHLOROSILANE	8		II		NONE	P001 IBC02		T7	TP2 TP13
1763	CYCLOHEXYL- TRICHLOROSILANE	8		II		NONE	P001 IBC02		T7	TP2 TP13
1766	DICHLOROPHENYL- TRICHLOROSILANE	8		II		NONE	P001 IBC02		T7	TP2 TP13
1767	DIETHYLDICHLOROSILANE	8	3	II		NONE	P001 IBC02		T7	TP2 TP13
1769	DIPHENYLDICHLOROSILANE	8		II		NONE	P001 IBC02		T7	TP2 TP13

UN No.	Name and description	Class or division	Subsidiary risk	UN packing group	Special provisions	Limited quantities	Packagings and IBCs		Portable tanks and bulk containers	
							Packing instruction	Special packing provisions	Instructions	Special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1771	DODECYLTRICHLOROSILANE	8		II		NONE	P001 IBC02		T7	TP2 TP13
1781	HEXADECYL- TRICHLOROSILANE	8		II		NONE	P001 IBC02		T7	TP2
1784	HEXYLTRICHLOROSILANE	8		II		NONE	P001 IBC02		T7	TP2 TP13
1799	NONYLTRICHLOROSILANE	8		II		NONE	P001 IBC02		T7	TP2 TP13
1800	OCTADECYLTRICHLORO- SILANE	8		II		NONE	P001 IBC02		T7	TP2 TP13
1801	OCTYLTRICHLOROSILANE	8		II		NONE	P001 IBC02		T7	TP2 TP13
1804	PHENYLTRICHLOROSILANE	8		II		NONE	P001 IBC02		T7	TP2
1816	PROPYLTRICHLOROSILANE	8	3	II		NONE	P001 IBC02		T7	TP2 TP13
1818	SILICON TETRACHLORIDE	8		II		1 L	P001 IBC02		T7	TP2 TP7
2434	DIBENZYL-DICHLOROSILANE	8		II		NONE	P001 IBC02		T7	TP2 TP13
2435	ETHYLPHENYL-DICHLORO- SILANE	8		II		NONE	P001 IBC02		T7	TP2 TP13
2437	METHYLPHENYL- DICHLOROSILANE	8		II		NONE	P001 IBC02		T7	TP2 TP13
2985	CHLOROSILANES, FLAMMABLE, CORROSIVE, N.O.S.	3	8	II		NONE	P001 IBC02		T11	TP2 TP13 TP27
2986	CHLOROSILANES, CORROSIVE, FLAMMABLE, N.O.S.	8	3	II		NONE	P001 IBC02		T11	TP2 TP27
2987	CHLOROSILANES, CORROSIVE, N.O.S.	8		II		NONE	P001 IBC02		T14	TP2 TP27
2988	CHLOROSILANES, WATER- REACTIVE, FLAMMABLE, CORROSIVE, N.O.S.	4.3	3 8	I		NONE	P401		T10	TP2 TP7 TP9 TP13
3361	CHLOROSILANES, TOXIC, CORROSIVE, N.O.S.	6.1	8	II		NONE	P001 IBC01		T11	TP2 TP13
3362	CHLOROSILANES, TOXIC, CORROSIVE, FLAMMABLE, N.O.S.	6.1	3 8	II		NONE	P001 IBC01		T11	TP2 TP13

Annex 2 (in ENGLISH ONLY)

List of chlorosilanes: proposed amendments either struck through or indicated in bold and underlined

UN No.	Name and description	Class or division	Subsidiary risk	UN packing group	Special provisions	Limited quantities	Packagings and IBCs		Portable tanks and bulk containers	
							Packing instruction	Special packing provisions	Instructions	Special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1162	DIMETHYLDICHLOROSILANE	3	8	II		NONE	P001 IBC02 Pxxx		T7 <u>T10</u>	TP2 <u>TP7</u> TP13
1183	ETHYLDICHLOROSILANE	4.3	3 8	I		NONE	P401		T10 <u>T14</u>	TP2 TP7 TP13
1196	ETHYLTRICHLOROSILANE	3	8	II		NONE	P001 IBC02 Pxxx		T7 <u>T10</u>	TP2 <u>TP7</u> TP13
1242	METHYLDICHLOROSILANE	4.3	3 8	I		NONE	P401		T10 <u>T14</u>	TP2 TP7 TP13
1250	METHYLTRICHLOROSILANE	3	8	I <u>II</u>		NONE	P001 Pxxx		T11 <u>T10</u>	TP2 <u>TP7</u> TP13
1295	TRICHLOROSILANE	4.3	3 8	I		NONE	P401		T14	TP2 TP7 TP13
1298	TRIMETHYLCHLOROSILANE	3	8	II		NONE	P001 IBC02 Pxxx		T7 <u>T10</u>	TP2 <u>TP7</u> TP13
1305	VINYLTRICHLOROSILANE	3	8	I <u>II</u>		NONE	P001 Pxxx		T11 <u>T10</u>	TP2 <u>TP7</u> TP13
1724	ALLYLTRICHLOROSILANE, STABILIZED	8	3	II		NONE	P001 IBC02 Pxxx		T7 <u>T10</u>	TP2 <u>TP7</u> TP13
1728	AMYLTRICHLOROSILANE	8		II		NONE	P001 IBC02 Pxxx		T7 <u>T10</u>	TP2 <u>TP7</u> TP13
1747	BUTYLTRICHLOROSILANE	8	3	II		NONE	P001 IBC02 Pxxx		T7 <u>T10</u>	TP2 <u>TP7</u> TP13
1753	CHLOROPHENYLTRICHLORO- SILANE	8		II		NONE	P001 IBC02 Pxxx		T7 <u>T10</u>	TP2 <u>TP7</u>
1762	CYCLOHEXENYL- TRICHLOROSILANE	8		II		NONE	P001 IBC02 Pxxx		T7 <u>T10</u>	TP2 <u>TP7</u> TP13
1763	CYCLOHEXYL- TRICHLOROSILANE	8		II		NONE	P001 IBC02 Pxxx		T7 <u>T10</u>	TP2 <u>TP7</u> TP13

UN No.	Name and description	Class or division	Subsidiary risk	UN packing group	Special provisions	Limited quantities	Packagings and IBCs		Portable tanks and bulk containers	
							Packing instruction	Special packing provisions	Instructions	Special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1766	DICHLOROPHENYL-TRICHLOROSILANE	8		II		NONE	P001 IBC02 Pxxx		F7 T10	TP2 TP7 TP13
1767	DIETHYLDICHLOROSILANE	8	3	II		NONE	P001 IBC02 Pxxx		F7 T10	TP2 TP7 TP13
1769	DIPHENYLDICHLOROSILANE	8		II		NONE	P001 IBC02 Pxxx		F7 T10	TP2 TP7 TP13
1771	DODECYLTRICHLOROSILANE	8		II		NONE	P001 IBC02 Pxxx		F7 T10	TP2 TP7 TP13
1781	HEXADECYL-TRICHLOROSILANE	8		II		NONE	P001 IBC02 Pxxx		F7 T10	TP2 TP7 TP13
1784	HEXYLTRICHLOROSILANE	8		II		NONE	P001 IBC02 Pxxx		F7 T10	TP2 TP7 TP13
1799	NONYLTRICHLOROSILANE	8		II		NONE	P001 IBC02 Pxxx		F7 T10	TP2 TP7 TP13
1800	OCTADECYLTRICHLOROSILANE	8		II		NONE	P001 IBC02 Pxxx		F7 T10	TP2 TP7 TP13
1801	OCTYLTRICHLOROSILANE	8		II		NONE	P001 IBC02 Pxxx		F7 T10	TP2 TP7 TP13
1804	PHENYLTRICHLOROSILANE	8		II		NONE	P001 IBC02 Pxxx		F7 T10	TP2 TP7 TP13
1816	PROPYLTRICHLOROSILANE	8	3	II		NONE	P001 IBC02 Pxxx		F7 T10	TP2 TP7 TP13
1818	SILICON TETRACHLORIDE	8		II		II NONE	P001 IBC02 Pxxx		F7 T10	TP2 TP7 TP13
2434	DIBENZYLDICHLOROSILANE	8		II		NONE	P001 IBC02 Pxxx		F7 T10	TP2 TP7 TP13
2435	ETHYLPHENYLDICHLOROSILANE	8		II		NONE	P001 IBC02 Pxxx		F7 T10	TP2 TP7 TP13
2437	METHYLPHENYLDICHLOROSILANE	8		II		NONE	P001 IBC02 Pxxx		F7 T10	TP2 TP7 TP13
2985	CHLOROSILANES, FLAMMABLE, CORROSIVE, N.O.S.	3	8	II		NONE	P001 IBC02 Pxxx		F14 T14	TP2 TP7 TP13 TP27

UN No.	Name and description	Class or division	Subsidiary risk	UN packing group	Special provisions	Limited quantities	Packagings and IBCs		Portable tanks and bulk containers	
							Packing instruction	Special packing provisions	Instructions	Special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
2986	CHLOROSILANES, CORROSIVE, FLAMMABLE, N.O.S.	8	3	II		NONE	P001 IBC02 Pxxx		T14 T14	TP2 TP7 TP13 TP27
2987	CHLOROSILANES, CORROSIVE, N.O.S.	8		II		NONE	P001 IBC02 Pxxx		T14	TP2 TP7 TP13 TP27
2988	CHLOROSILANES, WATER-REACTIVE, FLAMMABLE, CORROSIVE, N.O.S.	4.3	3 8	I		NONE	P401		T10 T14	TP2 TP7 TP9 TP13
3361	CHLOROSILANES, TOXIC, CORROSIVE, N.O.S.	6.1	8	II		NONE	P001 IBC01 Pxxx		T14 T14	TP2 TP7 TP13 TP27
3362	CHLOROSILANES, TOXIC, CORROSIVE, FLAMMABLE, N.O.S.	6.1	3 8	II		NONE	P001 IBC01 Pxxx		T14 T14	TP2 TP7 TP13 TP27

Annex 3 (in ENGLISH ONLY)

Data Sheet for Methyltrichlorosilane

**DATA SHEET TO BE SUBMITTED TO THE UNITED NATIONS
FOR NEW OR AMENDED CLASSIFICATION OF SUBSTANCES**

Submitted by ... CES..... Date January 2006.....

Supply all relevant information including sources of basic classification data. Data should relate to the product in the form to be transported. State test methods. Answer all questions - if necessary state "not known" or "not applicable" - If data is not available in the form requested, provide what is available with details. Delete inappropriate words.

Section 1. SUBSTANCE IDENTITY

- 1.1 Chemical name: Methyltrichlorosilane
- 1.2 Chemical formula : CH_3SiCl_3
- 1.3 Other names/synonyms : Trichloro(methyl)silane.....
- 1.4.1 UN number1250..... 1.4.2 CAS number 75-79-6.....
- 1.5 Proposed classification for the Recommendations
 - 1.5.1 proper shipping name (3.1.2)¹ .. Methyltrichlorosilane
 - 1.5.2 class/division ...3 subsidiary risk(s) ...8
packing groupII (according to proposal)
 - 1.5.3 proposed special provisions, if any
 - 1.5.4 proposed packing instruction(s)Pxxx (according to proposal)

Section 2. PHYSICAL PROPERTIES

- 2.1 Melting point or range $-77\text{ }^\circ\text{C}$
- 2.2 Boiling point or range $66\text{ }^\circ\text{C}$ (101.3kPa)
- 2.3 Relative density at :
 - 2.3.1 $15\text{ }^\circ\text{C}$ 1.283 g/cm^3
 - 2.3.2 $20\text{ }^\circ\text{C}$ 1.275 g/cm^3
 - 2.3.3 $50\text{ }^\circ\text{C}$ 1.223 g/cm^3
- 2.4 Vapour pressure at :
 - 2.4.1 $50\text{ }^\circ\text{C}$ 59.02 kPa
 - 2.4.2 $65\text{ }^\circ\text{C}$ 96.56 kPa

¹ *This and similar references are to chapters and paragraphs in the Model Regulations on the Transport of Dangerous Goods.*

- 4.1.3 Time effective at 55 °C.....
- 4.1.4 Conditions rendering it ineffective
- 4.2 Is the substance an explosive according to paragraph 2.1.1.1? (2.1¹) **yes/no**
- 4.2.1 If yes, give details
-
-
- 4.3 Is the substance a desensitized explosive? (2.4.2.4¹) **yes/no**
- 4.3.1 If yes, give details
-
-
- 4.4 Is the substance a self-reactive substance? (2.4.1¹) **yes/no**
- If yes, state:
- 4.4.1 exit box of flow chart... ..
- What is the self-accelerating decomposition temperature (SADT) for a 50 kg package?... °C
- Is the temperature control required? (2.4.2.3.4¹) **yes/no**
- 4.4.2 proposed control temperature for a 50 kg package.....°C
- 4.4.3 proposed emergency temperature for a 50 kg package.....°C
- 4.5 Is the substance pyrophoric? (2.4.3¹) **yes/no**
- 4.5.1 If yes, give details
-
-
- 4.6 Is the substance liable to self-heating? (2.4.3¹) **yes/no**
- 4.6.1 If yes, give details
-
-
- 4.7 Is the substance an organic peroxide (2.5.1¹) **yes/no**
- If yes state:
- 4.7.1 exit box of flow chart... ..
- What is the self accelerating decomposition temperature (SADT) for a 50 kg package? ... °C
- Is temperature control required? (2.5.3.4.1¹) **yes/no**
- 4.7.2 proposed control temperature for a 50 kg package.....°C

¹ *This and similar references are to chapters and paragraphs in the Model Regulations on the Transport of Dangerous Goods.*

Annex 4 (in ENGLISH ONLY)

Data Sheet for Vinyltrichlorosilane

**DATA SHEET TO BE SUBMITTED TO THE UNITED NATIONS
FOR NEW OR AMENDED CLASSIFICATION OF SUBSTANCES**

Submitted by ... CES.....Date January 2006.....

Supply all relevant information including sources of basic classification data. Data should relate to the product in the form to be transported. State test methods. Answer all questions - if necessary state "not known" or "not applicable" - If data is not available in the form requested, provide what is available with details. Delete inappropriate words.

Section 1. SUBSTANCE IDENTITY

- 1.1 Chemical name Vinyltrichlorosilane
- 1.2 Chemical formula $\text{CH}_2=\text{CH}-\text{SiCl}_3$
- 1.3 Other names/synonyms Ethenyltrichlorosilane.....
- 1.4.1 UN number1305 1.4.2 CAS number 75-94-5.....
- 1.5 Proposed classification for the Recommendations
- 1.5.1 proper shipping name (3.1.2¹)Vinyltrichlorosilane
- 1.5.2 class/division3 subsidiary risk(s) ...8
packing group ...II (according to proposal)
- 1.5.3 proposed special provisions, if any
- 1.5.4 proposed packing instruction(s)Pxxx (according to proposal)

Section 2. PHYSICAL PROPERTIES

- 2.1 Melting point or range < - 78 °C
- 2.2 Boiling point or range 92 °C (101.3 kPa)
- 2.3 Relative density at :
- 2.3.1 15 °C
- 2.3.2 20 °C 1.27 g/cm³
- 2.3.3 50 °C
- 2.4 Vapour pressure at :
- 2.4.1 50 °C23.5..... kPa

1 *This and similar references are to chapters and paragraphs in the Model Regulations on the Transport of Dangerous Goods.*

- 2.4.2 65 °C kPa
 - 2.5 Viscosity at 20 °C² 0.5 x 10⁻⁶ ... m²/s
 - 2.6 Solubility in water at 20 °C reacts violently with water g/100 ml
 - 2.7 Physical state at 20°C (2.2.1.1¹) ~~solid~~/liquid/gas²
 - 2.8 Appearance at normal transport temperatures, including colour and odour
colourless liquid, pungent odour.....
 - 2.9 Other relevant physical propertieshighly flammable; release of hydrogen chloride gas in contact with humidity, formation of hydrochloric acid vapours; reacts violently with water, alcohols, protic solvents
-
-

Section 3. FLAMMABILITY

- 3.1 Flammable vapour
 - 3.1.1 Flash point (2.3.3¹) 13°C ~~no~~/cc
 - 3.1.2 Is combustion sustained? (2.3.1.3¹) yes/no
 - 3.2 Autoignition temperature ..270..... °C
 - 3.3 Flammability range (LEL/UEL)..3.17 – 49.2 % (Vol.)
 - 3.4 Is the substance a flammable solid? (2.4.2¹) yes/no
 - 3.4.1 If yes, give details
-
-

Section 4. CHEMICAL PROPERTIES

- 4.1 Does the substance require inhibition/stabilization or other treatment such as nitrogen blanket to prevent hazardous reactivity ?
- yes/~~no~~
- If yes, state:
- 4.1.1 Inhibitor/stabilizer used nitrogen blanket to exclude humidity
 - 4.1.2 Alternative method
 - 4.1.3 Time effective at 55 °C.....

1 This and similar references are to chapters and paragraphs in the Model Regulations on the Transport of Dangerous Goods.

2 See definition of "liquid" in 1.2.1 of the Model Regulations on the Transport of Dangerous Goods.

- 4.1.4 Conditions rendering it ineffective
- 4.2 Is the substance an explosive according to paragraph 2.1.1.1? (2.1¹) **yes/no**
- 4.2.1 If yes, give details
-
-
-
- 4.3 Is the substance a desensitized explosive? (2.4.2.4¹) **yes/no**
- 4.3.1 If yes, give details
-
-
- 4.4 Is the substance a self-reactive substance? (2.4.1¹) **yes/no**
- If yes, state:
- 4.4.1 exit box of flow chart... ..
- What is the self-accelerating decomposition temperature (SADT) for a 50 kg package? °C
- Is the temperature control required? (2.4.2.3.4¹) **yes/no**
- 4.4.2 proposed control temperature for a 50 kg package.....°C
- 4.4.3 proposed emergency temperature for a 50 kg package.....°C
- 4.5 Is the substance pyrophoric? (2.4.3¹) **yes/no**
- 4.5.1 If yes, give details
-
-
-
- 4.6 Is the substance liable to self-heating? (2.4.3¹) **yes/no**
- 4.6.1 If yes, give details
-
-
-
- 4.7 Is the substance an organic peroxide (2.5.1¹) **yes/no**
- If yes state:
- 4.7.1 exit box of flow chart... ..
- What is the self accelerating decomposition temperature (SADT) for a 50 kg package? °C
- Is temperature control required? (2.5.3.4.1¹) **yes/no**

1 *This and similar references are to chapters and paragraphs in the Model Regulations on the Transport of Dangerous Goods.*

5.6 Other data

5.7 Human experiencecorrosive to skin, causes severe burns to the skin and to the eyes

Section 6. SUPPLEMENTARY INFORMATION

6.1 Recommended emergency action

6.1.1 Fire (include suitable and unsuitable extinguishing agents)medium expansion foam; no water; no halones

6.1.2 Spillage soak up with inert absorbent material (e.g. dry sand)

6.2 Is it proposed to transport the substance in:

6.2.1 Bulk Containers (6.8¹) yes/no

6.2.2 Intermediate Bulk Containers (6.5¹)? yes/no

6.2.3 Portable tanks (6.7¹)? yes/~~no~~

If yes, give details in Sections 7, 8 and/or 9.

Section 7. BULK CONTAINERS (only complete if yes in 6.2.1)

7.1 Proposed type(s)

Section 8. INTERMEDIATE BULK CONTAINERS (IBCs) (only complete if yes in 6.2.2)

8.1 Proposed type(s).....

Section 9. MULTIMODAL TANK TRANSPORT (only complete if yes in 6.2.3)

9.1 Description of proposed tank (including IMO tank type if known).....T10; IMO1

9.2 Minimum test pressure4 bars

9.3 Minimum shell thickness6 mm (mild steel).....

9.4 Details of bottom openings, if any :...not allowed

9.5 Pressure relief arrangementspressure-relief valve preceded by a frangible disc

9.6 Degree of fillingTP2; 95/(1+α (tr – tf)).....

9.7 Unsuitable construction materialsaluminium; non-ferrous metals.....

1 This and similar references are to chapters and paragraphs in the Model Regulations on the Transport of Dangerous Goods.