

Compilers Guide for the International Chemical Safety Cards

2018 (v1)

ICSC are prepared by an international group of experts on behalf of ILO and WHO, with the financial assistance of the European Commission.
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Foreword

This is the new Compilers Guide for the International Chemical Safety Cards, an essential tool for making (compiling) ICSC.

It has been several years since the transition of the production platform of ICSC, from the so-called PrettyBit (PB) system to the current internet based system). However all this time the makers (compilers) of ICSC have continued to use the 'manual' for making ICSC, the Compilers Guide (CG), which in fact is nothing but a Word document.

Maintenance of this PrettyBit Compilers Guide (PBCG) was performed in this document and includes activities like adding, editing or deleting (disallowing) standard phrases. But also other activities like adding information regarding GHS classifications and flammability related changes have been recorded in this document. It should also be noted that the PBCG contains several useful appendices with e.g. formulas and tools that can be applied when compiling a card.

The most actual version of the CG dates back from August 2010, with beforementioned additions dated February 2012 (titled 'Compiler's Guide - Updated August 2010 with GHS annotations February 2012'; marked in blue font for GHS-related remarks and in green for flammability-related remarks)).

However, keeping the CG up to date not only required meticulous maintenance, but has become increasingly difficult because the PB system had a set up quite different from the current system. For this reason the process of finally converting the PBCG into a new CG designed for the current production database system has been started.

A new Compilers Guide

In order to create a new Compilers Guide all the essential data from the PBCG has been converted to the current ICSC production database. It is the fruit of the labour over a period of well over a year.

For this a new Compilers Guide Committee has been formed. The members of this committee are Bénédicte LaRocca, Daria Pakulska, Marc Baril, Susana Torrado del Rey and Wim Beltman.

The maintenance and improvement of the Compilers Guide is a continuous process. The Compilers Guide is not a static document, but *a continuously evolving and improving document*, which requires both a *regular* and a *regulated* process of *updating*.

For this reason other compilers are invited to contact the committee members with any questions or suggestion regarding the Compilers Guide. Any contributions that may improve this CG are very welcome.

We are confident that this new CG will be a tremendous step forward in facilitating the compilers' work and hope you will enjoy this new document.

On behalf of the Compilers Guide Committee,

Wim Beltman, Scientific Editor ICSC.

27 September 2018.

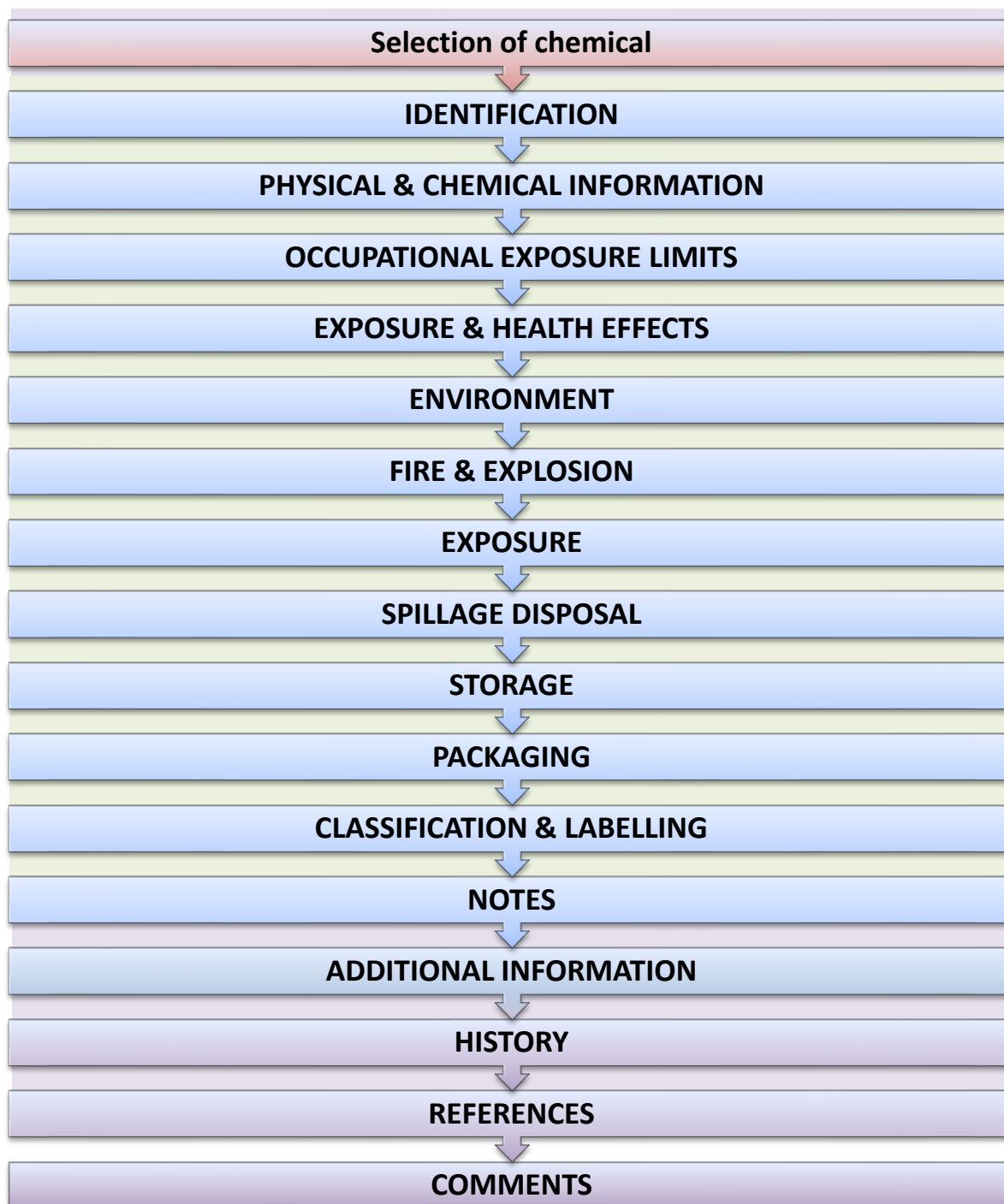
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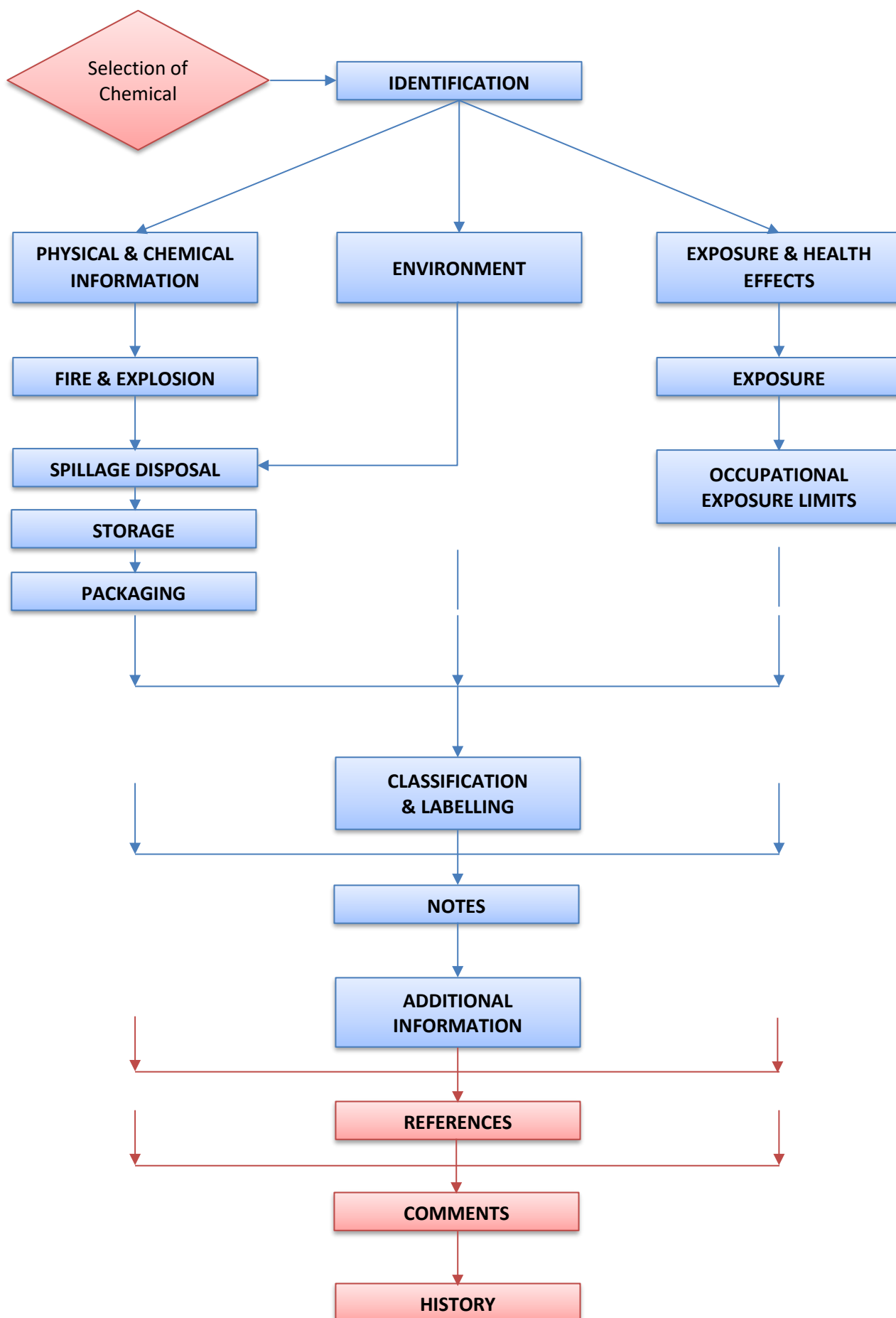
Roadmap

For compilers, the creation or updating process for an ICSC is most efficient when the card sections are completed in the following (most convenient) order, as depicted here:



The same order of sections will be followed in this Compilers Guide.

Another way of showing this efficient order and how the different card sections are connected is depicted in the next flow diagram.



Information format

The information in this CG will be presented in sections, made up out of *sentences* and *parameters* of one or more *fields*. The fields and sentences have an internal database number, e.g. **SentenceIDs**. Sentences are made up out of a model text with possibly one or more **parameter indicators** that can be substituted with a parameter value.

Conventions

- Model text of ICSC sentences appear in normal (black-colored) text.
- **SentenceIDs** and **parameter indicators** (e.g. [P1]), are indicated by a **dark red text color**.
- **PrettyBit phrase numbers** (PB#) are marked with a **light blue text color**, sometimes highlighted with a **yellow background**.

The information is structured by presenting text in tables with the following construction.

Field name

| 00 Field name | | |
|---------------|--|-------------|
| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
| 000000 | Model text [P1]. Explanation: text Indication: text Parameters: text Links: SentenceIDs <hr/> [P1] text Explanation: text Indication: text CGC remarks: text PoC: text | 0000000 |

A sentence can be followed with its Explanation, Indication, Parameters and/or Links. Only a few of the possible parameter values will be listed here. In some cases the number of possible values can be relatively high. In those cases only the first and last possible value are displayed. Compilers are referred to the production database for the full (and updated) set of possible parameter values.

For some parameter values it may be desirable to have a separate parameter-specific Explanation and Indication, which can be displayed as well.

After each sentence or group of sentences extra lines with CGC remarks and Points of Concern (PoC) can be shown as in **dark green text** with a light yellow background.

Grouping of sentences

In the current database system, sentences appear in a non-specific order of SentenceIDs. It may be convenient for compilers to group certain sets of related sentences. This will be done in by means of an extra header with a light blue background, e.g.:

| Boiling point / decomposition | |
|-------------------------------|--|
| Explanation: | Indicates the boiling point or range of the anhydrous substance at a normal atmospheric pressure (101.3 kPa). |
| Indication: | Round off to the nearest degree Celsius, use one decimal. Select additional sentences if there is a special reason to mention the boiling point at a pressure other than normal atmospheric pressure (101.3 kPa). |

As is shown above, a single Explanation and/or Indication may be given and will apply to all sentences in that group.

IDENTIFICATION

In the title bar of the ICSC, the main name and the state of the substance can be specified.

Name

An International Chemical Safety card is compiled in the English language and after Peer Review validation the card is (automatically) translated into other languages. The main name is entered as a free text (shown as the [T1] parameter).

| 01 Name | | |
|---------|--|-------------|
| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
| 10001 | <p>[T1]</p> <p>Explanation: For the MAIN NAME (use CAPITAL letters) priority is given to the name used by the manufacturing industry. If no common name is used, then the IUPAC name (International Union of Pure and Applied Chemistry) comes first. This is the official chemical name according to the rules of the IUPAC. In addition to the main name and the IUPAC name, other important synonyms are given. The MAIN NAME is completed with an indication of the trade form of the substance to which the Card applies. Main names and synonyms are indexed.</p> <p>Indication: Use roman digits between parentheses in this name to state the valency if necessary, e.g., IRON(III) OXIDE. The following prefixes are considered to form part of the name: bis, cyclo, iso and the numerals mono, di, tri, tetra, penta, etc. In the MAIN NAME they should be written in CAPITALS. The following prefixes should be considered as additions and should NOT be printed in CAPITALS in the MAIN NAME: ortho- (o-), meta- (m-), para- (p-), alpha- (a-), beta- (β-), gamma- (γ-), etc.; primary (prim-), secondary (sec-), tertiary (tert-); cis-, trans-; dextro- (d-), laevo- (l-); normal (n-), N- (link to the nitrogen atom).</p> | 11101000 |

State

The MAIN NAME is completed with an indication of the trade form of the substance to which the Card applies.

| 04 State | | |
|----------|--|-------------|
| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
| 40001 | <p>(cylinder)</p> <p>Indication: Applies if the substance is held in a cylinder suitable to keep gases or liquefied gases above atmospheric pressure.</p> <p>Links: (710016) (710003/710016/710017/710019) (660082/660105/660115+'COMPRESSED' 660083/660098/660106/660121) (640014/640013); 640003 (640048) (640021)</p> | 11301000 |
| 40002 | <p>(liquefied)</p> <p>Indication: Applies if the substance is a liquefied gas stored under atmospheric pressure, e.g., in a Dewar vessel. Cryogenics will have this description. This phrase does not apply to gases which are (partly) liquefied as a result of being kept under pressure in a cylinder; use 40001 (cylinder) instead.</p> <p>Links: (710016) 660144 580002+'face shield'</p> | 11303000 |
| 40003 | <p>(liquefied, cooled)</p> <p>Indication: Applies if the substance is an unstable gas (partly) liquefied under pressure and stored under continuous cooling to avoid decomposition. (Applies only to a few gases).</p> <p>Links: (710016) 640004</p> | 11305000 |
| 40004 | <p>(powder)</p> <p>Indication: Should normally be used only for metal powders.</p> | 11307000 |
| 40006 | See Notes | |

Synonyms

02 Synonyms

| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
|--------|--|--|
| 20001 | [T1] Explanation: In addition to the MAIN NAME and the IUPAC name, the EINECS (European Inventory of Existing Chemical Substances) name and other important synonyms are given here. Main names and synonyms are indexed. Indication: IUPAC name if different from 10001. Trivial names may be used without the stating the valency, e.g., copper sulfate for $\text{CuSO}_4 \cdot 5 \text{H}_2\text{O}$ | 11102000 11105000 11103000 11104000 |

Mass

05 Mass

| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
|--------|--|-------------|
| 50001 | Atomic mass: [N1] Explanation: The relative atomic mass is stated here. The relative atomic mass of a substance is the mass of 1 atom of that substance divided by 1/12 of the mass of 1 atom of carbon. Indication: Round off [N1] parameter to the nearest 0.1 | 11503000 |
| | Molecular mass Explanation: The relative molecular mass is stated here. The relative molecular mass of a substance is the sum of the relative atomic masses of the elements which together form a molecule of that substance. Indication: Round off [N1] parameter to the nearest 0.1 | |
| 50002 | Molecular mass: [N1] | |
| 50003 | Molecular mass: [N1] (average) | |
| 50004 | Molecular mass: [N1] (approx) | |
| 50005 | Molecular mass: variable (polymer) | 11505010? |
| 50006 | Formula: see Notes | |
| 50008 | Molecular mass: [N1] (see Notes) | 11505000 |

CAS number

11 CAS

| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
|--------|---|-------------|
| | Explanation: Unique Chemical Abstracts Service (CAS) registry numbers are used for identification as substances often have several synonyms. | |
| 110001 | CAS #: [N1]; ;] | 11701000 |
| 110003 | CAS #: see Notes | 11701000 |

UN number

The United Nations has numbered many substances to facilitate identification, especially during transport.

| 13 UN # | | |
|---------|--|-------------|
| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
| | Explanation: The United Nations has numbered many substances to facilitate identification, especially during transport. The UN Hazard Class, the UN Subsidiary Risks, and the UN Pack Group are entered in the field reserved for them in the section CLASSIFICATION & LABELING. | |
| 130001 | UN #: [N1]; ;] | 11911000 |
| 130002 | UN #: [N1] ([P2]) Parameters: 27 parameters: P2: Cadmium compounds; ... zinc powder or dust Indication: Select (or create) the proper parameter value for P2. The use of UN number for classes or groups of chemicals (n.o.s: not otherwise specified) must be discussed by the Peer Review group. | |
| 130003 | UN #: see Notes CGC remarks: The text in the Explanation has been revised (section name 'Identification' replaced with CLASSIFICATION & LABELING). The last line of the Explanation has been moved to the (new) Indication. | |

EC number

| 15 EC number | | |
|--------------|--|-------------|
| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
| 150001 | EC number: [N1]; ;] Explanation: The EINECS number is the reference number used in the European Inventory of Existing Commercial Chemical Substances between 1 January 1971 and 18 September 1981. It has been replaced by the EC number. The EINECS number is a seven-digit system, separated into 3 groups by hyphens of the type XXX-XXX-X, which starts by: - 2 or 3 (2XX-XXX-X or 3XX-XXX-X) for chemical substances belonging to EINECS (Existing Chemicals), - 4 (4XX-XXX-X) for chemical substances belonging to ELINCS (New Chemicals), - 5 (5XX-XXX-X) for chemical substances belonging to NLP (No-Longer Polymers). Indication: Complete with the EC number. | |
| | CGC remarks: Under REACH the name of this number has been renamed to "EC number". | |

Disallowed sentences in Identification

The RTECS number is not used anymore in the new layout of the ICSC (published October 2017). Therefore, the RTECS# sentences are *disallowed* and **do not need to be updated anymore**.

| 12 RTECS # | | |
|------------|---|-------------------|
| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
| 120001 | RTECS #: [N1]; ;] | <i>disallowed</i> |
| 120002 | RTECS #: [N1] ([P2]) | <i>disallowed</i> |
| 120003 | RTECS #: see Notes | <i>disallowed</i> |
| 120004 | RTECS #: none | <i>disallowed</i> |
| | CGC remarks: The RTECS# sentences are <i>disallowed</i> and do not need to be updated anymore. | |

PHYSICAL & CHEMICAL INFORMATION

Formula

| 03 Formula | | |
|------------|--|-------------|
| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
| 30001 | Formula: [N1] Indication: Complete with the formula of the substance. For an organic substance use a linear formula, showing the structure of the substance as far as this can be informative to a person with basic chemical knowledge. In other cases, the elemental formula should be used. | 11501000 |
| 30002 | Formula: [N1] (approx) | 11501000 |
| 30003 | Formula: see Notes | 11501000 |

Physical properties

The following section has been divided into subsections (groups) for which 'group Indications' are applied.

| 74 Physical properties | | |
|----------------------------|---|-------------|
| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
| Physical properties | | |
| | Indication: Physical properties should be displayed in the same order in all the cards, with the following order: 1-Boiling point / Decomposition 2-Melting point / Sublimation 3-Density / Relative density 4-Solubility 5-Vapour pressure 6-Relative vapour density 7-Relative density of the vapour/air mixture 8-Flash point 9-Auto-ignition temperature 10-Explosive limits 11-Octanol/water partition coefficient 12-Viscosity 13-Other physical properties | |
| | CGC remarks: On an ICSC the physical properties should be displayed in the order mentioned in the Explanation. However, the sentences in our production database may be appearing in a different order (e.g. alphabetically, or numerically on SentenceID). In this compilers guide the available sentences will be grouped according to the preferred order. Grouped sentences also allow for a general indication or explanation per group which avoids needless repetition (future developments). | |
| 740001 | See Notes. | |
| group | Boiling point / decomposition | |
| | Explanation: Indicates the boiling point or range of the anhydrous substance at a normal atmospheric pressure (101.3 kPa). | |
| | Indication: Round off to the nearest degree Celsius, use one decimal. Select additional sentences if there is a special reason to mention the boiling point at a pressure other than normal atmospheric pressure (101.3 kPa). | |
| 740007 | Boiling point: [N1]°C ["("P2)"] Parameters: 9 parameters: P2: 25%; 40% solution; 70%; 90%; calculated; estimated; explodes; partially sublimes; sublimes | 12101000 |
| 740008 | Boiling point at [N1]kPa: [N2]°C Indication: Applies if there is a special reason to mention the boiling point at a pressure other than normal atmospheric pressure (101.3 kPa). | 12102000 |
| 740009 | Boiling point at [N1]Pa: [N2]°C | |

| 74 Physical properties | | |
|------------------------|--|---------------|
| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
| | Indication: Applies if there is a special reason to mention the boiling point at a pressure other than normal atmospheric pressure (101.3 kPa). | |
| 740012 | Boiling point: [P1] Parameters: 3 parameters: P1: not available (decomposes when heated); see Notes; sublimes | 12103000 |
| 740013 | Decomposes [" at "N1°C"][" "P2] Explanation: Although the phrase "Boiling point (decomposes)" is used in many physico-chemical databases, it is more accurate to describe this as the decomposition temperature. The boiling point of a substance is a special temperature with an equilibrium between liquid and gaseous state. If the substance decomposes at this temperature no equilibrium state is possible because the substance changes in a chemical reaction. Parameters: 5 parameters: P2: (amorphous); after 31 days; after 7 days; at 0.01 kPa; when heated | 12106 + 12111 |
| 740016 | Decomposes: see Notes. | 12111500? |
| 740158 | Boiling point: No boiling point at normal pressure; decomposes [" "P1"][" "N1°C"] Parameters: 2 parameters: P1: at; on heating | |
| group | Melting point / Sublimation | |
| | Explanation: Indicates the melting point (or range) of the (anhydrous) substance at normal atmospheric pressure (101.3 kPa). If there is a significant difference between the melting point and the freezing point, the range is given. Indication: Round off to the nearest degree Celsius, use one decimal. Links: (870003 / 870004) | |
| 740051 | Melting point: [N1]°C ["("P2)"] Parameters: 15 parameters: P2: 25%; 40% solution; alpha-form; amorphous; beta-form; beta-sulfur; calculated; cis-isomer; m-; monohydrate; p-; r-sulfur; rapid heating; sublimes; trans-isomer | 12113/12114 |
| 740052 | Melting point: [N1]°C ["("P1)"], [N2]°C ["("P2)"] Parameters: 10 parameters: P1: 90%; m-; p-; pure; trans; P2: 70%; cis; m-; p-; technical | 12113/12114 |
| 740053 | Melting point: see Notes Indication: In case of hydrated substances (i.e., those with crystal water), the apparent melting point is given; this is then mentioned in NOTES. | 12121500 |
| 740155 | Melting point: softening point | |
| 740156 | Melting point: not available | |
| 740159 | Melting point: No melting point; decomposes [" "P1"][" "N1°C"] Explanation: Although the phrase "melting point (decomposes)" is used in many physico-chemical databases, it is more accurate to describe this as the decomposition temperature. The melting point of a substance is the specific temperature at which the substance exist in an equilibrium between solid and liquid state. If the substance decomposes at this temperature no equilibrium state is possible because the substance changes in a chemical reaction. Parameters: 3 parameters: P1: (see Notes); at; on heating | 12121000 |
| 740054 | Melting point: sublimes Indication: In case of hydrated substances (i.e., those with crystal water), the apparent melting point is given; this is then mentioned in NOTES. | |
| 740088 | Sublimation point: [N1]°C ["("P2)"] Explanation: A substance sublimes if on heating it passes directly from the solid to the vapour phase without melting. Indication: If the pressure at the triple point is >101.3 kPa. Round off to the nearest degree Celsius. Parameters: 2 parameters: P2: crystals; decomposes | 12104000 |
| 740087 | Sublimation Explanation: Sublimation is the phase transition of a substance directly from the solid to the gas phase without passing through the intermediate liquid phase. | 12105000 |

| 74 Physical properties | | | | | | | | |
|------------------------|---|---------------------------|---|-----------------------|--------------|-------------|----------------|--|
| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes | | | | | | |
| 740090 | Sublimation point: see Notes | 12104/12105 + 12111500 | | | | | | |
| 740091 | Sublimes at room temperature | – | | | | | | |
| group | Density / Relative density | | | | | | | |
| | Explanation: Relative density is typical for liquids. In source documents is often recorded the actual density in g/cm ³ . Density is used for many liquids and for most solids. | | | | | | | |
| | Indication: Use Density sentences in preference to sentences for Relative density. Round off the value to the nearest 0.1; for values between 0.8 and 1.1, to the nearest 0.01. If possible, use values applying to temperatures between 15 and 25°C. | | | | | | | |
| 740025 | Density (at [N1]°C): [N2] g/cm ³ | 12302000 | | | | | | |
| 740026 | Density[" ("P1)"]: [N2] g/cm ³ Parameters: 7 parameters: P1: amorphous; crystals; for liquid; for the alpha hemihydrate; for the beta hemihydrate; solid; trihydrate | | | | | | | |
| 740027 | Density[" ("P1)"]: [N2] g/l Parameters: 2 parameters: P1: gas; vapour at 15°C | | | | | | | |
| 740028 | Density[" ("P1)"]: [N2] kg/l Parameters: 1 parameter: P1: at the boiling point of the liquid | | | | | | | |
| 740029 | Density[" ("P1)"]: [N2] g/m ³ Parameters: 2 parameters: P1: bulk; gas | | | | | | | |
| 740160 | Density (at [N1]°C): [N2] g/ml | | | | | | | |
| 740161 | Density[" ("P1)"]: [N2] kg/m ³ Parameters: 2 parameters: P1: bulk; gas | 12302030 | | | | | | |
| 740030 | Density: see Notes | | | | | | | |
| 740062 | Relative density (water = 1): [N1] ["("P2)"] Parameters: 35 parameters: P2: -190°C; -21°C; -25°C; -33°C; -89°C; 100°C; 14% aqueous solution; 15°C; 20°C; 22°C; 25%; 25°C; 26°C; 30°C; 40% solution; 40°C; 45°C; 47°C; 5.5% aqueous solution; 50% solution; 60°C; 70%; 75°C; 90%; amorph; calculated; crude; cryst; expanded; hexahydrate; liquid; liquid at 4°C; liquid, -10°C; liquid, 0°C; liquid, 20°C, 6.86 atm | 12301000 | | | | | | |
| 740064 | Relative density (water = 1): see Notes Links: (870437) | | | | | | | |
| group | Solubitiy | | | | | | | |
| | Explanation: On the ICSC the solubility of a substance in water is shown (usually no data for other solvents may be given in the Notes section). In chemistry, solubility can be considered a mass concentration (ρ). The mass concentration is defined as the mass of a substance m divided by the volume of the mixture V : $\rho = m/V$. The volume V in the definition refers to the volume of the solution, not the volume of the solvent (water). One liter of an aqueous solution usually contains either slightly more or slightly less than 1 liter of water because the process of dissolution causes volume of liquid to increase or decrease. The solubility is given in g/100 ml water at 20°C, preferably with a descriptive term. Note that the terms used to describe solubility (e.g. 'moderately', 'poorly', 'sparingly') may vary from source to source and can be cause for confusion. The ICSC have adopted the terminology which is used by most databases in chemical industry, veterinary medicine and pharmacopoeias. They describe the solubility of a substance in terms of the volume of water (in milliliters), that is needed to dissolve 1 gram of the substance. This results in the following definitions: | | | | | | | |
| | <table border="1"> <thead> <tr> <th>Descriptive Term</th> <th>Volume of water (in ml) needed per gram substance</th> <th>ICSC solubility range</th> </tr> </thead> <tbody> <tr> <td>Very soluble</td> <td>Less than 1</td> <td>> 100 g/100 ml</td> </tr> </tbody> </table> | Descriptive Term | Volume of water (in ml) needed per gram substance | ICSC solubility range | Very soluble | Less than 1 | > 100 g/100 ml | |
| Descriptive Term | Volume of water (in ml) needed per gram substance | ICSC solubility range | | | | | | |
| Very soluble | Less than 1 | > 100 g/100 ml | | | | | | |

74 Physical properties

| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes | | | | | | | | | | | | | | | | | | |
|-----------------------|--|---------------------|------------------------|-------------------|---|---------------|--|-------------------|------------------------|-----------------|---|-------------------|------------------------|-----------------------|---------------------------|---------------------|-----------------------|------------------|-----------------|--|
| | <table border="1"> <tr> <td>Freely soluble</td> <td>From 1 to 10</td> <td>10 – 100 g/100 ml</td> </tr> <tr> <td>Soluble</td> <td>From 10 to 30</td> <td>3½ – 10 g/100 ml</td> </tr> <tr> <td>Sparingly soluble</td> <td>From 30 to 100</td> <td>1 – 3½ g/100 ml</td> </tr> <tr> <td>Slightly soluble</td> <td>From 100 to 1,000</td> <td>0.1 – 1 g/100 ml</td> </tr> <tr> <td>Very slightly soluble</td> <td>From 1,000 to 10,000</td> <td>0.01 – 0.1 g/100 ml</td> </tr> <tr> <td>Practically insoluble</td> <td>More than 10,000</td> <td>< 0.01 g/100 ml</td> </tr> </table> <p>If the substance reacts spontaneously with water this is indicated by the term 'reaction'.</p> <p>A liquid which forms one liquid phase, when mixed with water in any proportion, is indicated with 'miscible'.</p> <p>For <i>gases</i>, the solubility under a pressure of 1 atmosphere (101.3 kPa) is given.</p> <p>Indication: For the benefit of non-scientific users of the cards, give both the value for the solubility and the qualitative description based on the values listed in the table in Explanation. If the solubility is not accurately known then just give the qualitative description.</p> | Freely soluble | From 1 to 10 | 10 – 100 g/100 ml | Soluble | From 10 to 30 | 3½ – 10 g/100 ml | Sparingly soluble | From 30 to 100 | 1 – 3½ g/100 ml | Slightly soluble | From 100 to 1,000 | 0.1 – 1 g/100 ml | Very slightly soluble | From 1,000 to 10,000 | 0.01 – 0.1 g/100 ml | Practically insoluble | More than 10,000 | < 0.01 g/100 ml | |
| Freely soluble | From 1 to 10 | 10 – 100 g/100 ml | | | | | | | | | | | | | | | | | | |
| Soluble | From 10 to 30 | 3½ – 10 g/100 ml | | | | | | | | | | | | | | | | | | |
| Sparingly soluble | From 30 to 100 | 1 – 3½ g/100 ml | | | | | | | | | | | | | | | | | | |
| Slightly soluble | From 100 to 1,000 | 0.1 – 1 g/100 ml | | | | | | | | | | | | | | | | | | |
| Very slightly soluble | From 1,000 to 10,000 | 0.01 – 0.1 g/100 ml | | | | | | | | | | | | | | | | | | |
| Practically insoluble | More than 10,000 | < 0.01 g/100 ml | | | | | | | | | | | | | | | | | | |
| 740071 | <p>Solubility in water, g/100ml[" at "N2°C": [N3] ["("P4)"]]</p> <p>Parameters: 13 parameters: P4: good; good, trihydrate; miscible; moderate; none; pH-dependent; poor; reaction; reacts slowly; technical grade; very good; very poor</p> <p>Links: (680115) (680115 + 'water')</p> | 12304000 | | | | | | | | | | | | | | | | | | |
| 740072 | <p>Solubility in water, mg/l[" at "N2°C": [N3] ["("P4)"]]</p> <p>Parameters: 12 parameters: P4: good; miscible; moderate; none; pH-dependent; poor; reaction; reacts slowly; technical grade; very good; very poor</p> | | | | | | | | | | | | | | | | | | | |
| 740073 | <p>Solubility in water, ml/100ml[" at "N2°C": [N3] ["("P4)"]]</p> <p>Parameters: 11 parameters: P4: good; miscible; moderate; none; pH-dependent; poor; reaction; reacts slowly; technical grade; very good; very poor</p> | 12313000 | | | | | | | | | | | | | | | | | | |
| 740074 | <p>Solubility in water, g/l[" at "N2°C": [N3] ["("P4)"]]</p> <p>Parameters: 8 parameters: P4: good; moderate; none; poor; reaction; very good; very poor</p> | | | | | | | | | | | | | | | | | | | |
| 740084 | Solubility in water: see Notes | | | | | | | | | | | | | | | | | | | |
| 740086 | <p>Solubility in water[" at "N1°C": [P2]</p> <p>Parameters: 27 parameters: P2: decomposes; ... violent reaction</p> | | | | | | | | | | | | | | | | | | | |
| group | <p>Vapour pressure</p> <p>Explanation: The vapour pressure of gases in cylinders liquefied under pressure is given in kPa mentioning the corresponding temperature. (Note: 100 kPa = 1 bar). The saturated vapour pressure of solids and liquids is given in Pa or in kPa, preferably at a temperature of 20°C. (Note: 1 kPa = 1000 Pa = 10 mbar). If a calculated value is given this is indicated with 'ab.' (i.e., about). The vapour pressures at 20°C of substances boiling at temperatures ≥ 350°C are negligible and should NOT be mentioned.</p> <p>Indication: Skip for gases with a critical temperature < -10°C and for substances with a boiling point ≥ 350°C and an OEL ≥ 0.1 ppm. (For the OEL, see field 79). Use this phrase for a vapour pressure ≥ 0.1 kPa.</p> <p>Rounding off:</p> <table> <tr> <td>≥ 100 kPa</td> <td>: to the nearest unit;</td> </tr> <tr> <td>1-100 kPa</td> <td>: to 1 significant digit after the decimal point;</td> </tr> <tr> <td>≥ 0.1 - 1 kPa</td> <td>: to 2 significant digits after the decimal point;</td> </tr> <tr> <td>1 - 100 Pa</td> <td>: to the nearest unit;</td> </tr> <tr> <td>< 1 Pa</td> <td>: to the nearest significant digit after the decimal point.</td> </tr> </table> <p>If no value can be found, a calculated value is used; see Appendix 1.</p> <p>Rounding off calculated values:</p> <table> <tr> <td>≥ 5 kPa</td> <td>: to the nearest unit;</td> </tr> <tr> <td>2- 5 kPa</td> <td>: to the nearest 0.5 kPa;</td> </tr> </table> | ≥ 100 kPa | : to the nearest unit; | 1-100 kPa | : to 1 significant digit after the decimal point; | ≥ 0.1 - 1 kPa | : to 2 significant digits after the decimal point; | 1 - 100 Pa | : to the nearest unit; | < 1 Pa | : to the nearest significant digit after the decimal point. | ≥ 5 kPa | : to the nearest unit; | 2- 5 kPa | : to the nearest 0.5 kPa; | | | | | |
| ≥ 100 kPa | : to the nearest unit; | | | | | | | | | | | | | | | | | | | |
| 1-100 kPa | : to 1 significant digit after the decimal point; | | | | | | | | | | | | | | | | | | | |
| ≥ 0.1 - 1 kPa | : to 2 significant digits after the decimal point; | | | | | | | | | | | | | | | | | | | |
| 1 - 100 Pa | : to the nearest unit; | | | | | | | | | | | | | | | | | | | |
| < 1 Pa | : to the nearest significant digit after the decimal point. | | | | | | | | | | | | | | | | | | | |
| ≥ 5 kPa | : to the nearest unit; | | | | | | | | | | | | | | | | | | | |
| 2- 5 kPa | : to the nearest 0.5 kPa; | | | | | | | | | | | | | | | | | | | |

| 74 Physical properties | | |
|------------------------|---|-------------|
| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
| | 0.1 - 2 kPa : to the nearest 0.01 kPa; 10 - 100 Pa : to the nearest 10 Pa; < 10 Pa : state as < 10 Pa. | |
| 740093 | Vapour pressure: [P1] Parameters: 3 parameters: P1: 1.33 Pa; negligible; negligible at room temperature | |
| 740094 | Vapour pressure, Pa at [N2]°C: [N3] ["("P4)"] Parameters: 7 parameters: P2: 0.53 mPa; P4: 25%; 70%; 90%; calculated; negligible; very low | 12504000 |
| 740095 | Vapour pressure, kPa at [N2]°C: [N3] ["("P4)"] Parameters: 7 parameters: P2: 0.53 mPa; P4: 25%; 70%; 90%; calculated; negligible; very low | 12501000 |
| 740096 | Vapour pressure[" at "N1"°C"]: negligible | 12504010 |
| 740097 | Vapour pressure: see Notes | |
| 740032 | Evaporation rate (n-butyl acetate = 1): [N1] Explanation: Evaporation rate can be useful in evaluating the health and fire hazards of a material. For example, a substance with a high evaporation rate will readily form a vapor which can be inhaled or explode. Evaporation rates generally have an inverse relationship to boiling points; i.e. the higher the boiling point, the lower the rate of evaporation. Indication: The general reference material for evaporation rates is n-butyl acetate (commonly abbreviated BuAc). Whenever a relative evaporation rate is given, the reference material must be stated. | |
| group | Relative vapour density | |
| 740069 | Relative vapour density (air = 1): [N1] ["("P1)"] Explanation: This value indicates how many times a gas (or vapour) is heavier than air at the same temperature. For vapours from liquids and solids this value applies only for the vapour from the boiling liquid, therefore not for normal ambient temperatures. Indication: Skip if the boiling point >= 350°C. Round to 0.01 for values between 0.9 and 1.1; round other values to 0.1. Calculation $d=M/29$ Parameters: 4 parameters: P1: at boiling point; calculated; mixed isomers; see Notes | 12507000 |
| group | Relative density of the vapour/air mixture | |
| | Explanation: A mixture consisting of vapour and air is present above liquids (and solids) that are in contact with the open air. The density of this mixture relative to the surrounding pure air at 20°C, is important to the behaviour of this mixture. At values >= 1.1 the mixture may travel along the ground and may accumulate in depressions. At values between 0.9 and 1.1 fast mixing with the surrounding air may be expected. Indication: Skip if the substance is a gas or has a boiling point >= 350°C. Round to 0.01 for values between 0.9 and 1.1; round other values to 0.1. Calculation $D_m = 1 + (34 \times P_{20} \times 0.000001 \times [M-29])$ | |
| 740065 | Relative density of the vapour/air-mixture at [N1]°C (air = 1): [N2] | 12510000 |
| 740067 | Relative density of the vapour/air-mixture at 20°C (air = 1): see Notes | 12510000 |
| group | Flash point | |
| | Explanation: A common definition of the flash point is: 'the lowest temperature at atmospheric pressure (101.3 kPa) at which a liquid gives off so much combustible vapour at the liquid surface that this vapour, when mixed intimately with air, can be ignited by a flame or spark.' Flash points are also important characteristics of volatile solids such as benzoic acid and camphor. Although this definition of the concept flash point is unambiguous, its determination in actual practice meets with so many difficulties that it has been found necessary to specify the measurement procedures used for obtaining flash point values. Also, different authors may give different values as a result of impurities. When the exact value of the flash point is important in practice, it is best determined on the technical product at hand. The literature values have not always been determined according to one of the 'authorized' methods; the flash points quoted may differ from the values obtained by statutory methods. For safety reasons, the lowest value mentioned in authoritative references has been chosen. The addition 'o.c.' (open cup) or 'c.c.' (closed cup) indicates the determination method. | |

| 74 Physical properties | | |
|------------------------|--|-------------|
| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
| | Indication: Preference should be given to closed cup values, if available, otherwise open cup values can be used. Round off to the nearest degree Celsius and add 'c.c.' or 'o.c.'. State 'none' if the flash point cannot be determined although explosion limits are given. | |
| 740140 | Flash point: [N1]°C c.c.[" ("P2)"] Parameters: 2 parameters: P2: technical grade; trihydrate | 12702000 |
| 740141 | Flash point: [N1]°C o.c.[" ("P2)"] Parameters: 1 parameter: P2: mixed isomers | 12703000 |
| 740142 | Flash point: [N1]°C c.c., [N2]°C o.c.[" ("P3)"] | 12702+12703 |
| 740039 | Flash point: [N1]°C[" ("P2)"] Parameters: 1 parameter: P2: technical grade | 12701000 |
| 740040 | Flash point: Flammable gas Indication: Apply if a gas with flash point <0°C. Links: (420009 / 420018 / 420011 / 420002) | 12704000 |
| 740041 | Flash point: explodes at [N1]°C | 12701000 |
| 740042 | Flash point: explodes in air at [N1]°C | 12701000 |
| 740044 | Flash point: not available | |
| 740043 | Flash point: see Notes Indication: State 'see Notes' if no flash point in literature can be found although the substance is combustible; combine with 870105 in NOTES Links: (420009 / 420018 / 420011 / 420002) (871249/870006/870105) | |
| group | Auto-ignition temperature | |
| 740002 | Auto-ignition temperature: [N1]°C ["("P2)"] Explanation: A common definition of the auto-ignition temperature is: 'the lowest temperature at which a substance ignites spontaneously in contact with air and at which the combustion continues without there being a source of ignition (flame or spark).' The auto-ignition temperature depends not only on the properties of the substance but also on the dimensions, shape, nature of the contact material, and many other factors. In cases where the literature gives different values the lowest has been chosen. The auto-ignition temperature is important for the selection of electrical apparatus used in areas where explosive vapour/air mixtures may be present. Indication: Round off to the nearest degree Celsius. Parameters: 5 parameters: P2: cadmium metal dust; estimated; explosion; powder; technical grade | 12707000 |
| 740004 | Auto-ignition temperature: see Notes | 12707000 |
| group | Explosive limits | |
| | Explanation: The explosive limits are the range in which a mixture of a vapour, gas, mist, or powder with air can catch fire or explode when ignited. The explosive limits of gases and vapours in air are given in percentage by volume. Vapour pressure, flash point, and lower explosive limit are interrelated. The explosive limits of powders depend on the size of the particles. Usually the explosive limits of powders range from about 0.04 to several kg/cubic meter. Indication: The upper and lower explosive limits should be given, rounded off to 0.1%. Use '?' if one of the two values is unknown. If the (estimated) flash point >61°C or the flash point cannot be estimated: do not use this phrase. If the substance is combustible but explosive limits are not known and the (estimated) flash point ≤ 61°C : see in notes 870007 (24215). If the (estimated) flash point > 61°C or the flash point cannot be estimated: do not use this phrase. If the substance is a powder , forming explosive mixtures with known limit values, these could be mentioned in Notes. | |

| 74 Physical properties | | |
|------------------------|--|-------------|
| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
| 740033 | Explosive limits, vol% in air: [N1] [" (at "N2"°C)"] | 12710000 |
| 740034 | Explosive limits, vol% in air: [N1] [" (at "N2"°C)"] - [N3] [" (at "N4"°C)"] | 12710000 |
| 740035 | Explosive limits, vol% in air: [N1] (estimated) | 12710000 |
| 740036 | Explosive limits, vol% in air: [N1] (calculated) | 12710000 |
| 740037 | Explosive limits, vol% in air: [N1] (thermal decomposition >250°C) | 12710000 |
| 740038 | Explosive limits, vol% in air: see Notes Links: (870007) | 12710000 |
| group | Octanol/water partition coefficient | |
| | Explanation: The octanol/water partition coefficient (P_{ow}) of a substance is useful as a means to predict soil adsorption, biological uptake, lipophilic storage, and bioconcentration, and is defined as the ratio of the concentration of a substance in octanol and water. For convenience, the <i>logarithm</i> of the P_{ow} is used. | |
| | Indication: Values determined at about 20°C and 1 atmosphere should be given. | |
| 740056 | Octanol/water partition coefficient as log Pow: [N1] ["("P1)"] Parameters: 6 parameters: P1: 20°C; not explosive; pH-dependent; pyrethrin I; pyrethrin II; technical grade | 12801000 |
| 740058 | Octanol/water partition coefficient as log Pow: [N1] (calculated) | 12801500 |
| 740059 | Octanol/water partition coefficient as log Pow: [N1] (estimated) | |
| group | Viscosity | |
| | Explanation: This property gives an indication of the risk of pulmonary aspiration of organic liquids at 40 °C (i.e. close to body temperature). Low viscosity hydrocarbons are associated with a higher risk of aspiration. The <i>kinematic viscosity</i> should be given. Conversion between <i>dynamic</i> and <i>kinematic viscosity</i> is as follows: $\text{dynamic viscosity (mPa}\cdot\text{s)} / \text{density (g/cm}^3\text{)} = \text{kinematic viscosity (mm}^2\text{/s)}$ If the kinematic viscosity is expressed in Stokes (St) or centiStokes (cSt) then: 1 St = 100 cSt = 1×10^{-4} m ² /s = 100 mm ² /s 1 cSt = 1 mm ² /s | |
| | Indication: If - there is practical experience from reliable and good quality human evidence showing human aspiration toxicity including chemical pneumonitis, varying degrees of pulmonary injury or death following aspiration or - the substance is a hydrocarbon and its kinematic viscosity is 20.5 mm ² /s or less then 720047 and 620003 should be selected as well. (GHS category 1). For other liquids, if the kinematic viscosity is 14 mm ² /sec or less and, based upon animal studies and expert judgement, the liquids are presumed to cause human aspiration toxicity (i.e. GHS category 2 for aspiration hazard), a peer review decision is needed to select 720047 and 620003. Note: In the GHS, this category includes <i>n</i> -primary alcohols with a composition of at least 3 carbon atoms but not more than 13; <i>isobutyl alcohol</i> and <i>ketones</i> with a composition of no more than 13 carbon atoms. | |
| 740099 | Viscosity: [N1] [P2] [" (at "N3"°C)"] Parameters: 7 parameters: P2: Pa/s; cP; cSt; mPa; mPa/s; mm ² /s; ps Links: (720047 620003) | 1260000 |
| group | Other physical properties (NOT on card) | |
| | Indication: NOTE: these sentences usually do not appear on an ICSC, but merely serves as additional information used when compiling the ICSC. Therefore they do not require a translation into other languages. | |
| 740031 | Electrical conductivity: [N1] pS/m ["("P1)"] | 12716000 |

| 74 Physical properties | | |
|------------------------|--|-------------|
| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
| | <p>Explanation: It measures a material's ability to conduct an electric current</p> <p>Indication: The value is associated with a temperature. Apply to liquids (including liquid compressed gases). The electrical conductivity of a liquid is used for possible selection of 13221, 15207 and 15209. Electrical conductivity values found in the literature may be given in other units: - S/m: multiply by 1,000,000,000,000 to get pS/m - Mho/cm: multiply by 100,000,000,000,000 (Note: Mho = reciprocal Ohm). As electrical conductivity is not highly dependant on temperature, values determined between 15 and 25°C can be used.</p> <p>Parameters: 1 parameter: P1: at 30°C, IUCLID</p> <p>Links: (680055) (460010) (460011)</p> | |
| 740055 | <p>Minimum ignition energy: [N1]mJ</p> <p>Explanation: Minimum ignition energy (MIE) is the minimum amount of energy required to ignite a combustible vapor, gas or dust cloud, for example by means of an electrostatic discharge</p> <p>Indication: For substance classified as combustible/flammable material</p> | 12713000 |
| 740110 | <p>Heat of solution in water: 359 J/g (Strongly cools down when dissolved in water.)</p> <p>Explanation: Heat of solution is the enthalpy change associated with the dissolution of a substance in a solvent at constant pressure resulting in infinite dilution. Dissolution by most gases is exothermic. That is, when a gas dissolves in a liquid solvent, energy is released as heat, warming both the system (i.e. the solution) and the surroundings. The temperature of the solution eventually decreases to match that of the surroundings</p> <p>Indication: The enthalpy of solution is most often expressed in kJ/mol at constant temperature</p> | |

Disallowed sentences in Physical properties

| 74 Physical properties | | |
|------------------------|---|---------------|
| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
| | <p>Decomposes below boiling point at []°C</p> <p>Motivation: Phrase disallowed in April 2007 in favour of 740013: Decomposes[" at "N1"°C"][" "P2].</p> | 12107 / 12117 |
| | <p>Decomposes below boiling point []</p> <p>Motivation: Phrase disallowed in April 2007 in favour of 740013: Decomposes[" at "N1"°C"][" "P2].</p> | 12108 / 12118 |
| | <p>Boiling point (decomposes): []°C</p> <p>Motivation: Phrase disallowed in April 2007 in favour of 740013: Decomposes[" at "N1"°C"][" "P2].</p> | 12110 / 12120 |

Physical State; Appearance

The physical state and appearance of a substance is in one short sentence in CAPITAL LETTERS.

66 Physical state; appearance

| SENTID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes | | | | | | | | | | | | | | | | | | | | | | | | | |
|------------------|--|-------------|--------|----------|--------|---------|----------------|----|---------|--------|----------|---------|----|---------|--------|---------|------------------|----|----------|--------|---------|--------|----|---------|--------|---------|--|
| | <p>CGC remarks: This is one of the ICSC sections that needs to be tidied up (organized). For ease of use by the Compilers, the sentences have been grouped here in:</p> <ul style="list-style-type: none"> • SOLID • SOLID-TO-LIQUID • LIQUID • LIQUID-TO-GAS • GAS • OTHER <p>Please take note that in Indication the temperature of 20°C is used as a example, falling in the transitional temperature range of 15-30°C mentioned in Explanation.</p> | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | <p>Physical state; appearance</p> <p>Explanation: Substances are classified as gas, liquid, or solid according to their boiling and melting points at atmospheric pressure (101.3 kPa):</p> <table> <tr> <td>GAS:</td> <td>mp</td> <td>< 15 °C</td> <td>and bp</td> <td>< 15 °C</td> </tr> <tr> <td>GAS OR LIQUID:</td> <td>mp</td> <td>< 15 °C</td> <td>and bp</td> <td>15-30 °C</td> </tr> <tr> <td>LIQUID:</td> <td>mp</td> <td>< 15 °C</td> <td>and bp</td> <td>≥ 30 °C</td> </tr> <tr> <td>LIQUID OR SOLID:</td> <td>mp</td> <td>15-30 °C</td> <td>and bp</td> <td>≥ 30 °C</td> </tr> <tr> <td>SOLID:</td> <td>mp</td> <td>≥ 30 °C</td> <td>and bp</td> <td>≥ 30 °C</td> </tr> </table> <p>N.B.: Other definitions may be used in national legislation!</p> <p>Indication: Indicate the physical state using the table in Explanation. A substance with a boiling point of 20°C should be classified as 'gas or liquid'; a substance with a melting point of 20°C should be classified as 'liquid or solid'.</p> | GAS: | mp | < 15 °C | and bp | < 15 °C | GAS OR LIQUID: | mp | < 15 °C | and bp | 15-30 °C | LIQUID: | mp | < 15 °C | and bp | ≥ 30 °C | LIQUID OR SOLID: | mp | 15-30 °C | and bp | ≥ 30 °C | SOLID: | mp | ≥ 30 °C | and bp | ≥ 30 °C | |
| GAS: | mp | < 15 °C | and bp | < 15 °C | | | | | | | | | | | | | | | | | | | | | | | |
| GAS OR LIQUID: | mp | < 15 °C | and bp | 15-30 °C | | | | | | | | | | | | | | | | | | | | | | | |
| LIQUID: | mp | < 15 °C | and bp | ≥ 30 °C | | | | | | | | | | | | | | | | | | | | | | | |
| LIQUID OR SOLID: | mp | 15-30 °C | and bp | ≥ 30 °C | | | | | | | | | | | | | | | | | | | | | | | |
| SOLID: | mp | ≥ 30 °C | and bp | ≥ 30 °C | | | | | | | | | | | | | | | | | | | | | | | |
| group | <p>GAS</p> <p>Indication: Indicate the physical state using the table in Explanation. A substance with a boiling point less than 15°C and with a melting point less than 15°C should be classified as a 'gas'; a substance with a boiling point between 15 and 30°C and with a melting point less than 15°C should be classified as 'gas or liquid'. The COLOUR and/or 'ODOURLESS' may be added. Do not describe the odour as this is highly subjective and will depend on the concentration. A substance with a boiling point of 20°C should be classified as 'gas or liquid'; a substance with a melting point of 20°C should be classified as 'liquid or solid'.</p> | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 660029 | COLOURLESS GAS DISSOLVED IN ACETONE UNDER PRESSURE. | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 660081 | GAS WITH CHARACTERISTIC ODOUR. | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 660082 | [P1] GAS WITH CHARACTERISTIC ODOUR. Parameters: 6 parameters: P1: BLUISH; COLOURLESS; COMPRESSED; LIQUEFIED; NEARLY; OR | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 660083 | COLOURLESS GAS OR COMPRESSED LIQUEFIED GAS WITH CHARACTERISTIC ODOUR. Explanation: Use this phrase if a gas with a critical temperature > -10 °C. Critical temperature is the highest temperature at which the gas can be condensed to a liquid. | 13105 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 660098 | COLOURLESS ODOURLESS COMPRESSED OR LIQUEFIED GAS. Explanation: Use this phrase if a gas with a critical temperature > -10 °C. Critical temperature is the highest temperature at which the gas can be condensed to a liquid. | 13105 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 660105 | [P1] GAS WITH PUNGENT ODOUR. Parameters: 7 parameters: P1: COLOURLESS; COMPRESSED; GREENISH-YELLOW; HYGROSCOPIC; LIQUEFIED; RED-YELLOW; YELLOW | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 660106 | COLOURLESS GAS OR COMPRESSED LIQUEFIED GAS WITH PUNGENT ODOUR. Explanation: Use this phrase if a gas with a critical temperature > -10 °C. Critical temperature is the highest temperature at which the gas can be condensed to a liquid. | 13105 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 660115 | [P1] GAS. Parameters: 8 parameters: P1: COLOURLESS; COMPRESSED; LIQUEFIED; ODOURLESS; OR; REFRIGERATED; TASTELESS; YELLOW | 13101 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 660121 | COLOURLESS COMPRESSED LIQUEFIED GAS WITH CHARACTERISTIC ODOUR OF ROTTEN EGGS. | 13105 | | | | | | | | | | | | | | | | | | | | | | | | | |

| 66 Physical state; appearance | | |
|-------------------------------|---|-------------|
| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
| | Explanation: Use this phrase if a gas with a critical temperature > -10 °C. Critical temperature is the highest temperature at which the gas can be condensed to a liquid. | |
| group | GAS-LIQUID | |
| 660100 | [P1] GAS OR [P2]] LIQUID WITH PUNGENT ODOUR. Parameters: 7 parameters: P1: COLOURLESS; REDDISH-BROWN; P2: BROWN; COLOURLESS; FUMING; OR; YELLOW | |
| 660101 | GAS OR [P1]] LIQUID WITH PUNGENT ODOUR. Parameters: 2 parameters: P1: COLOURLESS; FUMING | |
| group | LIQUID | |
| | Indication: Indicate the physical state using the table in Explanation. A substance with a boiling point greater than 30°C and with a melting point less than 15°C should be classified as a 'liquid'; a substance with a boiling point greater than 30°C and with a melting point between 15 and 30°C should be classified as 'liquid or solid'. Complete this phrase with 'VERY VOLATILE' if the saturated vapour pressure at 20°C ≥ 40 kPa (if p ₂₀ is unknown, then if the b.p. < 40°C). Other indications, e.g., the COLOUR or ODOUR, may be added. | |
| 660013 | LIQUID. | |
| 660014 | [P1]] LIQUID. Parameters: 33 parameters: P1: AMBER; ... YELLOWISH | 13113000 |
| 660015 | YELLOWISH-BROWN WHEN LIQUID. | |
| 660016 | TECHNICAL-GRADE PRODUCT: [P1] LIQUID. Parameters: 4 parameters: P1: AMBER-TO-DARK BROWN; DARK BROWN; LIGHT YELLOW-TO-AMBER VISCOUS; VISCOUS COLOURLESS | |
| 660017 | [P1] OR [P2] LIQUID. Parameters: 9 parameters: P1: COLOURLESS; ... SLIGHTLY YELLOW OILY | |
| 660028 | VISCOUS YELLOW OIL OR PASTE (TECHNICAL GRADE); PRACTICALLY COLOURLESS WHEN PURE. | |
| 660067 | [P1]] LIQUID WITH [P2] ODOUR. Parameters: 7 parameters: P1: COLOURLESS; COLOURLESS-TO-YELLOW; HYGROSCOPIC; VISCOUS; P2: AMMONIA; AROMATIC; CHARACTERISTIC | |
| 660071 | LIQUID WITH CHARACTERISTIC ODOUR. | |
| 660072 | [P1] LIQUID WITH CHARACTERISTIC ODOUR. Parameters: 61 parameters: P1: AMBER VISCOUS; ... YELLOW-TO-COLOURLESS | |
| 660073 | YELLOW VISCOUS LIQUID-TO-PASTE WITH CHARACTERISTIC ODOUR. | |
| 660075 | PALE YELLOW MOBILE OIL WITH CHARACTERISTIC ODOUR. | |
| 660096 | COLOURLESS LIQUID WITH MILD ODOUR. | |
| 660099 | [P1]] LIQUID WITH PUNGENT ODOUR. Parameters: 25 parameters: P1: BROWN; ... YELLOW-TO-GREEN | |
| 660103 | SOLUTION IN WATER WITH PUNGENT ODOUR. | |
| 660104 | [P1]] SOLUTION IN WATER WITH PUNGENT ODOUR. Parameters: 4 parameters: P1: AMMONIA; COLOURLESS; VERY; VOLATILE | |
| 660120 | ORANGE LIQUID WITH CHARACTERISTIC ODOUR OF ROTTEN EGGS. | |
| 660144 | CRYOGENIC LIQUID Explanation: Cryogenic is a term applied to substances in very low temperatures. | |
| 660145 | FUMING LIQUID | |
| group | LIQUID-SOLID | |
| 660011 | COLOURLESS-TO-AMBER-COLOURED LIQUID OR SOLID. | |
| 660018 | COLOURLESS CRYSTALS OR LIQUID. | |
| 660019 | WHITE SOLID OR CLEAR COLOURLESS LIQUID. | |
| 660020 | CRYSTALS OR COLOURLESS LIQUID. | |

| 66 Physical state; appearance | | |
|-------------------------------|--|-------------|
| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
| 660021 | HYGROSCOPIC WHITE SOLID IN VARIOUS FORMS OR COLOURLESS LIQUID. | |
| 660022 | ODOURLESS CRYSTALS OR LIGHT YELLOW-TO-BLACK VISCOUS LIQUID. | |
| 660078 | COLOURLESS LIQUID OR CRYSTALLINE POWDER WITH CHARACTERISTIC ODOUR. | |
| 660090 | [P1]] LIQUID OR [P2]] CRYSTALS WITH CHARACTERISTIC ODOUR. Parameters: 6 parameters: P1: COLOURLESS; HYGROSCOPIC; YELLOW; P2: COLOURLESS; WHITE; YELLOW | |
| 660091 | [P1]] LIQUID OR CRYSTALS WITH CHARACTERISTIC ODOUR. Parameters: 6 parameters: P1: COLOURLESS; COLOURLESS-TO-YELLOW; HYGROSCOPIC; OILY; VISCOUS; WHITE-TO-YELLOW | |
| 660112 | [P1] LIQUID OR [P2] CRYSTALS WITH PUNGENT ODOUR. Parameters: 4 parameters: P1: COLOURLESS; COLOURLESS-TO-YELLOW; P2: COLOURLESS-TO-WHITE; WHITE | |
| 660126 | [P1]] LIQUID OR [P2]] CRYSTALS. Parameters: 16 parameters: P1: CLEAR; ... YELLOW | |
| 660127 | [P1]] LIQUID OR CRYSTALS. Parameters: 6 parameters: P1: COLOURLESS; COLOURLESS-TO-YELLOW; OILY; VISCOUS; YELLOW-BROWN-TO-BROWN; YELLOW-TO-GREEN | |
| 660142 | COLOURLESS TO BROWN SOLID IN VARIOUS FORMS OR LIQUID | |
| 660143 | COLOURLESS OR WHITE CRYSTALS OR LIQUID. | |
| 660146 | [P1]] CRYSTALS OR LIQUID. Parameters: 3 parameters: P1: COLOURLESS; WHITE; YELLOW | |
| 660154 | COLOURLESS LIQUID OR WHITE SOLID WITH CHARACTERISTIC ODOUR. | |
| group | SOLID Indication: Indicate the physical state using the table in Explanation. A substance with a melting point of 20°C should be classified as 'liquid or solid'. | |
| 660001 | COLOURLESS-TO-BEIGE SOLID (TECHNICAL GRADE). | |
| 660002 | FINE WHITE ODOURLESS CRYSTALLINE POWDER (MONOHYDRATE). | |
| 660003 | LIGHT YELLOW-TO-BROWN CRYSTALLINE MASS (SOLIDIFIED OIL). | |
| 660005 | LUSTROUS SILVER WHITE METAL (WHEN FRESHLY CUT). | |
| 660008 | DARK GREY-TO-BROWN AMORPHOUS POWDER, WITH METAL CHARACTERISTICS OR SILVERY-WHITE, LUSTROUS CRYSTALLINE SOLID. | |
| 660009 | ODOURLESS COLOURLESS-TO-CREAM-COLOURED CRYSTALLINE SOLID. Parameters: 8 parameters: P1: DELIQUISCENT; FIBROUS; GREY-TO-WHITE; ODOURLESS; PALE YELLOW CRYSTALLINE; WAXY; WHITE; WHITE-TO-YELLOW | |
| 660010 | [P1] OR [P2] SOLID. Parameters: 7 parameters: P1: BROWN AMORPHOUS; ... YELLOWISH FIBROUS | |
| 660012 | TECHNICAL PRODUCT IS WAXY SOLID. | |
| 660023 | WHITE-TO-YELLOW TRANSPARENT CRYSTALLINE SOLID WITH WAXY APPEARANCE. | |
| 660024 | MALLEABLE. | |
| 660025 | PALE YELLOWISH BRONZE LUMPS WITH METALLIC LUSTRE. Parameters: 3 parameters: P1: BROWN; DARK; YELLOW | |
| 660034 | ODOURLESS HYGROSCOPIC WHITE POWDER OR GLASS-LIKE PLATE. | |
| 660035 | [P1] PASTE. Explanation: Solids can exist in various forms largely dependent on their physicochemical properties. The form(s) in which they are generally found in the industrial setting are described. Describes a solid substance which is generally supplied as a paste (neither in liquid nor solid form). Indication: Use this phrase if the substance is normally supplied in the form of a paste. Parameters: 4 parameters: P1: BLACK-TO-BROWN; COLOURLESS-TO-WHITE; COLOURLESS-TO-WHITE WAXY; YELLOW SEMI-TRANSPARENT | 13135000 |

| 66 Physical state; appearance | | |
|-------------------------------|---|-------------|
| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
| | Links: (640012) | |
| 660036 | WHITE CRYSTALS OR POWDER WITH BITTER SALINE TASTE. | |
| 660037 | ODOURLESS COLOURLESS CRYSTALS OR WHITE CRYSTALLINE POWDER WITH BITTER TASTE. | |
| 660038 | ODOURLESS AND COLOURLESS CRYSTALS WITH BITTER TASTE. | |
| 660039 | COLOURLESS ODOURLESS HYGROSCOPIC BRITTLE VITREOUS LUMPS OR HARD WHITE CRYSTALS WITH SLIGHTLY BITTER TASTE. | |
| 660043 | [P1] METAL. | |
| 660045 | LIQUEFIES ON LOSS OF ITS WATER OF CRYSTALLIZATION. | |
| 660048 | POWDER. | |
| 660049 | [P1]] POWDER. Explanation: Solids can exist in various forms largely dependent on their physicochemical properties. The form(s) in which they are generally found in the industrial setting are described. Describes a solid substance which is generally supplied in the form of powder. Indication: Use this phrase if the substance is normally supplied as a powder. Parameters: 58 parameters: P1: AMORPHOUS; ... YELLOWISH-GREEN Links: (640012) | 13131000 |
| 660050 | [P1]] CRYSTALS OR [P2]] POWDER. Parameters: 31 parameters: P1: BLACK-TO-BROWN; ... YELLOW-TO-BROWN | |
| 660051 | [P1], OR] POWDER. Parameters: 15 parameters: P1: BLUE; ... YELLOW | |
| 660052 | BLUE-TO-GREEN POWDER OR BLACK PARTICLES. | |
| 660053 | [P1]] POWDER OR NEEDLES Parameters: 5 parameters: P1: COLOURLESS; CRYSTALLINE; OR; PURPLE; WHITE | |
| 660054 | [P1] NEEDLES. Parameters: 1 parameter: P1: YELLOW | |
| 660055 | ODOURLESS COLOURLESS CRYSTALS OR WHITE GRANULES. | |
| 660056 | [P1]] POWDER OR GRANULES Parameters: 3 parameters: P1: CRYSTALLINE; HYGROSCOPIC; WHITE | |
| 660057 | FIBRES. | |
| 660058 | WHITE-TO-GREY FIBRES. | |
| 660059 | [P1]] OR [P2]] POWDER. Parameters: 37 parameters: P1: BLACK; ... WHITE-TO-YELLOW | |
| 660060 | ALMOST ODOURLESS COLOURLESS CRYSTALS, PELLETS OR WHITE GRANULAR POWDER. | |
| 660061 | ODOURLESS DARK RED DELIQUESCENT CRYSTALS, FLAKES OR GRANULAR POWDER. | |
| 660062 | [P1]] OR POWDER. Parameters: 28 parameters: P1: AND; ... YELLOWISH | |
| 660068 | [P1] CRYSTALS WITH CHARACTERISTIC ODOUR. Parameters: 5 parameters: P1: COLOURLESS-TO-BROWN; COLOURLESS-TO-WHITE; COLOURLESS-TO-YELLOW; PALE YELLOW; YELLOW-TO-GREEN | |
| 660069 | [P1]] SOLID WITH CHARACTERISTIC ODOUR. Parameters: 10 parameters: P1: COLOURLESS; ... YELLOW-TO-AMBER | |
| 660070 | YELLOW NEEDLE-LIKE CRYSTALS OR GREENISH-YELLOW PLATES OR BRIGHT YELLOW SOLID WITH CHARACTERISTIC ODOUR. | |
| 660074 | DARK GREY CRYSTALS, POWDER OR PASTE WITH CHARACTERISTIC ODOUR. | |
| 660077 | [P1]] CRYSTALS OR [P2]] POWDER WITH CHARACTERISTIC ODOUR. Parameters: 4 parameters: P1: COLOURLESS; COLOURLESS-TO-WHITE; P2: CRYSTALLINE; WHITE | |
| 660079 | [P1] OR POWDER WITH CHARACTERISTIC ODOUR. | |

| 66 Physical state; appearance | | |
|-------------------------------|---|-------------|
| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
| | Parameters: 5 parameters: P1: PALE-YELLOW-TO-AMBER FRAGMENTS; WHITE CRYSTALS; WHITE OR TAN FLAKES; WHITE-TO-BROWNISH FLAKES; WHITE-TO-YELLOW CRYSTALS | |
| 660080 | [P1]] POWDER WITH CHARACTERISTIC ODOUR. Parameters: 13 parameters: P1: BROWN; ... YELLOW-TO-BROWN | |
| 660084 | [P1]] FLAKES WITH CHARACTERISTIC ODOUR. Parameters: 6 parameters: P1: BROWN; COLOURLESS; COLOURLESS-TO-PALE-YELLOW; TECHNICAL;; WHITE; WHITE-TO-REDDISH | |
| 660085 | HYGROSCOPIC PELLETS OR FLAKES WITH CHARACTERISTIC ODOUR. | |
| 660086 | COLOURLESS CRYSTALS OR GREY FLAKES WITH CHARACTERISTIC ODOUR. | |
| 660087 | [P1]] CRYSTALS OR FLAKES WITH CHARACTERISTIC ODOUR. Parameters: 3 parameters: P1: COLOURLESS-TO-BROWN; NEEDLE-LIKE; WHITE | |
| 660088 | CRYSTALS WITH CHARACTERISTIC ODOUR. | |
| 660089 | [P1]] CRYSTALS WITH CHARACTERISTIC ODOUR. Parameters: 34 parameters: P1: BROWN; ... YELLOWISH | |
| 660092 | COLOURLESS OR WHITE POWDER OR CRYSTALS WITH CHARACTERISTIC ODOUR. | |
| 660093 | [P1]] SOLID IN VARIOUS FORMS WITH CHARACTERISTIC ODOUR. Parameters: 9 parameters: P1: BROWN; ... YELLOW | |
| 660094 | [P1] CRYSTALS OR SOLID IN VARIOUS FORMS WITH CHARACTERISTIC ODOUR. Parameters: 2 parameters: P1: HYGROSCOPIC; WHITE | |
| 660095 | GREY CRYSTALS OR BLACK LUMPS WITH CHARACTERISTIC ODOUR. | |
| 660097 | WHITE CRYSTALS WITH ROSE-LIKE ODOUR. | |
| 660102 | [P1]] POWDER WITH PUNGENT ODOUR. Parameters: 2 parameters: P1: CRYSTALLINE; WHITE | |
| 660107 | HYGROSCOPIC COLOURLESS CRYSTALS OR WHITE FLAKES WITH PUNGENT ODOUR. | |
| 660108 | [P1]] CRYSTALS OR FLAKES WITH PUNGENT ODOUR. Parameters: 4 parameters: P1: GREY-TO-YELLOW; HYGROSCOPIC; WHITE-TO-YELLOW; YELLOW | |
| 660109 | WHITE POWDER OR COLOURLESS NEEDLES WITH PUNGENT ODOUR. | |
| 660110 | [P1]] CRYSTALS WITH PUNGENT ODOUR. Parameters: 14 parameters: P1: BLACK; ... YELLOW | |
| 660111 | [P1] SOLID IN VARIOUS FORMS WITH PUNGENT ODOUR. Parameters: 2 parameters: P1: COLOURLESS-TO-PALE-YELLOW; WHITE | |
| 660113 | COLOURLESS-TO-PALE YELLOW LIQUID OR CRYSTALS WITH PUNGENT ODOUR. | |
| 660114 | ODOURLESS GRANULES OR POWDER IN VARIABLE COLOUR. | |
| 660116 | [P1]] FLAKES. Explanation: Solids can exist in various forms largely dependent on their physicochemical properties. The form(s) in which they are generally found in the industrial setting are described. Describes a solid substance in flake form. Indication: Use this phrase if the substance is normally supplied as flakes. Parameters: 6 parameters: P1: COLOURLESS; DARK; GREY-TO-BLACK; HYGROSCOPIC; WHITE; YELLOW Links: (640012) | 13127000 |
| 660117 | VERY HYGROSCOPIC WHITE NEEDLES OR FLAKES. | |
| 660118 | COLOURLESS CRYSTALS OR RED-TO-BROWN FLAKES. | |
| 660119 | [P1]] CRYSTALS OR FLAKES. Parameters: 5 parameters: P1: COLOURLESS; HYGROSCOPIC; SLIGHTLY; WHITE; WHITE-TO-PALE-YELLOW | |
| 660122 | CRYSTALS. | |
| 660123 | COLOURLESS, WHITE OR VARIABLE BLACK, PURPLE OR GREEN CRYSTALS. | |

| 66 Physical state; appearance | | |
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| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
| 660124 | DARK RED-BROWN-TO-BLUIISH-BLACK AMORPHOUS SOLID OR RED TRANSPARENT CRYSTALS OR METALLIC GREY-TO-BLACK CRYSTALS. | |
| 660125 | [P1]]] CRYSTALS. Explanation: Solids can exist in various forms largely dependent on their physicochemical properties. The form(s) in which they are generally found in the industrial setting are described. Describes a solid substance with clearly crystalline form. Indication: Complete this phrase with the COLOUR and/or adjectives such as HYGROSCOPIC, DELIQUESCENT, DRY etc. Combinations of the phrases may be made. Use a free phrase if necessary, in cases where a good description is not possible using fixed phrases. Parameters: 66 parameters: P1: BLACK-TO-BROWN; ... YELLOW-TO-WHITE Links: (640012) | 13123000 |
| 660128 | [P1]]] POWDER OR CRYSTALS. Parameters: 4 parameters: P1: ODOURLESS; RED-BROWN; TASTELESS; YELLOW | |
| 660129 | [P1]]] POWDER OR [P2]]] CRYSTALS. Parameters: 6 parameters: P1: CRYSTALLINE; GREY; WHITE; P2: COLOURLESS; REDDISH-SILVERY; WHITE-TO-GREY | |
| 660130 | SOLID IN VARIOUS FORMS. | |
| 660131 | [P1]]] SOLID IN VARIOUS FORMS. Explanation: Solids can exist in various forms largely dependent on their physicochemical properties. The form(s) in which they are generally found in the industrial setting are described. Describes a solid substance which is generally supplied in a number of forms. Indication: Use this phrase if the substance is normally supplied as a solid in a variety of forms. Parameters: 37 parameters: P1: BLACK; ... YELLOWISH-WHITE Links: (640012) | |
| 660132 | BLACK FLAKES, LUMPS, POWDER OR CHIPS. | |
| 660133 | WHITE CRYSTALLINE POWDER OR LUMPS. | |
| 660134 | [P1] LUMPS. Explanation: Solids can exist in various forms largely dependent on their physicochemical properties. The form(s) in which they are generally found in the industrial setting are described. Describes a solid substance which is generally formed into lumps. Indication: Use this phrase if the substance is normally supplied in the form of lumps. Parameters: 2 parameters: P1: COLOURLESS; WHITE-TO-GREY Links: (640012) | |
| 660135 | RED-BROWN CRYSTALLINE POWDER OR GREY LUMPS. | |
| 660136 | COLOURLESS-TO-WHITE SLIGHTLY WAXY FLAKES OR LEAFLETS. | |
| 660137 | COLOURLESS CRYSTALS OR LIGHT BROWN PELLETS. | |
| 660138 | COLOURLESS-TO-WHITE HYGROSCOPIC CRYSTALS OR PELLETS. | |
| 660139 | WHITE POWDER OR PELLETS. | |
| 660141 | YELLOW-TO-GREEN-TO-BLUE-TO-BLACK CRYSTALS, DEPENDING ON PURITY. | |
| 660148 | WHITE, HYGROSCOPIC SOLID IN VARIOUS FORMS. | |
| 660149 | [P1]]] POWDER OR LUMPS. Parameters: 1 parameter: P1: GREY TO WHITE | |
| 660150 | WHITE CRYSTALS WITH FLOWERY ODOR. | |
| 660151 | WHITE POWDER OR NEEDLES WITH CHARACTERISTIC ODOUR. | |
| 660152 | WHITE TO BROWNISH FLAKES OR WHITE CRYSTALLINE POWDER, WITH CHARACTERISTIC ODOUR. | |
| 660153 | GREY-WHITE METAL POWDER | |
| 660155 | WHITE CRYSTALS OR TAN WAXY SOLID WITH CHARACTERISTIC ODOUR. | |
| 660156 | YELLOW-TO-AMBER WAXY SOLID WITH CHARACTERISTIC ODOUR. | |
| 660157 | PALE YELLOW OR WHITE SOLID WITH CHARACTERISTIC ODOUR. | |

66 Physical state; appearance

| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
|--------------|---|-------------|
| 660158 | LAVENDER, BLUE OR GREENISH FIBROUS SOLID. | |
| 660159 | FINE WHITE CRYSTALLINE POWDER | |
| group | OTHER | |
| 660004 | (SEE NOTES). | |
| 660006 | FORMS CRYSTALLINE MATERIALS ON HEATING OVER 1000°C. | |
| 660007 | WATER SOLUTION OF PARAQUAT DICHLORIDE IS DARK RED. | |
| 660027 | ODOURLESS WHEN PURE. | |
| 660030 | CAN SUBLIME EVEN AT ROOM TEMPERATURE. | |
| 660031 | <p>URNS [P1] ON EXPOSURE TO [P2], AND].</p> <p>Explanation: Some substances may change colour under certain conditions such as on exposure to air or to light.</p> <p>Indication: Complete this phrase with the colour and condition.</p> <p>Parameters: 29 parameters: P1: BLUISH GREY... MOISTURE</p> | 13145000 |
| 660032 | URNS DARK AND RESINIFIES ON PROLONGED EXPOSURE TO LIGHT. | |
| 660033 | URNS [P1] ON EXPOSURE TO AIR OR LIGHT. | |
| 660040 | SWEET TASTE. | |
| 660041 | <p>URNS [P1] ON STANDING.</p> <p>Parameters: 2 parameters: P1: BROWN; YELLOW</p> | |
| 660042 | <p>DARKENS ON STANDING.</p> <p>Parameters: 4 parameters: P1: BLUISH-WHITE VERY SOFT; ODOURLESS HEAVY MOBILE SILVERY LIQUID; SOFT SILVER-WHITE; WHITE</p> | |
| 660044 | ITS YELLOWISH GREEN VAPOUR HAS A PUNGENT SOUR SMELL. | |
| 660046 | URNS PINK ON EXPOSURE TO AIR AND LIGHT OR ON CONTACT WITH IRON. | |
| 660047 | TECHNICAL-GRADE PRODUCT: PALE YELLOW-TO-DARK BROWN. | |
| 660063 | COLOURLESS 25-50% SODIUM SILICATE SOLUTION IN WATER. | |
| 660064 | FORMS WHITE FUMES IN MOIST AIR. | |
| 660065 | TARNISHES ON EXPOSURE TO MOIST AIR. | |
| 660066 | URNS DARK ON EXPOSURE TO OZONE, HYDROGEN SULFIDE OR SULFUR. | |
| 660076 | CLEAR SLIGHTLY YELLOW SOLUTION WITH CHARACTERISTIC ODOUR. | |
| 660140 | ODOURLESS WHEN DRY. | |

Physical dangers**67 Physical dangers**

| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
|--------|---|-------------|
| 670001 | <p>As a result of flow, agitation, etc., electrostatic charges can be generated.</p> <p>Explanation: Electrostatic charges can be generated by the pumping, stirring, filtration, etc., of liquids having a conductivity lower than 10 000 pS/m. This occurs more readily when the liquids contain other liquids, gases, or solid particles (e.g., mixtures, suspensions). Equipment such as pumps, drums, piping, etc., become electrically charged and may make sparks when discharging to 'earth'. This may cause explosion of flammable vapour/air mixtures. A suitable remedy is to ground the conducting parts of such equipment. In some cases of mist and dust explosions, it has also been assumed that static discharge has been the ignition source. In contrast to liquids, the conductivity of dust particles or droplets in dust clouds or mists is of little or no significance in the charge-generating capacity.</p> <p>Indication: If a liquid (including liquefied compressed gas) with conductivity lower than 10 000 pS/m.</p> <p>Links: 460010, (460011)</p> | 13221 |
| 670003 | Dust clouds can be ignited on contact with intensely heated surfaces (above 500°C). | |

| 67 Physical dangers | | |
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| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
| 670004 | Dust explosion possible if in powder or granular form, mixed with air. Explanation: This is applicable to combustible substances which have the form of a powder or fine granules (diameter smaller than 0.5 mm). When well mixed with air, a substance in this form may deflagrate on ignition, even when somewhat humid. In a confined space, the deflagration may turn into an explosion. These dust explosions may be violent. Indication: Applies if the substance is combustible and in the form of powder or granules with diameters smaller than 0.5 mm. Do not use this phrase if the literature contains evidence that when the substance is dispersed in air, it cannot be ignited. Links: 450004 , 460022 | 13222 |
| 670005 | Free-flowing liquid condenses to form extremely cold dry ice. | |
| 670007 | Heating the material at high temperatures results in the formation of crystalline silica (see ICSC 0809 Cristobalite). | |
| 670008 | If dry, it can be charged electrostatically by swirling, pneumatic transport, pouring, etc. Explanation: In such cases it is imperative to take special preventive measures. An expert should be consulted. Indication: Applies if 670004 has been used and the substance is non-hygroscopic. Links: 460010 | 13223 |
| 670010 | The substance readily sublimes. | |
| 670011 | See Notes. | |
| 670014 | The gas is heavier than air and may accumulate in lowered spaces causing a deficiency of oxygen. Explanation: Relates to gases with a relative vapour density greater than 1.1. When these gases are released, they will travel along the ground and may accumulate in lowered spaces displacing the air, resulting in oxygen deficiency. Indication: Apply for a gas with relative vapour density (air = 1) ≥ 1.1 only if the gas has no pungent odour (PUNGENT ODOUR is not used in Physical state; appearance). This phrase also applies to simple asphyxiants as defined by the ACGIH having a density with respect to air ≥ 1.1 . (Refer to OCCUPATIONAL EXPOSURE LIMITS (Field 79) for OEL and ACGIH discussions). Links: 870030/870092 , 870068/870091 | 13201 + 13207 |
| 670015 | The gas is heavier than air and may travel along the ground; distant ignition possible. Explanation: Relates to substances for which the vapour density of the gas or the vapour/air mixture relative to air is greater than 1.1 and for which the flash point is < 23 °C. When these vapours or gases are released they will travel along the ground and form an explosive mixture, even at a considerable distance from the source of emission. Indication: Apply for a gas with relative vapour density (air = 1) ≥ 1.1 only if the criteria for flammable gases GHS categories 1 or 2 (H220 and H221, respectively) are met. | 13201 + 13205 |
| 670017 | The gas is heavier than air. Explanation: Relates to gases with a relative vapour density greater than 1.1. When these gases are released, they will travel along the ground. Indication: Apply if a gas with relative vapour density (air = 1) ≥ 1.1 . | 13201 |
| 670018 | The gas is lighter than air. Explanation: Relates to combustible gases whose vapour density relative to air is < 0.9 . When these gases are released they accumulate in the uppermost part of a building; exhaust facilities must be mounted high. Indication: Use if a combustible gas with relative density to air < 0.9 . | 13217 |
| 670019 | The gas mixes well with air, explosive mixtures are easily formed. Explanation: This phrase applies to gases with a vapour density of the gas between 0.9 and 1.1 and with a flash point < 23 °C. Although less dangerous than heavier gases or vapours, there is still a possibility of explosion. | 13211 |

| 67 Physical dangers | | |
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| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
| | Indication: Apply for flammable gases GHS categories 1 or 2; (H220 and H221, respectively) with a density relative to air ≥ 0.9 and < 1.1 . | |
| 670020 | The gas penetrates easily through walls and ceilings. | |
| 670022 | The vapour is heavier than air and may accumulate in lowered spaces causing a deficiency of oxygen. Explanation: Relates to substances for which the vapour density of the gas or the vapour/air mixture relative to air is greater than 1.1. When these vapours are released they will travel along the ground and may accumulate in lowered spaces displacing the air, resulting in oxygen deficiency. Indication: Apply for a vapour: - with a density of vapour/air-mixture at 20°C (air = 1) ≥ 1.1 AND - with a vapour pressure (at 20°C) > 10 kPa AND - only if the gas has no pungent odour (PUNGENT ODOUR is not used in Physical state; appearance). This phrase also applies to simple asphyxiants as defined by the ACGIH having a density with respect to air ≥ 1.1 . (Refer to OCCUPATIONAL EXPOSURE LIMITS (Field 79) for OEL and ACGIH discussions). Links: 870030/870092, 870068/870091 | 13203 + 13207 |
| 670025 | The vapour is heavier than air and may travel along the ground; distant ignition possible. Explanation: Relates to substances for which the vapour density of the gas or the vapour/air mixture relative to air is greater than 1.1 and for which the flash point is < 23 °C. When these vapours or gases are released they will travel along the ground and form an explosive mixture, even at a considerable distance from the source of emission. Indication: Apply for a vapour with a relative density of vapour/air-mixture at 20°C (air = 1) ≥ 1.1 only if the criteria for extremely flammable liquids GHS category 1 (H224) are met. | 13203 + 13205 |
| 670026 | The vapour is heavier than air. Explanation: Relates to substances for which the vapour density of the gas or the vapour/air mixture relative to air is greater than 1.1. When these vapours or gases are released they will travel along the ground Indication: If relative density of vapour/air-mixture at 20°C (air = 1) ≥ 1.1 . | 13203 |
| 670027 | The vapour mixes well with air, explosive mixtures are easily formed. Explanation: This phrase applies to substances with a vapour density of the vapour/air mixture between 0.9 and 1.1 and with a flash point < 23 °C. Although less dangerous than heavier vapours there is still a possibility of explosion. Indication: Use if the vapour-air mixture of the substance has a density relative to air (at 20 °C) ≥ 0.9 and < 1.1 and the extremely flammable liquids GHS category 1 (H224) are met. | 13213 |
| 670030 | Vapours are uninhibited and may polymerize, causing blockage of vents. | |
| 670031 | Vapours are uninhibited and may polymerize in vents or flame arresters, causing blockage. | |
| 670032 | May decompose if not stabilised. Indication: Use if decomposition of the substance creates a hazard e.g. production of heat or generation of toxic or flammable substances Links: 640042 | 13224 |
| 670033 | Ignites in air when finely divided. | |
| 670035 | No data. | |
| 670036 | This generates fire and explosion hazard. | |
| 670037 | The substance is very sensitive to heat, shock, friction, naked flames, sparks or electrostatic discharges. | |

Chemical dangers

| 68 Chemical dangers | | |
|---------------------|---|-----------------|
| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
| 680001 | Air or oxygen is not required for decomposition. | |
| 680002 | Aluminium burns in antimony trichloride vapour. | |
| 680003 | Attacked by pure water and by weak organic acids in the presence of oxygen. | |
| 680004 | Attacks [P1], and]. Indication: Can be completed with 'plastics', 'ceramics,' etc. if referred. Consider if the criteria for H290 (metals) is met for metals Parameters: 66 parameters: P1: alkaline earth metals; ... zinc alloys | 13397000 |
| 680005 | Attacks [P1] including [P2], and]["P3]. Parameters: 8 parameters: P1: many metals; P2: aluminium; copper; magnesium; nickel; steel; zinc; P3: unless inhibited | |
| 680006 | Attacks [P1] such as [P2], and]. Parameters: 15 parameters: P1: many organic substances; ... zinc | |
| 680007 | Attacks [P1], and] in the presence of [P2]. Explanation: Many chlorinated hydrocarbons split off HCl slowly when humid. This will attack metal. Indication: Applies to many chlorinated hydrocarbons split off HCl slowly when humid. Parameters: 18 parameters: P1: glass; ... zinc; P2: moist air; ... water or when dry Links: (640012) (640050) | 13395000 |
| 680008 | Attacks metals due to the slow formation of hydrogen chloride in storage. | |
| 680032 | Chromium is a catalytic substance and may cause reaction in contact with many organic and inorganic substances, causing fire and explosion hazard. | |
| 680033 | Contact with [P1], and] may cause [P2]. Parameters: 13 parameters: P1: alkali carbonates; ... water; P2: dangerous reactions; ... spontaneous ignition | |
| 680034 | Contact with [P1], and] causes [P2]. Parameters: 14 parameters: P1: acids; ... water; P2: a strong cooling effect; ... instantaneous explosion | |
| 680038 | Contact with [P1], and] may generate [P2]. Parameters: 5 parameters: P1: acids; moisture; water; P2: heat; toxic gas (stibine - see ICSC 0776) | |
| 680039 | Contact with [P1], and] generates [P2]. Explanation: Some substances may give off a gas which forms a fume with the water vapour in the surrounding air. Indication: Applies if the substance gives off a gas which forms a fume with the water vapour in the surrounding air (e.g., phosphorus pentachloride), or 'emits corrosive fumes (hydrochloric acid), which spread along the ground'. Parameters: 13 parameters: P1: air; ... water; P2: corrosive gas; ... toxic and corrosive fumes of selenium dioxide (see ICSC 0946) Links: 640050 | 13393000 |
| 680040 | Decomposes in alcohol and ammonia. | |
| 680041 | Contact with strong hydrogen peroxide solution causes violent decomposition to oxygen gas. | |
| 680042 | The substance is [P1]. | 13361 / 13363 / |

| 68 Chemical dangers | | |
|---------------------|---|---------------------------------------|
| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
| | <p>Explanation: Acids and bases are substances of mutually antagonistic character. Instead of 'bases', the terms 'alkaline' or 'caustic' substance are sometimes used. Both strong acids and bases are corrosive (mordant) to the skin and eyes. This property is generally known for acids, but the bases are just as dangerous in particular to the eyes. Strong acids and bases often react violently with other substances and attack many metals. Medium strong acids and bases are less dangerous but should not be handled carelessly. The terms strong acid applies to the well-known chemically strong acids (almost totally dissociating in water), including borderline cases with $\text{pH} < 0.2$.</p> <p>Indication: Combine with 680216-217 to mention substances with which the substance in question reacts. This phrase can be completed with indications of the materials towards which this strong acid is corrosive, as their corrosivities are not generally known.</p> <p>Parameters: 16 parameters: P1: a highly reactive compound; ... spontaneously flammable when dry</p> | 13367 / 13371 / 13373 / 13375 / 13377 |
| 680042 | <p>P1 a medium strong acid</p> <p>Explanation: The term medium strong acid applies to substances with a pH between 0.2 and 2.0.</p> <p>Indication: Use for liquid acids with $0.2 \leq \text{pH} < 2.0$ (between 0.2 and 2.0). Use for liquid acids; use 680205 (P2 a medium strong acid) for solid salts which hydrolyze in water to acids. For calculation of the pH: See Appendix 4. The pH is for the saturated solution in water at 20°C, with a maximum of 10 molar. Reactions of medium strong acids with other substances are mentioned preferably using a phrase such as 680115 (P2 oxidants). Acid salts from sulfuric acid (e.g., NaHSO_4) are regarded as medium strong. Also, salts consisting of a cation from a weak base and an anion from a strong acid (e.g., FeCl_3) are often medium strong. Consider if the criteria for H290 are met. (720100-P3 eyes, skin, resp tract) 640033-P1 strong bases</p> <p>Links: (720100-P3 eyes, skin, resp tract) 640033-P1 strong bases</p> | 13369000 |
| 680042 | <p>P1 a medium strong base</p> <p>Explanation: The term medium strong base applies to substances with a pH between 11.5 and 13.0.</p> <p>Indication: Use for liquid bases with $11.5 \leq \text{pH} < 13.0$ (between 11.5 and 13.0); use 680205 (P2 a medium strong base) for solid salts which hydrolyze in water to bases. For calculation of the pH: See Appendix 4. The pH is for the saturated solution in water at 20°C, with a maximum of 10 molar. Reactions of medium strong bases with other substances are mentioned preferably using a phrase such as 680115 (P2 oxidants). Acid salts from sulfuric acid (e.g., NaHSO_4) are regarded as medium strong. Salts consisting of an anion from a weak acid and a cation from a strong base (e.g., NaCN) are often regarded as medium strong bases.</p> <p>Links: (720100-P3 eyes, skin, resp tract) 640033-P1 strong acids</p> | 13375000 |
| 680042 | <p>P1 a strong acid</p> <p>Explanation: Acids and bases are substances of mutually antagonistic character. Instead of 'bases', the terms 'alkaline' or 'caustic' substance are sometimes used. Both strong acids and bases are corrosive (mordant) to the skin and eyes. This property is generally known for acids, but the bases are just as dangerous in particular to the eyes. Strong acids and bases often react violently with other substances and attack many metals. Medium strong acids and bases are less dangerous but should not be handled carelessly. The terms strong acid applies to the well-known chemically strong acids (almost totally dissociating in water), including borderline cases with $\text{pH} < 0.2$.</p> <p>Indication: Consider to combine with 680217 (violently with bases). Use for liquid acids with $\text{pH} \leq 0.2$; use 680205 (P2 a strong acid) for solid salts which hydrolyze in water to acids. For calculation of the pH: See Appendix 4. The pH is for the saturated solution in water at 20°C, with a maximum of 10 molar. This phrase can be completed with indications of the materials towards which this strong acid is corrosive, as their corrosivities are not generally known. If hydrogen is evolved, mention this with the addition 'This generates flammable/explosive gas (hydrogen - see ICSC0001)'. Consider if the criteria for H290 are met.</p> <p>Links: (720100-P3 eyes, skin, resp tract) 640033-P1 strong bases 310015 310016 (87119)</p> | 13367000 |

| 68 Chemical dangers | | | |
|---------------------|---|--|-------------|
| SentID | Model text, parameters and parameter values (with Indications and Explanations) | | PB# / notes |
| 680042 | P1 a strong base | | 13373000 |
| | Explanation: The term strong base applies to the well known chemically strong bases (almost totally dissociating in water), including borderline cases with pH > 13. | | |
| | Indication: Consider to combine with 680217 (violently with acid). Use for liquid bases with pH >= 13; use 680205 (P2 a strong base) for solid salts which hydrolyze in water to bases. For calculation of the pH: See Appendix 4. The pH is for the saturated solution in water at 20°C, with a maximum of 10 molar. This phrase can be completed with indications of the materials towards which this strong base is corrosive, as their corrosivities are not generally known. If hydrogen is evolved, mention this with the addition 'This generates flammable/explosive gas (hydrogen - see ICSC0001)'. | | |
| | Links: (720100-P3 eyes, skin, resp tract) 640033-P1 strong acids (310015 310016) (870119) | | |
| 680042 | P1 a strong oxidant | | 13361000 |
| | Indication: Consider to combine with 680216 (combustible and reducing materials). Strong oxidants are substances which readily respond to the potassium iodide I test by releasing iodine: - Water-soluble substances: dissolve in a little water and adjust to pH 4-5, unless already acidic. Add a drop of the solution to 1 ml of a fresh 10% aqueous potassium iodide (KI) solution. - Water-insoluble substances: add 0.1 g to 1 ml of a 10% solution of potassium iodide in acetic acid. A substance is also regarded as a strong oxidant if, when mixed with cellulose, the burning rate of the mixture equals or exceeds that of a mixture of barium nitrate and cellulose. This test is described in the Official Journal of the European Communities, L251, 19.9.1984. Consider if the criteria for H271 are met. ☑ application of H270 or H272 needs to be verified with phys.chem. experts! | | |
| | Links: (13703) (13709-13717) (420021) 430003-P1 flammables 560003 (580002-P1 safety goggles) 630033 640033-P1 combustible substances 870043 | | |
| 680042 | P1 a strong reducing agent | | 13363000 |
| | Indication: Consider to combine with 680216 (oxidants). Applies to typical electron donors, generally described in the literature as 'strong reducing agents'. Most of them are readily oxidized by contact with air. An example is stannous chloride. Many organic substances, e.g., saturated, hydrocarbons, also react with strong oxidants but are not strong reducing agents in the above sense. For these substances use 680115 (P2 oxidants). | | |
| | Links: 560003 630033 640033-P1 strong oxidants 870043 | | |
| 680042 | P1 a weak acid | | 13371000 |
| | Explanation: The term weak acid applies to substances with a pH between 2.0 and 6.0. | | |
| | Indication: Use for liquid acids with 2.0 <= pH < 6.0 (between 2.0 and 6.0). Use 680205 (P2 a weak acid) for solid salts which hydrolyze in water to acids. For calculation of the pH: See Appendix 4. The pH is for the saturated solution in water at 20°C, with a maximum of 10 molar. | | |
| 680042 | P1 a weak base | | 13377000 |
| | Explanation: The term weak base applies to substances with a pH between 8.0 and 11.5. | | |
| | Indication: Use for liquid bases with 8.0 <= pH < 11.5 (between 8.0 and 11.5). Use 680205 (P2 a weak base) for solid salts which hydrolyze in water to bases. For calculation of the pH: See Appendix 4. The pH is for the saturated solution in water at 20°C, with a maximum of 10 molar. | | |
| 680043 | Depending on the preparation method, the substance may ignite spontaneously on contact of finely divided powder with air or may burn on contact with air when heated above 200°C. | | |
| 680044 | Dissolves in water evolving heat. | | |
| 680045 | Dissolves in water liberating a considerable amount of heat. | | |

| 68 Chemical dangers | | |
|---------------------|---|-------------|
| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
| 680046 | Dissolves violently in water with liberation of much heat. | |
| 680047 | The dust reacts with [P1], and]. Parameters: 6 parameters: P1: hydrogen azide; oxidants; selenium; strong oxidants; tellurium; zinc | |
| 680050 | May explode on heating above [N1]°C[" "P2]. Parameters: 2 parameters: P2: (anhydrous); or when exposed to open flame | |
| 680052 | Mixtures with [P1], and] are [P2]. Parameters: 52 parameters: P1: 1-nitronaphthalene; ... zinc; P2: explosive; highly explosive; shock-sensitive; unstable | |
| 680052 | P2 shock-sensitive Indication: Base the application of this and other phrases on explosion depending on data found in relevant literature. Do NOT apply to shock-sensitive mixtures (e.g., due to contamination); use phrase 870011 instead. Links: (450038) (870157) (870125) | 13327000 |
| 680054 | Gradually gives off ammonia on exposure to air. | |
| 680055 | Heating may cause violent combustion or explosion. Explanation: This warning applies to substances that react as a result of self-heating or local heating, and continue to react even when no air is supplied. This results in a blazing combustion and in a 'confined' space may lead to a violent explosion. Indication: Base the application of this and other phrases on explosion depending on data found in relevant literature. Consider if the criteria for H241 are met. Links: 450038 (870125) | 13321000 |
| 680057 | Hydrolyzed by acids and alkalis to dinoseb (ICSC 0149). | |
| 680058 | Hydrolyzed by alkalis. | |
| 680059 | If in solution, reacts violently with iron, powdered aluminium and silver salts. | |
| 680060 | Impure material ignites spontaneously in air. | |
| 680061 | In the presence of finely dispersed metal powders the substance forms toxic and flammable carbonyls. | |
| 680063 | Lithium silicide attacks tellurium with incandescence. | |
| 680066 | May decompose on heating above [N1]°C. | |
| 680068 | May explode on heating[" "P1]. Explanation: This warning applies to substances that react as a result of self-heating or local heating, and continue to react even when no air is supplied. This results in a blazing combustion and in a 'confined' space may lead to a violent explosion. Indication: Base the application of this and other phrases on explosion depending on data found in relevant literature. Consider if the criteria for H240 are met. Parameters: 5 parameters: P1: above melting point, especially on rapid heating; during large scale atmospheric pressure distillation; even in the absence of air; rapidly to high temperature; to decomposition Links: (450038) (870125) | 13325000 |
| 680069 | May explode [P1] or or]. Parameters: 7 parameters: P1: if subjected to sparks; ... on shock | |
| 680071 | May explode on heating at 100°C or on contact with rough surfaces or if impurities or solids are present in the undiluted liquid or in the concentrated solutions or under high intensity lighting. | |
| 680081 | May explode on vacuum distillation. | |
| 680083 | May react vigorously with oxygen, acetylene, chlorine, fluorine or nitrous oxide. | |
| 680084 | Metal catalysts, such as platinum and nickel, greatly enhance these reactions. | |

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| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
| 680087 | Mixtures with iron (III) chloride, iron (III) oxide and tin (II) chloride ignite easily and burn fiercely. | |
| 680090 | The molten form reacts [P1] with [P2], and]. Parameters: 6 parameters: P1: rapidly; P2: alcohols; carboxylic acids and anhydrides; phenols; primary and secondary amines; thiols | |
| 680092 | On combustion, forms [P1], and]. Explanation: This phrase mentions important products of combustion. These substances may, in themselves, cause e.g. health hazards. The combustion of nearly all organic substances causes the formation of toxic gases, including carbon monoxide (CO). On these ICSCs, the formation of CO is mentioned if it constitutes a predominant part of the combustion products. Indication: Complete with toxic/caustic/acid/irritant/combustible/flammable/gas/vapour/mists/fumes/solid. In general combustion often produces a mixture of undefined toxic gases and CO; therefore 'toxic gases' may suffice. With aromatic and hetero-aromatic compounds the formation of CO is so predominant that it should be mentioned. See also for reference to other ICSCs. An example could be: On combustion, forms toxic gas including nitrogen oxides. Use one of the series 680708-11/680601-10/680800 for more complicated cases. Parameters: 19 parameters: P1: acetic acid fumes; ... toxic gases | 13331000 |
| 680093 | On combustion, forms [P1] including [P2], and]. Explanation: This phrase mentions important products of combustion. These substances may, in themselves, cause e.g. health hazards. The combustion of nearly all organic substances causes the formation of toxic gases, including carbon monoxide (CO). On these ICSCs, the formation of CO is mentioned if it constitutes a predominant part of the combustion products. Indication: Complete with toxic/caustic/acid/irritant/combustible/flammable/gas/vapour/mists/fumes/solid and, if known, with the name of combustion product(s) between parentheses. In general combustion often produces a mixture of undefined toxic gases and CO; therefore 'toxic gases' may suffice. With aromatic and hetero-aromatic compounds the formation of CO is so predominant that it should be mentioned. See also for reference to other ICSCs. An example could be: On combustion, forms toxic gas including nitrogen oxides. Use one of the series 680708-11/680601-10/680800 for more complicated cases. Parameters: 40 parameters: P1: corrosive fumes; ... toxic gases and vapours; P2: ammonia; ... sulfur oxides | 13331000 |
| 680094 | On combustion, forms [P1] of [P2], and]. Explanation: This phrase mentions important products of combustion. These substances may, in themselves, cause e.g. health hazards. The combustion of nearly all organic substances causes the formation of toxic gases, including carbon monoxide (CO). On these ICSCs, the formation of CO is mentioned if it constitutes a predominant part of the combustion products. Indication: Complete with toxic/caustic/acid/irritant/combustible/flammable/gas/vapour/mists/fumes/solid and, if known, with the name of combustion product(s) between parentheses. In general combustion often produces a mixture of undefined toxic gases and CO; therefore 'toxic gases' may suffice. With aromatic and hetero-aromatic compounds the formation of CO is so predominant that it should be mentioned. See also for reference to other ICSCs. An example could be: On combustion, forms toxic gas including nitrogen oxides. Use one of the series 680708-11/680601-10/680800 for more complicated cases. Parameters: 21 parameters: P1: corrosive gases; ... ; toxic gases and vapours; P2: antimony oxides (see ICSC 0012); ... sulfur oxides including sulfur dioxide (see ICSC 0074) | 13331000 |

| 68 Chemical dangers | | |
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| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
| 680108 | Oxidizes in air forming deposits which become peroxidized causing fire hazard. | |
| 680109 | Platinum is a catalytic substance and may cause reaction in contact with many organic and inorganic substances, causing fire and explosion hazard. | |
| 680110 | Products of hydrolysis in water include corrosive hydrochloric acid and acetic acid. | |
| 680115 | Reacts[" P1] with [P2], and][" P3]. | 13381 / 13383 / 13389 |
| | Explanation: The only chemicals mentioned as reactants with the 'ICSC substance' are those which are expected to be present and may constitute a hazard. Many substances react vigorously with, for instance, alkali metals (e.g., sodium) but as these are not likely to be readily available on the workfloor, the reaction with these materials is not mentioned on the ICSC. | |
| | Indication: This phrase can be completed with several indications. This phrase should be used to mention how the substance reacts with water in both rapid and slow decomposition. This phrase can also be used for reactions with commonly available chemicals, combined with 680602 to specify the hazard. (Alkali metals and earth-alkali metals are not regarded as commonly available substances. Light metals should be completed with examples.) Only include reactions which are likely to constitute a hazard. | |
| | Parameters: 406 parameters: P1: if in amorphous form; ... ; in powder form P2: 1-perchloryl-piperidine; ... ; zinc P3: (on heating); ... ; with incandescence | |
| | Links: 640033 640033 (P1 strong oxidants) | |
| 680122 | Reacts in an alkaline medium at high temperatures producing highly toxic chlorinated dioxins. | |
| 680123 | Reacts in the presence of potassium permanganate, lead(II) oxide, copper oxide or silver oxide, causing fire and explosion hazard. | |
| 680133 | Reacts slowly with water forming hardened hydrated compounds, releasing heat and producing a strong alkaline solution. | |
| 680148 | Reacts violently with oxidants, halogenated hydrocarbons, acids and water to form flammable/explosive gas (hydrogen - see ICSC 0001) and, in the case of water, lithium hydroxide which is very caustic. | |
| 680168 | Reacts violently with oxidants, bases in powdered form and is corrosive to most metals. | |
| 680172 | Reacts with strong acids and alkalis with possible formation of highly toxic tetraethyl thiopyrophosphates. | |
| 680178 | Reacts with acids and is corrosive to aluminium and zinc. | |
| 680200 | Rhodium is a catalytic substance and may cause reaction in contact with many organic and inorganic substances, causing fire and explosion hazard. | |
| 680201 | See Notes. | |
| 680202 | See ICSC [N1]. | |
| 680205 | The solution[" P1] is [P2]. | 13368 / 13370 / 13372 / 13374 / 13376 / 13378 |
| | Explanation: This phrase is used when the substance dissolved in water is a weak base (with pH between 8.0 and 11.5) or a medium strong base (with pH between 11.5 and 13.0) or a strong base including borderline strong case (with pH > 13); a weak acid (with pH between 2.0 and 6.0) or a medium strong acid (with pH between 0.2 and 2.0) or a strong acid (with pH <0.2); corrosive to metals. | |
| | Indication: Consider to combine with 680216-217 to mention substances with which the substance in question reacts. | |
| | Parameters: 10 parameters: P1: in water; P2: a medium strong acid; ... corrosive to metals | |
| 680205 | P2 a medium strong acid | 13370000 |
| | Explanation: This phrase is used when the substance dissolved in water is a medium strong acid (with pH between 0.2 and 2.0). | |
| | Indication: Use for solid salts which hydrolyze in water to medium strong acids with $0.2 \leq \text{pH} < 2.0$ (between 0.2 and 2.0). Use 680042 (P1 a medium strong acid) for liquid acids. For | |

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| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
| | <p>calculation of the pH: See Appendix 4. The pH is for the saturated solution in water at 20°C, with a maximum of 10 molar. Reactions of medium strong acids with other substances are preferably mentioned using a phrase such as 680115 (P2 oxidants). Acid salts from sulfuric acid (e.g., NaHSO₄) are regarded as medium strong. Also, salts consisting of a cation from a weak base and an anion from a strong acid (e.g., FeCl₃) are often medium strong. Consider if the criteria for H290 are met.</p> <p>Links: (720100-P3 eyes, skin, resp tract) 640033-P1 strong bases</p> | |
| 680205 | <p>P2 a medium strong base</p> <p>Explanation: This phrase is used when the substance dissolved in water is a medium strong base (with pH between 11.5 and 13.0).</p> <p>Indication: Use for solid salts which hydrolyze in water to bases with 11.5 ≤ pH < 13.0 (between 11.5 and 13.0); use 680042 (P1 a medium strong base) for liquid bases. For calculation of the pH: See Appendix 4. The pH is for the saturated solution in water at 20°C, with a maximum of 10 molar. Reactions of medium strong bases with other substances are mentioned preferably using a phrase such as 680115 (P2 oxidants). Salts consisting of an anion from a weak acid and a cation from a strong base (e.g., NaCN) are often regarded as medium strong bases.</p> <p>Links: (720100-P3 eyes, skin, resp tract) 640033-P1 strong acids</p> | 13376000 |
| 680205 | <p>P2 a strong acid</p> <p>Explanation: This phrase is used when the substance dissolved in water is a strong acid (with pH < 0.2).</p> <p>Indication: Consider to combine with 680217 (violently with bases). Use for solid salts which hydrolyze in water to acids with pH ≤ 0.2; use 680042 (P1 a strong acid) for liquid acids. For calculation of the pH: See Appendix 4. The pH is for the saturated solution in water at 20°C, with a maximum of 10 molar. This phrase can be completed with indications of the materials towards which this strong acid is corrosive, as their corrosivities are not generally known. If hydrogen is evolved, mention this with the addition 'This generates flammable/explosive gas (hydrogen - see ICSC0001)'. Consider if the criteria for H290 are met.</p> <p>Links: (720100-P3 eyes, skin, resp tract) 640033-P1 strong acids (310015 310016) (870119)</p> | 13368000 |
| 680205 | <p>P2 a strong base</p> <p>Explanation: This phrase is used when the substance dissolved in water is a strong base (with pH > 13).</p> <p>Indication: Consider to combine with 680217 (violently with acid). Use for solid salts which hydrolyze in water to bases with pH ≥ 13; use 680042 (P1 a strong base) for liquid bases. For calculation of the pH: See Appendix 4. The pH is for the saturated solution in water at 20°C, with a maximum of 10 molar. This phrase can be completed with indications of the materials towards which this strong base is corrosive, as their corrosivities are not generally known. If hydrogen is evolved, mention this with the addition 'This generates flammable/explosive gas (hydrogen - see ICSC0001)'. Consider if the criteria for H290 are met.</p> <p>Links: (720100-P3 eyes, skin, resp tract) 640033-P1 strong acids (310015 310016) (870119)</p> | 13374000 |
| 680205 | <p>P2 a weak acid</p> <p>Explanation: This phrase is used when the substance dissolved in water is a weak acid (with pH between 2.0 and 6.0).</p> <p>Indication: Use for solid salts which hydrolyze in water to weak acids with 2.0 ≤ pH < 6.0 (between 2.0 and 6.0). Use 680042 (P1 a weak acid) for liquid acids. For calculation of the pH: See Appendix 4. The pH is for the saturated solution in water at 20°C, with a maximum of 10 molar.</p> | 13372000 |
| | <p>P2 a weak base</p> | 13378000 |

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|---------------------|--|-------------|
| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
| | <p>Explanation: This phrase is used when the substance dissolved in water is a weak base (with pH between 8.0 and 11.5).</p> <p>Indication: Use for solid salts which hydrolyze in water to bases with $8.0 \leq \text{pH} < 11.5$ (between 8.0 and 11.5). Use 680042 (P1 a weak base) for liquid bases. For calculation of the pH: See Appendix 4. The pH is for the saturated solution in water at 20°C, with a maximum of 10 molar.</p> | |
| 680206 | <p>Solutions in water [P1].</p> <p>Parameters: 2 parameters: P1: may attack glass; slowly etch glass</p> | |
| 680210 | The acid is unstable if the concentration is over 72%; may explode by shock or concussion when dry or drying. Mixtures with combustible material (such as paper) may ignite spontaneously at room temperature. | |
| 680212 | The reaction is accelerated by peroxides or trichloroacetic acid. | |
| 680216 | <p>It reacts[" P1] with [P2], and].</p> <p>Parameters: 36 parameters: P1: under the influence of light; vigorously; violently; P2: acid; ... sulfur-containing compounds</p> | |
| 680217 | <p>It reacts[" P1] with [P2], and] and is corrosive[" P3].</p> <p>Parameters: 13 parameters: P1: violently; P2: acid; bases; P3: (see ICSC 1485 dimethylamine, aqueous solution); ... to metals such as aluminium, tin, lead and zinc</p> | |
| 680228 | <p>The substance can[" P1] form explosive peroxides[" P2].</p> <p>Explanation: During storage, peroxides can be formed. During distillation and evaporation (by heating) the substance concentrates to peroxides and the residue is explosive. Peroxides should be neutralized before concentration with ferrous thiocyanate or by passing the liquid over a column of activated alumina. These substances should not be stored over 12 months. (See Annex for reference)</p> <p>Indication: Apply if mentioned in list B of Data Sheet 1-655, National Safety Council, Chicago (USA) or if other definite indications of peroxide formation are present. Consider if the criteria for (H240) H241 (H242) are met ← this needs to be verified with phys.chem. experts!</p> <p>Parameters: 12 parameters: P1: readily; P2: , especially in anhydrous form; ... under the influence of light and air</p> <p>Links: 640003 640022 870046 (640042)</p> | 13301000 |
| 680228 | <p>P2 under specific circumstances, initiating explosive polymerization</p> <p>Explanation: In some cases peroxides initiate polymerization. Peroxides are generally neutralized with ferrous thiocyanate or by passing the liquid over a column with activated alumina.</p> <p>Indication: Applies if mentioned in list C of Data Sheet 1-655. For butadiene, chloroprene, and tetrafluoroethylene the phrase is completed with 'readily'. Consider if the criteria for H240 H241 are met. ← this needs to be verified with phys.chem. experts!</p> <p>Links: (640003) (640022) (640023-P1 inert gas) (640042) 870086</p> | 13307000 |
| 680236 | <p>The substance can presumably form explosive peroxides[" P1].</p> <p>Indication: Apply only to substances that are not listed as peroxidizable compounds in Data Sheet 1-655 and when other definite indications are also lacking, but the chemical structure permits formation of peroxides. Consider if the criteria for (H241) H242 are met. ← this needs to be verified with phys.chem. experts!</p> <p>Parameters: 3 parameters: P1: in contact with air; under the influence or air and light; upon exposure to air or light</p> | 13305000 |

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| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
| | Links: 640003 640022 870046 | |
| 680238 | The substance can readily form explosive peroxides[" "P1]. Explanation: Compounds that form peroxides that can explode even without being concentrated. Peroxides should be neutralized with ferrous thiocyanate or by passing the liquid over a column with activated alumina. These substances should not be stored over 3 months. Indication: Apply if mentioned in list A of Data Sheet 1-655, National Safety Council. Includes substances such as isopropyl ether, diphenylacetylene, vinylidene chloride, potassium and sodium amide. Consider if the criteria for (H241) H242 are met. ← this needs to be verified with phys.chem. experts! Parameters: 2 parameters: P1: if unstabilized and explode on shaking; on contact with air Links: 640003 | 13303000 |
| 680300 | Decomposes on heating at 288°C, on burning and on contact with strong acids. | |
| 680302 | Decomposes on heating at 210°C and on burning. | |
| 680304 | Decomposes on heating at high temperature and on burning. | |
| 680306 | Decomposes on heating between 150 and 300°C. | |
| 680307 | Decomposes on heating or on burning and on contact with hot surfaces. | |
| 680309 | Decomposes on heating or on burning or on contact with acids, bases and amines. | |
| 680378 | Decomposes rapidly at room temperature, especially in the presence of moisture and carbon dioxide, and violently on heating. | |
| 680401 | Decomposes when slowly heated to 300°C. | |
| 680403 | The substance if not stabilized will polymerize with generation of heat. | |
| 680404 | The substance ignites on contact with cellulose nitrate of high surface area. | |
| 680424 | The substance is a strong oxidizer when dry and can increase the risk of fire or ignite combustible substances. | |
| 680436 | The substance is decomposed by electric sparks. | |
| 680439 | The substance may[" "P1] polymerize[" "P2]. Explanation: Polymerization is a chemical reaction in which molecules of a substance combine to form larger molecules. This reaction generally involves liberation of heat, which may result in the building up of pressure or may give rise to fire and/or explosion. Parameters: 45 parameters: P1: freely; readily; spontaneously; violently; P2: due to heating; ... under the influence of water, acids, bases and heat | 13311010 |
| 680439 | P2 due to heating Indication: This phrase is used in connection with temperatures > 80°C. If known, temperatures should be mentioned, e.g., due to heating above 100°C. Links: (640003) | 13315000 |
| 680439 | P2 due to warming Indication: This phrase is used in connection with temperatures < 80°C. If known, temperatures should be mentioned, e.g., due to warming above 75°C. Links: 640003 | 13313000 |
| 680441 | The substance may polymerize due to heating to more than 120°C for more than 12 hours, or under the influence of catalysts. | |
| 680460 | The substance may polymerize to form aromatic compounds under the influence of temperatures above 600°C. | |
| 680469 | The substance may reduce the oxygen content of air in confined spaces. Explanation: The substance, when in contact with air in confined spaces, may deplete the oxygen content to a dangerous extent. Indication: This hazard is most relevant for solid reducing agents. Links: 870092 870031=870091 | 13365000 |

| 68 Chemical dangers | | |
|---------------------|---|-------------|
| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
| 680470 | <p>The substance[" "P1] may ignite spontaneously on contact with [P2], and][" "P3].</p> <p>Explanation: Substances which become hot and finally catch fire in contact with air at ambient temperature without any input of energy.</p> <p>Indication: GAS: Flammable gases that ignite spontaneously in air at a temperature of 54 °C or below</p> <p>LIQUIDS AND SOLIDS: Applies if the substance is liable to ignite within 5 minutes after coming into contact with air.</p> <p>The GHS Criteria are: "The liquid ignites within 5 minutes when added to an inert carrier and exposed to air, or it ignites or chars a filter paper on contact with air within 5 minutes" and "The solid ignites within 5 minutes of coming into contact with air".</p> <p>Parameters: 15 parameters: P1: , if in powder form;; , when finely dispersed;; , when finely divided;; at high concentrations; P2: acetylene; ... sulfur; P3: at higher temperatures; if finely divided or on heating</p> <p>Links: 420006</p> | 13329000 |
| 680479 | The substance may ignite spontaneously on contact with air when heated above 700°C. | |
| 680481 | <p>The substance[" "P1] polymerizes[" "P2].</p> <p>Explanation: Polymerization is a chemical reaction in which molecules of a substance combine to form larger molecules. This reaction generally involves liberation of heat, which may result in the building up of pressure or may give rise to fire and/or explosion.</p> <p>Parameters: 36 parameters: P1: easily; more rapidly; rapidly; readily; slowly; violently; P2: , especially under the influence of moisture; ... when pure; with acids and bases</p> | 13311000 |
| 680481 | <p>P2 due to warming</p> <p>Indication: This phrase is used in connection with temperatures < 80°C. If known, temperatures should be mentioned, e.g., due to warming above 75°C.</p> <p>Links: 640003</p> | 13313000 |
| 680501 | The substance polymerizes under the influence of temperatures above [N1]°C or under the influence of bases. | |
| 680502 | The substance polymerizes under the influence of temperatures above [N1]°C. | 13317060 |
| 680503 | The substance polymerizes unsaturated compounds. | |
| 680504 | The substance polymerizes violently due to heating above [N1]°C or under the influence of light and oxidants. | |
| 680510 | The substance, as a liquid or vapour, can readily polymerize. | |
| 680513 | This substance (anhydrous form) dissociates almost instantly into silicon tetrafluoride and corrosive and toxic hydrogen fluoride. | |
| 680514 | Toxic gases and vapours (such as nickel carbonyl) may be released in a fire involving nickel. | |
| 680515 | Unstable if stored in copper or zinc containers. | |
| 680516 | Unstable to light and moisture. | |
| 680518 | <p>Upon heating, toxic fumes are formed.</p> <p>Indication: Can be used instead of 680708-11/680601-10 for elemental substances, especially metals.</p> <p>Links: (420014)</p> | 13359000 |
| 680601 | <p>This produces [P1], and].</p> <p>Indication: Complete with toxic/caustic/acid/irritant/combustible/flammable/gas/vapour/mists/fumes/solid and, if known, with the name of the decomposition product(s) between parentheses. In general combustion often produces a mixture of undefined toxic gases and CO; therefore 'toxic gases' may suffice. With aromatic and hetero-aromatic compounds the formation of CO is so predominant that it should be</p> | 13353000 |

| 68 Chemical dangers | | |
|---------------------|--|-------------|
| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
| | mentioned. If oxygen is produced, then combine with 680800. Can be combined when appropriate with any of the sentences. Parameters: 289 parameters: P1: (highly) toxic fumes including nitrogen oxides and isocyanic acid; ... ; water | |
| 680602 | This generates [P1], and]. Parameters: 14 parameters: P1: a large amount of heat, with fire or explosion hazard; ... toxic, fire and explosion hazard | 13391000 |
| 680602 | P1 fire and explosion hazard Indication: Decomposition: only use if the decomposition itself causes fire or explosion hazard; not on the fact that, for example, a combustible gas is produced. Reaction: This phrase should not be used on the mere fact that a flammable gas is produced. The reaction should be capable of producing either so much heat that auto-ignition of the reacting chemicals is possible or of causing a strong pressure rise. For the fire hazards resulting from the formation of a flammable gas, reference should be made to the ICSC for that substance. Also see ind. 680092-4; names of substances with which the substance in question reacts, should not be mentioned. | 13313000 |
| 680603 | This produces[" "P1] toxic fumes[" of "P2 , and]. Parameters: 52 parameters: P1: highly; P2: aniline; ... zinc oxide | 13353270 |
| 680604 | This produces[" "P1] toxic fumes including [P2 , and][" "P3]. Parameters: 46 parameters: P1: highly; very; P2: ammonia; ... zinc oxides; P3: even in the absence of air | |
| 680605 | This produces toxic and corrosive fumes[" of "P1 , and][" "P2]. Parameters: 24 parameters: P1: ammonia; ... valeric acid; P2: flammable vapours | 13353290 |
| 680606 | This produces toxic and corrosive fumes including [P1 , and][" "P2]. Parameters: 47 parameters: P1: trichlorobenzenes (see ICSCs 0344, 1049 and 1222); ... sulfur oxides; P2: even in the absence of air | |
| 680607 | This produces toxic gases[" of "P1 , and]. Parameters: 12 parameters: P1: carbon monoxide; ... sulfur oxides | 13353260 |
| 680608 | This produces toxic gases including [P1 , and]. Parameters: 19 parameters: P1: ammonia (see ICSC 0414); ... sulfur oxides | |
| 680609 | This produces toxic and corrosive gases[" of "P1 , and]. Parameters: 8 parameters: P1: carbon monoxide; ... phosgene (see ICSC 0007) | 13353280 |
| 680610 | This produces toxic and corrosive gases including [P1 , and]. Parameters: 20 parameters: P1: acetic acid fumes; ... sulfur oxides | |
| 680701 | Decomposes[" "P1] at [N2]°C. Indication: Combine with 680601-610 to say decomposition products and hazards. Do not use for elemental substances; use 680518 instead. Parameters: 2 parameters: P1: quickly; slowly | |
| 680702 | Decomposes[" "P1] above [N1]°C [P2]. Indication: Combine with 680601-610 to say decomposition products and hazards. Do not use for elemental substances; use 680518 instead. Parameters: 5 parameters: P1: on heating; rapidly; P2: and on exposure to light; in the absence of air; when moist | |

| 68 Chemical dangers | | |
|---------------------|--|-------------|
| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
| 680704 | May decompose["P1] on contact with [P2], and]. Parameters: 4 parameters: P1: on heating; violently; P2: cobalt, copper or lead alloys; mineral acids | |
| 680705 | Decomposes["P1] on burning. Indication: Use if the substance is combustible. If no flash point, use 420014 where appropriate. Do not use for elemental substances; use 680518 instead. Combine with 680601-610 to say decomposition products. Parameters: 1 parameter: P1: rapidly | 13347000 |
| 680706 | May decompose["P1] on [P2], or]. Parameters: 6 parameters: P1: explosively; P2: concussion; friction; heating; prolonged storage (see Notes); shock | |
| 680706 | P1 explosively Indication: Base the application of this and other phrases on explosion depending on data found in relevant literature. Links: 450038 460004 | 13323000 |
| 680707 | Slowly decomposed by light in the presence of [P1]. Parameters: 1 parameter: P1: moisture | |
| 680708 | Decomposes["P1] [P2], or]. Indication: Combine with 680601-610 to say decomposition products and hazards. Do not use for elemental substances; use 680518 instead. Parameters: 14 parameters: P1: explosively; rapidly; slowly; violently; P2: at room temperature; ... on warming | 13341000 |
| 680708 | P2 on warming Indication: Complete with a temperature value if one is known, e.g. '(above 70°C)'; use for temperatures <80°C. Links: 450038 460004 | 13343000 |
| 680709 | Decomposes["P1] under the influence of [P2], and]. Indication: Combine with 680601-610 to say decomposition products and hazards. Do not use for elemental substances; use 680518 instead. Parameters: 16 parameters: P1: rapidly; slowly; P2: UV light; ... water Links: (640012) (640022) (640050) | 13351000 |
| 680710 | Decomposes["P1] on heating["P2]. Indication: Do not use for elemental substances; use 680518 instead. Complete with a temperature value if one is known, e.g. '(above 85°C)'; use 680708 (P2 on warming) for temperatures <80°C; if the temperature is unknown and the substance is combustible, use 680705. Combine with 680601-610 to say decomposition products and hazards. Parameters: 7 parameters: P1: rapidly; P2: above the boiling point; ... with strong aqueous alkali solutions | 13345000 |
| 680711 | Decomposes["P1] on contact with [P2], or]. Indication: Only to be used if it reacts with common chemicals or chemical groups likely to be found in an industrial setting. Do not mention specific chemicals; only reaction products should be highlighted. Combine with 680601-610 to say decomposition products and hazards. Do not use for elemental substances; use 680518 instead. | 13349000 |

| 68 Chemical dangers | | |
|---------------------|--|-------------|
| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
| | <p>For hot surfaces or flames: only to be used for substances which are only slightly or not at all combustible and which, on heating in contact with air, decompose forming noxious gases/vapours.</p> <p>Parameters: 40 parameters: P1: rapidly; slowly; violently; P2: acid fumes; ... water</p> <p>Links: (640033)</p> | |
| 680712 | <p>Decomposes [P1] on heating and on burning.</p> <p>Indication: Combine with 680601-610 to say decomposition products and hazards. Do not use for elemental substances; use 680518 instead.</p> <p>Parameters: 1 parameter: P1: rapidly</p> | |
| 680713 | <p>Decomposes["P1] on heating and on contact with [P2], and].</p> <p>Indication: Combine with 680601-610 to say decomposition products and hazards. Do not use for elemental substances; use 680518 instead.</p> <p>For hot surfaces or flames: only to be used for substances which are only slightly or not at all combustible and which, on heating in contact with air, decompose forming noxious gases/vapours.</p> <p>Parameters: 20 parameters: P1: rapidly; slowly; P2: acid fumes; ... water</p> | |
| 680714 | <p>Decomposes on heating and under the influence of [P1], and].</p> <p>Indication: Combine with 680601-610 to say decomposition products and hazards. Do not use for elemental substances; use 680518 instead.</p> <p>Parameters: 5 parameters: P1: UV light; acids; air; light; moisture</p> | |
| 680720 | Dimerization is catalyzed by traces of bases. | |
| 680721 | Dimerizes at temperatures above 40°C with strong heat release. | |
| 680800 | <p>This increases [P1].</p> <p>Indication: Apply to oxygen-carriers, e.g., nitrates, some organic peroxides, and other 'per'-compounds; see also UN Class 5.1. To be combined with appropriate sentences.</p> <p>Parameters: 2 parameters: P1: fire and explosion hazard; fire hazard</p> <p>Links: (420021)</p> | 13355000 |
| 680802 | The substance readily absorbs carbon dioxide. | |
| 680803 | Can form peroxides which may initiate a polymerisation reaction. | |
| 680804 | The substance will polymerize due to heating, on contact with peroxides, and under the influence of light. | |
| 680805 | No data. | |
| 680806 | The substance reacts with most organic and inorganic compounds, causing fire and explosion hazard. | |
| 680807 | Reacts violently with ammonia, ammonium salts and amines, sodium carbonate (soda ash) causing fire and explosion hazard. | |
| 680808 | It reacts violently with bases and is corrosive to most common metals forming a flammable/explosive gas (hydrogen - see ICSC 0001). | |
| 680809 | Most combustible materials ignite spontaneously on contact with this substance. | |
| 680810 | <p>Incompatible with["P1].</p> <p>Parameters: 2 parameters: P1: certain metal powders (aluminium, zinc, beryllium); plastics</p> | |
| 680811 | Can ignite combustible substances. | |
| 680812 | The substance can form peroxides on exposure to air, initiating explosive polymerization. | |
| 680813 | Unstable substance. | |
| 680814 | Decomposes partly at room temperature to chlorine and bromine. | |
| 680815 | Corrosive to [P1], and]. | |

| 68 Chemical dangers | | |
|----------------------------|---|--------------------|
| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
| | Parameters: 2 parameters: P1: iron; steel | |
| 680816 | Mixtures with reducing agents or reduced materials such as organic substances can be explosive. | |
| 680817 | It reacts["P1] with [P2], and] and is corrosive["P3]["P4]. Parameters: – | |
| 680818 | On combustion forms zinc oxide fumes. | |

EXPOSURE & HEALTH EFFECTS

And with the physical properties we can say more about the appearance and dangers...

Routes of exposure

| 70 Routes of exposure | | |
|-----------------------|---|------------------------|
| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
| | <p>Routes of exposure</p> <p>Explanation: Liquid and solid substances can be absorbed by swallowing, through the mucous membranes or the skin. Gas, vapour, mist, or finely dispersed solids will enter the body mainly through inhalation. This is the most frequent mode of exposure of substances in industrial situations. Liquid and solid substances can be absorbed by swallowing, through the mucous membranes or the skin. All of these subphrases can be completed with particulars; always close with a full stop (.).</p> <p><u>Explanation of some terms:</u></p> <p>Gas: a substance which at ambient temperature and pressure appears as a gas, meaning that the molecules of the substances travel freely in open space.</p> <p>Vapour: the gas of a substance which is formed above a liquid or solid by evaporation. Evaporation means the release of molecules from the liquid or solid. Evaporation decreases with increasing boiling point and can generally be regarded as negligible if the boiling point exceeds 350°C.</p> <p>Mist: a suspension of liquid particles in the air, formed by condensation of a vapour.</p> <p>Fume: a suspension of liquid or solid particles in the air formed by condensation of vapours from heated metals or of vapours produced by a decomposition reaction. Moisture in the air often promotes the formation of mists and fumes by reactions with the vapours.</p> <p>Dust-cloud: fine particles of powder of a solid substance, dispersed in the air.</p> <p>Aerosol: a suspension of liquid or solid particles in the air. Mist, fume and dust-cloud are more or less covered by the term 'aerosol'."</p> <p>Indication: The important routes of exposure resulting in absorption should be mentioned by selecting 700005 with the appropriate parameters according to human or acute experimental animal evidence.</p> <p>If no acute data is available in human or in experimental animals but the substance has systemic long term effect (cancer, reproduction effects, target organs systemic toxicity) then these data could be used by selecting 700004 with the appropriate parameters according to human or acute experimental animal evidence.</p> <p>For corrosives: If the substance is classified corrosive by specific routes of exposure then select 'Serious local effects' (700002 or 700003 or 700008 whichever routes are most appropriate) according to human or acute experimental animal evidence or based.</p> <p>To this approach of corrosive substances, some exceptions may exist, such as phenol and hydrogen fluoride. The purpose of the selected ICSC sentences in this section is to properly describe the local corrosive effects, especially in case of these exceptions. This goes further than the more generalistic GHS approach of irritation or corrosion.</p> <p>Therefore, motivation for selected sentences should be carefully documented by the PI in the section of the Comments, preferably with some references.</p> <p>In exceptional situations the Compiler's motivated selection should to be presented as a Point of Concern to be discussed at the peer-review meeting: it needs Peer Reviewed consent.</p> <p>If inhalation is the most likely route of exposure (gases, vapors), but there is no information on effects of short-term or or long-term exposure 700007 can be considered.</p> | 13600000 |
| 700005 | <p>The substance can be absorbed into the body in hazardous amounts [P1], and].</p> <p>Explanation: In some cases it could be difficult to qualify the route of absorption.</p> | 13501000 + 13502000 |

| 70 Routes of exposure | | |
|-----------------------|--|------------------------|
| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
| | <p>Indication: The important routes of exposure resulting in absorption should be mentioned by selecting 700005 with the appropriate parameters according to human or acute experimental animal evidence. 'hazardous amounts': use only of the substance is classified by GHS as toxic, categories 1, 2 or 3 (H300, H301, H310, H311, H330 or H331)</p> <p>Parameters: 16 parameters: P1: by ingestion; ... through the skin also as a vapour</p> | |
| | <p>CGC remarks: Select the appropriate parameter value from the list. For some of these parameter values individual Indications and Explanations are needed Feedback and suggestions for the CGC are very much appreciated.</p> | |
| 700004 | <p>The substance can be absorbed into the body [P1], and].</p> <p>Indication: If no acute data is available in human or in experimental animals but the substance has systemic long term effect (cancer, reproduction effects, target organs systemic toxicity) then these data could be used by selecting 700004 with the appropriate parameters according to human or acute experimental animal evidence. For those exceptional cases (with no data on acute effects, but possible adverse long-term effects) the Compiler should motivate the selection of sentence and parameters in the Comments section. In such exceptional situations the Compiler's motivated selection should to be presented as a Point of Concern to be discussed at the peer-review meeting: it needs Peer Reviewed consent.</p> <p>Parameters: 17 parameters: P1: (in solution) through the skin; ... through the skin also as a vapour</p> | |
| | <p>CGC remarks: Sentences 700004 and 700005 are very similar, but a clear distinction in Indications when to use which sentences is dearly needed. A first attempt to this effect has been made with the new general Indication text at the top of this Field.. Each sentence has its own set of paramaters. For some of those parameter values individual Indications and Explanations are needed Feedback and suggestions for the CGC are very much appreciated.</p> | |
| 700002 | <p>Serious [P1], and] by all routes of exposure.</p> <p>Indication: Use 'local effects' for corrosive substances (GHS categories 1A, 1B and 1C) that cause local tissue damage by any route of exposure but that are not necessarily absorbed. (H314).</p> <p>Parameters: 2 parameters: P1: local effects; systemic effects</p> | 13516005 |
| 700008 | Serious local effects on contact with eyes and skin. | |
| 700003 | Serious local effects on contact with skin. | 13516000 + 13516020 |
| | <p>Explanation: Liquid and solid substances can be absorbed by swallowing, through the mucous membranes or the skin. Gas, vapour, mist, or finely dispersed solids will enter the body mainly through inhalation. This is the most frequent mode of exposure of substances in industrial situations. Liquid and solid substances can be absorbed by swallowing, through the mucous membranes or the skin. All of these subphrases can be completed with particulars; always close with a full stop (.).</p> <p>Indication: Use for corrosive substances (GHS categories 1A, 1B and 1C) that cause local tissue damage by any route of exposure but that are not necessarily absorbed. Use according to GHS criteria for concentration limits and animal species. H314</p> | |
| 700007 | Exposure mainly occurs via inhalation. | |
| 700001 | See Notes. | |

Inhalation risk

| 71 Inhalation risk | | |
|--------------------|--|-------------|
| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
| | <p>Inhalation risk</p> <p>Indication: Select ONLY ONE sentence</p> | 13600000 |

| 71 Inhalation risk | | |
|--------------------|---|------------------------|
| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
| 710001 | <p>A harmful concentration of airborne particles can be reached quickly[" "P1].</p> <p>Indication: Applies to solids with b.p. >= 350 °C, using the window 'harmful' if: - OEL/TWA < 10 mg/m³ (particle concentrations); or - OEL/TWA not established nor estimated; or - solids regarded as carcinogenic (refer to 730066/730067). Applies to solids with boiling point > or = 350°C, using the window 'nuisance-causing' if the (estimated) OEL/TWA is > or = 10 mg/m³ (particle concentrations). Instead of an OEL/TWA, the specified national limit between harmful and nuisance dust may be used. Complete the sentence with a parameter reflecting the possible conditions or activity which could result in airborne dust or aerosols: 'by spraying', 'by dispersing', 'if powdered', etc. Link to 490005 in case of 'harmful concentration'.</p> <p>Parameters: 7 parameters: P1: , especially for fume; ... especially if powdered or as fumes</p> <p>Links: 490005 PREVENT DISPERSION OF DUST! (490006) PREVENT GENERATION OF MISTS!</p> | 13618010 |
| 710002 | <p>A harmful concentration of [P1] can be reached (very) quickly.</p> <p>Parameters: 1 parameter: P1: hydrogen chloride vapours</p> | |
| 710003 | <p>A harmful concentration of this gas in the air will be reached very quickly on loss of containment.</p> <p>Explanation: Many gases create a toxic atmosphere when released. This phrase is used when a harmful concentration of the substance in the atmosphere will be reached very quickly, and is based on a calculation involving the saturated vapour pressure.</p> <p>Indication: In order to estimate the acute inhalation risk of a gas, the OEL/ST value has to be used; refer to Field 79 Occupational Exposure Limits (OELs) for details. If a substance has no OEL/ST value, the OEL/C or 3 x OEL/TWA is used. If OEL/TWA > 500 ppm, multiply by 2 instead of 3. In some cases, an estimated OEL/ST could be used, based on other toxicological data; see also the RIR Appendix. Use 710019 if gas with OEL/ST <= 5000 ppm or OEL/ST has not been established and cannot be estimated.</p> | 13601000 |
| 710004 | <p>A harmful contamination of the air can be reached[" "P1] on evaporation of this substance at 20°C[" "P2].</p> <p>Explanation: The selection of one of the sentences is based on the speed with which the short-term exposure limit (STEL) of the substance is reached on evaporation under standard conditions. The more rapidly it is released into the air in indoor spaces the greater the hazard of inhalation of a harmful concentration of the vapour from the substance. However, harmful concentration of the substance in air can be reached very quickly if it is sprayed or dispersed, even if it evaporates only slowly.</p> <p>Indication: See individual indications of parameters</p> <p>Parameters: 7 parameters: P1: rather quickly; very quickly; P2: , especially on spraying; , on spraying much faster; , on spraying or dispersing much faster; on spraying; when dispersed</p> | 13609000 + 13611000 |
| 710004 | <p>P1 rather quickly</p> <p>Indication: Applies to liquids and solids with boiling points < 350 °C and with RIRs between 120 - 4000. (RIR = Relative Inhalation Risk; refer to the RIR Appendix for calculation). Complete this phrase with: '; on spraying/dispersing (however) much faster' if spraying, etc., or dispersing (active or passive) of the substance is possible. Indicate RIR value in the comments field.</p> | 13609000 |
| 710004 | <p>P1 very quickly</p> <p>Indication: Applies to liquids and solids with boiling points < 350 °C and with RIRs > 4000. (RIR = Relative Inhalation Risk; refer to the RIR Appendix for calculation). If a liquid or solid with b.p. < 350 °C has no OEL/TWA (or equivalent) and is considered to be carcinogenic, mutagenic, toxic to reproduction or a pulmonary sensitizer, this phrase is normally used; when in doubt, use 710012. Complete this phrase with: '; on spraying/dispersing</p> | 13611000 |

| 71 Inhalation risk | | |
|--------------------|---|------------------------|
| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
| | (however) much faster' if spraying, etc., or dispersing (active or passive) of the substance is possible. Indicate RIR value in the comments field. | |
| 710005 | <p>A harmful contamination of the air will be reached[" P1] on evaporation of this substance at 20°C["; "P2].</p> <p>Explanation: The selection of one of the parameters is based on the speed with which the short-term exposure limit (STEL) of the substance is reached on evaporation under standard conditions. The more rapidly it is released into the air in indoor spaces the greater the hazard of inhalation of a harmful concentration of the vapour from the substance. However, harmful concentration of the substance in air can be reached very quickly if it is sprayed or dispersed, even if it evaporates only slowly.</p> <p>Indication: See individual indications of parameters</p> <p>Parameters: 6 parameters: P1: quickly; rather slowly; slowly; very quickly; P2: on dispersing, however, much faster; on spraying or dispersing, however, much faster</p> | 13604000 |
| 710005 | <p>P1 quickly</p> <p>Indication: Applies to liquids and solids with boiling points < 350°C and with RIRs between 120 - 4000. (RIR = Relative Inhalation Risk; refer to the RIR Appendix for calculation.) Complete this phrase with: '; on spraying/dispersing (however) much faster' if spraying, etc., or dispersing (active or passive) of the substance is possible. Indicate RIR value in the comments field.</p> | 13604030 |
| 710005 | <p>P1 slowly</p> <p>Indication: Applies to liquids and solids with boiling points < 350°C and with RIRs between 12 - 120. (RIR = Relative Inhalation Risk; refer to the RIR Appendix for calculation.) Complete this phrase with: '; on spraying/dispersing (however) much faster' if spraying, etc., or dispersing (active or passive) of the substance is possible. Indicate RIR value in the comments field.</p> | 13604020 |
| 710006 | <p>A harmful contamination of the air will not or will only very slowly be reached on evaporation of this substance at 20°C["; "P1].</p> <p>Explanation: The selection of 710006 is based on the speed with which the short-term exposure limit (STEL) of the substance is reached on evaporation under standard conditions. The more rapidly it is released into the air in indoor spaces the greater the hazard of inhalation of a harmful concentration of the vapour from the substance. However, harmful concentration of the substance in air can be reached very quickly if it is sprayed or dispersed, even if it evaporates only slowly.</p> <p>Indication: Applies to liquids and solids with boiling points < 350°C and with RIRs < 12. (RIR = Relative Inhalation Risk; refer to the RIR Appendix for calculation) Complete this phrase with: 'on spraying/dispersing (however) must faster' if spraying, etc., or dispersing (active or passive) of the substance is possible. Indicate RIR value in the comments field.</p> <p>Parameters: 3 parameters: P1: on spraying or dispersing, however, much faster; on spraying, however, much faster; when in molten form, however, evaporation will be much faster</p> | 13605000 |
| 710007 | <p>A nuisance-causing concentration of airborne particles can be reached[" "P1].</p> <p>Parameters: 6 parameters: P1: on spraying; quickly; quickly on spraying; quickly when dispersed; quickly when dispersed, especially if powdered; quickly, especially if powdered</p> <p>Indication: Applies to liquids with b.p. >= 350°C and - OEL/TWA <10 mg/m³ (particle concentrations); or - OEL/TWA not established nor estimated; or - solids regarded as carcinogenic (refer to 730066/730067). Applies to solids with boiling point > or = 350°C, using the window 'nuisance-causing' if the (estimated) OEL/TWA is > or = 10 mg/m³ (particle concentrations). Instead of an OEL/TWA, the specified national limit between harmful and nuisance dust may be used. Complete the phrase with an indication of the conditions or activity which could cause airborne dust or aerosols, e.g., 'by spraying', 'by dispersing', 'if powdered', etc.</p> | 13618000 + 13618020 |

| 71 Inhalation risk | | |
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| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
| | Links: Link to 490005 in case of 'harmful concentration'. | |
| 710008 | A harmful concentration of airborne particles can be reached quickly when dispersed, especially if powdered. | |
| 710009 | Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly[" P1]. Explanation: Although the evaporation at normal ambient temperatures of high boiling substances is negligible, they can cause air contamination under certain conditions, especially when sprayed or handled as a powder. This phrase is used in the case of noxious substances. Indication: Applies to liquids with b.p. >= 350°C and - OEL/TWA <10 mg/m ³ (particle concentrations); or - OEL/TWA not established nor estimated. Complete the phrase with an indication of the conditions or activity which could cause airborne dust or aerosols, e.g., 'by spraying', 'by dispersing', 'if powdered', etc. Parameters: 6 parameters: P1: , especially if powdered; ... when dispersed, especially if powdered Links: (490006) | 13617000 |
| 710010 | Evaporation at 20°C is negligible; a nuisance-causing concentration of airborne particles can, however, be reached quickly[" P1]. Explanation: Although the evaporation at normal ambient temperatures of high boiling substances is negligible, they can cause air contamination on certain conditions, especially when sprayed or handled as a powder. This phrase is used for substances which only cause dust or aerosols of nuisance particles. Nevertheless, your lungs should not be used as dust traps, so protect them! Indication: Applies to liquids and solids with boiling point >= 350°C with an (estimated) OEL/TWA >= 10 mg/m ³ (particles concentration). Instead of an OEL/TWA the specified national limit between harmful and nuisance dust may be used. Complete the phrase with an indication of the conditions or activity which could cause airborne dust or aerosols, e.g., 'by spraying', 'by dispersing', 'if powdered', etc. Parameters: 5 parameters: P1: , especially if powdered; on spraying; on spraying or when dispersed, especially if powdered; when dispersed; when dispersed, especially if powdered Links: (490005) (490006) | 13619000 |
| 710011 | Hydrolysis in atmospheric moisture or perspiration may yield gaseous phosphine which can be inhaled. | |
| 710012 | No indication can be given about the rate at which a harmful concentration of this substance in the air is reached[" P1]. Explanation: The selection of one the Inhalation risk sentences is based on the speed with which the short-term exposure limit (STEL) of the substance is reached on evaporation under standard conditions. The more rapidly it is released into the air in indoor spaces the greater the hazard of inhalation of a harmful concentration of the vapour from the substance. However, harmful concentration of the substance in air can be reached very quickly if it is sprayed or dispersed, even if it evaporates only slowly. This phrase is used when there is insufficient data to determine how quickly a harmful contamination can be reached. Indication: Applies to liquids and solids with boiling points < 350°C and if RIRs cannot be assessed (e.g., due to insufficient data). If the RIR cannot even be estimated, this should result in extra care in the selecting of the Prevention phrases. (RIR = Relative Inhalation Risk; refer to Appendix 5 for calculation.) If a liquid or solid with boiling point < 350°C has no OEL/TWA (or equivalent) but is considered to be carcinogenic, mutagenic, toxic to reproduction, and/or a pulmonary sensitizer, 710004 is generally used; when in doubt, use this phrase. Parameters: 2 parameters: P1: on evaporation at 20°C; when dispersed | 13613000 |
| 710015 | No indication can be given whether a harmful concentration in the air will be reached. | 13615000? |
| 710016 | On loss of containment this substance can cause suffocation by lowering the oxygen content of the air in confined areas. | 13602000 |

| 71 Inhalation risk | | |
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| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
| | <p>Explanation: Many gases, whilst in themselves only slightly or non-toxic, displace the air when released, especially in confined spaces. The resulting decrease in oxygen content can cause suffocation. A decrease of oxygen to less than 18% is enough to be dangerous.</p> <p>Indication: In order to estimate the acute inhalation risk of a gas, the OEL/ST value has to be used; refer to the OELs (Field 79) for details. If a substance has no OEL/ST value, the OEL/C or 3 x OEL/TWA must be used. If OEL/TWA > 500 ppm, multiply by 2 instead of 3. In some cases, an estimated OEL/ST could be used, based on other toxicological data; see also the RIR Appendix Use 710016 if gas with OEL/ST > 5000 ppm or if the gas is known to be a simple asphyxiant (without other significant physiological effects), e.g., as indicated by the ACGIH (in all other cases use 710017).</p> <p>Links: 870031</p> | |
| 710017 | <p>On loss of containment this substance can cause serious risk of suffocation when in confined areas.</p> <p>Explanation: Many gases, whilst in themselves only slightly or non-toxic, displace the air when released, especially in confined spaces. The resulting decrease in oxygen content can cause suffocation. A decrease of oxygen to less than 18% is enough to be dangerous.</p> <p>Indication: In order to estimate the acute inhalation risk of a gas, the OEL/ST value has to be used; refer to the OELs (Field 79) for details. If a substance has no OEL/ST value, the OEL/C or 3 x OEL/TWA must be used. If OEL/TWA > 500 ppm, multiply by 2 instead of 3. In some cases, an estimated OEL/ST could be used, based on other toxicological data; see also the RIR Appendix. Use 710016 if gas with OEL/ST > 5000 ppm or if the gas is known to be a simple asphyxiant (without other significant physiological effects), e.g., as indicated by the ACGIH (in all other cases use 710017).</p> <p>Links: 870031</p> | 13603000 |
| 710019 | <p>On loss of containment, a harmful concentration of this gas in the air will be reached very quickly, especially in confined spaces.</p> <p>Explanation: Many gases create a toxic atmosphere when released. This phrase is used when a harmful concentration of the substance in the atmosphere will be reached very quickly, and is based on a calculation involving the saturated vapour pressure.</p> <p>Indication: In order to estimate the acute inhalation risk of a gas, the OEL/ST value has to be used; refer to the OELs (Field 79) for details. If a substance has no OEL/ST value, the OEL/C or 3 x OEL/TWA is used. If OEL/TWA > 500 ppm, multiply by 2 instead of 3. In some cases, an estimated OEL/ST could be used, based on other toxicological data; see also Appendix 5. Use 710019 if gas with OEL/ST ≤ 5000 ppm or OEL/ST has not been established and cannot be estimated.</p> | 13601010 |
| 710021 | See Notes. | |

Disallowed sentences in Inhalation risk

| 71 Inhalation risk | | |
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| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
| 710022 | <p>On loss of containment, a harmful concentration of this gas in the air will be reached very quickly.</p> <p>Motivation: CGC 29 November 2017: Phrase disallowed; 710003 can be used instead.</p> | |

Effects of short-term exposure

| 72 Effects of short-term exposure | | |
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| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
| | <p>Effects of short-term exposure</p> <p>Explanation: Short-term exposure generally refers to exposure up to one working day. In the description of effects of short-term exposure, the acute (minutes to hours) and latent (hours to days) effects are emphasized. Local effect: Relates to the effect of a substance</p> | 13600000 |

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| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes | | | | | | | | | | | | | | | | | | | | |
|-----------------------|--|----------------------|---------------------|-----------|----------------|----------------|------|---|---|-----------------------|------------|---------------|---|------------------|---|------|---------------------|-----------------------|---|------------|---------------|--|
| | <p>on the part of the body which was exposed to the substance and which becomes manifest during exposure or within a short time of the contact.</p> <p>Indication: Toxicological information should come from scientific literature preferably concerning man, or from animal studies that use guidelines like OECD or in accordance with generally accepted standards of good scientific practice at the time that the test was carried out. The chemical properties of the substance as assessed in a sentence like 680205 may be used. Although allowance should be made for exceptions, the following table could be used as a guide.</p> <table border="1"> <thead> <tr> <th>chemical property</th> <th>irritating</th> <th>corrosive</th> <th>very corrosive</th> </tr> </thead> <tbody> <tr> <td>weak acid/base</td> <td>eyes</td> <td>–</td> <td>–</td> </tr> <tr> <td>med. strong acid/base</td> <td>skin, eyes</td> <td>respir. tract</td> <td>–</td> </tr> <tr> <td>strong acid/base</td> <td>–</td> <td>skin</td> <td>eyes, respir. tract</td> </tr> <tr> <td>oxidizing strong acid</td> <td>–</td> <td>eyes, skin</td> <td>respir. tract</td> </tr> </tbody> </table> | chemical property | irritating | corrosive | very corrosive | weak acid/base | eyes | – | – | med. strong acid/base | skin, eyes | respir. tract | – | strong acid/base | – | skin | eyes, respir. tract | oxidizing strong acid | – | eyes, skin | respir. tract | |
| chemical property | irritating | corrosive | very corrosive | | | | | | | | | | | | | | | | | | | |
| weak acid/base | eyes | – | – | | | | | | | | | | | | | | | | | | | |
| med. strong acid/base | skin, eyes | respir. tract | – | | | | | | | | | | | | | | | | | | | |
| strong acid/base | – | skin | eyes, respir. tract | | | | | | | | | | | | | | | | | | | |
| oxidizing strong acid | – | eyes, skin | respir. tract | | | | | | | | | | | | | | | | | | | |
| 720001 | <p>Exposure[" P1] could cause [P2], and].</p> <p>Explanation: This phrase indicates certain effects which may be caused by exposure to the substance.</p> <p>Indication: May be completed with 'trembling', 'convulsions', 'excitement', 'muscle weakness', etc. a) Substances with an OEL (not ceiling value): Can be completed with 'above the OEL' if the effect is possible after a short exposure time at realistic levels, e.g., less than 5-10 times the OEL. If the effect mentioned would only be expected at very high levels (>10 x OEL), this phrase can be used and completed with 'far above the OEL'. b) Substances with a ceiling OEL value: Must be completed with 'above OEL'. c) Substances without an OEL: One of these phrases can be used, completed if possible after the word 'exposure' with the mention of conditions that produce the stated effect, e.g., 'at low level or 'at high level'. The application of this phrase to substances for which there is no OEL requires 'Peer-Review'. Consider for substances that meet the criteria for GHS categories 1 or 2 for specific target organ toxicity following single exposure (H370 or H371).</p> <p>Parameters: 63 parameters: P1 (13 parameters): above the OEL; ... to very high concentrations; P2 (50 parameters): a non-allergic rash on contact; ... ; unconsciousness or death</p> | 13761000 13763000 | | | | | | | | | | | | | | | | | | | | |
| 720002 | Acute exposure to high concentrations of zinc chloride fume can lead to Adult Respiratory Distress Syndrome leading to pulmonary fibrosis and death. | | | | | | | | | | | | | | | | | | | | | |
| 720005 | Blistering agent. | | | | | | | | | | | | | | | | | | | | | |
| 720006 | Cholinesterase inhibition. | 13756000 | | | | | | | | | | | | | | | | | | | | |
| | <p>Explanation: Much of the nervous system depends on a chemical neurotransmitter called acetylcholine, the action of which is controlled by an enzyme acetylcholinesterase. Some substances, such as organophosphorous and carbamate pesticides, can inhibit the activity of this enzyme. This results in accumulation of the active neurotransmitter and hyperactivity of the nerve pathways. Symptoms of acute poisoning can include irritability, tremors, convulsions, and possibly death, usually as a result of respiratory failure.</p> <p>Indication: Apply for chemicals (carbamate or organophosphorous esters) which can cause significant cholinesterase inhibition. Combine with 720134 with 'nervous system'.</p> <p>Links: 720134 + 'nervous system' 720135 720001 + (P2 death) 720103-091 (490003) 510076-87-106-79-31-22-114-65 (540026-29-3) 600070-4-35-108-2 870020 (or 70) - 870026 (or 072)</p> | | | | | | | | | | | | | | | | | | | | | |
| 720009 | Corrosive. | 13701000 | | | | | | | | | | | | | | | | | | | | |
| | Indication: Use 720100 instead, to avoid repetition. | | | | | | | | | | | | | | | | | | | | | |
| 720010 | Corrosive on ingestion. | 13718000 | | | | | | | | | | | | | | | | | | | | |
| | Explanation: If the substance applies to criteria for H314; if the substance only applies to the criteria for H315 or EUH071, the compilers should evaluate whether it should be considered to be corrosive to the digestive tract or not. | | | | | | | | | | | | | | | | | | | | | |

| 72 Effects of short-term exposure | | |
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| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
| | Links: 600015-6-90 (600096) (620003) | |
| 720038 | Exposure to small amounts of the molten or liquid form of the substance may result in extensive skin absorption and rapid death. | |
| 720039 | Exposure to sun may enhance the irritating effect of this substance. | |
| 720041 | Exposure to the aerosol in a hot environment may result in death. | |
| 720044 | Ingestion[" "P1] could cause [P2], and]. Parameters: 12 parameters: P1: of large amounts; P2: asphyxiation due to swelling of the throat; ... swelling of mouth and throat | |
| 720045 | Ingestion[" "P1] could cause effects on the [P2], and]. Parameters: 10 parameters: P1: at high doses; of large amounts; P2: blood; ... pancreas | |
| 720046 | If a solution is swallowed, aspiration into the lungs may result in chemical pneumonitis. | (13733000) |
| 720047 | If this liquid is swallowed, aspiration into the lungs may result in chemical pneumonitis. | 13733000 |
| 720048 | Immediately glues (sticks to) biological tissues. | |
| 720051 | Ingestion of this substance may produce oxygen bubbles (embolism) in the blood, resulting in shock. | |
| 720052 | Inhalation[" of "P1] may cause lung oedema. Explanation: Some chemicals can cause damage deep in the lungs, inducing lung oedema (fluid in the lungs). This effect may be delayed up to 24 hours after exposure. The patient should have complete rest (preferably in semi-recumbent posture) and must be kept under medical observation (even if symptoms have yet to manifest themselves). The doctor (or person authorized by him/her) may consider administration of an inhalation therapy. With all substances which may cause lung oedema, this warning has to be included in NOTES (e.g., 24201). Shortness of breath can sometimes originate from different causes such as an oxygen deficiency or asthma, without lung oedema developing. Indication: Apply to substances where there is good literature evidence that inhalation of the substance can cause lung oedema without clear upper respiratory tract corrosive/strong irritant effects (note: use phrase 720166 for lung oedema caused by corrosive and/or water-soluble substances). Consider for substances that meet the criteria for H314 or EUH071. Complete the first part of this phrase with 'of this gas', 'of vapour/mist/fume of this substance' or 'of powder/dust of this substance', as appropriate. Combine the phrase with 870557 in NOTES. Parameters: 18 parameters: P1: decomposition products; ... this gas Links: 530004 (optional) 720091 530007 870060 870557 | 13719100 |
| 720086 | Lachrymation. Explanation: Some substances, known as lachrymators, cause the eyes to water. Indication: Apply to typical lachrymators, i.e., gases or liquids of which the vapours induce lachrymation NOT due to ordinary irritation of the eyes. See 570010. | 13702000 |
| 720087 | May accelerate skin absorption of other materials. | |
| 720090 | May cause mechanical irritation[" to the "P1], and]. Indication: Use this phrase when there is a good literature evidence that the substance causes irritation by mechanical means. Parameters: 4 parameters: P1: eyes; eyes (as a solid); respiratory tract; skin Links: 510024 570033 570027 | 13710000 |
| 720091 | Medical observation is indicated. Explanation: With some substances there is a distinct interval between the moment of exposure and the onset of the first symptoms. In such cases, observation preferably in a hospital, may be necessary in order to have instant medical aid available, should the need arise. | 13782000 |

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| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
| | Indication: This phrase can be used with 720103. | |
| 720092 | Rapid evaporation of the liquid may cause frostbite. Explanation: Besides having chemical effects, a substance may also cause injury by its physical effects. This applies in particular to liquefied gases. Such liquids may evaporate so quickly that contact with the skin and the eyes may lead to heat extraction and consequently frostbite. Indication: Applies to compressed liquefied gases and to liquids with a boiling point < 20°C. Also see 13743. Consider for substances that meet the criteria for H281 or H280 in case of a under pressure liquefied gas. Links: (540032) 550001 560006 | 13741000 |
| 720093 | See ICSC [N1] ["("P1)"]. Parameters: 2 parameters: P1: potassium hydroxide; sodium hydroxide | |
| 720094 | See Notes. | 13783000 |
| 720095 | Asphyxiation. | |
| 720098 | The liquid is corrosive. Indication: Use 720100 instead, to avoid repetition. | |
| 720100 | The [P1] is[" "P2] corrosive to the [P3], and]. Explanation: Corrosive means that the substance can destroy tissue of the skin or the respiratorytract or can seriously damage the eyes. Indication: Complete with 'the eyes', if criteria for H318 (serious eye damage) are met; 'the skin' if the criteria for H314 (severe skin burns and eye damage) is met; 'respiratory tract' if the substance may cause more damage to the respiratory tract than by irritation (more serious than the criteria for H335) = EUH071. Insert 'very' before 'corrosive' if H314 criteria for category 1A (and 1B?) apply to the substance (i.e., causes severe burns); if H314 applies, it can be generally assumed that the substance is also 'very' corrosive to the eyes and the respiratory tract. If 'very' is inserted, 16207 should also be used. If the substance is corrosive to the eye and skin, face shield has to be selected as protective equipment. If the substance is corrosive to the eye, safety goggles are sufficient. If the substance is corrosive as a gas, dust, mist or vapour, then respiratory protection has to be selected. Parameters: 8 parameters: P1: aerosol; substance; vapour; P2: very; P3: digestive tract; eyes; respiratory tract; skin Links: (720052-530009) (490001) 510103-24-14-98-65-8 540034-38 (540008) 540043 590002 570027-33-46 (570021) (580002 - P1) 600015-6-90 (620003) (630001 - P1) | 13711000 |
| 720101 | The [P1] are corrosive to the [P2], and]. Parameters: 4 parameters: P1: substance and the vapour; P2: eyes; respiratory tract; skin | |
| 720103 | The effects may be delayed. Explanation: The effects of exposure to some substances do not become manifest until some time (possibly hours) after the exposure. Indication: Can be completed with '(see Notes)' if additional information given in NOTES. | 13781000 |
| 720105 | The heated substance may cause burns. | |
| 720106 | The hot liquid may cause severe skin burns. Indication: Applies to solids which are transported and generally handled in liquid state at a temperature >= 50°C. Links: 550002 | 13745000 |
| 720107 | The liquid may cause frostbite. | 13743000 |

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| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
| | <p>Explanation: This phrase is used in the case of liquids with a temperature < -30°C such as gases that have been liquefied by cooling (cryogenics) and not those liquefied by being kept under pressure (compressed).</p> <p>Indication: Applies to liquids with a temperature < -30°C, e.g., gases liquefied by cooling (cryogenics). Also see 720092. Consider for substances that meet the criteria for H281.</p> <p>Links: 540041 550001 560006</p> | |
| 720120 | <p>The [P1] is[" "P2] irritating to the [P3], and].</p> <p>Explanation: Irritating means that the substance may cause significant inflammation of the skin or a significant injury to the eyes, other than mechanical means.</p> <p>Indication: Complete with 'the eyes', 'the skin', or 'the respiratory tract' if the criteria for H318, H319 or H320 (for eyes), H315 or H316 (for skin), or H335 (for the respiratory tract) are met. Use the related subphrase, for example: 'The substance is irritating to the skin and is corrosive to the eyes.'</p> <p>Parameters: 20 parameters: P1: aerosol; ... vapour at high levels; P2: mildly; moderately; severely; P3: digestive tract; ... upper respiratory tract</p> <p>Links: 570033 (570027) 580002 (P1) 590002 540038 (540034) 550006 510024 510103</p> | 13709000 |
| 720121 | <p>The [P1] are[" "P2] irritating to the [P3], and].</p> <p>Parameters: 10 parameters: P1: substance and the aerosol; substance and the vapour; substance and the vapour in high concentrations; substance, the vapour of this substance and the aerosol; P2: mildly; moderately; severely; P3: eyes; respiratory tract; skin</p> | |
| 720134 | <p>The substance may cause effects on the [P1], and][" "P2].</p> <p>Explanation: This phrase indicates if the substance can cause a systemic effect after exposure for a short period of time (up to one day). A systemic effect is one that occurs in a part of the body other than the point of contact, and indicates that the substance has been absorbed. The phrase indicates what organs or body systems may be affected.</p> <p>Indication: Complete with target organs in terms understandable to a lay person (nervous system, liver, blood, etc.). The phrase should not be used to indicate hypoxia due to superseding of oxygen by an inert gas. Consider for substances that meet the criteria for GHS categories 1 or 2 for specific target organ toxicity following single exposure (H370 or H371). This sentence should be combined with 720135.</p> <p>Parameters: 49 parameters: P1: acid-base balance in the body; ... thyroid; P2: at high concentrations; at high doses; at high levels; when ingested in large amounts</p> | 13751000 |
| 720135 | <p>This may result in [P1], and].</p> <p>Explanation: The phrase indicates, if possible, what consequences this may have.</p> <p>Indication: Use this phrase to indicate the effects only if it adds useful information to 720134 and there are good literature references. Only include effect that could be manifested after exposure to realistic levels. Do not include symptoms; these are described in Fields 51, 54, 57 and 60 (symptoms for Inhalation, Skin, Eyes and Ingestion, respectively).</p> <p>Toxicological information should come from scientific literature preferably concerning man, or from animal studies that use guidelines like OECD or in accordance with generally accepted standards of good scientific practice of the time that the test was carried out.</p> <p>'Respiratory failure' is the inability of the cardiac and pulmonary systems to maintain an adequate exchange of oxygen and carbon dioxide in the lungs. When this expression is chosen include one of the following in phrase 720134: heart, cardiovascular system, lungs or blood. 'Respiratory depression' is caused by the depression of the central nervous system, in which the respiration is slow or feeble failing to provide full</p> | 13753000 |

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| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
| | ventilation and perfusion of the lung. When this expression is chosen include the following in phrase 720134: central nervous system. Parameters: 112 parameters: P1: aberrations of the thymus, spleen and adrenal glands; ... weakness | |
| 720146 | Water solutions may cause skin blisters. | |
| 720153 | Inhalation[" of "P1] may cause [P2], and]. Explanation: This phrase indicates certain effects which may be caused if the substance is inhaled. Indication: The first part of this phrase may be completed with: - 'of this gas' in case of gas; - 'of vapour/mist/fume of this substance' in case of a liquid (or a solid); or - 'of powder/dust of this substance' in case of solids. The second parameter can be used to describe possible effect(s). Do not include symptoms, these are described in Field 51 (Inhalation symptoms). Parameters: 46 parameters: P1: dust; ... this gas; P2: Adult Respiratory Distress Syndrome (ARDS); ... unconsciousness | 13722000 |
| 720154 | Inhalation[" of "P1] may cause [P2]. Explanation: This phrase indicates certain effects which may be caused if the substance is inhaled. Indication: Applies in case of human evidence. Complete the first part of this phrase with 'of this gas', 'of vapour/mist/fume of this substance' or 'of powder/dust of this substance', as appropriate. Consider for substances that meet the criteria for H334. Parameters: 8 parameters: P1: dust; the aerosol; the vapour; this gas; P2: asthma-like reactions; asthma-like reactions (RADS); asthmatic reactions; lung oedema, but only after initial corrosive effects on eyes and/or airways have become manifest Links: 730038 870023 870024 | 13721100 |
| 720155 | Inhalation of high amounts of metallic silver vapours may cause lung damage with pulmonary oedema. | |
| 720156 | Contact of the vapour with the eyes may cause visual disturbances. | |
| 720157 | If swallowed the substance easily enters the airways and could result in aspiration pneumonitis. Explanation: Some organic substances with a low viscosity and surface tension can, if swallowed, easily be aspirated into the lungs. The risk is particularly high if vomiting occurs. Aspiration may result in the development of chemical pneumonitis. Known substances are certain hydrocarbons, turpentine and pine oil. Other substances may lower the surface tension of water, and therefore also of the mucosa of e.g. the esophagus. This may result in the reflux of the substance and/or gastric contents ('creeping up' by e.g. foam formation), and with a consequent risk of aspiration. Examples are detergents (soaps, liquid or solid). Indication: Applies when substance meets GHS criteria for aspiration risk of Category 1 (H304). Links: 620024 600113 620003 | 13734000 |
| 720158 | If swallowed the substance may cause vomiting and could result in aspiration pneumonitis. Explanation: Some organic substances with a low viscosity and surface tension can, if swallowed, easily be aspirated into the lungs. The risk is particularly high if vomiting occurs. Aspiration may result in the development of chemical pneumonitis. Known substances are certain hydrocarbons, turpentine and pine oil. Other substances may lower the surface tension of water, and therefore also of the mucosa of e.g. the esophagus. This may result in the reflux of the substance and/or gastric contents ('creeping up' by e.g. foam formation), and with a consequent risk of aspiration. Examples are detergents (soaps, liquid or solid). There may, however, be insufficient data or evidence to confirm that this is a hazard with certain chemicals. Some authorities would consider the following to be included in this category: n-primary alcohols with a composition of at least 3 carbon atoms but not | 13735000 |

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| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
| | more than 13; isobutyl alcohols, and ketones with a composition of no more than 13 carbon atoms. Indication: Applies when substance does not meet GHS criteria for aspiration risk of Category 1, but there are animal studies suggesting aspiration potential, or an expert judgment is made that takes into account surface tension, water solubility, boiling point, volatility. Note that these criteria are close to, but not identical with, those for GHS Category 2 (H305). Links: 600113 620003 | |
| 720159 | The substance hydrolyses rapidly on exposure to moisture releasing H ₂ S. | |
| 720160 | Suffocation. Explanation: A number of gases and vapours, when present in high concentrations in air, act primarily as simple asphyxiant without other significant physiologic effects. The minimal oxygen content should be 18% by volume under normal atmospheric pressure. A decrease of oxygen to less than 18% is enough to be dangerous. Atmospheres deficient in oxygen do not provide adequate warning and most simple asphyxiants are odourless. Several simple asphyxiants present an explosion hazard. Indication: Apply to gases and vapours that cause suffocation by asphyxiation rather than as an effect of systemic toxicity. | 13727000 |
| 720162 | Exposure to the molten substance may result in extensive skin absorption and rapid death. | |
| 720163 | The effects may be delayed up to 48 hours. | |
| 720164 | The substance may cause effects on [P1], and]["P2]. Parameters: 3 parameters: P1: cardiovascular system; nervous system; several organs | |
| 720165 | Inhalation at high concentrations and ingestion of large amounts may cause effects on the lungs, kidneys, liver and cardiovascular system. | |
| 720166 | Inhalation of high concentrations may cause lung oedema, but only after initial corrosive effects on the eyes and the upper respiratory tract have become manifest. Indication: Apply to corrosive and/or water-soluble substances where there is good literature evidence that inhalation of the substance can cause lung oedema (Note: use phrase 720052 for lung oedema caused by non-corrosive substances). Note: 720100 with P1 respiratory tarct (.. is corrosive to the respiratory tract) should also have been selected. Consider for substances that meet the criteria for H314 or EUH071. Links: 720091 530004 530007 510065 510098 | 13720000 |
| 720167 | Severe effects may occur following a prolonged symptom-free period. | |
| 720168 | Exposure through the skin could cause local effects, including sensations such as tingling, itching or burning. | |
| 720169 | The [P1] may be irritating to the [P2], and]. Parameters: 4 parameters: P1: substance; P2: eyes; respiratory tract; skin | |
| 720170 | The skin effects may appear after a latency period of a few hours. | |
| 720171 | See Acute Hazards/Symptoms | |

Disallowed sentences in Effects of short-term exposure

| 72 Effects of short-term exposure | | |
|-----------------------------------|---|-------------|
| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
| 720004 | If this liquid is swallowed, aspiration into the lungs may result in chemical pneumonitis. Motivation: disallowed in nov 2008 in favour of 720157 and 720158. | 13733000 |

Effects of long-term or repeated exposure

| 73 Effects of long-term or repeated exposure | | |
|--|---|-------------|
| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
| | Effects of long-term or repeated exposure | 13800000 |
| | Indication: Effects listed under Short-term can duplicated here, however, to do so is a peer review decision. | |
| 730001 | See Notes. | 13860000 |
| 730003 | Animal tests show that this substance possibly causes toxic effects upon human reproduction. | |
| 730004 | Animal tests show that this substance possibly causes toxicity to human reproduction or development. Explanation: Causes developmental retardation (in utero or after birth) and embryoletality or malformations, in mammalian tests in the absence of severe maternal toxicity (i.e. substantial reduction in weight gain, persistent emesis, hypo- or hyper-activity or convulsions). There should be good evidence that the dose intervals in the experiment were sufficiently small to permit embryonic survival and the potential for any teratogenic effect to be expressed; if these conditions are not met, then consider not using this phrase. Evidence of adverse effects usually come from teratogenicity, fertility, peri- and post-natal and multigeneration test designs. In addition to the information on reproductive capacity coming from the treatment of pregnant animals, other data may have to be considered by the investigators and the peer-review committee. These include : 1. measure of spermatozoa count; 2. measure of sperm motility; 3. measure of sperm abnormalities; 4. histology of the reproductive organs with a pathologist's evaluation that reproductive capacity has been impaired; 5. dominant lethal effects in male or female animals (preimplantation loss, early death). Reductions in 1, or 2, an increase in 3 or 5, or the record of an effect in 4, all could be interpreted as antifertility effects. Whether these effects are sufficient to trigger the use of a warning is a matter of judgement by the Peer-Review Committee. Points to be considered in this judgement include: 1. the severity of the effect; 2. the dose level required to produce the effect; 3. the relationship of this dose level to other indications of toxicity in the experimental animal; 4. the relationship of the lowest effective dose level to the possible human dose levels (excluding catastrophic exposure); 5. the reproducibility of the effect within the laboratory; 6. the reproducibility of the effect in different laboratories. Indication: Consider for substances that meet the criteria for GHS category 2 for Reproductive toxicity (H361). A decision to use this phrase must be a conclusion taken by the Peer-Review Committee. Links: (490004) | 13855000 |
| 730005 | Causes serious reproductive toxicity in humans. | |
| 730006 | Causes toxicity to human reproduction or development. Explanation: As effects upon men are more easily observed than effects upon women, it is considered that any attempt to distinguish between the sexes could be seriously misleading. A decision to use of this phrase must be a conclusion taken by the Peer-Review Committee. Indication: Use if human data are available which show that the substance impairs fertility in adults, results in embryotoxicity or fetotoxicity, or causes malformations, retarded development or functional deficiencies in the new born. Consider for substances that meet the criteria for GHS category 1A for Reproductive toxicity (H360) Links: 490007 | 13851000 |
| 730007 | May cause addiction. | |
| 730009 | Cholinesterase inhibition. | 13818000 |

73 Effects of long-term or repeated exposure

| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
|--------|--|-------------|
| | <p>Explanation: Much of the nervous system depends on a chemical neurotransmitter called acetylcholine, the action of which is controlled by an enzyme acetylcholinesterase. Some substances, such as organophosphorous and carbamate pesticides, can inhibit the activity of this enzyme. This results in an accumulation of the active neurotransmitter and hyperactivity of the nerve pathways. This phrase is used when the effect is a result of long-term or repeated exposure.</p> <p>Consider for substances that meet the criteria for GHS categories 1 or 2 for specific target organ toxicity following repeated exposure, where nervous systems are target organs and cholinesterase inhibition can be expected (H372 or H373).</p> <p>Indication: 510076-22-31-106-79-114-87 (540026-29-3) 600070-4-35-108-2 870020/070-26/72 (490003) to be combined with 730012 and 730080</p> | |
| 730010 | <p>May cause [P1], and].</p> <p>Parameters: 10 parameters: P1: autoimmune diseases; .. an increase in cholinesterase activity</p> | |
| 730011 | Chronic poisoning may cause toothache, swelling of the jaw, phossy jaw, spontaneous fractures of bones and anaemia. | |
| 730012 | Cumulative effects are possible. | |
| 730015 | Expert advice should be sought when working with this material. | |
| 730017 | Exposure to the substance may increase noise-induced hearing loss. | |
| 730018 | Fumes of this substance are possibly carcinogenic to humans. | |
| 730019 | Inhalation may cause asthma-like reactions (RADS). | 13808000 |
| | <p>CGC Remark: Note Sc. Editor: No Indication available / developed for this sentence. This sentence should be in the section Effects of short-term exposure because these 'irritant induced respiratory reactions occur after short-term exposure and do not require repeated exposure e.g. to develop an allergy!</p> | |
| 730021 | <p>Repeated or prolonged inhalation[" of "P1] may cause effects on the [P2], and].</p> <p>Parameters: 15 parameters: P1: dust; ... very high concentrations; P2: lungs; teeth</p> | |
| 730023 | May cause a general allergic reaction, such as urticaria or shock. | |
| 730024 | May cause birth defects. | |
| 730025 | May cause fluorosis due to formation of hydrogen fluoride. | |
| 730026 | May cause genetic damage in humans. | |
| 730028 | <p>May cause heritable genetic damage to human germ cells.</p> <p>Explanation: Since no chemical has been identified as including such damage, a more definitive phrase (i.e., Causes...) is not required. The substance may cause mutations in the germ cells (ova or spermatozoa) of humans, which could be transmitted to the offspring. This phrase is used when there is clear evidence that the substance can cause heritable mutations, or the evidence is strong enough for presumption that the substance should be regarded as if it induces heritable mutations in germ cells. Note that evidence restricted to the mutagenic effects in somatic cells, with no germ cell evidence, is subsumed by the carcinogenicity phrases (730065-66-67-68).</p> <p>Indication: There is either a) strong evidence for a causal association between human exposure to the substance and heritable genetic damage, or, b) sufficient evidence to provide a strong presumption that human exposure to the substance may result in development to heritable genetic damage, generally on the basis of appropriate mammalian studies, e.g., specific locus or heritable translocation tests and other relevant information, such as pharmacokinetic and tissue distribution studies in combination with somatic cell mutagenicity studies. Consider for substances that meet the criteria for GHS categories 1A, 1B or 2 for Germ cell mutagenicity (H340, H341). A decision to use this phrase must be a conclusion taken by the Peer-Review Committee.</p> <p>Links: 490001</p> | 13845000 |
| 730030 | May cause inflammation and discoloration of gums. | |

| 73 Effects of long-term or repeated exposure | | |
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| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
| 730032 | May cause reproductive toxicity in humans. | |
| 730033 | <p>May cause toxicity to human reproduction or development.</p> <p>Indication: This phrase can be used instead of phrase 730006 when the human evidence is weaker, but is supported by experimental evidence from exposed mammals. A decision to use this phrase must be a conclusion taken by the Peer-Review Committee. Consider for substances that meet the criteria for GHS category 1B for Reproductive toxicity (H360).</p> <p>Links: 490007</p> | 13853000 |
| 730034 | Repeated exposure leads to marked tolerance and short absence from exposure may lead to sudden death. | |
| 730035 | <p>Repeated or prolonged contact may cause skin sensitization[" "P1].</p> <p>Explanation: A contact sensitizer is a substance that will induce an allergic response following skin contact. People with an existing allergy should avoid contact with this substance.</p> <p>Indication: Apply if there is evidence in humans that the substance can induce sensitization by skin contact in a substantial number of people, or where there are positive results from appropriate animal test. Evidence should include: Positive data from patch testing, normally obtained in more than one dermatology clinic; Epidemiological studies showing allergic contact dermatitis caused by the substance; Positive data from appropriate animal tests; Positive data from experimental studies in man. Well documented episodes of allergic contact dermatitis, normally obtained in more than one dermatology clinic. Evidence from animal studies is usually more reliable than evidence from human exposure. In cases where evidence is available from both sources, and there is a conflict in results, the quality and reliability of evidence from both sources must be assessed. Negative human data should not normally be used to negate positive results from animal studies. In animal studies, when an adjuvant type method for skin sensitization is used, a response at least 30% of the animals is considered positive. For a non-adjuvant test method a response of at least 15% of the animals is considered positive. Consider for substances that meet the GHS criteria for categories 1A and 1B for skin sensitization (H317). A decision to use this phrase must be considered by the Peer-Review Committee.</p> <p>Parameters: 3 parameters: P1: and allergic conjunctivities; and photosensitization; in rare cases</p> <p>Links: 550004 (490001)</p> | 13803000 |
| 730036 | <p>Repeated or prolonged contact with skin may cause [P1], and][" "P2].</p> <p>Parameters: 11 parameters: P1: chronic ulcers; ... pigmentation disorders; P2: especially when the skin is exposed to fumes; under the influence of UV light</p> <p>Links: (550006)</p> | 13801000 |
| 730038 | <p>Repeated or prolonged inhalation may cause [P1], and].</p> <p>Parameters: 6 parameters: P1: asbestosis (fibrosis of the lungs), pleural plaques, thickening and effusions; asthma; asthma-like symptoms; asthma-like syndrome (RADS); fluorosis; nasal ulceration</p> <p>Links: (490001) 870023 870024</p> | 13805000 |
| 730043 | Strong inorganic acid mists containing this substance are carcinogenic to humans. | |
| 730046 | The substance defats the skin, which may cause dryness or cracking. | |
| 730048 | <p>The substance may cause a[" "P1] discolouration of the [P2], and].</p> <p>Parameters: 13 parameters: P1: brown; greenish-black; grey; grey-blue; yellow; P2: eyes; fingernails; hair; nose; skin; skin (argyria/argyrosis); throat; tongue</p> | |
| 730049 | The substance may cause allergic reactions with flu-like symptoms and 'pulmonary disease-anaemia syndrome'. | |

| 73 Effects of long-term or repeated exposure | | |
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| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
| 730054 | <p>The substance may have effects on the [P1], and].</p> <p>Explanation: This sentence indicates what organs or systems may be affected and what consequences this may have, but with relevance to long-term exposure.</p> <p>Indication: Complete with the target organs using terms understandable to the lay person (nervous system, liver, blood, etc.) and combine if possible with 730085. Otherwise close 730054 with a full stop. Do not duplicate the target organs and effects described under Effects of Short-Term Exposure unless there is an important reason to do so. Consider for substances that meet the criteria for GHS categories 1 or 2 for specific target organ toxicity following repeated exposure (H372 or H373).</p> <p>Parameters: 51 parameters: P1: adrenals; ... upper respiratory tract</p> <p>Links: 730085</p> | |
| 730055 | <p>Ingestion may cause effects on the [P1], and].</p> <p>Parameters: 9 parameters: P1: bladder; blood; bone marrow; central nervous system; gastrointestinal tract; heart; kidneys; liver; thyroid</p> | |
| 730056 | <p>Ingestion in large amounts may cause effects on the [P1], and].</p> <p>Parameters: 7 parameters: P1: bladder; bone marrow; central nervous system; heart; kidneys; liver; thyroid</p> | |
| 730059 | <p>The substance may have effects on the cardiovascular system and nervous system, and may cause hair loss.</p> | |
| 730064 | <p>This specific compound has not been studied for carcinogenicity, but data from similar[" P1] compounds indicate that it should be considered as being possibly carcinogenic to humans.</p> <p>Parameters: 1 parameter: P1: cobalt</p> | |
| 730065 | <p>This substance is carcinogenic to humans.</p> <p>Explanation: A carcinogen is a substance which induces cancer or increases its incidence. Classification of a substance as posing a carcinogenic hazard is based on the inherent properties of the substance and does not provide information on the level of the human cancer risk which the use of this substance may represent. This sentence indicates that there is sufficient evidence to support a causal association between the exposure to a substance and human cancer, according to criteria published by the International Agency for Research on Cancer (IARC) or outlined in the Globally Harmonised System (GHS) for Human Health and Environmental Effects of Chemical Substances. See Annex 9 and 10. A decision to use this phrase must be a conclusion taken by the Peer-Review Committee.</p> <p>Indication: Use phrase if it complies with criteria applicable to a placing as IARC Classification Group 1 (Carcinogenic to humans) or GHS 1A (Known human carcinogen - H350).</p> <p>Links: 490001</p> | 13831000 |
| 730066 | <p>This substance is probably carcinogenic to humans.</p> <p>Explanation: A carcinogen is a substance which induces cancer or increases its incidence. Classification of a substance as posing a carcinogenic hazard is based on the inherent properties of the substance and does not provide information on the level of the human cancer risk which the use of this substance may represent. This sentence indicates that the evidence of a causal association between the exposure to a substance and human cancer is not sufficient, but it is strong enough to establish a probability, according to criteria published by the International Agency for Research on Cancer (IARC) or outlined in the Globally Harmonised System (GHS) for Human Health and Environmental Effects of Chemical Substances. These data can be supported by mammalian experiments, since substances that have induced malignant tumours in well performed experimental studies in animals are also to be presumed to be human carcinogens unless there is strong evidence that the mechanism of tumour formation is not relevant for humans. A decision to use this phrase must be a conclusion taken by the Peer-Review Committee.</p> | 13833000 |

| 73 Effects of long-term or repeated exposure | | |
|--|---|-------------|
| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
| | <p>Indication: Use phrase if it complies with criteria applicable to a placing as IARC Classification Group 2A (Probably carcinogenic to humans) or GHS Classification 1B (Presumed human carcinogen - H350).</p> <p>Links: 490001</p> | |
| 730067 | <p>This substance is possibly carcinogenic to humans.</p> <p>Explanation: A carcinogen is a substance which induces cancer or increases its incidence. Classification of a substance as posing a carcinogenic hazard is based on the inherent properties of the substance and does not provide information on the level of the human cancer risk which the use of this substance may represent. Substances that have induced malignant tumours in well performed experimental studies in animals are also to be presumed to be human carcinogens unless there is strong evidence that the mechanism of tumour formation is not relevant for humans. This sentence indicates that the evidence of a causal association between the exposure to a substance and human cancer is inadequate (or there are no human studies), but there is strong evidence from mammalian experiments for the presumption of a human carcinogenic hazard, according to criteria published by the International Agency for Research on Cancer (IARC) or outlined in the Globally Harmonised System (GHS) for Human Health and Environmental Effects of Chemical Substances. A decision to use this phrase must be a conclusion taken by the Peer-Review Committee.</p> <p>Indication: Use phrase if it complies with criteria applicable to a placing as IARC Classification Group 2B (Possibly carcinogenic to humans) or GHS Classification 2 (Suspected human carcinogen - H351).</p> <p>Links: 490001</p> | 13835000 |
| 730068 | <p>Tumours have been detected in experimental animals but may not be relevant to humans.</p> <p>Explanation: A carcinogen is a substance which induces cancer or increases its incidence. Classification of a substance as posing a carcinogenic hazard is based on the inherent properties of the substance and does not provide information on the level of the human cancer risk which the use of this substance may represent. This sentence is used when positive results from mammalian experiments are available in the published literature, but the tumours arise by mechanisms for which there is strong evidence that they may not occur in humans. Sometimes, an unrealistically high dose may be considered as part of such mechanism, e.g., leading to certain types of bladder tumours in rats. A decision to use this phrase, or no phrase at all, must be a conclusion taken by the Peer-Review Committee.</p> <p>Indication: Use this phrase if it complies with IARC Classification 3 (Unclassifiable as to carcinogenicity to humans) but differs from EC or other important classification system. Also consider for substances that meet the criteria for GHS category 2 for carcinogenicity (H351).</p> <p>Links: (490001)</p> | 13837000 |
| 730070 | Further see ICSC [N1]. | |
| 730080 | See Acute Hazards/Symptoms. | |
| 730085 | <p>This may result in [P1], [and].</p> <p>Explanation: This phrase combined with 730054/092 indicates what organs or systems may be affected and what consequences this may have, but with relevance to long-term exposure.</p> <p>Indication: Use this phrase to indicate the effects only if it adds useful information to 730054/092 and there are good literature references. Toxicological information should come from scientific literature preferably concerning man, or from animal studies that use guidelines like OECD guidelines or in accordance with generally accepted standards of good scientific practice at the time that the test was carried out.</p> <p>Parameters: 152 parameters: P1: a benign pneumoconiosis (stannosis); ... yellowish skin discolouration</p> | 13815000 |

73 Effects of long-term or repeated exposure

| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
|--------|---|-------------|
| | Links: 730054 730092 | |
| 730087 | <p>Lungs may be affected by repeated or prolonged exposure to an aerosol of this substance.</p> <p>Explanation: The effects on the lungs include chronic bronchitis, lung fibrosis, etc. which only become manifest after some time of repeated or prolonged exposure. This phrase is used when the effects are only caused if relatively high concentrations of the substance are inhaled. Definition of long-term or repeated exposure: more extended exposure than short-term (i.e., more than one working day). In the description of effects of short term exposure, the acute (minute to hours) and latent (hours to days) effects should be emphasized, whereas in the description of the effects of long-term or repeated exposure the chronic and cumulative effects should be mentioned.</p> <p>Indication: Applies when there is evidence of effects on the lungs (e.g., chronic bronchitis, lung fibrosis, etc.) which only become manifest after some time of repeated or prolonged exposure. Consider for substances that meet the criteria for GHS categories 1 or 2 for specific target organ toxicity following repeated exposure, with lungs specified as affected organs (H372 or H373).</p> | 13809000 |
| 730088 | Risk of tooth erosion upon repeated or prolonged exposure to an aerosol of this substance. | |
| 730089 | The substance may have effects on the liver and kidneys, resulting in impaired functions. | |
| 730090 | Tumours have been detected in experimental animals but may not be relevant to humans. | |
| 730091 | <p>Lungs may be affected by repeated or prolonged exposure[" "P1].</p> <p>Explanation: The effects on the lungs include chronic bronchitis, lung fibrosis, etc. which only become manifest after some time of repeated or prolonged exposure. This phrase is used when the effects are only caused if relatively high concentrations of the substance are inhaled. Definition of long-term or repeated exposure: more extended exposure than short-term (i.e., more than one working day). In the description of effects of short term exposure, the acute (minute to hours) and latent (hours to days) effects should be emphasized, whereas in the description of the effects of long-term or repeated exposure the chronic and cumulative effects should be mentioned.</p> <p>Indication: Applies when there is evidence of effects on the lungs (e.g., chronic bronchitis, lung fibrosis, etc.) which only become manifest after some time of repeated or prolonged exposure. Consider for substances that meet the criteria for GHS categories 1 or 2 for specific target organ toxicity following repeated exposure, with lungs specified as affected organs (H372 or H373).</p> <p>Parameters: 3 parameters: P1: to dust particles; to dust particles if crystalline silica is present; to the vapour</p> | 13809000 |
| 730092 | <p>The substance may have effects on [P1], and].</p> <p>Explanation: This sentence indicates what organs or systems may be affected and what consequences this may have, but with relevance to long-term exposure.</p> <p>Indication: Complete with the target organs using terms understandable to the lay person (nervous system, liver, blood, etc.) and combine if possible with 730085. Otherwise close 730092 with a full stop. Do not duplicate the target organs and effects described under Effects of Short-Term Exposure unless there is an important reason to do so. Consider for substances that meet the criteria for GHS categories 1 or 2 for specific target organ toxicity following repeated exposure (H372 or H373).</p> <p>Parameters: 2 parameters: P1: male fertility; multiple organs</p> <p>Links: 730085</p> | 13813000 |
| 730093 | Exposure may result in kidney stones, slow-healing ulcers and black finger nails. | |
| 730094 | <p>The substance when ingested may have effects on the [P1], and].</p> <p>Parameters: 2 parameters: P1: blood; nervous system</p> | |
| 730095 | <p>Repeated or prolonged exposure may cause [P1], and].</p> <p>Parameters: 1 parameter: P1: skin photosensitization</p> | |
| 730096 | This substance causes cancer of the lung, mesothelioma, cancer of the larynx, and cancer of the ovary in humans. | |

| 73 Effects of long-term or repeated exposure | | |
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| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
| 730097 | There is limited evidence that this substance causes colorectal cancer or cancer of the pharynx or stomach. | |
| 730098 | Health effects of the substance have been investigated but none have been found Explanation: Some chemicals do not represent a hazard to human health even at high, and improbably high, levels of exposure. Indication: Applies if the available literature (following a thorough search) indicates that potential toxicity has been extensively and reliably investigated and indicates that there is no evidence of likely adverse effects. Use 870017 in cases where the chemical has not been investigated adequately. The selection of this phrase has to be approved by the Peer Review group. | 13872000 |
| 730099 | Repeated or chronic inhalation of the vapour may cause chronic inflammation of the upper respiratory tract. | |
| 730100 | May cause skin dryness or cracking | |
| 730102 | May cause [P12], and]. Parameters: 1 parameter: P12: test parameter 12 | |
| 730103 | Non-specific complaints like gastrointestinal disorders, headache, nausea etc. may occur. | |
| 730104 | Mists of this strong inorganic acid are carcinogenic to humans. | |
| 730105 | Exposure to skin may result in dryness, oil acne, dermatitis and photosensitivity. | |
| 730106 | Fluoride can accumulate in teeth, joints and bones. This may result in stained tooth enamel up to joint and bone disorders (fluorosis). | |
| 730107 | Sensitization to the substance, through repeated or prolonged inhalation or skin contact, may result in serious granulomatous lung disease (chronic beryllium disease). | |
| 730108 | This substance is possibly carcinogenic to humans if inhaled. | |
| 730109 | This substance is carcinogenic to humans if inhaled. | |
| 730110 | Further see ICSC [N1] and ICSC [N2]. | |

Disallowed sentences in Effects of long-term or repeated exposure

| 73 Effects of long-term or repeated exposure | | |
|---|--|-------------|
| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
| 730002 | Animal tests show that this substance possibly causes malformations in human babies. Motivation: Not available. PR 16-03-2001. | 13857000 |
| 730026 | May cause genetic damage in humans. Motivation: Not available | 13843000 |
| 730101 | May cause [P1], and].[Ule] Parameters: 3 parameters: P1: 2nd local effect; local effect test; P11: test parameter 11 Motivation: Test sentence. | 13843000 |

ENVIRONMENT

| 85 Environmental data | | |
|-----------------------|---|-------------|
| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
| 850001 | Avoid release to the environment in circumstances different to normal use. | |
| 850002 | Bioaccumulation of this chemical may occur along the food chain, for example in [P1], and]. Parameters: 17 parameters: P1: algae; ... vegetables | |
| 850003 | Bioaccumulation of this chemical may occur along the food chain. | 13905080 |
| 850004 | Bioaccumulation of this chemical may occur in [P1], and]. Indication: Apply if bioconcentration factor (BCF) >= 100. If log Pow >= 3.0 and BCF < 100 but here is additional supporting information, you can use this phrase, If log Pow >= 3 but BCF < 100, you don't have to use the phrase. Complete with the applicable food source, e.g. cattle, mammals, fish, crustacea, seafood, birds, plants, etc., as mentioned in literature references used, Parameters: 19 parameters: P1: algae; ... vegetables Links: 630034 (640039) | 13905000 |
| 850008 | It is strongly advised not to let the chemical enter into the environment because it is persistent. | |
| 850010 | It is strongly advised not to let the chemical enter into the environment. Indication: Use this phrase if: - the substance is 'toxic' or 'very toxic' (to the aquatic environment) (850015, 850016) or - the substance is 'harmful' (to the aquatic environment) (850014) or the substance is 'hazardous' (to the environment) (850019) AND where there is evidence of bioaccumulation (850004 selected) or evidence that the substance is not readily degradable and has adverse effects. A substance is considered as readily degradable if: a) in 28-day studies, the following levels of degradation are achieved within 10 days of the start of degradation (this being the time when 10 % of the substance has been degraded): - in tests based upon dissolved organic carbon: 70 %, - in tests based upon oxygen depletion or CO2 generation: 60 % of the theoretical maxima; or b) when BOD 5/COD >= 0.5; or c) there is other evidence showing degradability in the aquatic of > 70 % within a 28-day period. Links: 630034 (640039) | 13907000 |
| 850012 | Radon is a common source of natural radiation. | |
| 850013 | See Notes. | |
| 850014 | The substance is harmful to aquatic organisms. Indication: Complete with "harmful" according to the following criteria: 96 hr LC50 (for fish) 10 mg/l < LC50 <= 100 mg/l and/or 48 hr EC50 (for daphnia) 10 mg/l < EC50 <= 100 mg/l and/or 72 hr IC50 (for algae) 10 mg/ < IC50 <= 100 mg/l Select also phrase 850017 if, in addition, the substance is not readily degradable. See also ind. in phrase 850010. Links: 630034 (640039) | 13902030 |
| 850015 | The substance is toxic to aquatic organisms. Indication: Complete with "toxic" according to the following criteria: 96 hr LC50 (for fish) 1 mg/l < LC50 <= 10 mg/l and/or 48 hr EC50 (for daphnia) 1 mg/l < EC50 <= 10 mg/l and/or 72 hr IC50 (for algae) 1 mg/l < IC50 <= 10 mg/l Select also phrase 850017 if, in addition, the substance is not readily degradable or the log Pow >= 3.0 (unless the experimentally determined BCF <= 100). | 13902020 |

| 85 Environmental data | | | | | | |
|-----------------------|--|---------------------------------------|-------------------------------|---------------------------------------|-------------------|----------|
| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes | | | | |
| | Links: 630034 (640030) (640039) | | | | | |
| 850016 | <p>The substance is very toxic to aquatic organisms.</p> <p>Indication: Complete with "very toxic" according to the following criteria: 96 hr LC50 (for fish) <= 1 mg/l (OECD guideline) and/or 48 hr EC50 (for daphnia) <= 1 mg/l and/or 72 hr IC50 (for algae) <= 1 mg/l</p> <p>Select also phrase 850017 if, in addition, the substance is not readily degradable or the log Pow >= 3.0 (unless the experimentally determined BCF <= 100).</p> <p>Links: 630034 (640030) (640039)</p> | 13902010 | | | | |
| 850017 | <p>The substance may cause long-term effects in the aquatic environment.</p> <p>Explanation: Normally used in combination with 850014, 850015, 850016.. Applies also if the substance is not readily degradable and the log Pow >= 3.0 (unless the experimentally determined BCF <= 100), for example to poorly water-soluble substances (solubility <= 1mg/l). The above criteria apply unless additional scientific evidence relating to degradation or toxicity may provide adequate assurance that the substance does not constitute a long-term danger to the aquatic environment, for example if appropriate chronic toxicity test NOEC > 1 mg/l.</p> <p>Indication: Use in the combination with the phrase 850014, 850015, 850016 and the criteria for readily degradability and bioaccumulation given there. Applies also to substances covered by the criteria in 850014, 850015, 850016 if substance is not readily degradable and log Pow >= 3.0 (unless the experimentally determined BCF <= 100).</p> <p>Links: 630034 (640039)</p> | 13909000 | | | | |
| 850018 | <p>This substance does enter the environment under normal use. Great care, however, should be taken to avoid any additional release, for example through inappropriate disposal.</p> <p>Explanation: Apply chemicals such as pesticides that are released to the environment under normal use.</p> | 13911000 | | | | |
| 850019 | <p>This substance may be hazardous to the environment. Special attention should be given to [P1], and].</p> <p>Indication: The use of this phrase is a peer-review decision, The phrase can be used to specify the target.</p> <p>Parameters: 27 parameters: P1: air quality; ... wildlife</p> <table border="1"> <tr> <td>P1</td> <td>its impact on the ozone layer</td> <td><i>disallowed: use 850024 instead</i></td> <td><i>disallowed</i></td> </tr> </table> <p>Links: 630034 (640039)</p> | P1 | its impact on the ozone layer | <i>disallowed: use 850024 instead</i> | <i>disallowed</i> | 13903000 |
| P1 | its impact on the ozone layer | <i>disallowed: use 850024 instead</i> | <i>disallowed</i> | | | |
| 850021 | <p>Environmental effects from the substance have not been investigated adequately.</p> <p>Explanation: The potential ecotoxicity of some chemicals has not been investigated satisfactorily, because, for example, faulty protocols have been used, or results incorrectly interpreted. For some chemicals, little is known simply because no research has been carried out.</p> | 13920000 | | | | |
| 850022 | No data. | | | | | |
| 850023 | Environmental effects of the substance have been adequately investigated, but no significant effects have been found. | new sentence | | | | |
| 850024 | <p>Avoid release to the environment because of its impact on the ozone layer.</p> <p>Indication: Any of controlled substances listed in Annexes of the Montreal protocol or any mixture containing at least one of those substances at a concentration > 0.1 %. http://ozone.unep.org/en/handbook-montreal-protocol-substances-deplete-ozone-layer/44</p> <p>Links: 340256</p> | new sentence (13903100) | | | | |
| | <p>CGC Remark: A new sentence to correspond with the H420 in GHS. (At the time of publication of this CG the sentence may not been added to the ICSC production database yet).</p> | CGC 29-11-2017 | | | | |

FIRE and EXPLOSION

These fields are shown on an ICSC in three columns for *hazard*, *prevention* and *response* (firefighting), respectively. Until recently, Fire and Explosion were separated in two rows. However, in the new layout of ICSC (as of October 2017) Fire and Explosion are combined.

Acute hazards

In the current layout of the ICSC (as of October 2017), the Acute hazards for Fire (Fields 42) and the Acute hazards for Explosion (Field 45) are combined into one section.

| 42 Fire - Acute hazards | | |
|-------------------------|--|-------------|
| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
| 420001 | <p>Combustible under specific conditions.</p> <p>Explanation: Relates to liquids that have no flash point but form flammable vapour/air mixtures at elevated temperatures; explosive limits are often given. Also for substances (solids) that can only be burnt when subjected to high energy sources of ignition. This phrase does not apply to gases.</p> <p>Indication: For explosive substances use 450038. Examples of liquids in this category: dichloromethane, trichloroethene, and 1,1,1-trichloroethane: they have no flash point but can form explosive vapour/air mixtures. Applies also to substances that are normally regarded as non-combustible but for which the phrases 'On combustion forming of....' or 'The substance decomposes on burning....' was used.</p> <p>Links: (680094) (680708-680710-680705) 430005 (870009) (870010)</p> | 14109000 |
| 420002 | <p>Combustible.</p> <p>Explanation: Relates to liquids and solids with flash point > 60°C. For solids which, although difficult to ignite in normal air, are capable of supporting combustion if brought to a high temperature, use 420029.</p> <p>Indication: For explosive substances use 450038. Use for substances that are neither flammable (420009, 420018, and 420011 do not apply) nor explosive (450038). If both 420002 and 420022 apply, then use 420022. Apply if a liquid with flash point > 60°C and to solid with flash point is > 60°C that is not classified by UN Transport as flammable. H227 Combustible liquid. (GHS category 4: flash point > 60 °C and ≤ 93 °C)</p> <p>Links: 430005 (640014)</p> | 14107000 |
| 420003 | Contact with moisture or water may generate sufficient heat to ignite combustible materials. | |
| 420004 | Cylinder may explode in heat of fire. | |
| 420006 | <p>May ignite spontaneously on contact with air.</p> <p>Explanation: Substances which become hot and finally catch fire in contact with air at ambient temperature without any input of energy</p> <p>Indication: GAS: Flammable gases that ignite spontaneously in air at a temperature of 54 °C or below LIQUIDS AND SOLIDS: Applies if the substance is liable to ignite within 5 minutes after coming into contact with air.</p> <p>The GHS Criteria are: "The liquid ignites within 5 minutes when added to an inert carrier and exposed to air, or it ignites or chars a filter paper on contact with air within 5 minutes" and "The solid ignites within 5 minutes off coming into contact with air".</p> <p>When using the UN Transport classification, substances according to class 4.2 packing group I should be included for application of this phrase. H232: May ignite spontaneously if exposed to air H250: Catches fire spontaneously if exposed to air</p> <p>Links: 680470</p> | |
| 420009 | <p>Extremely flammable.</p> <p>Explanation: Relates to liquids that have a flash point < 23°C and an initial boiling point less or equal to 35°C, and to flammable gases, when liquefied.</p> | 14101000 |

| 42 Fire - Acute hazards | | |
|-------------------------|---|-------------|
| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
| | <p>Indication: Apply if flammable gas with flash point < 0°C and to gases which are flammable in contact with air at ambient temperature and pressure (also consider GHS criteria for H220). For explosive substances use 450038.</p> <p>LIQUIDS (GHS: H224 Extremely flammable liquid and vapour. (GHS category 1: flash point < 23 °C and initial boiling point ≤ 35 °C): Applies if the flash point is < 23°C AND the boiling point is ≤ 35°C (or in case of a boiling range, the initial boiling point).</p> <p>SOLIDS: This phrase does not apply to solids.</p> <p>GASES (GHS: H220 Extremely flammable gas (GHS category 1A): "Gases, which at 20°C and a standard pressure of 101.3kPa: (a) are ignitable when in a mixture of 13% or less by volume in air; or (b) have a flammable range with air of at least 12 percentage points regardless of the lower flammable limit"</p> <p>Links: 430004 460015 640014</p> | |
| 420011 | <p>Flammable.</p> <p>Explanation: Relates to liquids and solids with flash point more or equal to 23 and < 60°C and to solids that continue to burn after removal of the source of ignition, but do not readily catch fire.</p> <p>Indication: When using the UN Transport classification, substances according to class UN 4.1 flammable solid, packing group III should be included for application of this phrase. Apply also to liquids if the flash point is not available but is unlikely to exceed 60°C. Applies to self-reactive substances and organic peroxides with relatively high ignition energy (i.e., SADT value > 35°C) which are not regarded as explosive. When using the UN Transport classification, substances according to class UN 4.1, 5.2 types E-F should be included for application of this phrase. GHS: H242 Heating may cause a fire (signal word "Warning", GHS Types E-F organic peroxides, self-reactive). For explosive substances use 450038.</p> <p>GAS (GHS: H221 Flammable gas (signal word "Warning", GHS category 2)): Gases, other than those of Category 1, which, at 20°C and a standard pressure of 101.3kPa, have a flammable range while mixed in air.</p> <p>LIQUID (GHS: H226 Flammable liquid and vapour. (GHS category 3)): Apply if a liquid with flash point ≥ 23 °C and ≤ 60 °C.</p> <p>SOLID (GHS: H228 Flammable solid (signal word "Warning", GHS category 2)): - Burning rate test: For solids other than metal powders: (a) the wetted zone stops the fire for at least 4 minutes; and (b) the burning time < 45 s or the burning rate > 2.2mm/s. For metal powders the burning time > 5 min and less or equal to 10 min.</p> <p>Links: 430004 640014</p> | 14105000 |
| 420014 | <p>Gives off irritating or toxic fumes (or gases) in a fire.</p> <p>Explanation: General warning for all compounds containing nitrogen, phosphorous, arsenic, sulfur, selenium and/or halogen atom(s) in the molecule, which, upon burning or heating in a fire, will decompose producing toxic and/or irritating fumes.</p> <p>Links: (680710)</p> | 14129000 |
| 420016 | <p>Heating will cause rise in pressure with risk of bursting.</p> <p>Indication: Applies to liquids with boiling points <100°C.</p> | 14125000 |
| 420018 | <p>Highly flammable.</p> <p>Explanation: Solid substances and preparations which may readily catch fire after brief contact with a source of ignition and which continue to burn or to be consumed after the removal of the source of ignition. Gas and liquid substances having a flash point < 23°C, but which are not extremely flammable. Organic peroxides and self-reactive substances thermally unstable liable to undergo a strongly exothermic decomposition even without participation of oxygen (excluding explosives, organic peroxides, oxidising substances). Relates to liquids with a flash point and an initial boiling point.</p> | 14103000 |

| 42 Fire - Acute hazards | | |
|-------------------------|---|-------------|
| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
| | <p>Indication: Apply if flammable gas or liquid with flash point < 23°C. Also to a solid which is spontaneously flammable in the air or which may readily catch fire after brief contact with a source of ignition and which continues to burn after the removal of the source of ignition. For explosive substances use 450038. 'Readily catch fire' implies a burning time < 45 seconds for a 100 mm strip of heaped solid, ignited by a hot wire. Also applies to organic peroxides and other solids apt to auto-oxidation with low ignition energy but that are not to be regarded as explosive (see 450038). Low ignition energy can be interpreted as a self-accelerating decomposition temperature (SADT) less or equal to 35°C; a list of substances with SADT values can be found in the International Maritime Dangerous Goods Code, London. When using the UN Transport classification for flammable solids, substances according to class 4.1 and 5.2 should be included for application of this phrase.</p> <p>GHS: H242 Heating may cause a fire (GHS Types C-D organic peroxides, self-reactive; signal word "Danger").</p> <p>GASES (GHS: H221 Flammable gas (signal word "Danger", GHS category 1B)): Gases which meet the flammability criteria for Category 1A, but which are not pyrophoric, nor chemically unstable, and which have at least either: a) a lower flammability limit of more than 6% by volume in air; or b) a fundamental burning velocity of less than 10 cm/s</p> <p>LIQUID (GHS: H225 Highly flammable liquid and vapour. (GHS category 2)): Apply if a liquid with flash point < 23°C and a boiling point (or in case of a boiling range, the initial boiling point) >35°C. SOLID (GHS: H228 Flammable solid (signal word "Danger", GHS category 1)): - Burning rate test: For solids other than metal powders: (a) the wetted zone does not stop the fire and (b) the burning time < 45 s or the burning rate > 2.2mm/s. For metal powders the burning time less.</p> <p>Links: 430004 460015 640014</p> | |
| 420019 | <p>Liquid formulations containing organic solvents may be flammable.</p> <p>Explanation: A substance, which may in itself be non-combustible, may commonly occur dissolved in a flammable solvent.</p> <p>Indication: Apply to substances which in practice are often used in flammable commercial formulations.</p> <p>Links: (450012) 870037</p> | 14119000 |
| 420020 | <p>Many reactions may cause fire or explosion.</p> <p>Indication: Use 420020 only when more appropriate than the use of 450012.</p> | 14123000 |
| 420021 | <p>Not combustible but enhances combustion of other substances.</p> <p>Explanation: Some non-combustible substances can give off oxygen which may enhance the combustion of other substances. Examples include: perchlorates, peroxides, and other oxidants.</p> <p>Some oxidizing non-combustible substances may generally by providing oxygen, cause or contribute to the combustion of other material more than air does.</p> <p>Indication: Apply to inorganic chlorites, chlorates, perchlorates (and similar halogen compounds), permanganates, persulfates, some peroxides, nitrates, nitrites, and other non-combustible strong oxidants.</p> <p>Any gas, liquid or solid which may, generally by providing or yielding oxygen, cause or contribute to the combustion of other material.</p> | 14113000 |
| 420022 | <p>Not combustible but forms flammable gas on contact with water or damp air.</p> <p>Explanation: Substances which in contact with water or damp air evolve extremely flammable gases in dangerous quantities, at a minimum rate of one litre/kilogram/hour.</p> <p>Indication: Substances such as Na or K that are neither flammable (420009, 420018, and 420011 do not apply) nor explosive (450038), but that on contact with water or humid air evolve flammable gas in dangerous quantities (1 litre/kg/hour or more). If both 420002 AND 420022 apply, then use 420022. When using the UN Transport classification, substances according to class UN 4.3 should be included for application of this phrase.</p> | 14115000 |

| 42 Fire - Acute hazards | | |
|-------------------------|--|--------------|
| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
| | H260: In contact with water releases flammables gases which may ignite spontaneously H261: In contact with water release flammable gases. Links: (640014) 640012 | |
| 420024 | Not combustible. Explanation: Relates to substances that cannot (or only under very extreme conditions) be oxidized. Indication: 'Very extreme conditions' are understood to be conditions which are not to be found generally in industry or normal laboratories. Also see 420021 and 420022. | 14111000 |
| 420026 | See Notes. | 14127000 |
| 420027 | The substance may ignite combustible materials. | |
| 420029 | Combustible only at increased temperature. Indication: Applies to solids which, although difficult to ignite in normal air, are capable of supporting combustion if brought to a high temperature. | |
| 420030 | Contact with metals may evolve flammable hydrogen gas. | |
| 420031 | Not combustible (impurities constitute a fire risk). Indication: Relates to substances that cannot (or only under very extreme conditions) be oxidized but can contain impurities causing a fire risk. 'Very extreme conditions' are understood to be conditions which are not found generally in industry or normal laboratories. | |
| 420032 | Flammable as dust. Indication: Applies to solids which are not flammable as a mass but their dust has been reported in literature as being flammable. NEED TO FIND AN EXAMPLE! | |
| 420036 | Highly flammable when finely divided. Indication: Applies to solids which are not flammable as a mass but have been reported in literature to become flammable when finely divided rather than powdered or as dust. NEED TO FIND AN EXAMPLE! | |
| 420038 | Highly flammable if powdered. Indication: Applies to solids which are not flammable as a mass but have been reported in literature to become flammable as a powder rather than as dust or finely divided. NEED TO FIND AN EXAMPLE! | |
| 420039 | Combustible if powdered. Indication: Applies to solids which do not usually burn as a mass but their powders but have been reported in literature to burn. This is particularly relevant for metals, e.g. an aluminium tube does not burn but aluminium powder does. | |
| 420040 | Not combustible but forms flammable gas on heating. | |
| 420042 | See Chemical dangers | |
| 420043 | Forms flammable gas on contact with water or damp air. | |
| 420044 | Self-heating. Explanation: Substances, other than pyrophoric, which become hot and finally catch fire in contact with air at ambient temperature without any input of energy. This substance differs from a pyrophoric liquid or solid in that it will ignite only when in large amounts (kg) and after long periods of time (hours or days). Indication: Apply if a positive test is obtained in a test using a 25 or 100 mm sample cube at 140°C. When using the UN Transport classification, substances according to class UN 4.2 packing group II, III should be included for application of this phrase. H251: Self-heating; may catch fire H252: Self-heating in large quantities; may catch fire | |
| | CGC Remark: NEW PHRASE: The explanation was used before with the phrase "Highly flammable". INDICATION BASED ON GHS FOR PYROPHORIC GAS/LIQUIDS/SOLIDS | |
| 420045 | May ignite on exposure to air. CGC Remark: This sentence requires an Indication (and Explanation). | |
| 420046 | See Explosion | new sentence |

| 42 Fire - Acute hazards | | |
|------------------------------|--|--------------|
| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
| | CGC Remark: A new sentence added (after PR meeting Lyon 2107), but this sentence has already become obsolete because Fire and Explosion are combined in new the layout | |
| 420047 | Flammable under specific conditions | new sentence |
| | CGC Remark: A new sentence added (after PR meeting Lyon 2107), but this (any newly proposed) sentence requires an Indication (and Explanation). → PR meeting minutes? WG? | |
| 45 Explosion - Acute hazards | | |
| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
| 450001 | Above [N1]°C explosive vapour/air mixtures may be formed. Explanation: This relates to substances with a flash point between 23 and 93°C, the specific value of the flash point should be mentioned. Indication: Apply if flash point is > 23°C and < 93°C. H226 H227 | 15105000 |
| 450004 | Finely dispersed particles form explosive mixtures in air. Explanation: This is mentioned if dust explosions are possible. Mists of combustible liquids are generally also explosive. Indication: Applies if 670004 was used. Links: 460012+460022 490005 | 15107000 |
| 450005 | Gas/air mixtures are explosive. Explanation: This applies to flammable gases. There is a great risk of explosive gas/air mixtures being formed upon release of the gas at ambient temperatures. Indication: Apply if flammable gas. H220 H221 Links: 430004 640014 (640003/640004) | 15101000 |
| 450006 | Liquid and vapour flash in direct sunlight. | |
| 450007 | Mixture with water or water vapour explodes violently on spark ignition. | |
| 450008 | Risk of explosion on contact with [P1], or]. Parameters: 50 parameters: P1: acetylene; ... zinc | |
| 450012 | Risk of fire and explosion[P1], or]. Indication: Do NOT use this phrase if the explosive reaction only occurs with/under relatively rare chemicals/conditions. The information on the ICSC is intended for normal working situations! Parameters: 13 parameters: P1: as a result of decomposition when heated; ... when exposed to heat or flame | |
| 450017 | Risk of fire and explosion on contact with [P1], or]. Indication: May be completed with the following: - 'on contact with' - 'if formulations contain flammable/explosive solvents' - 'as a result of (violent) decomposition when' (mentioning which chemicals or circumstances). Do NOT use this phrase if the explosive reaction only occurs with/under relatively rare chemicals/conditions. The information on the ICSC is intended for normal working situations! Parameters: 50 parameters: P1: acetylene; ... zinc | 15109000 |
| 450027 | See Chemical Dangers. | |
| 450028 | See Notes. | |
| 450030 | Solutions may explode during drying or concentration operations. | |
| 450032 | Vapour/air mixtures are explosive. Explanation: This applies to highly flammable liquids (i.e., those with a flash point < 23°C). There is a great risk of explosive vapour/air mixtures being formed upon release of the liquid at ambient temperatures. | 15103000 |

| 45 Explosion - Acute hazards | | |
|------------------------------|---|--------------|
| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
| | Indication: Apply if liquid with flash point < 23°C. H224 H225 | |
| | Links: 430004 640014 (640003/640004) | |
| 450036 | Risk of explosion[P1], or]. Parameters: 12 parameters: P1: as a result of decomposition when heated ... when exposed to heat or flame | 15108000 |
| 450038 | Explosive. Explanation: Explosive substances can decompose violently when ignited by sparks or friction, causing a local temperature increase that triggers a very fast chain reaction. Although such a decomposition is often attended with fire, the reaction does not need an external source of oxygen, in contrast to an explosive combustion of a flammable vapour/air mixture. Explosives often contain in their molecules a relatively high oxygen content through which an internal combustion is possible. Substances with explosive characteristics can also be flammable. The term 'explosive' is used if the minimum ignition energy to trigger an explosion exceeds a certain standard or if the substance is definitely known to be explosive. Indication: Applies if the substance when heated in a confined space explodes or appears to be more sensitive to shock or friction than m-dinitrobenzene. If test results or labelling indications are not available, the decision to use this phrase should be taken based on literature references. GHS: Apply to liquids and solids classified by UN unstable explosive or explosive class 1.1 to 1.6. H200 H201 H202 H203 H204 H205 H241 Use 450012 to give further data. Links: 14201 22101 (22301/22303) | 14121000 |
| 450039 | Heating will cause rise in pressure with risk of bursting. Indication: Applies to liquids with boiling points < 100°C. | 15104000 |
| 450041 | Risk of fire and explosion on contact with: | |
| 450042 | Risk of explosion when exposed to[P1], or]. Parameters: 4 parameters: P1: electrostatic discharges; flame; heat; sparks | |
| 450043 | Highly explosive. CGC Remark: A new sentence added (after PR meeting Lyon 2107), but this (any newly proposed) sentence requires an Indication (and Explanation). → PR meeting minutes? WG? | new sentence |
| 450044 | Explosive underspecific conditions. CGC Remark: A new sentence added (after PR meeting Lyon 2107), but this (any newly proposed) sentence requires an Indication (and Explanation). → PR meeting minutes? WG? | new sentence |

Prevention

In the current layout of the ICSC (as of October 2017), the Prevention sentences for Fire (Fields 43) and for Explosion (Field 46) are combined into one section.

| 43 Fire - Prevention | | |
|----------------------|---|-------------|
| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
| 430001 | If powder: NO open flames, NO sparks, and NO smoking. Indication: Applies if any of 420032, 420036, 420038 is used. | |
| 430003 | NO contact with [P1], or]. Explanation: This applies to substances that can react very violently (involving fire or explosion risks) with the materials mentioned. Indication: Can also be used in sub-section Explosion (phrases 450000). Select proper P1 parameter according to the parameter's indication. Parameters: 47 parameters: P1: acetylene; ...; zinc | 14207000 |
| 430003 | P1 flammables Explanation: Applies if 420021 is used or if the substance is a flammable organic peroxide as mentioned in indication of 420018 and 420011. | 14205000 |

| 43 Fire - Prevention | | |
|---------------------------|---|--------------|
| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
| | Indication: This warning is used for strong oxidants, including organic peroxides. | |
| 430003 | P1 hot surfaces Indication: If auto-ignition temperature < 200°C. Can be completed with particulars, for instance, '(e.g., steam pipes)'; if applicable, otherwise close with a full stop (.). | 14209000 |
| 430004 | NO open flames, NO sparks and NO smoking. Explanation: This applies to combustible substances with a flash point less or equal to 61°C and to solids which are easily ignited in normal air. Indication: Applies if any of 420009, 420018, 420011, 420022, or 450038 is used. | 14201000 |
| 430005 | NO open flames. Explanation: This applies to all other combustible substances. The concept 'open flame' also includes surfaces whose temperature is above the auto-ignition temperature of the substance. Indication: Applies if 420002 or 420001 is used. | 14203000 |
| 430006 | If powder: NO open flames Indication: Applies if 420039 is used. | |
| 430007 | See Chemical Dangers. | |
| 430009 | See Notes. | new sentence |
| | CGC Remark: A new sentence added (after PR meeting Lyon 2107), but this (any newly proposed) sentence may require an Indication. | |
| 46 Explosion - Prevention | | |
| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
| 460001 | Above [N1]°C use a closed system and ventilation. Explanation: This applies to all liquids with a flash point > 60°C but < 93°C. In the case of liquids with a flash point >= 93°C, no special attention is paid to the explosion hazard which exists at temperatures above the flash point. Indication: Complete with the value of the flash point. | 15205000 |
| 460002 | Above [N1]°C use a closed system, ventilation and explosion-proof electrical equipment. Explanation: This applies to all liquids with a flash point >= 23°C but <= 60°C. N.B.: The technical measures taken to ensure that the composition of the vapour-air mixture in the processing equipment remains outside the explosive limits require careful process design and fall outside the scope of this guide. 'Explosion-proof electrical equipment' refers to electrical equipment suitable for use in a space or zone where a risk of gas explosion exists. Details are given in various national publications on this issue. Indication: Complete with the value of the flash point. | 15203000 |
| 460003 | Closed system, ventilation, explosion-proof electrical equipment and lighting. Explanation: This applies to liquids with a flash point below 23°C and to flammable gases. The recommendations deal with the standard safety measures that must be taken in order to prevent the formation and ignition of explosive mixtures of gas/vapour and air. N.B.: The technical measures taken to ensure that the composition of the vapour-air mixture in the processing equipment remains outside the explosive limits require careful process design and fall outside the scope of this guide. 'Explosion-proof electrical equipment and lighting' refers to electrical equipment and lighting suitable for use in a space or zone where a risk of gas explosion exists. Details are given in various national publications on this issue. Indication: Applies to liquids with flash point < 23°C and to flammable gases. | 15201000 |
| 460004 | Do NOT expose to friction or shock. Explanation: Relates to substances which may undergo explosive decomposition as a result of concussion or friction. Indication: Applies if 680069 is used. | 15215000 |

| 46 Explosion - Prevention | | |
|---------------------------|---|---------------|
| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
| 460005 | Do not expose to heat and keep wet with at least 30% water. | |
| 460006 | Do NOT expose to heat, friction or shock. | 15215000 |
| 460008 | Do NOT use compressed air for filling, discharging, or handling. Explanation: This phrase is used with highly flammable liquids with a view to prevent the formation and spreading of ignitable vapour/air mixtures and mists. Use pumps, gravity, or compressed inert gas to transport these liquids. Indication: Applies to liquids with a flash point < 23°C; NOT to compressed liquefied gases. | 15211000 |
| 460009 | Flame arrester to prevent flash-back from burner to cylinder. | |
| 460010 | Prevent build-up of electrostatic charges (e.g., by grounding). Explanation: This is applicable to those combustible liquids which can generate electrostatic charges as a result of flow, friction, or other action (i.e., electric conductivity lower than 10 000 pS/m). When such substances are handled, all equipment must be grounded. Besides grounding, there are other means of preventing undesirable discharges or inhibiting the generation of charges. Refer to specialized literature. For solids, the risk of dust explosion can be diminished by taking suitable measures which prevent generation and accumulation of electrostatic charges; consult an expert. Indication: Applies if a liquid with a flash point < 93°C and an electric conductivity < 10 000 pS/m (see 740031 for value). For solids, applies if 680069 was used. | 15207 / 15219 |
| 460011 | Prevent build-up of electrostatic charges (e.g., by grounding) if in liquid state. Explanation: This is applicable to liquefied gases which can generate electrostatic charges as a result of flow, friction, or other action (i.e., electric conductivity lower than 10 000 pS/m). When such substances are handled, all equipment must be grounded. Besides grounding, there are other means of preventing undesirable discharges or inhibiting the generation of charges. Refer to specialized literature. Indication: Applies to flammable gases liquefied by compression or cooling. | 15209000 |
| 460012 | Prevent deposition of dust. Explanation: This is applicable to cases where finely dispersed powder in air is explosive. It will sometimes be necessary to install special equipment for combating dust explosions. Indication: Applies if 670004 was used. | 15217000 |
| 460013 | PREVENT DISPERSION OF DUST. Explanation: This is applicable to cases where finely dispersed powder in air is explosive. | 15206000 |
| 460014 | Prevent warming above [N1]°C. | |
| 460015 | Use non-sparking handtools. Explanation: Combustible vapour/air mixture can be ignited by sparks of a certain minimal energy, depending on the substance in question. If this is lower than the quantity of energy in sparks from normal handtools, this phrase is used. Indication: Applies if the minimum ignition energy is < 0.6 mJ; see 740055 for the value. | 15213000 |
| 460016 | Vapours will be uninhibited and may polymerize in exhaust or ventilation facilities with risk of breakdown. | |
| 460017 | See Notes. | |
| 460018 | NO contact with [P1], [] or]. Parameters: 2 parameters: P1: metals; strong oxidizing agents | |
| 460020 | NO contact with incompatible materials: | 15219500 |
| 460021 | See Chemical Dangers | |
| 460022 | Closed system, dust explosion-proof electrical equipment and lighting. Explanation: This is applicable to cases where finely dispersed powder in air is explosive. It will sometimes be necessary to install special equipment for combating dust explosions. Indication: Applies if 670004 was used. | 15217000 |
| 460023 | Do not handle cylinders with oily hands. | |

Disallowed sentences in Fire & Explosion – Prevention

46 Explosion - Prevention

| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
|--------|---|-------------------|
| 460016 | Vapours will be uninhibited and may polymerize in exhaust or ventilation facilities with risk of breakdown. Motivation: This sentence should be moved to Physical dangers | <i>disallowed</i> |

Fire fighting

In the current layout of the ICSC (as of October 2017), the Fire fighting sentences for Fire (Fields 44) and for Explosion (Field 47) are combined into one section.

44 Fire - Fire fighting

| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
|--------|---|-------------|
| | <p>Fire fighting</p> <p>Explanation: To handle a chemical fire safely, specific training is necessary as each fire depends on the characteristics of the chemical, the location of the fire, other chemicals nearby, etc. Expert fire fighters must be trained in handling the types of fires at the facility, and planning drills must be carried out periodically. Management must ensure this is done or the threat from fire will be far greater. Moderate to large fires must be handled by expert fire fighters who must act with local authorities in judging whether the incident poses a threat to the surrounding community and therefore calls for an evacuation or calls for staying indoors with windows closed and ventilation off. Methods must be available for notifying the public without causing panic. This public participation must also be exercised periodically so that the residents near the facility know what needs to be done. A general rule for moderate to large fires is to shut off the supply of combustible substances if possible, obtain expert help and evacuate the area. For small fires, shut off supply of combustible substances, evacuate area, and extinguish if possible. Chemical workers can handle small fire themselves only when they are properly trained and have adequate equipment and supplies of materials such as compatible foams, etc. The selection of the fire extinguishing agents for an ICSC and the order in which they are listed is based on their applicability by laymen under various conditions as well as on their effectiveness. They are only intended for small fires. In case of moderate or large fires experts have to decide how to cope with the situation; under some circumstances it may be better to let the fire burn out instead of extinguishing it with water that afterwards could pollute the environment heavily with dissolved toxic substances (e.g., pesticides). In some instances it is stated which extinguisher must NOT be used, because a dangerous reaction may follow. In particular instances a special extinguishing agent is indicated. As the case may be, further information is given in Notes (e.g., 870001).</p> <p>Indication: One or more fire extinguishing agents (general) should be mentioned (for tackling small fires) if the substance is (extremely/highly) flammable or combustible. No extinguishing agent should be mentioned for substances combustible only under specific conditions as the criteria used in this guide are not applicable to abnormal fire conditions. For these substances, 440003 or 440016 should normally be used. For flammable gases, normally the combination of 440004 + Dry powder (P1 440001) + CO2 (P1 440001) should be used. For all other flammable or combustible substances, if possible, put extinguishing agents in the order of preference. The phrase 440002 must be used to indicate 'forbidden' agents. Use Water in large amounts and 440003 for non-combustible substances.</p> | |
| 440001 | <p>Use [P1], [,].</p> <p>Parameters: 16 parameters: P1: AFFF; alcohol-resistant foam; carbon dioxide; coarse water spray; dry powder; dry sand; fine water spray; foam; inert gas; polymer foam; powder; special powder; water; water in large amounts; water spray; wet sand</p> | 14300000 |
| 440001 | <p>P1 alcohol-resistant foam</p> <p>Explanation: Alcohols, ketones, and esters are capable of 'breaking up' many types of foam, causing loss of the extinguishing effect. Special foam grades have been developed which are more resistant to such decomposition. (AFFF/ATC is also meant here; ATC stands for Alcohol Type Concentrate). Also see the general Explanation for Fire Fighting.</p> | 14311000 |

| 44 Fire - Fire fighting | | |
|-------------------------|--|-------------|
| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
| | <p>Indication: Use for combustible liquids (flash point $\leq 93^{\circ}\text{C}$) that are more than 1% miscible with water (polar solvents). Liquids which react with water are considered as having a miscibility of 1-10% and should have 'foam' and 'alcohol-resistant foam'.</p> | |
| 440001 | <p>P1 carbon dioxide</p> <p>Explanation: The extinguishing action of carbon dioxide consists of excluding oxygen. Strictly speaking, this substance is only suitable for the extinguishing of small (incipient) fires in sheltered positions; in actual practice this means indoors only. Also see the general Explanation for Fire Fighting.</p> | 14317000 |
| 440001 | <p>P1 coarse water spray</p> <p>Indication: Consider 'Coarse water spray' if any of the following apply:</p> <ol style="list-style-type: none"> 1) It is a solid which is (or its aqueous solution is) NOT corrosive (UN class 8), toxic (UN class 6), or environmentally sensitive (UN class 9). 2) It is carried as a hot liquid above 100°C and considerable amounts of water are essential for the safe and effective control. 3) It is a solid which is (or its aqueous solution is) corrosive (UN class 8), toxic (UN class 6), or environmentally sensitive (UN class 9) BUT considerable quantities of water are essential for the safe or effective control (e.g. solids of class 5.1 or those with sub-risk 5.1). | 1430520 |
| 440001 | <p>P1 dry powder</p> <p>Explanation: Many chemicals will react with water with a varying degree of violence. Those which are considered to warrant particular violence because of severe exothermic reaction causing hazard to emergency workers should be treated with dry powder. These are mainly powders on a bicarbonate base or on an ammonium phosphate base. The extinguishing action appears to consist of inhibiting the chain reactions which keep the fire burning; this phenomenon is called negative catalysis. These powders are also called 'dry chemical' or 'dry agent'. Also see the general Explanation for Fire Fighting.</p> <p>Indication: Applies if the application of water would increase the overall hazard. Use if any of the following apply:</p> <ol style="list-style-type: none"> 1) Substances of class 3, ADR in Item 21 (a) or (b) and UN2988, due to their reactivity with water to form dangerous decomposition products, particularly when burning. 2) Substances of class 4.2, ADR Items (a), except 11 (a), (i.e. metal powders & pyrophoric substances e.g. metal alkyls). 3) Substances of class 4.3, ADR or sub-risk 4.3, except UN2210, because of liberation of flammable gases when wet. 4) Substances of class 5.1, ADR Item 55) Substances of class 6.1, ADR Item 446) <p>Substances of class 8, ADR in Items: 1 (a) excluding UN2240, 8 (a), 10 (b), 11 (b), 12 (a) or (b), 33 (a), 35 (b) excluding UN2798 and 2799, 36 (b), 37 (b), 71 a) or (b), 72 (a) or (b), due to their reactivity with water to form dangerous decomposition products.</p> | |
| 440001 | <p>P1 dry sand</p> | 14319000 |
| 440001 | <p>P1 fine water spray</p> <p>Indication: Consider 'Fine water spray' if any of the following apply:</p> <ol style="list-style-type: none"> 1) It is a non-flammable gas. 2) It is carried as a hot liquid above 100°C and considerable amounts of water are NOT essential for safe or effective control. 3) It is a liquid which is non-combustible (flash point $\geq 93^{\circ}\text{C}$). 4) It is a liquid which is combustible (flash point $\leq 93^{\circ}\text{C}$) and an oxidiser (UN class 5 or sub-risk 5.1). 5) It is a liquid which is combustible (flash point $\leq 93^{\circ}\text{C}$), which is NOT an oxidiser (UN class 5 or sub-risk 5.1), and is $> 10\%$ miscible with water (combine with 14311). 6) It is a solid which is (or its aqueous solution. is) corrosive (UN class 8), toxic (UN class 6), or environmentally sensitive (UN class 9), and where considerable quantities of water are not required for safe or effective control. 7) It is a combustible (flash point $\leq 93^{\circ}\text{C}$) immiscible liquid with relative density >1.1 at 20°C. | 14305010 |
| 440001 | <p>P1 foam</p> | 14309000 |

| 44 Fire - Fire fighting | | |
|-------------------------|---|-------------|
| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
| | <p>Explanation: A physically produced foam is meant here. Its action consists in preventing heat transfer between the flame and the burning liquid, whereby evaporation is inhibited. Also see the general Explanation for Fire Fighting. Generally used for flammable liquids which are lighter than water and less than 1% miscible with water. Foam is essential if the risk of spread of fire is to be avoided. Its use is even more desirable with liquids of low flash point.</p> <p>Indication: Apply to flammable liquids which are less than 1% miscible with water and relative density less than or equal to 1.1 at 20°C. Particularly if the flash point is low. Apply also to combustible liquids (flash point ≤ 93°C) with miscibility 1-10% with water, and combine with 'alcohol-resistant foam'.</p> | |
| 440001 | <p>P1 special powder</p> <p>Explanation: These agents are mentioned for metal fires and special cases.</p> | 14321000 |
| 440001 | <p>P1 water in large amounts</p> <p>Explanation: The fire-fighting action of water mainly consists in cooling due to evaporation and exclusion of oxygen due to the formation of steam. Sometimes large amounts are needed. Also see the general Explanation for Fire Fighting. The use of water jets in dealing with chemical fires is generally not recommended; a throw of 40 meters or more, and 1000 litres per minute is essential because of the risks created by the uncontrolled spreading of the chemicals, particularly corrosive, highly toxic, or environmentally sensitive material, thus increasing the hazard to emergency workers or passers by. Water should not be applied on chemicals which react violently with water, without the approval of an expert. Many chemicals will react with water with a varying degree of violence. Substances that are carried hot to maintain the solid as a melt or in solution, and would therefore be expected to rapidly solidify on cooling, should not be subjected to the application of considerable quantities of water unless this is necessary to effect safe control. In these circumstances, a medium or fine spray should be used.</p> <p>Indication: Consider not using for corrosive (UN class 8), highly toxic (UN class 6.1), or environmentally sensitive material (UN class 9). For chemicals carried hot to maintain the solid as a melt or in solution, use '[Fine] water spray'. Do not use if it reacts violently with water.</p> | 14303000 |
| 440001 | <p>P1 water spray</p> <p>Explanation: In this way the water is distributed more effectively over the burning substance, thereby enhancing its cooling and sealing effect. Also see the general Explanation for Fire Fighting. A typical spray branch will deliver a range of droplet size up to 100 micrometers (fine/mist), 100-500 micrometers (medium), and 1000 micrometers (coarse) at distances up to 30 meters. Water should not be applied on chemicals which react violently with water, without the approval of an expert. Many chemicals will react with water with a varying degree of violence. Substances that are carried hot to maintain the solid as a melt or in solution, and would therefore be expected to rapidly solidify on cooling, should not be subjected to the application of considerable quantities of water unless this is necessary to effect safe control. Normally, therefore, a medium or fine spray should be used rather than coarse spray. Compressed and liquefied pressure gases are normally dealt with by dilution/dispersion. Water in the form of a medium-fine spray (mist) can usually be effective in knocking down leaking gas clouds, though care is necessary to avoid water going directly on to some liquid gas pools where a rapid boil-off may be undesirable e.g. insoluble, toxic or flammable gases.</p> <p>Indication: Do not use if the substance reacts violently with water.</p> | 14305000 |
| 440002 | <p>NO [P1], [,].</p> <p>Parameters: 6 parameters: P1: carbon dioxide; foam; hydrous agents; other agents; powder; water</p> <p>Links: 870014</p> | 14349000 |
| 440002 | <p>P1 carbon dioxide</p> | 14349010 |

| 44 Fire - Fire fighting | | |
|---------------------------------------|--|-------------|
| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
| | Explanation: The extinguishing action of carbon dioxide consists of excluding oxygen. Strictly speaking, this substance is only suitable for the extinguishing of small (incipient) fires in sheltered positions; in actual practice this means indoors only. Also see the general Explanation for Fire Fighting. | |
| 440003 | In case of fire in the surroundings, use appropriate extinguishing media. | 14351000 |
| 440004 | Shut off supply; if not possible and no risk to surroundings, let the fire burn itself out. In other cases extinguish with [P1], ,]. Explanation: This sentence is used for flammable gases. The best way to extinguish the fire is by shutting off the gas supply. If this is impossible, it is far better to let the fire burn itself out in a 'controlled' fashion rather than extinguish it. Indication: Use for flammable gases, combined (usually) with Dry powder and Carbon dioxide. Parameters: 15 parameters: P1: alcohol-resistant foam; appropriate extinguishing agent; carbon dioxide; coarse water spray; dry powder; dry sand; foam; inert gas; polymer foam; powder; special powder; water; water in large amounts; water spray; wet sand | 14301000 |
| | P1 AFFF | disallowed |
| 440006 | Do not attempt to extinguish large fire, evacuate area. | |
| 440010 | Water may be ineffective. | |
| 440012 | Evacuate area, fight fires only from an explosion-resistant location. | |
| 440013 | See Notes. | |
| 440015 | In case of fire in the surroundings: all extinguishing agents allowed. | |
| 440016 | In case of fire in the surroundings: [P1]. Explanation: This is used only for non-combustible substances. It is possible that the ICSC substance may react dangerously with certain extinguishing agents if involved in a fire. This phrase is used to give the necessary warning. Indication: Applies if the risk of fire can increase by reaction of this non-combustible substance with an extinguishing agent. To be completed with:- do not use ... (mention the agent involved)- only use ... (mention the agent involved)In selecting, weigh the odds of (not) using a certain agent against the increase of the fire risks. Parameters: 3 parameters: P1: all extinguishing agents allowed; use appropriate extinguishing media; water in large amounts, water spray | 14353000 |
| 47 Explosion - First Aid/Firefighting | | |
| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
| 470001 | Combat fire from a sheltered position. Explanation: Used if an explosion due to instability, etc., is likely to occur. Indication: Applies if the NFPA reactivity code is 3 or 4, or if explosive (450038), or if the UN transport classification is 1.1, 1.2, or 1.3, or if gas in cylinder. For the NFPA code, see 870750. | 15309000 |
| 470004 | NO direct contact with water. | |
| 470007 | In case of fire: keep cylinder cool by spraying with water. Explanation: Cylinders, tanks, and drums which are exposed to heat radiation due to a fire in the neighbourhood must be cooled in order to prevent explosion or collapse as a result of pressure rise or local overheating. Indication: Applies if a boiling point < 100°C, or flash point <= 60°C, or decomposition temperature < 100°C AND no dangerous reaction with water. | 15303000 |
| 470009 | In case of fire: keep drums, etc., cool by spraying with water. Explanation: Cylinders, tanks, and drums which are exposed to heat radiation due to a fire in the neighbourhood must be cooled in order to prevent explosion or collapse as a result of pressure rise or local overheating. Indication: Applies if a boiling point < 100°C, or flash point <= 60°C, or decomposition temperature < 100°C AND no dangerous reaction with water. | 15301000 |

| 47 Explosion - First Aid/Firefighting | | |
|--|---|----------------------|
| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
| 470010 | See Notes. | |
| 470012 | NO direct contact of the substance with water. Explanation: Cylinders, tanks, and drums which are exposed to heat radiation due to a fire in the neighbourhood must be cooled in order to prevent explosion or collapse as a result of pressure rise or local overheating. This phrase is used if the substance reacts dangerously with water. Indication: Applies if a boiling point < 100°C, or flash point <= 60 °C, or decomposition temperature < 100°C AND a dangerous reaction with water is possible. | 15305000 15307000 |

EXPOSURE

Note: In the new layout (as of October 2017), the three “Exposure” columns (Fields 48, 49 and 50) have been merged to one row, just above the symptoms, prevention and first aid sections).

The CGC has expressed the desire to keep the presentation of those 3 fields in three separate columns.

For the compilers the presentation (layout) of this information is of no consequence: compilers can just select the proper sentences in each field.

| 48 Exposure – symptoms | | |
|--------------------------|---|-------------|
| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
| | <p>Exposure – symptoms</p> <p>Explanation: For each of the routes of exposure (inhalation, skin, eyes, and ingestion), a brief survey is given of the principal perceptible symptoms (signs) which may result when contact with the substance exceeds a certain degree. Only symptoms due to an acute exposure to the substance are mentioned.</p> <p>Indication: Do NOT mention more than 8 symptoms in each subsection. In general only symptoms from human experience should be mentioned. Symptoms established in animal tests should only be mentioned if they are important to the reader and possible (in the professional judgement of compiler) in humans; application of the symptoms has to be peer-reviewed. Place symptoms in sequence. This sequence should be based on the occurrence of the symptoms on increasing exposure. Use an alphabetical order if an occurrence sequence can not be given. Systemic symptoms should be mentioned in the subsection on the route of exposure. Example: a possible symptom of ingestion of thallium is 'loss of vision'. This should be mentioned in subsection 'Ingestion', NOT in 'Eyes'.</p> | 1610000 |
| | <p>CGC remarks: This general Explanation and Indication text is meant for the Symptoms Fields for the four routes of exposure. It should be moved to the corresponding fields.</p> | |
| 480001 | See EFFECTS OF LONG-TERM OR REPEATED EXPOSURE. | 16101000 |
| 480002 | See Notes. | 16102000 |
| 49 Exposure – prevention | | |
| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
| | <p>Exposure – prevention</p> <p>Explanation: The prevention of physical contact for every route of exposure is briefly described. In practice the safety officer or the occupational hygienist will recommend the most appropriate precautionary measures for a given situation in order to limit the exposure to the substance sufficiently. The necessary precautionary measures should be selected and built into any new process during the planning stages that precedes its introduction. Obviously, it is of prime importance to prevent contact with the substance as far as practicable by suitable design and operation of process installations. These criteria take precedence over the use of devices for personal protection. Any evaluation of a danger situation must take into account not only the toxicity of a substance but also the chance of exposure. The risk of exposure may depend on factors such as:</p> <ul style="list-style-type: none"> - physical properties, such as vapour pressure, rate of evaporation, boiling point, solubility, particle size in solid substances, etc.; - efficiency of systems for local exhaust of noxious gases and vapours; - shape and dimensions of the working area and the possibility of dust being spread by air streams. Rapid spreading causes danger to other people also present in the working area; - other circumstances under which the substance is used <p>Indication: In case data on toxicity and on hazards of a substance are not readily available, the compiler should take this into account in the selection of the phrases on prevention.</p> | 1620000 |
| | <p>CGC remarks: This general Explanation and Indication text is meant for the Prevention Fields for the four routes of exposure. It should be moved to the corresponding fields.</p> | |
| 490001 | <p>AVOID ALL CONTACT!</p> <p>Explanation: This warning is given only for highly dangerous substances. The symptoms may appear either immediately or after some time has passed.</p> | 16207000 |

| | | |
|--------|---|----------|
| | <p>Indication: Apply if the substance is:</p> <ul style="list-style-type: none"> - a very corrosive or easily sensitizing substance; H 314 H334 - carcinogenic to humans H350 - mutagenic to humans H340; - GHS Category 1 Toxic to reproduction H360 ; or - one for which all contact should be avoided because of serious hazard of irreversible damage. <p>'Contact' is to be regarded as a short-time contact of the substance in its normal physical state with the skin or on the inhalation/ingestion of very small quantities. H300 H310 H330</p> | |
| 490003 | <p>AVOID EXPOSURE OF ADOLESCENTS AND CHILDREN!</p> <p>Explanation: It should be forbidden to assign tasks to teenagers and to children in which they can be exposed to dangerous substances, as they are far more sensitive to the impact of noxious chemicals than adults. This phrase should therefore be superfluous. Yet it has been used on the ICSCs of many substances as an extra warning to keep the substance out of the reach of teenagers and children.</p> <p>Indication: Use this phrase:</p> <ul style="list-style-type: none"> - if there are developmental effects - if children are likely to be more sensitive - if there are long term effects - if there are hormonal effects - if there are morphological effects as opposed to physiological effects - pesticides that are harmful or toxic to health according to the criteria in GHS. <p>The use of this phrase should be decided by the Peer Review group.</p> | 16211000 |
| 490004 | <p>AVOID EXPOSURE OF BREASTFEEDING WOMEN!</p> <p>Indication: Use this phrase if there is evidence that the substance has been detected in the milk and the one phrases 730004-730006-730033 has been selected. Also consider when the GHS criteria for effects on or via lactation (H362) are met. A decision to use this phrase must be a conclusion taken by the Peer-Review Committee.</p> | 16210000 |
| 490005 | <p>PREVENT DISPERSION OF DUST!</p> <p>Explanation: This recommendation concerns solids that may induce formation of powder or dust on handling and may cause serious adverse effects.</p> <p>Indication: If 710001 is used, this applies in case of 'harmful' concentrations. If no OEL has been established, application of these phrases should be based on other toxicological data. In case data on toxicity and on hazards of a substance are not readily available, the compiler should take this into account in the selection of the phrases on prevention.</p> | 16201000 |
| 490006 | <p>PREVENT GENERATION OF MISTS!</p> <p>Explanation: This recommendation concerns liquids with high boiling points that may induce formation of mists on handling and may cause serious adverse effects.</p> <p>Indication: If 710009 is used, this applies for high boiling liquids. If no OEL has been established, application of these phrases should be based on other toxicological data.</p> | 16203000 |
| 490007 | <p>STRICT HYGIENE!</p> <p>Explanation: Hygienic precautions should always be observed when handling chemicals. This extra warning is given when a substance is considered to be so dangerous that particular caution must be exercised.</p> <p>Indication: The application of this phrase should be considered if the substance is:</p> <ul style="list-style-type: none"> - a gas with an OEL <= 10 ppm or a rat LC50 (<4hr) <= 0.5 mg/l; H330 - a liquid or solid with a RIR >= 4000; or - a solid (powder) with an OEL < 1 mg/m3 or a rat oral LD50 <= 25 mg/kg. <p>The possible effects should also be considered. H301 H311 H331</p> | 16205000 |
| 490009 | Use appropriate engineering controls. | |
| 490010 | See Notes. | |
| | Indication: Do not use if 480002 has already been selected. | |

| 50 Exposure - First Aid | | |
|--------------------------------|---|-------------|
| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
| | Exposure – First Aid | 1630000 |
| | Explanation: To properly apply the recommended first aid measures, the reader is referred to an appropriate instruction manual. Persons who may be required to apply first aid should be trained and qualified. | |
| | CGC remarks: This general Explanation text is meant for the First Aid Fields for the four routes of exposure. It should be moved to the corresponding fields. | |
| 500001 | See Notes. Indication: Do not use if 480002 or 490010 has already been selected. | |
| 500002 | IN ALL CASES CONSULT A DOCTOR! Explanation: As the substance can cause serious effects by all routes of exposure, a doctor should be consulted. N.B.: Indications on other phrases regarding medical attention are given in the sub-sections Inhalation, Skin, Eyes, and Ingestion. Indication: Apply if serious effect can occur by any route of exposure, sentence 530007, 560008, 620015 is selected, and there is justification to highlight medical consultation. Apply to extreme cases. Peer-review group decision needed. Links: 530007 560008 620015 | 16301000 |
| 500003 | FIRST AID: USE PERSONAL PROTECTION. Explanation: In the case of a person contaminated with a highly toxic chemical first aiders and medical staff may be at risk of poisoning from secondary contamination unless they use personal protective equipment such as gloves, goggles, apron, overalls, masks etc. For certazin chemicals e.g. nerve gases full body protection with a chemical protection suit and respiratory protection may be needed. Indication: Use for chemicals that are fatal or toxic on skin contact or that produce highly toxic vapour (GHS Acute Toxicity categories 1-2). Use of this phrase is a peer-review decision and supporting evidence should be provided. Add specific information in Notes. If this phrase is used then it is not necessary to use 500002, 560017 or 620019. | 16302000 |

Disallowed sentences in Exposure

| 42 Exposure – Prevention | | |
|---------------------------------|---|-------------|
| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
| 490002 | AVOID EXPOSURE OF (PREGNANT) WOMEN! date: disallowed in 2007 Motivation: This phrase was disallowed in April 2007 in preference for 'AVOID ALL CONTACT' on the grounds that women could be in the early stages of pregnancy without being aware, also men needed protection from reprotoxic substances and this phrase was therefore not sufficiently inclusive. | 16209000 |

SYMPTOMS - PREVENTION - FIRST AID

Inhalation

| 51 Inhalation – symptoms | | |
|--------------------------|---|-------------|
| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
| 510000 | <p>Inhalation – symptoms</p> <p>Explanation: The symptoms on the ICSC are mentioned as far as possible in sequence of occurrence on increasing exposure. However, personal sensitivity and/or other influences may cause symptoms to appear in different order. For each routes of exposure (inhalation, skin, eyes, and ingestion), a brief survey is given of the principal perceptible symptoms (signs) which may result when contact with the substance exceeds a certain degree. Only symptoms due to an acute exposure to the substance are mentioned.</p> <p>Indication: Do NOT mention more than 8 symptoms in each subsection. In general only symptoms from human experience should be mentioned. Symptoms established in animal tests should only be mentioned if they are important to the reader and possible (in the professional judgement of the compiler) in humans; application of the symptoms has to be peer-reviewed. List symptoms in sequence, if appropriate. This sequence should be based on the occurrence of the symptoms on increasing exposure. Use an alphabetical order if an occurrence sequence can not be given. Systemic symptoms should be mentioned in the subsection on the route of exposure. Example: a possible symptom of ingestion of thallium is 'loss of vision'. This should be mentioned in subsection 'Ingestion', NOT in 'Eyes'.</p> | 17100000 |
| 510003 | Abdominal cramps. | 17107000 |
| 510004 | Abdominal pain. | 17105000 |
| 510009 | Blood in the urine. | |
| 510011 | Blue lips, fingernails and skin. Indication: Early symptom of cyanosis due to methaemoglobinemia. Can be used if exposure is likely to be sufficient. | 17108/17109 |
| 510013 | Blurred vision. Indication: Use for chemicals that cause blurred vision as a systemic effect once absorbed, e.g. by causing dilated or constricted pupils. | 17122000 |
| 510014 | Burning sensation. Indication: H314 H335 | 17111000 |
| 510016 | Chest pain. | |
| 510017 | Chest tightness. | |
| 510021 | Confusion. | 17113000 |
| 510022 | Convulsions. | 17114000 |
| 510024 | Cough. Indication: H335 | 17115000 |
| 510025 | Dark urine. | |
| 510026 | Death | |
| 510027 | Diarrhoea. | 17117000 |
| 510031 | Dizziness. Indication: H336 | 17119000 |
| 510032 | Drowsiness. Indication: H336 | 17121000 |
| 510034 | Dry throat. | |
| 510035 | Lethargy. | |
| 510036 | Elevated blood pressure. | |
| 510037 | Euphoria. | |
| 510038 | Numbness. | |
| 510039 | Excessive salivation. | |
| 510040 | Facial paralysis, numbness and tremor. | |
| 510041 | Fall in blood pressure. | |
| 510042 | Fatigue. | |

| 51 Inhalation – symptoms | | |
|--------------------------|---|-------------|
| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
| 510045 | Fever. | 17126000 |
| 510046 | Flushing of the face. | |
| 510047 | Further see Ingestion. Indication: “Further see ...” (510047) is used after a few symptoms; “See ...” (510094) is used when there is no symptoms | 17147010 |
| 510048 | Garlic odour. | |
| 510052 | Hallucinations. | |
| 510053 | Headache. | 17125000 |
| 510057 | Incoordination. | |
| 510058 | Increased heart rate. | |
| 510061 | Irregular heartbeat. | |
| 510062 | Irritability. | |
| 510063 | Nasal irritation. | |
| 510064 | Jaundice. | |
| 510065 | Laboured breathing. Indication: 530004 | |
| 510067 | Loss of memory. | |
| 510071 | Malaise. | |
| 510073 | Metallic taste. | |
| 510074 | Muscle cramps. | |
| 510075 | Muscle pain. | |
| 510076 | Muscle twitching. | 17110000 |
| 510077 | Muscular weakness. | |
| 510078 | Nasal congestion. | |
| 510079 | Nausea. | 17131000 |
| 510080 | Nervousness. | |
| 510081 | Nosebleeds. | |
| 510084 | Palpitations. | |
| 510085 | Paralysis. | |
| 510087 | Pupillary constriction, muscle cramp, excessive salivation. | 17142000 |
| 510088 | Pupillary constriction. | |
| 510089 | Red skin. | |
| 510091 | ringing in the ears. | |
| 510093 | See Effects of long-term or repeated exposure. Indication: Apply when there is no acute hazard but significant amount of chronic hazard (e.g. carcinogenicity). | 17146000 |
| 510094 | See Ingestion. Indication: “See ...” (510094) is used when there is no symptoms; “Further see ...” (510047) is used after a few symptoms | 17147000 |
| 510095 | See Notes. | 17149000 |
| 510097 | Shock. | |
| 510098 | Shortness of breath. Indication: 530004 H314 (H335) EUH071 | 17133000 |
| 510100 | Slowing of heart rate. | |
| 510101 | Slurred speech. | |
| 510102 | Sneezing. | |
| 510103 | Sore throat. Indication: H335 H314 EUH071 | 17135000 |
| 510104 | Staggering gait. | |
| 510105 | Suffocation. Indication: Apply to gases and vapours that cause suffocation by asphyxiation rather than as an effect of systemic toxicity. | 17130000 |
| 510106 | Sweating. | |

| 51 Inhalation – symptoms | | |
|---------------------------------|---|-------------|
| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
| 510107 | Sweet taste in the mouth. | |
| 510108 | Symptoms may be delayed. Indication: Only to be used in special cases; use NOTES for further information Links: (870025) | 17145000 |
| 510109 | Tingling sensation. | |
| 510113 | Tremor. | 17140000 |
| 510114 | Unconsciousness. Indication: H336 | 17137000 |
| 510115 | Visual disturbances. | |
| 510116 | Vomiting. | 17139000 |
| 510117 | Weak and irregular pulse. | |
| 510118 | Weakness. | 17141000 |
| 510119 | Wheezing. | 17143000 |
| 510121 | Frequent, sudden and painful urination. | |
| 510122 | Red urine. | |
| 510123 | Hemoglobinuria. | |
| 510126 | Burning sensation behind the breastbone. Explanation: A burning sensation behind the breastbone is caused by irritation or corrosion of the tissues of the upper respiratory tract. Indication: Use for gases, vapours, mists and aerosols that are irritant or corrosive to mucous membranes | 17111010 |
| 510127 | Nasal discharge. | |
| 510128 | Loss of smell. | |
| 510129 | Loss of speech. | |
| 510130 | Coughing up blood. | |
| 510131 | Bleeding under the skin. | |
| 510132 | Heart palpitations. | |
| 510133 | Burning sensation in the throat and chest. | |
| 510134 | Ataxia | |
| 510135 | Respiratory and cardiac arrest. | |
| 510136 | Cyanosis | |
| 510137 | No acute symptoms expected. Explanation: Use fo chemicals where the physico-chemical and/or toxicological data indicate that symptoms are unlikely by this route. Links: (560020) | 17102000 |

Disallowed sentences in Inhalation – Symptoms

| 51 Inhalation – Symptoms | | |
|---------------------------------|---|-------------------|
| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
| 510125 | Symptoms may be delayed. Motivation: Sentence already exists: use 510108 instead. | <i>disallowed</i> |

| 52 Inhalation – prevention | | |
|-----------------------------------|--|-------------|
| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
| 520000 | Inhalation – prevention Explanation: Recommendations for the prevention of inhalation of noxious substances are highly dependant on the circumstances under which the substance is used, including its physical state and form. Therefore only general recommendations are given. | 17200000 |

| 52 Inhalation – prevention | | |
|----------------------------|---|-------------|
| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
| | <p>Indication: Do NOT use combinations of the 520000 series; use 'breathing protection' or 'closed system and ventilation' (P1 520002) only in special cases, see indications. If the 520000 phrases are not applicable, then use a free phrase. Sometimes there is no inhalation risk whatever, for instance if the RIR < 1 or when dealing with solids (b.p. >= 350°C) in lumps. In these cases no phrase is used.</p> | |
| 520001 | <p>Avoid inhalation of [P1], and].</p> <p>Parameters: 6 parameters: P1: aerosol; dust; fine dust; fumes; mist; vapour</p> | 17202000 |
| 520001 | <p>P1 dust</p> <p>Indication: Use for substances that produce insoluble, inhalable nuisance dust.</p> | 1720210 |
| 520002 | <p>Use [P1], and].</p> <p>Indication: Select the proper parameter for inhalation prevention according to the substance and the Indications.</p> <p>Parameters: 6 parameters: P1: breathing protection; breathing protection when handling molten form; closed system; local exhaust; ventilation; ventilation (not if powder)</p> | |
| 520002 | <p>P1 breathing protection</p> <p>Indication: Normally this phrase should NOT be used. The application should be a Peer-Review decision based on arguments presented by the compiler. Do NOT use combinations of the 520000 series. If not applicable, use a free phrase.</p> | 17211000 |
| 520002 | <p>P1 ventilation</p> <p>Explanation: This applies to liquids or solids that do not in general carry serious risks when their vapour is inhaled, i.e. substances for which the OEL will not be exceeded under normal operating conditions.</p> <p>Indication: Applies if the RIR < 12 and the substance is not a powder. If no applicable, use a free phrase. Sometimes there is no inhalation risk whatever, for instance if the RIR < 1 or when dealing with solids (b.p. => 350 °C) in lumps. In these cases no phrase is used.</p> | 1720210 |
| 520002 | <p>P1 ventilation (not if powder)</p> <p>Explanation: This applies to solids that do not in general carry serious risks when inhaled, i.e. substances for which the OEL will not be exceeded under normal operating conditions. The addition '(not if powder)' is used if the substance also comes as a powder, that easily could be scattered by air streams caused by a ventilation system. As the inhalation of a powdered substance, even when of relatively low toxicity, should be prevented, ventilation should not be used in those cases.</p> <p>Indication: Applies if the RIR < 12 and exposure to a substance as a powder. If no applicable, use a free phrase. Sometimes there is no inhalation risk whatever, for instance if the RIR < 1 or when dealing with solids (b.p. => 350 °C) in lumps. In these cases no phrase is used.</p> | 17203000 |
| 520005 | Use appropriate engineering controls. | |
| 520007 | <p>Use [[P1], and].</p> <p>Parameters: 4 parameters: P1: breathing protection; closed system; local exhaust; ventilation</p> | |
| 520007 | <p>P1 breathing protection</p> <p>Indication: Normally this phrase should NOT be used. The application should be a Peer-Review decision based on arguments presented by the compiler. Do NOT use combinations of the 520000 series. If not applicable, use a free phrase.</p> | 17211000 |
| 520007 | <p>P1 ventilation</p> <p>Explanation: This applies to liquids or solids that do not in general carry serious risks when their vapour is inhaled, i.e. substances for which the OEL will not be exceeded under normal operating conditions.</p> <p>Indication: Applies if the RIR < 12 and the substance is not a powder. If no applicable, use a free phrase. Sometimes there is no inhalation risk whatever, for instance if the RIR < 1 or when dealing with solids (b.p. => 350 °C) in lumps. In these cases no phrase is used.</p> | 17201000 |

| 53 Inhalation - First Aid | | |
|---------------------------|--|-------------|
| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
| 530001 | Administration of oxygen may be needed. | |
| 530002 | Artificial respiration may be needed. Explanation: This applies to serious cases where the patient has stopped breathing altogether or nearly altogether. Artificial respiration is also indicated in cases of acute laboured breathing with a risk of suffocation. In many cases where the ICSC recommends artificial respiration, an obvious first choice would be to administer oxygen, but this form of treatment has been left out deliberately. The administration of oxygen, if carried out improperly, is sometimes more harmful than beneficial to the patient. It should therefore be administered exclusively by specially trained first aid and medical personnel or doctors. It is useful to have oxygen resuscitation apparatus available near to sites where the risk is high and where on-the-spot treatment could be given by properly qualified first aid personnel. Indication: Applies when, based on collective information on the chemical and symptoms, respiratory distress might be expected. If an oxygen apparatus should be available when handling the concerning substance, then also use 871422. EUH071 | 17305000 |
| 530003 | Fresh air, rest. Indication: This applies to all cases where the inhalation of a substance has given rise to complaints or symptoms. H335 H336 | 17301000 |
| 530004 | Half-upright position. Explanation: This is important in those cases where inhalation of a severely irritating or a corrosive substance has led to shortness of breath or which is likely to cause lung oedema. This position is often the most comfortable for the patient. Indication: Apply to substances likely to cause lung oedema. EUH071 | 17303000 |
| 530005 | No mouth-to-mouth artificial respiration. Indication: Use when the substance involved could be found at toxic levels in the exhaled air of the victim. Use only in rare cases, such as for cyanides. | 17306000 |
| 530006 | Seek medical attention if you feel unwell. Indication: Consider the use of this phrase if no symptoms can be listed because of lack of data but the substance is classified in GHS as Acute Toxicity categories 1-4, or as having Specific Target Organ Systemic Toxicity from single or repeated exposure. The use of this phrase is a peer-review decision. H330 H331 H332 (H335) (H333) | 17309020 |
| 530007 | Refer for medical attention. Explanation: 1/ Treat the patient by observation and supportive measures as indicated by his/her condition. 2/ If the services of a Medical Officer or a Medical Doctor are readily available, the patient should be placed in his/her care and a copy of the ICSC should be provided. Further action will be the responsibility of the Medical Specialist. 3/ If medical attention is not available on the work site or in the near surroundings, send the patient to a hospital, together with a copy of the ICSC. 4/ When there are no toxicity data about a substance, it may be advisable for someone who has definitely been exposed to have a period of medical observation in case toxic effects develop. It is preferable for this advice to appear in this section rather than in Notes. Indication: Use the phrase if the substance has acute toxicity by inhalation (GHS criteria III). Also consider using this phrase when there is no information about the toxicity of the substance concerned, however, other available data suggest that the substance may be toxic e.g. similar compounds, structure-activity relationship data. This a peer-review decision. EUH071 H330 H331 H332 H333 | 17309000 |
| 530008 | Refer immediately for medical attention. Indication: Use this phrase if the substance has acute toxicity by inhalation (GHS criteria I or II). H330 (H331) EUH071 | 17309010 |

53 Inhalation - First Aid

| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
|--------|---|-------------|
| 530009 | See Notes. | 17313000 |
| 530011 | Fresh air. | |

Skin

| 54 Skin – symptoms | | |
|--------------------|---|----------------------|
| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
| 540000 | <p>Skin – symptoms</p> <p>Explanation: A substance may produce acute symptoms when it comes in contact with the skin. Where a substance may be absorbed by the skin, consideration must be given to whether or not this constitutes an acute physical hazard. The degree of hazard following skin absorption depends chiefly on: - the permeability of the skin; - the duration of exposure; - the concentration of the substance; - the nature of the substance; and - the properties of the solvent, if used. Absorption may occur without visible symptoms! The symptoms on the ICSC are mentioned as far as possible in sequence of occurrence on increasing exposure. However, personal sensitivity and/or other influences may cause symptoms to appear in a different order. For each routes of exposure (inhalation, skin, eyes, and ingestion), a brief survey is given of the principal perceptible symptoms (signs) which may result when contact with the substance exceeds a certain degree. Only symptoms due to an acute exposure to the substance are mentioned.</p> <p>Indication: Do NOT mention more than 8 symptoms in each subsection. In general only symptoms from human experience should be mentioned. Symptoms established in animal tests should only be mentioned if they are important to the reader and possible (in the professional judgement of the compiler) in humans; application of the symptoms has to be peer-reviewed. List symptoms in sequence, if appropriate. This sequence should be based on the occurrence of the symptoms on increasing exposure. Use an alphabetical order if an occurrence sequence can not be given. Systemic symptoms should be mentioned in the subsection on the route of exposure. Example: a possible symptom of ingestion of thallium is 'loss of vision'. This should be mentioned in subsection 'Ingestion', NOT in 'Eyes'.</p> | 18100000 |
| 540001 | <p>Further see Inhalation.</p> <p>Indication: Only use when other symptoms are selected here.</p> | 18123010 |
| 540002 | <p>See Ingestion.</p> <p>Indication: Only use if no symptoms are selected here. Use for chemicals that are also absorbed through the skin causing systemic effects.</p> | 18123020 |
| 540003 | <p>See Inhalation.</p> <p>Indication: Only use if no symptoms are selected here.</p> | 18123000 |
| 540004 | See Notes. | |
| 540005 | <p>See EFFECTS OF LONG-TERM OR REPEATED EXPOSURE.</p> <p>Indication: Apply when there is no acute hazard but significant amount of chronic hazard (e.g. carcinogenicity).</p> | 18126000 |
| 540007 | Delayed skin burns. | |
| 540008 | <p>Blisters.</p> <p>Indication: Applies not only to substances that produce effect similar to thermal burns, but also to vesicants such as CS₂, some chemical warfare agents and some allergens that do not produce pain and/or reddening. H314 (H315)</p> | 18117000 |
| 540009 | Blue lips, fingernails and skin. | 18118000 18119000 |
| 540011 | <p>Burning sensation.</p> <p>Indication: H314 (H315)</p> | 18111000 |
| 540013 | Collapse. | |
| 540014 | Unconsciousness. | |
| 540015 | Convulsions. | |
| 540019 | Symptoms may be delayed. | |
| 540020 | <p>Dry skin.</p> <p>Indication: Apply to substances which may defat the skin.</p> | 18105000 |
| 540021 | <p>EASILY ABSORBED!</p> <p>Indication: Select if the skin absorption is the principal route of exposure.</p> | 18102000 |
| 540024 | Itching. | |

| 54 Skin – symptoms | | |
|---------------------------|---|--------------------|
| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
| 540026 | MAY BE ABSORBED! Indication: Applies if absorption (700004 - P1 through the skin and inhalation or through the skin) is to be regarded as an acute hazard in peer-review; if the substance meets the criteria of dermal acute toxicity category 1 or 2 in GHS (dermal LD50<200 mg/kg, fatal/toxic in contact with skin) OR if it has serious long term systematic effects (cancer, reproductive toxicity) and has been shown to pass through skin in significant amounts. The decision to use this phrase is taken by peer-review Committee. H310 (H311) Links: (870025) | 18103000 |
| 540029 | Muscle twitching. | 18120000 |
| 540031 | Numbness. | |
| 540032 | ON CONTACT WITH LIQUID: FROSTBITE. Indication: Applies if a compressed liquefied gas or liquid with a boiling point < 20°C. H281 Links: 550001 560006 | 18125000 |
| 540034 | Pain. Indication: Pain' is rarely combined with 'redness' alone. H314 (H315) | 18113000 |
| 540036 | Pupillary constriction. | |
| 540037 | Rash. | |
| 540038 | Redness. Indication: (540034) H314 H315 H316 | 18107000 |
| 540040 | Roughness. | |
| 540041 | Frostbite. Indication: Applies if a liquefied gas stored under atmospheric pressure (cryogenic). H281 Links: 550001 560006 | 18109000 |
| 540042 | Serious skin burns. Indication: Use for substances with GHS skin corrosion classification 1A to 1B. H314 | |
| 540043 | Skin burns. Indication: Use for substances with GHS skin corrosion classification 1A to 1C. May be completed with 'serious'. H314 | 18110000 |
| 540044 | Skin discoloration. | |
| 540047 | Swelling. | |
| 540050 | Tingling sensation. | |
| 540052 | Transient white spots. | |
| 540053 | Yellow staining of the skin. | |
| 540055 | Transient skin flushing. | |
| 540056 | Severe itching. | |
| 540057 | No acute symptoms expected. | |
| 540058 | ON CONTACT WITH GAS OR DRY ICE: FROSTBITE. | |
| 540059 | ON CONTACT WITH GAS: FROSTBITE. | |
| 540060 | Further see Ingestion. | |

| 55 Skin – prevention | | |
|-----------------------------|--|--------------------|
| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
| 550001 | Cold-insulating gloves. Explanation: These are recommended for prevention of frostbite in the handling of cold substances (e.g., compressed liquefied gases or liquids whose boiling point is below 0°C). If the | 18203000 |

| 55 Skin – prevention | | |
|----------------------|---|-------------|
| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
| | <p>substance can penetrate through the skin or damage it, a combination must be found with a rubber or plastic glove material which is sufficiently resistant to the substance.</p> <p>Indication: Use this phrase for:</p> <ul style="list-style-type: none"> - liquids with a temperature < -30°C; - liquids with a boiling point < 20°C; or - liquefied gases in cylinders (660098). | |
| 550002 | <p>Heat-insulating gloves when handling molten form.</p> <p>Explanation: These are recommended for prevention of burns in the handling of substances often handled at elevated temperature (e.g., molten sulfur). If the substance can penetrate through the skin or damage it, a combination must be found with a rubber or plastic glove material which is sufficiently resistant to the substance.</p> <p>Indication: Use this phrase for liquids frequently handled at a temperature > 50°C.</p> | 18205000 |
| 550004 | <p>Protective clothing.</p> <p>Explanation: The aim should be to adjust the working conditions so that normal working clothes, i.e., overalls with suitable gloves and boots, can be worn. In practice, however, this will not always be possible. The use of protective clothing is recommended when even occasional contact with a substance through the normal working clothes can have serious consequences. The safety officer should decide whether working conditions require the wearing of protective clothing and, if so, the type to be worn. Also see the Guidelines for Selection of Chemical Protective Clothing, published by the American Conference of Governmental Industrial Hygienists (ACGIH), Cincinnati (USA). N.B.: Trousers should be worn over boots, not tucked in.</p> <p>Indication: Applies to the following substances:</p> <ul style="list-style-type: none"> - liquids which cause skin burns, such as strong oxidants and concentrated strong acids and bases; - substances which may cause sensitization; or - substances whose absorption through the skin involves hazards. | 18207000 |
| 550006 | <p>Protective gloves.</p> <p>Explanation: In general it is necessary to use protective gloves when handling chemicals. With only a few substances that are physiologically regarded as harmless could one refrain from the use of gloves, provided the contact period is short. Extensive contact with these substances may cause mechanical damage (abrasion, cutting) to the skin; use of industrial gloves made of leather or woven textiles is recommended in these cases. In all other cases such industrial gloves may not protect the skin adequately and should not be used. To prevent injury to and/or absorption through the skin, gloves made of rubber or plastic impermeable to the substance in question should be used. For some chemicals however, a glove material that offers adequate protection is not yet available; such substances must therefore be handled only in effectively protected equipment (i.e., closed). As regards the choice of the glove material, the safety officer should be asked for advice. Refer also to special publications, e.g., Guidelines for Selection of Chemical Protective Clothing, published by the American Conference of Governmental Industrial Hygienists (ACGIH), Cincinnati (USA).</p> <p>Indication: Applies to all substances with the exception of:</p> <ul style="list-style-type: none"> - solid substances which can be regarded as physiologically inert; - liquids frequently handled at a temperature > 50°C; - liquids frequently handled at a temperature < -30°C; - liquids with a boiling point < 20°C; or - liquefied gases in cylinders (660098). | 18201000 |
| 550007 | See Notes. | |
| 550008 | Apron. | 18207200 |
| 550009 | Overalls. | 18207400 |
| 550010 | Barrier cream. | |

| 56 Skin - First Aid | | |
|---------------------|---|-------------|
| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
| 560001 | <p>See Notes.</p> <p>Explanation: Refers to the need to isolate contaminated clothing, which can be a source of secondary exposure to first aiders and medical staff.</p> <p>Indication: Use for chemicals that are harmful or toxic on skin contact or that produce toxic vapour (GHS Acute Toxicity categories 1-3; skin notation in OELs). Use also for chemicals that are corrosive to skin (GHS skin corrosion category 1), or that are respiratory or skin sensitizers by GHS definitions</p> <p>Links: 870044</p> | 18301020 |
| 560002 | Apply calcium gluconate to the burn areas. | |
| 560003 | <p>First rinse with plenty of water for at least 15 minutes, then remove contaminated clothes and rinse again.</p> <p>Explanation: When the skin and clothing are heavily contaminated with strong oxidants or with strong reducing agents, or highly flammable substances, the clothes could catch fire. In those cases it is preferable to rinse first with water or have a shower and only then remove contaminated clothes.</p> <p>Indication: For gases or liquids with flash point < 60°C, spontaneously flammable solids (such as organic peroxides) or which may readily catch fire after brief contact with a source of ignition and which continue to burn after the removal of the source of ignition. Applies if 680042 + P1 'a strong oxidant' or P1 'a strong reducing agent' is used. H250 (H224 H251 H270 H271)</p> | 18307010 |
| 560004 | <p>Refer immediately for medical attention.</p> <p>Indication: Use the phrase if the substance has dermal acute toxicity (GHS criteria I or II), if the substance is corrosive to the skin (GHS skin corrosion/irritation 1A to 1C). Use for refrigerated liquefied gases. H310 H311 (H312) H314 H281</p> | 18315010 |
| 560006 | <p>ON FROSTBITE: rinse with plenty of water, do NOT remove clothes.</p> <p>Explanation: In case of frostbite, do not remove clothing because of the increased risk of infection when blisters burst. Obviously, the contaminated clothes and skin must be rinsed with plenty of water.</p> <p>Indication: Applies to substances that cause frostbite, i.e. if 720092 or 720107 is used. H281</p> | 18303000 |
| 560008 | <p>Refer [P1] for medical attention [P2].</p> <p>Explanation: 1/ Treat the patient by observation and supportive measures as indicated by his/her condition. 2/ If the services of a Medical Officer or a Medical Doctor are readily available, the patient should be placed in his/her care and a copy of the ICSC should be provided. Further action will be the responsibility of the Medical Specialist. 3/ If medical attention is not available on the work site or in the near surroundings, send the patient to a hospital, together with a copy of the ICSC. 4/ When there are no toxicity data about a substance, it may be advisable for someone who has definitely been exposed to have a period of medical observation in case toxic effects develop. It is preferable for this advice to appear in this section rather than in Notes.</p> <p>Indication: Use the phrase if the substance has dermal acute toxicity (GHS criteria III). Also, consider using this phrase when there is no information about the toxicity of the substance concerned, however other available data suggest that the substance may be toxic e.g. similar compounds, structure-activity relationship data. This is a peer-review decision.</p> <p>Parameters: 2 parameters: P1: immediately; P2: if skin irritation occurs</p> | 18315000 |
| 560008 | <p>P1 immediately</p> <p>Indication: Use the phrase if the substance has dermal acute toxicity (GHS criteria I or II), if the substance is corrosive to the skin (GHS skin corrosion/irritation 1A to 1C). Use for refrigerated liquefied gases. H310 H311 (H312) H314 H281</p> | 18315010 |

| 56 Skin - First Aid | | |
|---------------------|---|-------------|
| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
| 560008 | <p>P2 if skin irritation occurs</p> <p>Indication: Use the phrase if GHS criteria for skin corrosion/irritation 2 or 3 apply. H315 H316</p> | 18135020 |
| 560010 | <p>Remove contaminated clothes.</p> <p>Explanation: Usually it makes sense to take off contaminated clothes and shoes as soon as possible to avoid further contact between them and the skin. It is better, however, to start with a rinse or a shower and to take off clothing during this treatment.</p> <p>Indication: Apply when criteria for GHS corrosive for skin (Category 1) is met (H314), substances which have a skin notation in OELs or which are absorbed through the skin in harmful quantities according to literature references (LD50 dermal <= 2000 mg/kg by weight) H310 H311 H312. Apply when repeated or prolonged contact may cause skin sensitization (H317). Do not apply in case of thermal burning or frostbite because of the increased risk of infection when blisters burst. H281 (H314) NB Use 560003 for gases or liquids with flash point between 0 and 61°C, spontaneously flammable solids (such as organic peroxides) or which may readily catch fire after brief contact with a source of ignition and which continue to burn after the removal of the source of ignition. H250 H260 (H224 H251 H261 H270 H271) Consider to combine with 560011, 560013 or 18313</p> | 18301000 |
| 560011 | <p>Rinse and then wash skin with water and soap.</p> <p>Explanation: This means active, thorough cleaning of the skin; 560013 applies for passive cleaning of the skin with water only. Do not wash if the skin is damaged or likely to be damaged.</p> | 18309000 |
| 560013 | <p>Rinse skin with plenty of water or shower.</p> <p>Explanation: This means the passive cleaning of the skin with water only; 560011 applies for active, thorough cleaning of the skin. Do not wash if the skin is damaged or likely to be damaged.</p> <p>Indication: Use with 18311010 if appropriate. H314 H315 H316</p> | 18311000 |
| 560015 | To remove substance use polyethylene glycol 300 or vegetable oil. | |
| 560016 | Use radiation detector to ensure no remaining contamination. | |
| 560017 | <p>Wear protective gloves when administering first aid.</p> <p>Explanation: The process of rendering first aid can lead to the first-aider being exposed to the chemical concerned. In the case of chemicals that are toxic by skin exposure the first aider should wear protective gloves to limit their own skin exposure.</p> <p>Indication: Use for chemicals that are harmful or toxic on skin contact (GHS Acute Toxicity categories 1-3; skin notation in OELs). Use also for chemicals that are corrosive to skin (GHS skin corrosion category 1), or that are respiratory or skin sensitizers by GHS definitions. H310 H311 H314 H317</p> <p>Links: (870044)</p> | 18317000 |
| 560020 | <p>Seek medical attention if you feel unwell.</p> <p>Indication: Consider the use of this phrase if no symptoms can be listed because of lack of data but the substance is classified in GHS as acute toxicity categories 1-4, or as having Specific Target Organ Systemic Toxicity from single or repeated exposure. The use of this phrase is a peer-review decision. H312 H313</p> | 18315030 |
| 560021 | <p>Rinse skin with plenty of water or shower for at least 15 minutes.</p> <p>Indication: Use for chemicals with GHS corrosive category 1A to C. H314</p> | 18311010 |
| 560022 | To remove substance use polyethylene glycol 400 or vegetable oil. | |
| 560023 | Rinse contaminated clothes (fire hazard) with plenty of water. | |
| 560024 | Administration of oxygen may be needed. | |

Disallowed sentences in Skin - First Aid

| 51 Skin - First Aid | | |
|----------------------------|---|--------------------|
| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
| 560014 | Rinse with plenty of water, do NOT remove clothes. Motivation: Unknown. PR decision 2008. | <i>disallowed</i> |
| 560018 | Put clothes in sealable container. Motivation: Unknown. PR decision 2009 | <i>disallowed</i> |

Eyes

| 57 Eyes – Symptoms | | |
|--------------------|---|-------------|
| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
| 570000 | Eyes – Symptoms Explanation: The acute symptoms resulting from contact of the substance with the eyes are described. If absorption of the vapour of the substance is possible, this will also be mentioned. Indication: List the symptoms in sequence, if appropriate. The sequence should be based on occurrence of the symptoms on increasing exposure to the substance. | |
| 570001 | Further see Inhalation. | |
| 570002 | See Inhalation. | |
| 570003 | See Skin. | |
| 570004 | See Ingestion. | |
| 570005 | Blue haze and halo. | |
| 570006 | Blurred vision. Indication: Blurred vision may be caused by direct contact with chemicals that may damage the cornea. NB: this phrase should not be used when blurred vision is a consequence of systemic toxicity (see other routes of exposure). | 19113000 |
| 570008 | Burning sensation. | |
| 570009 | Burns. Indication: H314 (H318) H319 | 19116000 |
| 570010 | Watering of the eyes. Explanation: Some substances, known as lachrymators, cause the eyes to water. Indication: Apply to typical lachrymators, i.e. gases or liquids of which the vapours induce lachrymation NOT due to ordinary irritation of the eyes. | 19104000 |
| 570011 | Conjunctivitis. | |
| 570012 | Corneal damage. | |
| 570016 | Further see Skin. | |
| 570018 | Itching. | |
| 570021 | Loss of vision. | 19115000 |
| 570022 | MAY BE ABSORBED! | |
| 570026 | ON CONTACT WITH LIQUID: FROSTBITE. | |
| 570027 | Pain. Indication: H314 H318 H319 (H320) | 19109000 |
| 570029 | Partial loss of vision. | |
| 570030 | Photophobia. | |
| 570031 | Superficial corneal damage. | |
| 570032 | Pupillary constriction. | |
| 570033 | Redness. Indication: H314 H318 H319 H320 Links: (570027) | 19107000 |
| 570036 | Stinging sensation. | |
| 570037 | Swelling of the eyelids. | |
| 570040 | Yellow vision. | |
| 570041 | Brown staining. | |
| 570042 | Temporary loss of vision. | 19115010 |
| 570043 | Permanent loss of vision. | 19115020 |
| 570044 | VAPOUR WILL BE ABSORBED! Indication: Should be used if absorption by the eyes causes a special hazard. | 19103000 |
| 570046 | Severe burns. Indication: H314 | 19117500 |
| 570047 | Spasms, photophobia and dilated pupils. | |

57 Eyes – Symptoms

| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
|--------|---|-------------|
| 570048 | No acute symptoms expected. | |
| 570049 | ON CONTACT WITH GAS: FROSTBITE. | |
| 570050 | Dryness of eyes. | |

Disallowed sentences in Eyes – Symptoms**57 Eyes – Symptoms**

| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
|--------|---|-------------------|
| 570035 | Severe deep burns. Motivation: Unknown. PR decision 2007. | <i>disallowed</i> |

58 Eyes – prevention

| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
|--------|---|-------------|
| 580000 | Eyes – prevention Explanation: The type of eye protection to be used depends on both the substance to which one is exposed and on the work situation. More than one means of protection is sometimes mentioned. Contact lenses in general give no protection to the eyes in industrial situations. The recommendations on eye protection are the same whether or not contact lenses are worn. Contact lenses can cause extra risks; it is better to not use them at all but to wear safety spectacles with correcting lenses instead. | |
| 580002 | Wear [P1], or]. Parameters: 4 parameters: P1: face shield; safety goggles; safety goggles (if molten); safety spectacles | |
| 580002 | P1 face shield Explanation: To be used for liquid or non-dusting solid substances that are dangerous to both eyes and skin. The type of eye protection to be used depends on both the substance to which one is exposed and on the work situation. More than one means of protection is sometimes mentioned. Contact lenses in general give no protection to the eyes in industrial situations. The recommendations on eye protection are the same whether or not contact lenses are worn. Contact lenses can cause extra risks; it is better to not use them at all but to wear safety spectacles with correcting lenses instead. N.B.: A face shield affords inadequate protection in situations where liquid droplets can splash up from below, for instance, when an object drops into a drum filled with the liquid. Indication: Applies if the substance is corrosive to skin (see 720100 or its alternatives), or if an acute absorption hazard (540026), or if 400002 (liquefied gas) was used. This phrase can be combined with 'safety spectacles' or 'safety goggles' by starting it with 'or'; without 'or' it can also be applied either alone or in combination with 'eye protection'. | 19205000 |
| 580002 | P1 safety goggles Explanation: To be used for liquid and solid substances including fine powders that may endanger the eyes, but present little danger to the (facial) skin upon occasional contact. The type of eye protection to be used depends on both the substance to which one is exposed and on the work situation. More than one means of protection is sometimes mentioned. Contact lenses in general give no protection to the eyes in industrial situations. The recommendations on eye protection are the same whether or not contact lenses are worn. Contact lenses can cause extra risks; it is better to not use them at all but to wear safety spectacles with correcting lenses instead. Indication: Applies if the substance is corrosive to the eyes but not to the skin (see 720100 and its alternatives), or if the substance occurs as a powder and is a nuisance to the eyes. This phrase can be combined with 'face shield' or 'eye protection'. | 19203000 |
| 580002 | P1 safety spectacles Explanation: To be used for protection against liquid and/or solid substances that present little danger to eyes and skin upon occasional contact (apart from mechanical danger). The type with side shields is preferable. Attention should be given to the resistance of the | 19201000 |

| 58 Eyes – prevention | | |
|----------------------|--|-------------|
| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
| | <p>materials of the spectacles to the substances which are to be handled. This applies also to other means of eye protection. The type of eye protection to be used depends on both the substance to which one is exposed and on the work situation. More than one means of protection is sometimes mentioned. Contact lenses in general give no protection to the eyes in industrial situations. The recommendations on eye protection are the same whether or not contact lenses are worn. Contact lenses can cause extra risks; it is better to not use them at all but to wear safety spectacles with correcting lenses instead.</p> <p>Indication: This phrase can be combined with 'face shield' or 'eye protection'. This phrase should be applied to all substances that do not require more complete means of protection. Exceptions: - solids which cannot easily be dispersed, e.g., pastes; or - gases in cylinders which are in themselves not dangerous to the eyes.</p> | |
| 580003 | <p>Wear [P1], [or] in combination with breathing protection.</p> <p>Parameters: 5 parameters: P1: eye protection; face shield; safety goggles; safety goggles (if molten); safety spectacles</p> | |
| 580003 | <p>P1 eye protection</p> <p>Explanation: Depending on the work situation, this alternative to any of the preceding means of eye protection has to be used for substances that are both dangerous to the eyes AND: - involve a great risk of inhalation of a harmful vapour concentration; - inhalation of which in the form of a finely dispersed powder, such as in the event of dusting, should definitely be avoided; or - must on no account be allowed to come into contact with the skin. The combination may consist of: - a fresh-air hood; - a full-face respirator with either fresh-air supply or filter of the right class (powders) or type (vapours); - a fresh-air helmet (for some solids only).</p> <p>Indication: This phrase should be used for gases or liquids. Applies if the RIR > 4000 and any skin contact should be avoided; or inhalation of powder from the substance is not allowable, and any skin contact should be avoided.</p> | 19207000 |
| 580003 | <p>P1 face shield</p> <p>Explanation: To be used for liquid or non-dusting solid substances that are dangerous to both eyes and skin. The type of eye protection to be used depends on both the substance to which one is exposed and on the work situation. More than one means of protection is sometimes mentioned. Contact lenses in general give no protection to the eyes in industrial situations. The recommendations on eye protection are the same whether or not contact lenses are worn. Contact lenses can cause extra risks; it is better to not use them at all but to wear safety spectacles with correcting lenses instead. N.B.: A face shield affords inadequate protection in situations where liquid droplets can splash up from below, for instance, when an object drops into a drum filled with the liquid.</p> <p>Indication: Applies if the substance is corrosive to skin (see 720100 or its alternatives), or if an acute absorption hazard (540026), or if 400002 (liquefied gas) was used. This phrase can be combined with 'safety spectacles' or 'safety goggles' by starting it with 'or'; without 'or' it can also be applied either alone or in combination with 'eye protection'.</p> | 19205000 |
| 580003 | <p>P1 safety goggles</p> <p>Explanation: To be used for liquid and solid substances including fine powders that may endanger the eyes, but present little danger to the (facial) skin upon occasional contact. The type of eye protection to be used depends on both the substance to which one is exposed and on the work situation. More than one means of protection is sometimes mentioned. Contact lenses in general give no protection to the eyes in industrial situations. The recommendations on eye protection are the same whether or not contact lenses are worn. Contact lenses can cause extra risks; it is better to not use them at all but to wear safety spectacles with correcting lenses instead.</p> <p>Indication: Applies if the substance is corrosive to the eyes but not to the skin (see 720100 and its alternatives), or if the substance occurs as a powder and is a nuisance to the eyes. This phrase can be combined with 'face shield' or 'eye protection'.</p> | 19203000 |
| 580003 | <p>P1 safety spectacles</p> | 19201000 |

| 58 Eyes – prevention | | |
|----------------------|---|-------------|
| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
| | <p>Explanation: To be used for protection against liquid and/or solid substances that present little danger to eyes and skin upon occasional contact (apart from mechanical danger). The type with side shields is preferable. Attention should be given to the resistance of the materials of the spectacles to the substances which are to be handled. This applies also to other means of eye protection. The type of eye protection to be used depends on both the substance to which one is exposed and on the work situation. More than one means of protection is sometimes mentioned. Contact lenses in general give no protection to the eyes in industrial situations. The recommendations on eye protection are the same whether or not contact lenses are worn. Contact lenses can cause extra risks; it is better to not use them at all but to wear safety spectacles with correcting lenses instead.</p> <p>Indication: This phrase can be combined with 'face shield' or 'eye protection'. This phrase should be applied to all substances that do not require more complete means of protection. Exceptions: - solids which cannot easily be dispersed, e.g., pastes; or - gases in cylinders which are in themselves not dangerous to the eyes.</p> | |
| 580004 | <p>Wear [P1], [or] in combination with breathing protection if powder.</p> <p>Parameters: 5 parameters: P1: eye protection; face shield; safety goggles; safety goggles (if molten); safety spectacles</p> | |
| 580004 | <p>P1 eye protection</p> <p>Indication: This phrase should be used for solids which may come as a powder. Applies if RIR > 4000, and any skincontact should be avoided; or inhalation of powder from the substance is notallowable, and any skin contact should be avoided.</p> | 19209000 |
| 580004 | <p>P1 face shield</p> <p>Explanation: To be used for liquid or non-dusting solid substances that are dangerous to both eyes and skin. The type of eye protection to be used depends on both the substance to which one is exposed and on the work situation. More than one means of protection is sometimes mentioned. Contact lenses in general give no protection to the eyes in industrial situations. The recommendations on eye protection are the same whether or not contact lenses are worn. Contact lenses can cause extra risks; it is better to not use them at all but to wear safety spectacles with correcting lenses instead. N.B.: A face shield affords inadequate protection in situations where liquid droplets can splash up from below, for instance, when an object drops into a drum filled with the liquid.</p> <p>Indication: Applies if the substance is corrosive to skin (see 720100 or its alternatives), or if an acute absorption hazard (540026), or if 400002 (liquefied gas) was used. This phrase can be combined with 'safety spectacles' or 'safety goggles' by starting it with 'or'; without 'or' it can also be applied either alone or in combination with 'eye protection'.</p> | 19205000 |
| 580004 | <p>P1 safety goggles</p> <p>Explanation: To be used for liquid and solid substances including fine powders that may endanger the eyes, but present little danger to the (facial) skin upon occasional contact. The type of eye protection to be used depends on both the substance to which one is exposed and on the work situation. More than one means of protection is sometimes mentioned. Contact lenses in general give no protection to the eyes in industrial situations. The recommendations on eye protection are the same whether or not contact lenses are worn. Contact lenses can cause extra risks; it is better to not use them at all but to wear safety spectacles with correcting lenses instead.</p> <p>Indication: Applies if the substance is corrosive to the eyes but not to the skin (see 720100 and its alternatives), or if the substance occurs as a powder and is a nuisance to the eyes. This phrase can be combined with 'face shield' or 'eye protection'.</p> | 19203000 |
| 580004 | <p>P1 safety spectacles</p> <p>Explanation: To be used for protection against liquid and/or solid substances that present little danger to eyes and skin upon occasional contact (apart from mechanical danger). The type with side shields is preferable. Attention should be given to the resistance of the materials of the spectacles to the substances which are to be handled. This applies also to other means of eye protection. The type of eye protection to be used depends on both the substance to which one is exposed and on the work situation. More than one</p> | 19201000 |

| 58 Eyes – prevention | | |
|-----------------------------|---|--------------------|
| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
| | <p>means of protection is sometimes mentioned. Contact lenses in general give no protection to the eyes in industrial situations. The recommendations on eye protection are the same whether or not contact lenses are worn. Contact lenses can cause extra risks; it is better to not use them at all but to wear safety spectacles with correcting lenses instead.</p> <p>Indication: This phrase can be combined with 'face shield' or 'eye protection'. This phrase should be applied to all substances that do not require more complete means of protection.</p> <p>Exceptions:</p> <ul style="list-style-type: none"> - solids which cannot easily be dispersed, e.g., pastes; or - gases in cylinders which are in themselves not dangerous to the eyes. | |
| 59 Eyes - First Aid | | |
| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
| 590002 | <p>First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then refer for medical attention.</p> <p>Explanation: Rinse continuously with water, preferably for at least 15 minutes. As a harmful substance could stay under contact lenses, they should be removed but only if they are not sticking to the eyes. Otherwise, extra damage could be done. After rinsing, the victim should see a doctor in all cases, whether for treatment or for a check-up only. He/she should be escorted if indicated.</p> <p>Indication: Apply where symptoms have been listed under eye exposure.</p> | 19301000 |
| 590003 | <p>Refer for medical attention.</p> <p>Indication: Use the phrase if the substance causes eye damage/irritation (GHS eye damage/irritation 2). H318 H319</p> | 19303000 |
| 590004 | Rinse with plenty of water for several minutes (remove contact lenses if easily possible). | |
| 590005 | <p>Refer immediately for medical attention.</p> <p>Indication: Use the phrase if the substance causes eye damage/irritation (GHS eye damage/irritation 1). Also, consider using this phrase when there is no information about the toxicity of the substance concerned, however other available data suggest that the substance may be toxic e.g. similar compounds, structure-activity relationship data. This is a peer-review decision. H318 H310 H330</p> | 19303010 |
| 590007 | <p>Rinse with plenty of water (remove contact lenses if easily possible).</p> <p>Explanation: For some chemicals, there may be no data from animal testing or human case reports from which to derive a list of symptoms. This does not necessarily mean that no harm could result to the eye, for example even inert chemicals may cause physical irritation.</p> <p>Indication: Use when NO symptoms are listed for eye exposure. H320</p> | 19302000 |
| 590008 | ON FROSTBITE: rinse with plenty of water. | |

Ingestion

| 60 Ingestion – Symptoms | | |
|-------------------------|---|-------------|
| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
| 600000 | <p>Ingestion – Symptoms</p> <p>Explanation: Although it can be assumed that nobody will intentionally eat or drink chemicals, symptoms that result from this route of absorption, are listed as far as space permits or the hazard of a substance demands. In this connection, solids or liquids that stick to the skin (hands) or clothes are considered to be particularly dangerous. The symptoms are listed in order of occurrence on increasing exposure. See explanation 480000.</p> <p>Indication: This sub-section should only be used for liquids or solids (not gases) that are toxic or corrosive in relatively small amounts, for instance if:</p> <ul style="list-style-type: none"> - the rat oral LD₅₀ < 2 g/kg, H300 H301 H302 - a strong or medium strong acid/base, - a strong oxidant, - the substance needs a T+, T, Xn, C, or O label conforming to the EC rules; or H314 - other data are known, indicating serious effects on ingestion. <p>Further see ind. 480000.</p> | |
| 600001 | Further see Inhalation. | 20143010 |
| 600002 | See Inhalation. | 20143000 |
| 600003 | See Notes. | 20144000 |
| | <p>Indication: Use when additional information pertaining to symptoms and signs is included in the Notes section, e.g. where symptoms and signs have been documented in case reports of deliberate ingestion but are not considered likely in occupational exposure.</p> <p>Links:</p> | |
| 600004 | Abdominal cramps. | 20103000 |
| 600005 | Abdominal distension. | |
| 600006 | Abdominal pain. | 20105000 |
| 600008 | Incoordination. | |
| 600009 | See Skin | |
| 600010 | Spontaneous bleeding from various sites. | |
| 600012 | Blue lips, fingernails and skin. | 20106+20107 |
| 600014 | Blurred vision. | 20122000 |
| | <p>Indication: Use for chemicals that cause blurred vision as a systemic effect once absorbed, e.g. by causing dilated or constricted pupils.</p> | |
| 600015 | Burning sensation[" P1], and]. | 20109000 |
| | <p>Indication: Complete with location of effect. H314</p> <p>Parameters: 6 parameters: P1: behind the breastbone; in the chest and stomach; in the mouth; in the stomach; in the throat and chest; of the tongue</p> | |
| 600022 | Irregular heartbeat. | |
| 600026 | Confusion. | 20111000 |
| 600027 | Constipation. | 20113000 |
| 600028 | Convulsions. | 20114000 |
| 600030 | Cough. | 20115000 |
| 600031 | Deafness. | |
| 600032 | Death. | |
| 600033 | Delirium. | |
| 600035 | Diarrhoea. | 20117000 |
| 600039 | Dizziness. | 20119000 |
| 600040 | Drowsiness. | 20121000 |
| | <p>Indication: H336</p> | |
| 600041 | Dullness. | 20123000 |
| 600044 | Excessive salivation. | 20140000 |
| | <p>Indication: For OP compounds.</p> | |
| 600045 | Excitation. | |

| 60 Ingestion – Symptoms | | |
|-------------------------|---|-------------|
| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
| 600046 | Fatigue. | |
| 600047 | Fever. | |
| 600048 | Flushing of the face. | |
| 600049 | Hallucinations. | |
| 600050 | Headache. | 20125000 |
| 600051 | Hyperexcitability. | |
| 600052 | Elevated blood pressure. | |
| 600053 | Increased respiratory rate. | |
| 600058 | Irritability. | |
| 600059 | Jaundice. | |
| 600060 | Laboured breathing. | 20127000 |
| 600064 | Fall in blood pressure. | |
| 600065 | Low body temperature. | |
| 600066 | Metallic taste. | |
| 600067 | Muscle cramps. Indication: For OP compounds. | 20140000 |
| 600068 | Muscle paralysis. | |
| 600069 | Muscle stiffness. | |
| 600070 | Muscle twitching. | 20110000 |
| 600071 | Muscle spasms. | |
| 600072 | Muscular fibrillation. | |
| 600073 | Nausea. | 20129000 |
| 600074 | Numbness of tongue and lips. | |
| 600075 | Numbness. | |
| 600076 | Muscle pain. | |
| 600078 | Palpitations. | |
| 600081 | Pupillary constriction. Indication: For OP compounds. | 20140000 |
| 600083 | Increased heart rate. | |
| 600084 | Respiratory arrest. | |
| 600085 | Restlessness. | |
| 600086 | Ringing in the ears. | |
| 600088 | See Effects of long-term or repeated exposure. Indication: Apply when there is no acute hazard but significant amount of chronic hazard (e.g. carcinogenicity). | 20142000 |
| 600090 | Shock or collapse. Indication: H314 | 20130000 |
| 600092 | Shortness of breath. Indication: H314 | 20131000 |
| 600093 | Skin rash. | |
| 600094 | Slow heart rate. | |
| 600096 | Sore throat. | 20133000 |
| 600097 | Sweating. | |
| 600098 | Symptoms may be delayed. | |
| 600099 | Tingling sensation. | |
| 600102 | Tremor. | |
| 600104 | Ulceration in the mouth. | |
| 600105 | Unconsciousness. Indication: H336 | 20135000 |
| 600108 | Vomiting. | 20137000 |
| 600109 | Weakness. | 20139000 |
| 600110 | Red urine. | |
| 600111 | See Effects of short-term exposure | |

| 60 Ingestion – Symptoms | | |
|----------------------------------|---|--------------------|
| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
| 600112 | Severe thirst. | |
| 600113 | Aspiration hazard! Indication: Apply for chemicals classified as GHS aspiration category 1 H304 Links: 720157 620024 | 20145000 |
| 600114 | Burns in mouth and throat. Indication: Use for corrosive substances, GHS category 1 skin corrosion. H314 | 20133200 |
| 600116 | Garlic breath. | |
| 600117 | Ataxia. | |
| 600118 | Sedation. | |
| 600119 | Low blood pressure. | |
| 600120 | Paralysis. | |
| 600121 | Cardiac dysrhythmia. | |
| 600122 | No acute symptoms expected. Indication: Use for chemicals where the physico-chemical and/or toxicological data indicate that symptoms are unlikely by this route (e.g. if chemical is a gas). Can also be used if the only reports of symptoms are from deliberate/unusually high exposures and none are expected from more routine types of exposures. In this case combine with 600003 See Notes. Links: (620020) (24426) | 20102000 |
| 600123 | Dark-coloured urine. | |
| 61 Ingestion – prevention | | |
| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
| 610001 | Do not eat, drink, or smoke during work. Explanation: It is recommended that there should never be eating, drinking, or smoking during work. Although this recommendation could be considered to form a normal part of the general rules of conduct, it is mentioned on all ICSCs as an extra warning. In view of the great risk of food being contaminated during the handling of toxic powders or viscous toxic liquids, this warning applies especially to those substances. Indication: Generally applies to all substances. It should be a Peer-Review decision not to select. | 20201000 |
| 610002 | Wash hands before eating. Explanation: It is highly advisable to wash one's hands before eating. Indication: Applies to pesticides, toxic and very toxic substances. Peer-review decision not to select. | 20202000 |
| 62 Ingestion - First Aid | | |
| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
| 620001 | Administration of oxygen may be needed. | |
| 620002 | Artificial respiration may be needed. | |
| 620003 | Do NOT induce vomiting. Explanation: While inducing vomiting is dissuaded in general, this warning is given for corrosive or caustic substances and organic solvents of low viscosity. Corrosives and caustics cause extra harm to mucous membranes on vomiting, and solvents may cause chemical pneumonitis if aspirated. As of October 2006, the Indication for induction of vomiting has been limited to those cases where chemicals are highly toxic and there is evidence that induction of vomiting makes a difference to outcome. In the case of substances that are an aspiration risk there is an additional hazard. This situation is too complex for a general recommendation on first aid to be written on the Card. The decision to induce vomiting should be taken on a case by case basis by an informed medical practitioner. | 20309000 |

| 62 Ingestion - First Aid | | |
|--------------------------|---|-------------|
| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
| | <p>Indication: Add systematically for all corrosive and severely irritating substances, and organic solvents of low viscosity that have a high risk of aspiration into the lungs. H336 H314 H304 H305</p> | |
| 620004 | <p>Give a slurry of activated charcoal in water to drink.</p> <p>Explanation: Activated charcoal is used to prevent the absorption from gastrointestinal tract in case of potentially toxic amounts of chemical. Delay in the administration of activated charcoal impairs its efficiency and therefore it should be administered as soon as possible. This means within one hour after ingestion, but the potential benefit after one hour cannot be excluded. Because ingested amount is usually unknown, activated charcoal doses should be high enough: for adults 25-100 g in glass of water is recommended. However, NEVER GIVE A DROWSY OR UNCONSCIOUS PATIENT ANYTHING TO DRINK!</p> <p>Indication: Applies to substances which can be easily ingested at amounts producing severe intoxication. This means substances with an oral LD50 <200-300 mg/kg (about) and high amounts need not to be ingested to produce toxicity. Contraindications for the use of activated charcoal include unprotected airway (for example, resulting from lowering of consciousness) and situations in which its use increases the risk of aspiration (for example, liquid hydrocarbons). Charcoal should NOT be used for elemental metals, iron salts, lithium salts, ethanol, isopropanol, methanol, ethylene glycol, petroleum distillates with high aspiration potency, strong acids and alkali. Although activated charcoal may be less effective for cyanide salts, it may still be of benefit if administered immediately after the ingestion. H300 H301</p> | 20305000 |
| 620005 | <p>Give nothing to drink.</p> <p>Indication: H336 (H314 H304 H305)</p> | 20311000 |
| 620006 | <p>Give one or two glasses of water to drink.</p> <p>Indication: Use for irritants and severe irritants. H315 H316 H319 H320</p> | 20310000 |
| 620012 | Avoid unnecessary stimulation of the victim. | |
| 620013 | NO mouth-to-mouth artificial respiration. | |
| 620014 | <p>Refer immediately for medical attention.</p> <p>Indication: Use the phrase if the substance has oral acute toxicity (GHS criteria I, II ou III) or there is risk of aspiration (GHS aspiration toxicity 1 or 2).</p> | 20317010 |
| 620015 | <p>Refer for medical attention [P1].</p> <p>Explanation: 1/ Treat the patient by observation and supportive measures as indicated by his/her condition. 2/ If the services of a Medical Officer or a Medical Doctor are readily available, the patient should be placed in his/her care and a copy of the ICSC should be provided. Further action will be the responsibility of the Medical Specialist. 3/ If medical attention is not available on the work site or in the near surroundings, send the patient to a hospital, together with a copy of the ICSC. 4/ When there are no toxicity data about a substance, it may be advisable for someone who has definitely been exposed to have a period of medical observation in case toxic effects develop. It is preferable for this advice to appear in this section rather than in Notes.</p> <p>Indication: Use the phrase if the substance has oral acute toxicity (GHS criteria IV). Also, consider using this phrase when there is no information about the toxicity of the substance concerned, however other available data suggest that the substance may be toxic e.g. similar compounds, structure-activity relationship data. This is a peer-review decision. H300 H301 H302 H303 H314 H336</p> <p>Parameters: 1 parameter: P1: if you feel unwell</p> | 20317000 |
| 620017 | <p>Rinse mouth.</p> <p>Explanation: This is especially important when the throat and mouth are likely to be affected.</p> <p>Indication: Application to be considered per substance. In any case if a corrosive or irritant liquid or solid.</p> | 20301000 |

| 62 Ingestion - First Aid | | |
|---------------------------------|---|--------------------|
| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
| 620018 | See Notes. | 20321000 |
| 620019 | Wear protective gloves when inducing vomiting. | 20315000 |
| 620020 | Seek medical attention if you feel unwell. Indication: Consider to use this phrase if no symptoms can be listed because of lack of data but the substance is classified in GHS as Acute Toxicity Categories 1-4, or as having Specific Target Organ Systemic Toxicity from single or repeated exposure. The use of this phrase is a peer-review decision. H302 H303 | 20317020 |
| 620022 | If within a few minutes after ingestion, one small glass of water may be given to drink. | |
| 620023 | Give a slurry of activated charcoal in water to drink, but NOT if convulsions occur. | |
| 620024 | Refer for medical attention if breathing difficulties and/or fever develop. Explanation: Ingestion of some substances, e.g. some petroleum distillates, can cause delayed chemical pneumonitis. It is important that a person who has been exposed is assessed by a health professional even if asymptomatic at the time. The victim should also be warned to return for medical attention if symptoms develop later. Indication: Use for substances that may cause delayed chemical pneumonitis where acute symptoms do not otherwise qualify for: 'Refer for medical attention' (if the victim is to be referred for medical attention anyway then 'Refer for medical attention' would be enough). H304 H305 | 20318000 |

Disallowed sentences in Ingestion - First Aid

| 62 Ingestion - First Aid | | |
|---------------------------------|--|--------------------|
| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
| 620011 | Induce vomiting (ONLY IN CONSCIOUS PERSONS!). Motivation: PR decision 2010. | 20307000 |
| 620016 | Rest. Motivation: no adequate indication could be given for its use. PR decision 2010. | 20313000 |

SPILLAGE DISPOSAL

| 63 Spillage disposal | | |
|----------------------|---|-------------|
| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
| | <p>Spillage disposal</p> <p>Explanation: The ICSC is limited to the handling of small to moderate sized spills. For larger spills, experts must be notified and actions must be taken such as evacuation or firefighting. For extremely dangerous substances, any spill is dangerous enough for the chemical worker to call for expert help. In any case, personal safety equipment must be worn when such chemicals are spilled and evacuation is usually in order. The more dangerous a substance is, the more important it is to have an emergency plan available for large spills and to devise actions to be taken in the event of a sudden small or moderate leakage or discharge to the surroundings. Some means of limiting the effects of leakage are:</p> <ul style="list-style-type: none"> - facilities for collecting spilled liquid - sand or a suitable absorbing material for containment or absorption - provision to seal leaking drums; and - provision to rinse away spilled substance (as far as allowed); - ventilation <p>In connection with this the following aids should be available at all times:</p> <ul style="list-style-type: none"> - personal protective equipment (goggles, face shields, special clothing, aprons, boots, gloves, respiratory protective equipment, etc.); - collecting vessels (e.g., enclosing vessels); - neutralizing agents; and - sand or a suitable absorbing material <p>Detailed disposal procedures are given in various handbooks on chemical safety detailed disposal.</p> <p>When chemicals are used in the cleaning-up procedure, attention should be given to eventual disposal of the waste materials. The general measures for spillage disposal on the ICSC are intended to protect those who have to deal with a spill and to avoid environmental pollution. Concerning the latter, adaptations should be made so that directives on the ICSCs conform to the rules of national legislation, including possible incineration or other disposal of collected residues.</p> <p>Indication: Read this instruction first! Select the phrases in this section in order:</p> <ol style="list-style-type: none"> 1. Personal protection 2. Environmental precautions 3. Clean-up procedures <p>Most liquids and solids conform to the specification of one or another of the groups A, B, and C that are listed below. Having determined in which group a substance belongs one should select the appropriate phrase(s). For disposal of gases see 630166, 630089, 630093, 630094, 630096, 630097.</p> <p>N.B.: The classification into the groups A, B, and C is based on generally accepted ideas on the prevention of water pollution.</p> <p>Group A contains salts whose ions are fairly common in natural surface waters; group B contains those substances which in general cause little pollution and therefore could be drained in small amounts; group C contains substances which cause undesired pollution. If necessary the list of group C can be adapted to national legislation. After using the combination phrases, the single phrases should be gone through and be added as necessary. Give attention to special disposal phrases 630033 / 630063 / 630089, 630093, 630094, 630096, 630097 / 630034.</p> <p>Specification of the groups A, B, and C:</p> <p>A: Inorganic salts, acids, and bases only containing one or more of the following: aluminium, ammonium, calcium, iron, magnesium, manganese, potassium or sodium; carbonate, chloride, nitrate, phosphate (ortho), silicate, or sulfate.</p> <p>A1: Solid: neutral or weak or medium strong acid or base.</p> <p>A2: Solid: strong acid or base.</p> <p>A3: Liquid: neutral or weak acid or base.</p> <p>A4: Liquid: medium or strong acid or base.</p> <p>B: Liquids (B1) and solids (B2) with a solubility in water > 10 g/100 ml and with flash point > 0°C, and not reacting spontaneously with water to produce toxic or flammable vapours or gases, and not belonging to group A or C.</p> | 21000000 |

| 63 Spillage disposal | | |
|----------------------|---|-------------|
| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
| | <p>C: Liquids (C1) and solids (C2) which do not meet the specification of group A or B, or are mentioned in the following lists: Substances containing any of the following elements: antimony, arsenic, barium, beryllium, boron, cadmium, chromium, cobalt, copper, lead, mercury, molybdenum, nickel, selenium, tellurium, thallium, tin, titanium, uranium, vanadium, zinc. Substances belonging to one of the following categories: acid halides; amides; aromatic polycyclic compounds; biocides and pesticides; carbides; carcinogens, human and animal (including asbestos) ; halogens and their organic compounds (except bromide, chloride and iodide salts) ; hydrogen cyanide, hydrogen fluoride, hydrogen selenide and hydrogen sulfide (all of their solutions and salts) ; mercaptans; nitrites and nitrides; nitrogen-containing organic compounds (except amines and ammonium salts) ; oils (mineral) ; phosphorus and organic phosphorus compounds; peracids, peroxides, persalts; phenols and phenol compounds; silanes (halogenated) ; silicon-containing organic compounds, silicones included; sulfur-containing organic compounds (except sulfates and sulfites) ; all persistent substances which could accumulate in animals or plants. N.B.: Sometimes a liquid C can be transferred to group B by a simple treatment of the spillage; in such cases apply 630011, 630154, 630180, 630008. All phrases with '[containers]' can be completed with material specification. Use this possibility only when strictly necessary</p> | |
| 630001 | <p>Personal protection: [P1], and]. Parameters: 26 parameters: P1: A/P3 filter respirator for organic vapour and toxic particles ... thermal gloves</p> | |
| 630002 | Absorb liquid in sand or inert absorbent. | |
| 630003 | <p>Absorb remaining liquid in [P1], or]. Explanation: This applies to liquids which must not be allowed to enter the sewer because they are highly flammable (i.e., flash point < 23°C) or are dangerous to health or may cause serious environmental pollution. 'Safe place' means a place that is free from explosion hazards and where no persons can be exposed to the substance or where no environmental pollution is possible. Substances spilled in the laboratory can be cleared away by special equipment obtainable from the suppliers of the chemicals Indication: This phrase may be completed by mentioning a special absorbent or by adding 'dry' if the substance should not come into contact with water. Also see indication field 63. Parameters: 8 parameters: P1: damp sawdust; dry sand; earth; inert absorbent; lime; sand; sand; vermiculite</p> | 21215000 |
| 630004 | <p>Carefully collect remainder[" in "P1], or " containers"]. Explanation: This applies if the dispersion of the substance must definitely be prevented. Indication: Applies to solids whose dispersion should not be allowed due to: - high toxicity (rat oral LD50 < 300 mg/kg or T-label according to EC rules or H300-H301); or - capability of spontaneous ignition (H250); or - highly flammable or explosive (420009, 420018, or 450038)(H200 to H205, H228); or - environmental pollution (group C)(H400 to H413). Also see the general indication for Spillage disposal (field 63). Parameters: 3 parameters: P1: covered; plastic; sealable</p> | 21231000 |
| 630006 | <p>If appropriate, moisten first to prevent dusting. Explanation: Try to prevent dusting of powders by moistening; use a dust respirator as specified Indication: Combine with 630102, 630178, 630179 if applies.</p> | 21223000 |
| 630008 | <p>Cautiously neutralize remainder[" with "P1], or]. Indication: Applies if a solid and a strong acid or base. Complete this phrase by mentioning the neutralizer (e.g., 'with chalk slurry' or 'with sodium bisulfate slurry') or by mentioning the process (e.g., 'by adding...'). Also see the general indication for Spillage disposal (field 63). Parameters: 13 parameters: P1: alkaline materials; ... sodium hypochlorite solution</p> | 21225000 |
| 630011 | Cautiously neutralize spilled liquid[" with "P1], or]. | 21205000 |

| 63 Spillage disposal | | |
|----------------------|--|-------------|
| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
| | <p>Explanation: While neutralizing (medium) strong acids or bases, a great deal of heat can be developed. The neutralizing process should therefore be done by adding small portions of neutralizer at a time and with protection against spattering</p> <p>Indication: Complete by mentioning the neutralizer ('with...') or the process to be applied ('by...'). Chose the neutralizer case by case. In general cases, for acids: soda ash, sodium bicarbonate, slaked lime, weak alkaline solution, for bases: dilute acid. Also see the general indication for Spillage disposal (field 63).</p> <p>Parameters: 7 parameters: P1: caustic soda; ... weak alkaline solution such as disodium carbonate</p> | |
| 630018 | <p>Collect leaking and spilled liquid in covered[" P1], or] containers as far as possible.</p> <p>Parameters: 15 parameters: P1: acid resistant; ... steel (not copper)</p> | |
| 630028 | Collect the spilled substance into containers. | |
| 630030 | <p>Consult an expert!</p> <p>Explanation: This applies to a number of highly dangerous substances that present fire or health hazards to anyone in the neighbourhood. An expert must be consulted as soon as possible</p> <p>Indication: In general, 630040 and 630030 are used in combination although a situation could occur when only one of them is selected. Apply 630030 if:</p> <ul style="list-style-type: none"> - a flammable gas (H220 H221) with relative density to air ≥ 0.9; - a toxic gas with a rat LC50 (4 hr) ≤ 2 mg/l (T-label according to EC rules) - a gas, toxic according to GHS categories 1-2 for acute inhalatory toxicity (H330); - a liquid with a RIR ≥ 4000; or - liquid with the ratio $p_{20}/LEL \geq 10$ (where p_{20} = saturated vapour pressure at 20°C in kPa and LEL = lower explosive limit in volume %). - for gas or liquids with RIR > 100, or with flash point $< 23^{\circ}\text{C}$, - for extremely and highly flammable substances (in Fire hazard section). H220 (H221) H222 (H223) H224 H225 - when phrase 'gas./air mixtures are explosive' or 'vapour/air mixtures are explosive' is used (in Explosion hazard section). - for pyrophoric substances (according to EU criteria for R:17). H250 <p>Both 630030 and 630040 can, if necessary, be completed with an indication of the circumstances under which these measures should be taken; for instance, 'in case of a large spill' can be indicated if appropriate.</p> <p>Links: 630040</p> | 21103000 |
| 630032 | <p>Cover the spilled material with [P1], or].</p> <p>Explanation: Liquid chemicals when spilled in small or moderate amounts should be covered in order to prevent evaporation.</p> <p>Indication: Apply for liquids meeting the criteria for F or F+ chemicals / H224 H225 (H226). Complete the phrase with foam-blanket. Apply also for liquids meeting the criteria for T+, T (H330 H331) or C (H314 EUH071) if the vapour pressure at room temperature exceeds 20 kPa. Complete this phrase with the names of the inert absorbent such as sand, earth, vermiculite, etc.</p> <p>Parameters: 16 parameters: P1: dry earth; ... wet sand</p> | |
| 630033 | <p>Do NOT absorb in saw-dust or other combustible absorbents.</p> <p>Explanation: Applies to substances which could cause self-heating and ignition of combustible adsorbents.</p> <p>Indication: Applies to liquids or solid strong oxidants or reductants (680042-P1 a strong oxidant or P1 a strong reducing agent). Also see indication 630000. H251 H252</p> <p>Links: (680042 + P1 a strong oxidant 680216 + P2 combustible and reducing material 680042 + P1 a strong reducing agent 680216 + P2 oxidants)</p> | |
| 630034 | <p>Do NOT let this chemical enter the environment.</p> <p>Explanation: Release to the environment of a substance should be avoided when the substance is hazardous to the environment (acute or long-term), or when bioaccumulation can occur.</p> | |

| 63 Spillage disposal | | |
|----------------------|---|-------------|
| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
| | Indication: Apply this phrase when section Environmental Data is filled in.(H400 to H413) | |
| | Links: (850019, 850004, 850010, 850017) 640039 | |
| 630035 | Do NOT use water. | |
| 630036 | Do NOT wash away into sewer. Explanation: This is mentioned as an extra warning in case of very flammable liquids which are practically insoluble in water, thus causing a serious explosion hazard in the sewer. Also for insoluble strong smelling substances (mercaptanes, amines, etc.). Indication: Applies for liquids with flash-point < 23°C (H224 H225) and a solubility in water < 1 g/100 ml (i.e. not or only slightly soluble). Also see indication 630000. Do not use for environmental hazard (H400 to H413) - use 630034 instead. Links: 640039 | |
| 630037 | Do not allow to dry out. | |
| 630040 | Evacuate danger area! Explanation: The immediate area of an incident is that area of approximately 100 meters radius in which the emergency services operate. Consideration may be given to warning people nearby to stay indoors with doors and windows closed. Evacuation would be considered when there is a threat to people in immediate danger. Indication: In general, 630040 and 630030 are used in combination although a situation could occur when only one of them is selected. Apply 630040 if:- a flammable gas (H220 H221) with relative density to air >= 0.9;- a toxic gas with a rat LC50 (4 hr) <= 2 mg/l (T-label according to EC rules);- a gas, toxic according to GHS categories 1-2 for acute inhalatory toxicity (H330);- a liquid with a RIR >= 4000; or- liquid with the ratio p20/LEL >= 10 (where p20 = saturated vapour pressure at 20°C in kPa and LEL = lower explosive limit in vol. %).Both 630040 and 630030 can, if necessary, be completed with an indication of the circumstances under which these measures should be taken. Links: 630030 | |
| 630049 | If liquid: collect leaking liquid in[" "P1] containers[" "P2]. Parameters: 3 parameters: P1: covered plastic; sealable; P2: as far as possible | |
| 630051 | If solid: sweep spilled substance into[" "P1] containers. Parameters: 1 parameter: P1: sealable | |
| 630058 | Keep wet. | |
| 630059 | Let solidify. Explanation: It is preferable to clean up solids rather than liquids. When no acute risks for people or environment and the freezing point is low enough, wait with cleaning till the spill is solidified. Indication: Applies if a (warm) liquid with a melting or freezing point >25°C. (In warm climate zones: >35°C instead of >25°C). Also see ind. 630000. | |
| 630062 | Moisten the remainder. | |
| 630063 | NEVER direct water jet on liquid. Explanation: This applies to liquids with a very low temperature and to liquids which can vigorously react with water. Addition of water greatly increases the rate of evaporation. Indication: Applies if a compressed liquefied gas, liquid with a temperature < -30°C, or a liquid which violently reacts with water. | |
| 630064 | Neutralize used water with chalk or soda. | |
| 630065 | Note: Reacts with water to form an adhesive mass. | |
| 630076 | Personal protection: complete protective clothing SPECIFICALLY RECOMMENDED AS EFFECTIVE AGAINST Chlorine trifluoride, including self-contained breathing apparatus. | |
| 630088 | Prevent contact with water or moist substances. | |
| 630089 | Remove airborne particles with fine water spray. Indication: Applies to airborne particles which are fairly soluble in water or react with water producing water-soluble compounds | |
| 630090 | Turn off gas at source if possible. | |

| 63 Spillage disposal | | |
|----------------------|---|-------------|
| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
| 630092 | Remove all ignition sources. Explanation: Select when a gas/air mixture or vapour/air mixture of a spill can easily be ignited. Indication: "Use this phrase for highly flammable (F+) substances. H220 H221 H222 H224 H225" | |
| 630093 | Remove fumes with fine water spray. Indication: Applies to fumes which are fairly soluble in water or react with water producing water-soluble compounds. | |
| 630094 | Remove gas with fine water spray. Indication: Applies to gases which are fairly soluble in water or react with water producing water-soluble compounds. | |
| 630095 | Store and dispose of according to local regulations. | |
| 630096 | Remove vapour cloud with fine water spray. Indication: Applies to vapours clouds which are fairly soluble in water or react with water producing water-soluble compounds. | |
| 630097 | Remove vapour with fine water spray. Indication: Applies to vapours which are fairly soluble in water or react with water producing water-soluble compounds. | |
| 630098 | See Chemical Dangers. | |
| 630099 | See Notes. | |
| 630102 | Sweep spilled substance into covered[" P1], [,] containers. Parameters: 12 parameters: P1: air-tight; clean; dry; dry plastic; labelled; metallic; non-combustible; non-metallic; plastic; sealable; suitable; water-filled | |
| 630109 | Sweep spilled substance into containers or absorb liquid in sand or inert absorbent and remove to safe place. | |
| 630130 | Sweep spilled substance into plastic or glass containers. | |
| 630151 | Then store and dispose of according to local regulations. | |
| 630152 | Then wash away with plenty of water. Indication: Should only be used if the substance in question cannot cause serious environmental pollution or an explosive atmosphere in the sewer. Should not be used if the substance reacts with water or is insoluble in water. To be used after, e.g., 630008 or 630011. Also see indication 630000. | |
| 630154 | Treat remaining liquid with a mixture of ammonia (4-8%), detergent (2%), and water. | |
| 630157 | Use water spray to disperse vapours. | |
| 630158 | Vacuum spilled material with specialist equipment. | |
| 630166 | Ventilation. Explanation: A spill often causes a harmful or even dangerous concentration of gases/vapours. Ventilation is a means of clearing the atmosphere. Moreover, for leaking gases it is the only method to remove them. In some situations however ventilation might increase the danger: - substances in the form of powder may be dispersed by ventilation; - local ventilation could cause faster evaporation of a liquid spill, thus increasing the vapour concentration if not enough fresh air is supplied; and - concentrations above the upper explosion limit will decrease, thus bringing the atmosphere within the explosive limits. Indication: Ventilation should be applied judiciously and NEVER for solids which occur as a powder, and in general not for substances with a boiling point $\geq 350^{\circ}\text{C}$. Use when phrase 710017 or 710019 or "a harmful contamination of the air -will be reached very quickly-on evaporation of this substance at 20°C " is selected. | |
| 630167 | Wash away remainder with plenty of water. Indication: Should only be used if the substance in question cannot cause serious environmental pollution or an explosive atmosphere in the sewer. Should not be used if the substance reacts with water or is insoluble in water. | |
| 630168 | Wash away spilled liquid with plenty of water. Explanation: Substances which do not react violently with water and are not likely to cause serious environmental pollution, or result in an explosive atmosphere in the sewer can be | |

| 63 Spillage disposal | | |
|----------------------|---|-------------|
| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
| | washed away with plenty of water. Insoluble solids and liquids are not easily dispersed with water and may well block the drains. | |
| | Indication: Should only be used if the substance in question cannot cause serious environmental pollution or an explosive atmosphere in the sewer. Also see indication 633000. Should not be used if the substance reacts violently with water, or is insoluble in water. | |
| 630169 | Wet powder to prevent dusting and ignition. | |
| 630170 | Wet spilled material before picking it up, do not attempt to sweep up dry material. | |
| 630171 | If liquid: do NOT absorb in saw-dust or other combustible components. | |
| 630172 | Shut off cylinder if possible. | |
| 630173 | Isolate the area until the gas has dispersed. Explanation: Once gases have been released they cannot be "recovered". Sometimes a water spray can be used to reduce the amount of a soluble gas in the air however, this cannot be done indoors. Therefore the only solution is to isolate and ventilate the area where the gas has been released until the gas has dispersed Indication: Use for all gases presenting a hazard, including simple asphyxiants. | |
| 630175 | Vacuum with specialist equipment (See Notes) or carefully sweep into [" "P1], or] containers. Explanation: A spill can effectively be cleaned up by vacuum aspiration into a closed vessel. This is different from a domestic vacuum cleaner, which will disperse the substance in the air via its exhaust. Indication: Apply for substances that are toxic and very toxic. Parameters: 11 parameters: P1: air-tight; clean; dry; labelled; metallic; non-combustible; non-metallic; plastic; sealable; suitable; water-filled Links: 870047 | |
| 630176 | Collect leaking liquid in covered[" "P1] containers. Explanation: As a rule a leaking liquid should be collected in a 'sealable' container. However if the liquid could polymerize or decompose violently due to casual circumstances (e.g., contamination), the container should only be 'covered' rather than 'sealed' in order to allow any pressure which might tear the container to be released. Indication: Apply to unstable liquids with risk of pressure-rise due to polymerization, decomposition. All phrases with '['] containers' can be completed with a material specification. Use this possibility only when strictly necessary. Everyone knows for instance that acids should be collected in acid-resistant material, such an addition, therefore, being superfluous. Also see indication 630000. Parameters: 3 parameters: P1: dry plastic; metal; plastic | |
| 630177 | Collect leaking liquid in sealable[" "P1] containers. Explanation: As a rule a leaking liquid should be collected in a 'sealable' container. However if the liquid could polymerize or decompose violently due to casual circumstances (e.g., contamination), the container should only be 'covered' rather than 'sealed' in order to allow any pressure which might tear the container to be released. Indication: Apply to stable liquids with no risk of pressure-rise by polymerization, decomposition. All phrases with '['] containers' can be completed with a material specification. Use this possibility only when strictly necessary. Everyone knows for instance that acids should be collected in acid-resistant material, such an addition, therefore, being superfluous. Also see indication field 63. Parameters: 7 parameters: P1: air tight; dry; metal; non-metallic; non-plastic; plastic; steel (not copper) | |
| 630178 | Sweep spilled substance into sealable[" "P1] containers. Parameters: 1 parameter: P1: non-metallic | |
| 630179 | Sweep spilled substance into containers. Explanation: Apply when the spill does not need special treatment. | |
| 630180 | Treat remaining liquid with an alkaline substance. | |

Disallowed sentences in Spillage disposal

63 Spillage disposal

| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
|--------|--|-------------|
| 630019 | Collect leaking and spilled liquid in sealable["P1 , or] containers as far as possible. 18 parameters: P1: acid resistant; ... suitable Motivation: use 630177 instead. Helsinki 2003 | 21207000 |

PACKAGING

31 Packaging

| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
|--------|---|-------------|
| 310001 | Airtight. Explanation: This condition is specified when contact of the substance with air causes danger. Indication: Especially for substances that react with humid air and to prevent the formation of peroxides. Not to be used to control (normal) evaporation. | 23101000 |
| 310002 | Can be stored only in glass, stainless steel, aluminium or polyethylene-lined container. | |
| 310003 | Do not transport with food and feedstuffs and combustible materials. Indication: Apply for chemicals classified as 6.1 or 8 by the UN Committee of Experts for Transport of Dangerous Goods. | |
| 310004 | Do not transport with food and feedstuffs. Indication: Apply for chemicals classified as 6.1 or 8 by the UN Committee of Experts for Transport of Dangerous Goods. | 23110000 |
| 310005 | Marine pollutant. Explanation: The United Nations Maritime Organization (IMO) has developed a classification system for chemicals with regard to their toxicity to marine life. Use sentence with 'Severe' when appropriate (310008) | 23507000 |
| 310007 | See Notes. | |
| 310008 | Severe marine pollutant. | 23507010 |
| 310009 | Should be stored in iron or steel containers. | |
| 310010 | Special fittings. | |
| 310011 | Special insulated container. Indication: Apply to gases liquefied by cooling, and kept in open containers (i.e., 660144). | 23107000 |
| 310012 | Special insulated cylinder. Indication: Apply to compressed liquefied gases which have to be stored cooled, e.g., for reasons of stability. | 23109000 |
| 310013 | Special material. Explanation: This phrase is only used if a need for special packaging material cannot be regarded as common knowledge. It is assumed that persons who deal frequently with chemicals are acquainted with the corrosivity of acids, bases, and solutions in water to common steel and many other metals and with the unsuitability of many plastics for containing organic solvents or liquids. The supplier of the substance can usually advise the selection of an appropriate material. | 23103000 |
| 310014 | Transport only if stabilized. | |
| 310015 | Unbreakable packaging. Explanation: This condition is specified for very dangerous substances. The breakable packaging is imparted greater protection by the unbreakable one. The enclosing vessel serves in addition as collecting vessel in case of rupture. Indication: Apply if: - a liquid with a RIR >= 4000; - a liquid with a ratio of the p20 to LEL >= 300 (see 630030); - a liquid concentrated strong acid or base; or | 23105000 |

| 31 Packaging | | |
|--------------|---|-------------|
| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
| | - a powder with an OEL/TWA ≤ 0.1 mg/m ³ . Also consider to combine with 310016 | |
| | Links: (310016) | |
| 310016 | Put breakable packaging into closed unbreakable container. Indication: Apply if: - a liquid with a RIR ≥ 4000 ; - a liquid with a ratio of the p20 to LEL ≥ 300 (see 630030); - a liquid concentrated strong acid or base; or - a powder with an OEL/TWA ≤ 0.1 mg/m ³ . Also consider to combine with 310016 | 23105000 |
| 310018 | Special packaging required. | |

STORAGE

| 64 Safe storage | | |
|-----------------|--|-------------|
| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
| 640000 | Safe storage Explanation: The storage instructions described in the ICSC are recommended primarily from the health and safety perspective. No consideration has been given, for example, to the (non-hazardous) deterioration of a chemical from the technical standpoint. Indication: Especially for substances that react with humid air and to prevent the formation of peroxides. Not to be used to control (normal) evaporation. | |
| 640001 | See Chemical Dangers. Explanation: This phrase is selected only in some cases where there is a long list of chemicals reacting with the substance. It is always preferable to repeat the class or even name of substances susceptible to react violently with the chemical. Indication: Use the phrase after selecting P1 incompatible materials in 640033. In the case, some chemicals are already cited in the phrase 640033, use 'Separated from... and [other] incompatible materials. See chemical dangers.' | |
| 640002 | See Notes. | |
| 640003 | Cool. Explanation: This is applicable to cylinders, highly volatile liquids, and to substances which may decompose, polymerize, or form peroxides upon warming. In general a storage temperature below 25°C will be sufficient. Indication: Applies if 'very volatile' is used (see indication LIQUID in Physical state; appearance), or if an undesired reaction occurs, or dissolved gas comes free on warming above 30°C. | 22301000 |
| 640004 | Cooled. Indication: Applies if a storage temperature $< 10^\circ\text{C}$ is necessary. | |
| 640005 | Do NOT store or transport in containers made from [P1], or]. Explanation: Especially in countries with low technical standards and legislation, it happens often that compounds are divided from the original packaging and stored in normal daily used packaging like tins, cans, bottles etc. Indication: Select the phrase in case of reaction with material that is used for storing or transport (temporary storage), like Al, Zn, plastics, glass. Parameters: 11 parameters: P1: alloys high in copper; ... zinc | |
| 640006 | Do not allow to solidify. | |
| 640012 | Dry. Explanation: This applies to hygroscopic and deliquescent substances as well as to substances which may react with water and/or moist air. | |

| 64 Safe storage | | |
|-----------------|---|-------------|
| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
| | Indication: Applies to hygroscopic and deliquescent substances, and chemicals that may react with water or moist air. | |
| 640013 | Fireproof if in building. Explanation: 'Fire-proof' applies to gas-cylinders stored within a building, even if the gas is not combustible. See general expl.of the field and 640014. Indication: Applies if non-combustible gas in cylinders. Also see ind. 640014. H280 | |
| 640014 | Fireproof. Explanation: This condition is specified for flammable substances and for flammable gases in cylinders. Also for solids which can develop combustible gases if in contact with water or water vapour (H260 H261) and for solids which for any reason should be stored under fireproof conditions. 'Fire-proof' implies: - the construction (degree of fire-resistance) and location (with respect to other buildings) of the storage accommodation in relation to the quantity and flammability of the stored substances; - the possibility of collecting part of the stored liquid to limit spreading; - compartments within a building to separate reactive substances from one another; - special requirements for electrical, heating, and sewage installations; - adequate ventilation to open air; - provision of sufficient fire extinguishing agents and facilities; - regulations, e.g., for filling, discharging, and handling (decanting preferably in a separate room); - no-smoking and other warning signs; and- suitable packaging of stored substances. These items are often detailed in official national regulations; otherwise refer to specialized handbooks on fire prevention. Indication: Applies to: - gases in cylinders, only if combustible (H220 H221); - substances with flash points < 61°C and all those for which 420009, 420018, 420011, 420022, or 450038 has been used (H222 H223 H224 H225 H226 H228); or - substances which may decompose readily on heating, producing very toxic gases or vapours (rat LC50 (4 hr) <= 0.5 mg/l). N.B.: The condition 'fire-proof' is intended to reduce the fire hazards caused by the storage of flammable substances to a practicable minimum. In other words, prevent the supply of flammable material to a fire that has started and prevent contact of flammables with sources of ignition. 'Fire-proof' is not generally intended to restrict the hazard of evaporation of a liquid with a toxic vapour; it would lead to storage of nearly all liquids under fireproof conditions. An exception could be made for substances which should be kept out of the heat of a fire because they readily decompose on heating, producing very toxic gases or vapours. The use of 'fire-proof' for this purpose should not be frequent. Also see 640003 ('cool'). | |
| 640016 | Inspect container frequently to identify bulging and leaking. | |
| 640017 | Install continuous monitoring system with alarm. | |
| 640018 | Isolated from work area. | |
| 640019 | Keep in a separate building protected from shock. | |
| 640021 | Keep in a well-ventilated room. Indication: For substances for which 640048 does not apply, but nevertheless on long storage need ventilation because they very slowly release harmful vapours, e.g., high boiling pesticides. | |
| 640022 | Keep in the dark. Indication: Apply if the chemical reacts or polymerises, or forms peroxides under the influence of light. Do not use when exposure to light degrades the quality of the substance, e.g., by discoloration, without creating hazardous conditions. | |
| 640023 | Keep under [P1], or]. Parameters: 7 parameters: P1: inert gas; mineral oil; nitrogen atmosphere; oil; oxygen-free liquid; petroleum oil; water | |
| 640028 | Store in [P1], or]. Parameters: 10 parameters: P1: a separate building; ... vented containers | |
| 640029 | Ozone is frequently stored refrigerated in halons. | |
| 640030 | Provision to contain effluent from fire extinguishing. Explanation: On extinguishing a fire with water, the effluent will be polluted by the burning substance and its combustion products. In the case of very ecotoxic substances, storage | |

| 64 Safe storage | | |
|-----------------|---|-------------|
| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
| | provisions should be taken to prevent the effluent water from reaching sewers and/or surrounding surface waters. | |
| | Indication: Applies to substances responding to the criteria of the phrases 850016, 850015 (env "very toxic" or "toxic"), or 850010, or 310005. | |
| 640033 | Separated from [P1], [] and []. | |
| | Explanation: This is recommended if the substance can react violently with the substances mentioned. IMPORTANT DATA, contains information about reactivity. | |
| | Indication: Complete with the name(s) of the chemical(s) with which the substance may react vigorously. Only to be used if the named chemicals are reasonably common in industrial or laboratory practice. These should not be used for substances in gas-cylinders! | |
| | Parameters: 116 parameters: P1: : see Chemical Dangers; ... zinc alloys | |
| | P1 incompatible materials | |
| | Links: 640001 | |
| 640035 | Solutions of diazomethane should not be stored. | |
| 640036 | Store between [N1]°C and [N2]°C. | |
| 640037 | Store at maximum 20 °C, never exceed 30 °C. | |
| 640038 | Store in an area having corrosion resistant concrete floor. | |
| 640039 | Store in an area without drain or sewer access. | |
| | Explanation: Some substances, when released in the sewer, could cause a serious explosion hazard, and other substances could initiate an environmental problem. To avoid this, it would be preferable to store such substances in rooms where there is no open drain connected to a sewer. | |
| | Indication: Use the phrase when 630034 or 630036 is selected. | |
| 640042 | Store only if stabilized. | |
| | Explanation: This applies to substances which tend to polymerize or which may either react violently or form hazardous compounds during storage (with, e.g., atmospheric oxygen, peroxide formation, etc.). The selection of a suitable inhibitor or stabilizer must always be left to an expert, whose assistance is also needed when there is uncertainty as to whether the inhibitor has been added. The expert should also check if the stabilizer alters the toxicological properties of the substance and adjust the preventive measures when necessary. | |
| | Indication: Apply if the substance polymerises or may react violently or form hazardous compounds during storage (with, e.g., atmospheric oxygen, peroxide formation, etc.). | |
| | Links: 870067 | |
| 640043 | Store only in original packaging. | |
| 640044 | Store outside or in a separate well-ventilated building. | |
| 640046 | The substance cannot be stored or shipped. | |
| 640048 | Ventilation along the floor. | |
| | Explanation: This applies to substances which may form dense vapour/air mixtures that stay near the floor. | |
| | Indication: Applies if boiling point is < 350°C and flash point > 60°C or if non-combustible and the relative density of vapour/air mixture >= 1.0 at 20°C. | |
| 640049 | Ventilation along the floor and ceiling. | |
| | Indication: Applies if a gas with molecular mass < 29 (check 500001/500002-8). | |
| 640050 | Well closed. | |
| | Indication: Use for toxic or very toxic substances, for highly or extremely flammable substances or for substances with a high vapour pressure. Use for hygroscopic and deliquescent substances, for substances which may react with water and/or moist air, for substances with peroxide formation, and for substances with strong smell (e.g. mercaptans). It is also recommended to use this phrase in case of radioactive substances because of the problem of decontamination when the substance is spilled. Also use for liquids in bottles and drums. | |

| 64 Safe storage | | |
|------------------------|---|--------------------|
| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
| | Links: (640003) | |
| 640052 | Substance should be kept wet. | |
| 640053 | Store only in original container. Explanation: The original container will have been designed-selected to take in account the compatibilities and reactivity issues related to the substance. Indication: Use for chemicals that are classified as T+, C and N. Consider for very toxic and corrosive substances or substances which are harmful to the environment (when H300, H310, H330, H314, H318, H290, H400, H401, H402, H410, H411 or H412 is applied). | |
| 640055 | Storage conditions may vary according to the type of inhibitor used. | |
| 640056 | Refer to the manufacturer's instructions for proper storage conditions. | |
| 640057 | Store only if damped. | |

CLASSIFICATION & LABELLING

GHS Classification

| 34 GHS Classification | | |
|-----------------------|---|-------------|
| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
| 340000 | <p>GHS Classification</p> <p>Explanation: The selection of the appropriate hazard statement, signal word and pictogram should be in accordance with the classification criteria in the latest revised version of the GHS, displayed below the menu 'GHS official text and corrigenda' (https://www.unece.org/trans/danger/publi/ghs/ghs_welcome_e.html).</p> <p>Indication: The justification, INCLUDING classification category, for each selection should be given in the COMMENTS box in the GHS section. This is particularly important if a hazard statement has been selected according to GHS criteria but complementary information is not given elsewhere on the Card because Compiler's Guide criteria are not met. It is also important the hazard category in the Comments box e.g. Acute Toxicity Category 1.</p> | |
| 340004 | <p>Causes damage to [P1], and][" if "P2]</p> <p>Indication: H370. complete with "organs", or state all organs affected, if known. State route of exposure if it is conclusive proven that no other routes of exposure cause the hazard.</p> <p>Parameters: 22 parameters: P1: bladder; ... vascular system; P2: inhaled; swallowed</p> | |
| 340005 | <p>Causes damage to [P1], and] through prolonged or repeated exposure[" if "P2]</p> <p>Indication: H372. complete with "organs", or state all organs affected, if known.State route of exposure if it is conclusive proven that no other routes of exposure cause the hazard.</p> <p>Parameters: 26 parameters: P1: blood system; ... the thyroid; P2: in contact with skin; inhaled; swallowed</p> | |
| 340013 | <p>Causes [P1], and]</p> <p>Parameters: 7 parameters: P1: eye damage; ... skin irritation</p> | |
| 340020 | <p>Combustible liquid</p> <p>Indication: H227</p> | |
| 340021 | <p>Contains gas under pressure; may explode if heated</p> <p>Indication: H280</p> | |
| 340023 | <p>Extremely flammable gas</p> <p>Indication: H220</p> | |
| 340026 | <p>Fatal if swallowed</p> <p>Indication: H300. Use combined sentence if more than one route</p> | |
| 340036 | <p>Flammable liquid and vapour</p> <p>Indication: H226</p> | |
| 340038 | <p>Harmful if swallowed</p> <p>Indication: H302. Use combined sentence if more than one route</p> | |
| 340039 | <p>Harmful in contact with skin</p> <p>Indication: H312. Use combined sentence if more than one route</p> | |
| 340040 | <p>Harmful to aquatic life</p> <p>Indication: H402</p> | |
| 340041 | <p>Harmful to aquatic life with long lasting effects</p> <p>Indication: H412</p> | |
| 340042 | <p>Highly flammable liquid and vapour</p> <p>Indication: H225</p> | |
| 340043 | <p>In contact with water releases flammable gases which may ignite spontaneously</p> <p>Indication: H260</p> | |

| 34 GHS Classification | | |
|-----------------------|--|-------------|
| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
| 340045 | May be harmful if swallowed Indication: H303. Use combined sentence if more than one route | |
| 340046 | May be harmful in contact with skin Indication: H313. Use combined sentence if more than one route | |
| 340047 | May cause [P1], and] Parameters: 8 parameters: P1: allergic skin reaction; cancer; dizziness; drowsiness; genetic defects; harm to breast-fed children; long lasting harmful effects to aquatic life; respiratory irritation | |
| 340051 | May cause fire or explosion; strong oxidizer Indication: H271 | |
| 340052 | May cause or intensify fire; oxidizer Indication: H270 | |
| 340053 | May cause damage to [P1], and][" if "P2] Indication: H371. complete with "organs", or state all organs affected, if known. State route of exposure if it is conclusive proven that no other routes of exposure cause the hazard. Parameters: 16 parameters: P1: blood; ... thymus; P2: inhaled; swallowed | |
| 340054 | May cause damage to [P1], and] through prolonged or repeated exposure[" if "P2] Indication: H373. complete with "organs", or state all organs affected, if known. State route of exposure if it is conclusive proven that no other routes of exposure cause the hazard. Parameters: 21 parameters: P1: blood; ... urinary tract; P2: inhaled; swallowed | |
| 340056 | Signal: Danger | |
| 340057 | Signal: Warning | |
| 340060 | Suspected of damaging fertility or the unborn child Indication: H361. State specific effect if known. State route of exposure if it is conclusive proven that no other routes of exposure cause the hazard. Use 340259 | |
| 340063 | Toxic if swallowed Indication: H301. Use combined sentence if more than one route | |
| 340064 | Toxic in contact with skin Indication: H311 | |
| 340065 | Toxic to aquatic life Indication: H401 | |
| 340069 | Very toxic to aquatic life Indication: H400 | |
| 340100 | Catches fire spontaneously if exposed to air Indication: H250 | |
| 340118 | Contains refrigerated gas; may cause cryogenic burns or injury Indication: H281 | |
| 340136 | Explosive; mass explosion hazard Indication: H201 | |
| 340137 | Fatal if inhaled Indication: H330. Use combined sentence if more than one route | |
| 340139 | Fatal in contact with skin Indication: H310. Use combined sentence if more than one route | |
| 340156 | Flammable solid | |

| 34 GHS Classification | | |
|-----------------------|--|----------------|
| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
| | Indication: H228 | |
| 340157 | Harmful if inhaled [P1] Indication: H332. Use combined sentence if more than one route Parameters: 4 parameters: P1: (dust); (gas); (mist); (vapour) | |
| 340161 | Heating may cause a fire Indication: H242 | |
| 340162 | May be corrosive to metals Indication: H290 | |
| 340163 | May be fatal if swallowed and enters airways Indication: H304 | |
| 340164 | May be harmful if inhaled [P1] Indication: H333. Use combined sentence if more than one route Parameters: 4 parameters: P1: (dust); (gas); (mist); (vapour) | |
| 340165 | May be harmful if swallowed and enters airways Indication: H305 | |
| 340185 | May damage fertility or the unborn child Indication: H360. State specific effect if known.State route of exposure if it is conclusive proven that no other routes of exposure cause the hazard. Use 340258 | |
| 340187 | May intensify fire; oxidizer Indication: H272 | |
| 340193 | Toxic if inhaled [P1] Indication: H331. Use combined sentence if more than one route Parameters: – | No parameters! |
| 340194 | Toxic to aquatic life with long lasting effects Indication: H411 | |
| 340195 | Very toxic to aquatic life with long lasting effects Indication: H410 | |
| 340207 | May cause [P1], or][" if "P2] Parameters: 5 parameters: P1: allergic or asthmatic symptoms; breathing difficulties; cancer; P2: inhaled; swallowed | |
| 340208 | zSymbol: Corr-Skull | |
| 340209 | Self-heating in large quantities; may catch fire. Indication: H252 | |
| 340210 | Causes severe skin burns and eye damage Indication: H314 | |
| 340212 | Causes skin irritation Indication: H315. Use combined sentence 340217 if there is also eye irritation | |
| 340213 | Causes mild skin irritation Indication: H316 | |
| 340214 | Causes serious eye damage Indication: H318 | |
| 340215 | Causes serious eye irritation Indication: H319 | |
| 340216 | Causes eye irritation Indication: H320. Use combined sentence 340217 if there is also skin irritation | |

| 34 GHS Classification | | |
|------------------------------|--|--------------------|
| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
| 340217 | Causes skin and eye irritation | |
| 340218 | Extremely flammable liquid and vapour Indication: H224 | |
| 340219 | Flammable gas Indication: H221 | |
| 340220 | Fatal if swallowed or in contact with skin | |
| 340221 | Fatal if swallowed or if inhaled | |
| 340222 | Fatal in contact with skin or if inhaled | |
| 340223 | Fatal if swallowed, in contact with skin or if inhaled | |
| 340224 | Toxic if swallowed or in contact with skin | |
| 340225 | Toxic if swallowed or if inhaled | |
| 340226 | Toxic in contact with skin or if inhaled | |
| 340227 | Toxic if swallowed, in contact with skin or if inhaled | |
| 340228 | Harmful if swallowed or in contact with skin | |
| 340229 | Harmful if swallowed or if inhaled | |
| 340230 | Harmful in contact with skin or if inhaled | |
| 340231 | Harmful if swallowed, in contact with skin or if inhaled | |
| 340232 | May be harmful if swallowed or in contact with skin | |
| 340233 | May be harmful if swallowed or if inhaled | |
| 340234 | May be harmful in contact with skin or if inhaled | |
| 340235 | May be harmful if swallowed, in contact with skin or if inhaled | |
| 340236 | May cause long lasting harmful effects to aquatic life Indication: H413 | |
| 340237 | In contact with water releases flammable gases Indication: H261 | |
| 340238 | May cause respiratory irritation Indication: H335 | |
| 340239 | May cause drowsiness or dizziness Indication: H336 | |
| 340240 | Unstable explosive Indication: H200 | |
| 340241 | Explosive; severe projection hazard Indication: H202 | |
| 340242 | Explosive; fire, blast or projection hazard Indication: H203 | |
| 340243 | Fire or projection hazard Indication: H204 | |
| 340244 | May mass explode in fire Indication: H205 | |
| 340245 | Heating may cause an explosion Indication: H240 | |
| 340246 | Heating may cause a fire or explosion Indication: H241 | |
| 340247 | Extremely flammable aerosol Indication: H222 | |
| 340248 | Flammable aerosol Indication: H223 | |
| 340249 | May cause harm to breast-fed children | |

| 34 GHS Classification | | |
|------------------------------|---|--------------------|
| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
| | Indication: H362 | |
| 340250 | May cause allergy or asthma symptoms or breathing difficulties if inhaled Indication: H334 | |
| 340251 | May cause an allergic skin reaction Indication: H317 | |
| 340252 | May cause genetic defects Indication: H340. State route of exposure if it is conclusive proven that no other routes of exposure cause the hazard | |
| 340253 | Suspected of causing genetic defects Indication: H341. State route of exposure if it is conclusive proven that no other routes of exposure cause the hazard | |
| 340254 | May cause cancer Indication: H350. State route of exposure if it is conclusive proven that no other routes of exposure cause the hazard. | |
| 340255 | Suspected of causing cancer Indication: H351. State route of exposure if it is conclusive proven that no other routes of exposure cause the hazard | |
| 340256 | Harms public health and the environment by destroying ozone in the upper atmosphere Indication: H420. Any of controlled substances listed in Annexes of the Montreal protocol or any mixture containing at least one of those substances at a concentration > 0.1 %. http://ozone.unep.org/en/handbook-montreal-protocol-substances-deplete-ozone-layer/44 | |
| 340257 | Self-heating; may catch fire Indication: H251 | |
| 340258 | May damage fertility or the unborn child [" if "P2] Indication: H360 Parameters: 3 parameters: P2: in contact with skin; ingested; inhaled | |
| 340259 | Suspected of damaging fertility or the unborn child [" if "P2] Indication: H361 Parameters: 3 parameters: P2: in contact with skin; ingested; inhaled | |
| 340260 | No hazard classification according to GHS criteria | |
| 340261 | Insufficient data for GHS classification | |
| 340278 | Pressurized container: may burst if heated Indication: H229 | |
| 340279 | May react explosively even in the absence of air Indication: H230 | |
| 340280 | May react explosively even in the absence of air at elevated pressure and/or temperature Indication: H231 | |
| 340281 | See Notes | |

Disallowed sentences in GHS Classification

| 34 GHS Classification | | |
|------------------------------|--|--------------------|
| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
| 340025 | Fatal if inhaled vapour Motivation: covered by 340024 + parameter. Not used on any ICSC (CGC 27-11-2017) | |
| 340037 | Harmful if inhaled vapour Motivation: covered by 340157 + parameter. Not used on any ICSC (CGC 27-11-2017) | |

| 34 GHS Classification | | |
|-----------------------|--|-------------|
| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
| 340044 | May be harmful if inhaled dust Motivation: covered by 340164 + parameter. Not used on any ICSC (CGC 27-11-2017) | |
| 340058 | Suspected of causing [P1] Parameters: 3 parameters: P1: cancer; cancer if inhaled; genetic defects Motivation: covered by 340253 + 340255. Not used on any ICSC (CGC 27-11-2017) | |
| 340061 | Toxic Motivation: unknown | |
| 340062 | Toxic if inhaled vapour Motivation: unknown | |
| 340138 | Fatal if inhaled dust Motivation: unknown | |
| 340158 | Harmful if inhaled dust Motivation: unknown | |
| 340186 | May damage fertility or the unborn child if inhaled Motivation: delete (=covered by 340258). Used in ICSC 0003 and 0023 (CGC 27-11-2017) | |
| 340200 | Fatal if inhaled mist Motivation: unknown | |
| 340204 | May be harmful if inhaled vapour Motivation: delete (=covered by 340164). Used in ICSC 1341 and 1722 (CGC 27-11-2017) | |
| 340206 | Fatal if inhaled mist Motivation: unknown | |
| 340266 | Toxic if inhaled ([P1]) Parameters: 4 parameters: P1: dust; gas; mist; vapour Motivation: unknown | |
| 340282 | May cause cancer if inhaled Motivation: delete (=covered by 340207). Used in 0064. (CGC 27-11-2017) | |

Transportation – UN Classification

| 33 UN Classification | | |
|----------------------|--|-------------|
| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
| 330000 | <p>UN Classification</p> <p>Explanation:</p> <p>Class 1. Explosives:</p> <p>Division 1.1 Substances & articles which have a mass explosion hazard. (NOTE: A mass explosion is one which affects almost the entire load virtually instantaneously.)</p> <p>Division 1.2 Substances & articles which have a projection hazard but not a mass explosion hazard.</p> <p>Division 1.3 Substances & articles which have a fire hazard and either a minor blast hazard or a minor projection hazard or both, but not a mass explosion hazard.</p> <p>Division 1.4 Substances & articles which present no significant hazard.</p> <p>Division 1.5 Very insensitive substances & articles; mass explosion hazard.</p> <p>Division 1.6 Extremely insensitive articles; no mass explosion hazard.</p> <p>Class 2. Gases (compressed, liquefied, dissolved under pressure, or refrigerated):</p> <p>This class comprises (a) permanent gases - gases which cannot be liquefied at ambient temperatures; (b) liquefied gases - gases which come liquid under pressure at ambient temperatures; (c) dissolved - gases dissolved under pressure in a solvent, which may be absorbed in a porous material; and (d) refrigerated permanent gases such as liquid air, oxygen, etc.</p> <p>Division 2.1 Flammable gases</p> | |

| 33 UN Classification | | |
|----------------------|---|-------------|
| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
| | <p>Division 2.2 Non-flammable, non-toxic gases</p> <p>Division 2.3 Toxic gases.</p> <p>Class 3. Flammable Liquids: Flammable liquids are liquids, or mixtures of liquids, or liquids containing solids in solution or suspension (for example, paints, varnishes, lacquers, etc., but not including substances otherwise classified on account of their dangerous characteristics) which give off a flammable vapour at temperatures of not more than 60.5°C, closed-cup test, or not more than 65.6°C, open-cup test.</p> <p>Class 4. Flammable Solids: Substances liable to spontaneous combustion; substances which, on contact with water, emit flammable gases.</p> <p>Division 4.1 Flammable solids, self-reactive substances, solid desensitized explosives and polymerizing substances. Solids, other than those classed as explosives, which under conditions encountered in transport are readily combustible, or may cause or contribute to fire through friction.</p> <p>Division 4.2 Substances liable to spontaneous combustion. Substances liable to spontaneous heating under normal conditions encountered in transport, or heating up in contact with air, and being then liable to catch fire.</p> <p>Division 4.3 Substances which, on contact with water, emit flammable gases.</p> <p>Class 5. Oxidizing substances; organic peroxides</p> <p>Division 5.1 Oxidizing substances. Substances which, while in themselves not necessarily combustible, may, generally by yielding oxygen, cause, or contribute to, the combustion of other materials.</p> <p>Division 5.2 Organic peroxides. Organic substances which contain the bivalent -O-O- structure and may be considered derivatives of hydrogen peroxide, where one or both of the hydrogen atoms have been replaced by organic radical.</p> <p>Class 6. Poisonous (toxic) and infectious substances.</p> <p>Division 6.1 Poisonous (toxic) substances. These substances are liable either to cause death or serious injury or to harm human health if swallowed or inhaled, or by skin contact.</p> <p>Division 6.2 Infectious substances. Substances containing viable micro-organisms or their toxins which are known, or suspected, to cause disease in animal or humans.</p> <p>Class 7. Radioactive material. A radioactive material is defined as any material for which the specific activity is greater than 70 kBq/kg (0.002 microCi/g).</p> <p>Class 8. Corrosives. These are substances which, by chemical action, will cause severe damage when in contact with living tissue, or, in case of leakage, will materially damage, or even destroy, other goods or the means of transport; they may also cause other hazards.</p> <p>Class 9. Miscellaneous dangerous substances. These are substances and articles which during the transport present a danger not covered by other classes.</p> <p>Indication: Mention when available; see 33 f for the UN number. Complete with the applicable number which can be found in the United Nations Recommendations on the Transport of Dangerous Goods, latest revised edition, available in UNECE website below the menu 'UN Model Regulations' (https://www.unece.org/trans/danger/publi/unrec/rev20/20files_e.html). See also the latest edition of the legal file of the International Register of Potentially Toxic Chemicals (IRPTC) of United Nations Environment Programme, Geneva. Also mention the UN Subsidiary Risks (330002) and Packing Group (330003).</p> | |
| 330001 | <p>UN Hazard Class: [P1]; ;].</p> <p>Parameters: 25 parameters: P1: 1; 1.1; 1.1D; 1.1D (Desensitized); 2; 2.1; 2.2; 2.3; 3; 4; 4.1; 4.1 (wetted); 4.2; 4.2 (calcium pyrophoric); 4.2 (dry); 4.3; 5; 5.1; 5.2; 5.3; 6; 6.1; 7; 8; 9</p> | 23503000 |
| 330002 | <p>UN Subsidiary Risks: [P1], [and]</p> <p>Parameters: 24 parameters: P1: 1; 1.1D; 2; 2.1; 2.2; 2.3; 3; 4; 4.1; 4.1 (wetted); 4.2; 4.2 (calcium pyrophoric); 4.2 (dry); 4.3; 5; 5.1; 5.2; 5.3; 6; 6.1; 6.1 (Desensitized); 7; 8; 9</p> <p>CGC remarks: In UN model 2017, the term 'Risks' has been replaced with 'Hazards'.</p> | 23504000 |
| 330003 | <p>UN Pack Group: [P1], [,]</p> <p>Explanation: The recommendations on the packing of dangerous goods are based, in the main, on existing international and national regulations. Account is also taken of a prevailing trend to replace the detailed specifications of packaging, which may vary considerably from one country to another, by tests designed to ensure that packages containing dangerous goods can withstand normal conditions of transport and to ensure the</p> | 23505000 |

| 33 UN Classification | | |
|-----------------------------|---|--------------------|
| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
| | <p>desirable level of safety. When drafting the recommendations sight was not lost of improvements and changes that may occur as a result of progress in science and technology. So provisions are made for the use of packaging which, while not complying exactly with the specifications set out in the recommendations, would be nevertheless as satisfactory in every respect as those that do, and would successfully pass the recommended tests when prepared for transport.</p> <p>Indication: Dangerous goods of all classes other than UN Hazard Classes 1, 2, 6.2, and 7 (see 330001) have for packing purposes been divided among three groups according to the degree of danger they present: great danger: Packing Group I; medium danger: Packing Group II; and minor danger: Packing Group III.</p> <p>Parameters: 4 parameters: P1: I; I (calcium pyrophoric); II; III</p> | |
| 330005 | Carriage by some modes of transport is prohibited. | |

OCCUPATIONAL EXPOSURE LIMITS (OEL)

Since the migration to the current database system, the card section 'Occupational exposure limits' (Field 69), has been difficult to fill out for Compilers, due to 'migration/programming complications' encountered. Regarding the OEL field, the Compilers were advised: DO NOT TOUCH! ("the Secretariat will complete this field after the Peer Review meeting").

As of 2018 a new field (Field 79) for entering OEL values has become available to compilers.

In this field three types of OELs can be entered: TLVs (by the ACGIH), MAKs (by the German DFG), and EULs (by the European SCOEL).

| 79 Occupational exposure limits | | |
|---------------------------------|---|-------------|
| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
| | <p>CGC The available sentences and parameters should be self-explanatory.</p> <p>remarks: If desired, new indications for this field and its sentences will be developed.</p> | |

NOTES

In May 2017 there were 1161 sentences available for the section notes. Since then, the number of available sentences has been reduced, but it still is a considerable list. Therefore, listing them all here would cover (too) many pages. The reader is referred to the database itself.

| 87 Notes | | |
|----------|--|-------------|
| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
| | <p>CGC The available sentences and parameters should be self-explanatory.</p> <p>remarks: If desired, new indications for this field and its sentences can/will be developed.</p> <p>This still needs further work. The Compilers Guide Committee will gladly accept any suggestions that could improve the use of this field.</p> <p>Some suggestions that can be thought off are:</p> <ul style="list-style-type: none"> - If possible, parameter sentences should be used for similar sentences. - Another long standing wish of the compilers is the possibility of numbering the notes (sentences). This would allow for showing on a card e.g. 'See Note 3'. | |
| 870001 | [T1] | |
| 870002 | Temperature of decomposition is unknown in the literature. | |
| 870003 | The apparent melting point caused by loss of crystal water is given. | |
| ... | ... | |
| 871575 | Data for the isomers: cis-isomer (CAS 156-59-2), trans isomer (CAS 156-60-5), other boiling point 60.3, melting point -81.5°C (cis), -49.4°C (trans); flash point c.c. 6°C (cis), 2-4°C (trans); relative density (water = 1) 1.28 (cis), 1.26 (trans); vapour pressure 24.0 kPa (cis), 35.3 kPa (trans) at 20°C; relative density of the vapour/air-mixture at 20°C (air = 1): 1.6 (cis), 1.8 (trans); octanol/water partition coefficient as log Pow: 1.86 (cis), 2.09 (trans). | |

ADDITIONAL INFORMATION

The ICSC section Additional Information is reserved for information specific to a translation, a region or a country and may contain information about local legislation, national Occupational Exposure Limit values, European CLP labelling, et cetera.

The identifier “EC number” (EC#) has been renamed to “EU-CLP Index number” and moved from the Identification section on top of the card to the section ADDITIONAL INFORMATION.

| 86 Additional information | | |
|---|--|-----------------|
| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# link PB# |
| 860001 | [T1] | |
| 140001 | EC #: [N1]; ;] | |
| 140002 | EC #: [N1] ([P1]) Parameters: 2 parameters: P1: lead compounds; pyrophoric | |
| CGC remarks: The identifier “EC number” (EC#) has been renamed to “EU-CLP Index number”. | | |

Disallowed field: EC Classification

On the older ICSC layout the EC Classification was positioned under the section PACKAGING & LABELLING; in the new ICSC layout (as of October 2017) this field has been moved to the section ADDITIONAL INFORMATION (together with EC-CLP Index number).

The former EU system of classification and labelling of chemicals (a.k.a. DSD) has been replaced by the REACH directive and the CLP system, based on the GHS (but with some specific differences).

Therefore, the (former) EC Classification does not need to be updated anymore.

| 32 EC Classification | | |
|---|--|-------------|
| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# / notes |
| CGC remarks: The (former) EC Classification are <i>disallowed</i> and do not need to be updated anymore . It has been suggested to replace the former classification (in ADDITIONAL INFORMATION) with the current CLP. This has to be a Peer Review decision. | | |
| 320001 | Symbol: [P1 , ,]. Parameters: 10 parameters: P1: C; E; F; F+; N; O; T; T+; Xi; Xn | |
| 320002 | R: [P1 - -] Parameters: 123 parameters: P1: 1; ... 9 | |
| 320003 | S: [P1 - -] Parameters: 82 parameters: P1: ... 9 | |
| 320004 | Note: [P1 , ,]. Parameters: 37 parameters: P1: 0; ... Z | |

REFERENCES

References are listed with a unique number [N1], usually preceded with the @ symbol. In the text parameter the full biographic details can be listed.

| 98 References | | |
|---------------|---|-----------------|
| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# link PB# |
| 870001 | @[N1].[T2] | |

COMMENTS

The comments field is not visible on the published ICSC and only serves for the compilers to enter data (e.g. quotes from references) to motivate the selection of sentences in the different fields.

Comments are organized in sentences for each field. The [T1] parameter can be filled with this text.

| 99 Comments | | |
|-------------|---|-----------------|
| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# link PB# |
| 990000 | Comments Indication: Maintain the same order as the fields in this compilers guide (see the ROADMAP). Avoid selecting a sentence twice. | |
| 990013 | {R46} Explosion - Prevention: [T1] | |
| 990018 | {R18} Emergency Response: [T1] | |
| 990042 | {R42} Fire - Acute hazards: [T1] | |
| 990043 | {R43} Fire - Prevention: [T1] | |
| 990044 | {R44} Fire - First Aid: [T1] | |
| 990045 | {R45} Explosion - Acute hazards: [T1] | |
| 990047 | {R47} Explosion - First Aid: [T1] | |
| 990050 | {R50} Exposure - First Aid: [T1] | |
| 990051 | {R51} Inhalation - Acute hazards: [T1] | |
| 990052 | {R52} Inhalation - Prevention: [T1] | |
| 990053 | {R53} Inhalation - First Aid: [T1] | |
| 990054 | {R54} Skin - Acute hazards: [T1] | |
| 990055 | {R55} Skin - Prevention: [T1] | |
| 990056 | {R56} Skin - First Aid: [T1] | |
| 990057 | {R57} Eyes - Acute hazards : [T1] | |
| 990058 | {R58} Eyes - Prevention: [T1] | |
| 990059 | {R59} Eyes - First Aid: [T1] | |
| 990060 | {R60} Ingestion - Acute hazards: [T1] | |
| 990061 | {R61} Ingestion - Prevention: [T1] | |
| 990062 | {R62} Ingestion - First Aid: [T1] | |
| 990063 | {R63} Spillage Disposal: [T1] | |
| 990064 | {R64} Storage: [T1] | |
| 990065 | {R65} Packaging & Labelling: [T1] | |
| 990066 | {R66} Physical State; Appearance: [T1] | |
| 990067 | {R67} Physical Dangers: [T1] | |
| 990068 | {R68} Chemical Dangers: [T1] | |
| 990069 | {R69} Occupational Exposure Limits: [T1] | |
| 990070 | {R70} Routes of Exposure: [T1] | |
| 990071 | {R71} Inhalation Risk: [T1] | |
| 990072 | {R72} Effects of Short-term Exposure: [T1] | |
| 990073 | {R73} Effects of Long-term or Repeated Exposure: [T1] | |
| 990074 | {R74} Boiling point: [T1] | |
| 990075 | {R75} Melting point: [T1] | |
| 990076 | {R76} Relative density: [T1] | |
| 990077 | {R77} Solubility in water: [T1] | |
| 990078 | {R78} Vapour pressure: [T1] | |

| 99 Comments | | |
|-------------|---|-----------------|
| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# link PB# |
| 990079 | {R79} Relative vapour density: [T1] | |
| 990080 | {R80} Relative density of the vapour/air-mixture at 20°C: [T1] | |
| 990081 | {R81} Flash point: [T1] | |
| 990082 | {R82} Auto-ignition temperature: [T1] | |
| 990083 | {R83} Explosion limits: [T1] | |
| 990084 | {R84} Octanol/water partition coefficient as log Pow: [T1] | |
| 990085 | {R85} Environmental Data: [T1] | |
| 990086 | {R86} Additional Information: [T1] | |
| 990087 | {R87} Notes: [T1] | |
| 990098 | {R98} Physical properties - Other information: [T1] | |
| 990187 | {R187} Name, synonyms: [T1] | |
| 990216 | {R216} Identification: [T1] | |
| 990228 | {R228} GHS Classification: [T1] | |
| 990229 | {R99} Viscosity: [T1] | |
| 990230 | {R48} Exposure - Acute hazards: [T1] | |
| 990231 | {R49} Exposure - Prevention: [T1] | |
| 990233 | {R32} EU Classification: [T1] | |

HISTORY

Like the comments field, the history field is also not visible on the published ICSC. It contains administrative data about the ICSC, which can be entered by the secretariat and the compilers.

| 97 History | | |
|------------|---|-----------------|
| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# link PB# |
| 970001 | Authors: [T1] | |
| 970002 | Date of Peer-Review: [T1] | |
| 970003 | Date of Review at IPH: [T1] | |
| 970004 | Modifications: [T1] | |
| 970005 | Number: [T1] | |
| 970006 | Peer-Review Status: [T1] | |
| 970007 | Remark: [T1] | |
| 970008 | Second Reviewer: [T1] | |
| 970009 | PI: [T1] | |
| 970010 | Meeting location: [T1] | |
| 970011 | Last entry of CHEMISTRY data: [T1] | |
| 970012 | Last entry of BIOLOGY data: [T1] | |

Discontinued (disallowed) field: Emergency response

The field EMERGENCY RESPONSE does not appear on the new layout (per October 2017). Sentences regarding the NFPA Code and Transport Emergency Cards do not need to be updated / will be deleted.

| 18 Emergency response | | |
|-----------------------|--|-----------------|
| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# link PB# |
| | CGC remarks: As confirmed by older meeting reports regarding the PR discussion and decisions about the new layout, this Field and all their sentences can be removed by the secretariat / database management. | |
| 640001 | NFPA Code: [P1]; ;]. Parameters: 25 parameters: P1: 0; F; F-; F0; F1; F2; F3; F4; H; H-; H0; H1; H2; H3; H4; OX; R; R-; R0; R1; R1 (uncoated); R2; R3; R4; W | to be deleted |
| 640002 | Transport Emergency Card: TEC (R)-[N1]. | to be deleted |
| 640003 | Transport Emergency Card: TEC (R)-[N1] or [N2]. | to be deleted |
| 640004 | Transport Emergency Card: TEC (R)-[N1]; ;] [("P2")]. | to be deleted |

| 18 Emergency response | | |
|------------------------------|--|-------------------------------|
| SentID | Model text, parameters and parameter values (with Indications and Explanations) | PB# link PB# |
| | Parameters: 6 parameters: P2: Barium compounds; liquid; molten; only for the hot product; pyrophoric; solid | |
| 640005 | Transport Emergency Card: TEC (R)- see Notes. | to be deleted |

Appendices

List of GHS hazard statements and EU CLP Annex III supplemental information

GHS hazard statements

Version Rev. 7.

Table A3.1.1: Hazard statement codes for physical hazards

| Code (1) | Physical hazard statements (2) |
|----------|---|
| H200 | Unstable explosive |
| H201 | Explosive; mass explosion hazard |
| H202 | Explosive; severe projection hazard |
| H203 | Explosive; fire, blast or projection hazard |
| H204 | Fire or projection hazard |
| H205 | May mass explode in fire |
| H206 | Fire, blast or projection hazard; increased risk of explosion if desensitizing agent is reduced |
| H207 | Fire or projection hazard; increased risk of explosion if desensitizing agent is reduced |
| H208 | Fire hazard; increased risk of explosion if desensitizing agent is reduced |
| | |
| H220 | Extremely flammable gas |
| H221 | Flammable gas |
| H222 | Extremely flammable aerosol |
| H223 | Flammable aerosol |
| H224 | Extremely flammable liquid and vapour |
| H225 | Highly flammable liquid and vapour |
| H226 | Flammable liquid and vapour |
| H227 | Combustible liquid |
| H228 | Flammable solid |
| H229 | Pressurized container: may burst if heated |
| | |
| H230 | May react explosively even in the absence of air |
| H231 | May react explosively even in the absence of air at elevated pressure and/or temperature |
| H232 | May ignite spontaneously if exposed to air |
| | |
| H240 | Heating may cause an explosion |
| H241 | Heating may cause a fire or explosion |
| H242 | Heating may cause a fire |
| | |
| H250 | Catches fire spontaneously if exposed to air |
| H251 | Self-heating; may catch fire |
| H252 | Self-heating in large quantities; may catch fire |
| | |
| H260 | In contact with water releases flammable gases which may ignite spontaneously |
| H261 | In contact with water releases flammable gas |
| | |
| H270 | May cause or intensify fire; oxidizer |
| H271 | May cause fire or explosion; strong oxidizer |
| H272 | May intensify fire; oxidizer |
| | |
| H280 | Contains gas under pressure; may explode if heated |
| H281 | Contains refrigerated gas; may cause cryogenic burns or injury |
| | |
| H290 | May be corrosive to metals |

Table A3.1.2: Hazard statement codes for health hazards

| Code (1) | Health hazard statements (2) |
|-------------|--|
| H300 | Fatal if swallowed |
| H301 | Toxic if swallowed |
| H302 | Harmful if swallowed |
| H303 | May be harmful if swallowed |
| H304 | May be fatal if swallowed and enters airways |
| H305 | May be harmful if swallowed and enters airways |
| H310 | Fatal in contact with skin |
| H311 | Toxic in contact with skin |
| H312 | Harmful in contact with skin |
| H313 | May be harmful in contact with skin |
| H314 | Causes severe skin burns and eye damage |
| H315 | Causes skin irritation |
| H316 | Causes mild skin irritation |
| H317 | May cause an allergic skin reaction |
| H318 | Causes serious eye damage |
| H319 | Causes serious eye irritation |
| H320 | Causes eye irritation |
| H330 | Fatal if inhaled |
| H331 | Toxic if inhaled |
| H332 | Harmful if inhaled |
| H333 | May be harmful if inhaled |
| H334 | May cause allergy or asthma symptoms or breathing difficulties if inhaled |
| H335 | May cause respiratory irritation |
| H336 | May cause drowsiness or dizziness |
| H340 | May cause genetic defects (state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard) |
| H341 | Suspected of causing genetic defects (state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard) |
| H350 | May cause cancer (state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard) |
| H351 | Suspected of causing cancer (state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard) |
| H360 | May damage fertility or the unborn child (state specific effect if known)(state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard) |
| H361 | Suspected of damaging fertility or the unborn child (state specific effect if known)(state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard) |
| H362 | May cause harm to breast-fed children |
| H370 | Causes damage to organs (or state all organs affected, if known) (state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard) |
| H371 | May cause damage to organs (or state all organs affected, if known)(state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard) |
| H372 | Causes damage to organs (state all organs affected, if known) through prolonged or repeated exposure (state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard) |

| Code (1) | Health hazard statements (2) |
|-----------------------|---|
| H373 | May cause damage to organs (state all organs affected, if known) through prolonged or repeated exposure (state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard) |
| H300+H310 | Fatal if swallowed or in contact with skin |
| H300+H330 | Fatal if swallowed or if inhaled |
| H310+H330 | Fatal in contact with skin or if inhaled |
| H300+H310+H330 | Fatal if swallowed, in contact with skin or if inhaled |
| H301+H311 | Toxic if swallowed or in contact with skin |
| H301+H331 | Toxic if swallowed or if inhaled |
| H311+H331 | Toxic in contact with skin or if inhaled |
| H301+H311+H331 | Toxic if swallowed, in contact with skin or if inhaled |
| H302+H312 | Harmful if swallowed or in contact with skin |
| H302+H332 | Harmful if swallowed or if inhaled |
| H312+H332 | Harmful in contact with skin or if inhaled |
| H302+H312+H332 | Harmful if swallowed, in contact with skin or if inhaled |
| H303+H313 | May be harmful if swallowed or in contact with skin |
| H303+H333 | May be harmful if swallowed or if inhaled |
| H313+H333 | May be harmful in contact with skin or if inhaled |
| H303+H313+H333 | May be harmful if swallowed, in contact with skin or if inhaled |
| H315+H320 | Causes skin and eye irritation |

Table A3.1.3: Hazard statement codes for environmental hazards

| Code (1) | Environmental hazard statements (2) |
|-------------|---|
| H400 | Very toxic to aquatic life |
| H401 | Toxic to aquatic life |
| H402 | Harmful to aquatic life |
| H410 | Very toxic to aquatic life with long lasting effects |
| H411 | Toxic to aquatic life with long lasting effects |
| H412 | Harmful to aquatic life with long lasting effects |
| H413 | May cause long lasting harmful effects to aquatic life |
| H420 | Harms public health and the environment by destroying ozone in the upper atmosphere |

EU CLP Annex III - supplemental information

Part 2. Supplemental hazard information.

Table 2.1: Physical properties

| Code (1) | Environmental hazard statements (2) |
|----------------|---|
| EUH 001 | Explosive when dry. |
| EUH 014 | Reacts violently with water. |
| EUH 018 | In use may form flammable/explosive vapour-air mixture. |
| EUH 019 | May form explosive peroxides. |
| EUH 044 | Risk of explosion if heated under confinement. |

Table 2.2: Health properties

| Code (1) | Environmental hazard statements (2) |
|----------------|---|
| EUH 029 | Contact with water liberates toxic gas. |
| EUH 031 | Contact with acids liberates toxic gas. |
| EUH 032 | Contact with acids liberates very toxic gas. |
| EUH 066 | Repeated exposure may cause skin dryness or cracking. |
| EUH 070 | Toxic by eye contact. |
| EUH 071 | Corrosive to the respiratory tract. |

Part 3. supplemental supplemental label elements/information on mixtures.

| Code (1) | Environmental hazard statements (2) |
|---------------------|--|
| EUH 201/201A | Contains lead. Should not be used on surfaces liable to be chewed or sucked by children. Warning! Contains lead. |
| EUH 202 | Cyanoacrylate. Danger. Bonds skin and eyes in seconds. Keep out of reach of children. |
| EUH 203 | Contains chromium (VI). May produce an allergic reaction. |
| EUH 204 | Contains isocyanates. May produce an allergic reaction. |
| EUH 205 | Contains epoxy constituents. May produce an allergic reaction. |
| EUH 206 | Warning! Do not use together with other products. May release dangerous gases (chlorine). |
| EUH 207 | Warning! Contains cadmium. Dangerous fumes are formed during use. See information supplied by the manufacturer. Comply with the safety instructions. |
| EUH 208 | Contains <name of the sensitising substance>. May produce an allergic reaction. |
| EUH 209/209A | Can become highly flammable in use. Can become flammable in use. |
| EUH 210 | Safety data sheet available on request. |
| EUH 401 | To avoid risks to human health and the environment, comply with the instructions for use. |

Calculation of the saturated vapour pressure of organic liquids

Based on the article of Hass and Newton in CRC Handbook of Chemistry and Physics (annexed) the following formula has been derived:

$$p_{20} = (1013/760) \times 10^c$$

p_{20} = saturated vapour pressure at 20°C in mbar

$$c = 2.8808 - \frac{(a_n \times t_b + b_n) (t_b - 20)}{296.1 - 0.15 t_b}$$

The group number can be found in the list in the article of Hass and Newton or by using the group number classification (see below).

After the group number has been determined, a_n and b_n can be read from the table:

| n | a_n | b_n |
|---|--------|-------|
| 1 | 0.0021 | 4.31 |
| 2 | 0.0021 | 4.54 |
| 3 | 0.0021 | 4.77 |
| 4 | 0.0022 | 5.00 |
| 5 | 0.0023 | 5.22 |
| 6 | 0.0023 | 5.44 |
| 7 | 0.0023 | 5.67 |
| 8 | 0.0023 | 5.90 |

Group number classification:

| Substance group | n |
|---|---|
| - hydrocarbons and substances with relatively few elements other than C and H | 2 |
| - ethers | |
| - silicones | |
| - sulphides | |
| - aldehydes | 3 |
| - epoxy-compounds | |
| - esters (higher) | |
| - ketones | |
| - compounds containing N | 4 |
| - esters (lower; relatively high O ₂ content) | |
| - phenols (also higher and polyvalent phenols) | |
| - carboxylic acids | 5 |
| - acid anhydrides | |
| - alcohols | 7 |
| - glycols | |
| - water | |

Halogen derivatives: same group as though halogen were H.

Select n = 4 for substances difficult to classify.

N.B.: Calculated p_{20} values < 0.1 mbar can deviate considerably from the real value.
Divide by 10 to convert p_{20} from mbar (=hPa) into kPa.

Calculation of the density of vapours as a means of estimating their pattern of dispersion

When vapours that are dangerous for reasons of health or flammability can be liberated from a liquid, it is necessary to know their density ratio to air in order to be able to estimate their pattern of dispersion.

Vapours which are approximately as heavy as, or slightly heavier than, air will mix easily with the surrounding air, while heavy vapours will travel along the ground without diluting themselves, causing accumulation in lower spaces.

The vapour density ratio to air is therefore mentioned in most of the important handbooks on dangerous substances. In these handbooks the density (d) is calculated with the formula d (to air) = $M/29$, where M = the molecular mass of the vapour and 29 = the molecular mass of air. This formula follows from the fact that all gases and vapours have equal molar volumes at the same temperature and pressure. Using this formula for acetic acid ($M = 60.0$) leads to the conclusion that the vapour of the acid is 2.1 x heavier than air.

However, this formula is only valid for a pure vapour unmixed with air. With evaporating liquids, however, a vapour/air mixture is formed in which the percentage of vapour increases with the temperature. When the boiling point of the liquid is reached and the vapour pressure becomes 1 atmosphere, the vapour will not contain air. The formula d (to air) = $M/29$ will only then be valid.

Thus, the vapour of acetic acid is 2.1 times as heavy as air only when the temperature of both the acid and the air is above 118°C (the boiling point of acetic acid). At all temperatures below the boiling point, a vapour/air mixture is formed which has a much lower density ratio to the surrounding air. In order to calculate the real density to air ratio of the vapour/air mixture of a liquid at for instance 20°C, the following formula has to be used:

$$d_m \text{ (to air)} = 1 + \frac{(M - 29) p_{20}}{29 \times 1013}$$

$$= 1 + 34 \times 10^{-6} \times p_{20} \times (M - 29)$$

where p_{20} = the saturated vapour pressure in mbar at 20°C.

Comparing the results of both formulae for a number of liquids results in the following values:

| | d | d_m |
|---------------------|-----|-------|
| acetic acid | 2.1 | 1.02 |
| acetone | 2.0 | 1.2 |
| hexachlorobutadiene | 9.0 | 1.004 |
| n-pentane | 2.5 | 1.8 |
| tetrachloroethylene | 5.8 | 1.09 |
| trichloroethylene | 4.5 | 1.3 |

It is clear from this table that an estimation of the dispersion pattern of a vapour at room temperature based on a d value given in one of the handbooks can be grossly incorrect.

Moreover, it is probable that the vapour concentration will rarely, if ever, reach the saturation point, so that in practice the density of the vapour will be under the calculated d_m value.

Finally, a rule of thumb for the application of d_m to air values at 20°C:

At values under 1.1. one may expect a reasonably fast mixing of the vapour with the surrounding air in most situations; at values above 1.1. one should be prepared to find the forming of vapours which travel along the ground and mix poorly with the surrounding air.

Derivation of the formula:

$$\begin{aligned}d_m &= \text{density of the vapour/air mixture which is formed at } 20^\circ\text{C in relation to air.} \\ &= \frac{\text{vapour mass} + \text{air mass}}{\text{air mass}} \quad \begin{array}{l} \text{(in 1 litre mixture) at } 20^\circ\text{C and } 1013 \text{ mbar} \\ \text{(in 1 litre air)} \end{array} \\ &= \frac{(M/22.4 \times 273/293 \times p_{20}/1013) + (29/22.4 \times 273/293 \times (1013 - p_{20})/1013)}{29/22.4 \times 273/293 \times 1013/1013}\end{aligned}$$

(The molar vapour volume at 0°C and 1013 mbar is 22.4 liter)

$$\begin{aligned}&= 1 + \frac{(M - 29) p_{20}}{29 \times 1013} \\ &= 1 + 34 \times p_{20} \times 10^{-6} (M - 29)\end{aligned}$$

Reference:

Mutgeert, B.J. (1983) The calculation of the density of vapours, Proceedings 10th World Congress of Occupational Accidents and Diseases, Ottawa.

Minimum ignition energy

Minimum ignition energy in mJ

| | | | | | |
|----------------------------|-------|---------------------|-------|----------------------|-------|
| acetaldehyde | 0.37 | dimethyl ether | 0.29 | methane | 0.28 |
| acetone | 1.15 | dimethyl propane | 1.57 | methanol | 0.14 |
| acetylene | 0.017 | dimethyl sulfide | 0.5 | methyl acetylene | 0.11 |
| acrolein | 0.16 | dioxane | < 0.3 | methylal | 0.5 |
| acrylonitrile | 10.16 | ethane | 0.24 | methyl cyclohexane | 0.27 |
| ammonia (NH ₃) | 680 | ethene | 0.07 | methyl ethyl ketone | 0.27 |
| aziridine | 0.48 | ether | 0.19 | methylformate | 0.5 |
| benzene | 0.20 | ethyl acetate | 0.46 | pentane | 0.22 |
| 1,3-butadiene | 0.13 | ethyl amine | 2.4 | 2-pentene | 0.18 |
| butane | 0.25 | ethyl chloride | < 0.3 | propane | 0.25 |
| carbon monoxide | < 0.3 | ethylene oxide | 0.065 | propene | 0.28 |
| carbon disulphide | 0.009 | furan | 0.22 | propionaldehyde | 0.4 |
| cyclohexane | 0.22 | heptane | 0.24 | propylchloride | 1.08 |
| cyclopentane | 0.54 | hexane | 0.24 | propylene | 0.28 |
| 1,3-cyclopentadiene | 0.67 | hydrogen | 0.011 | propylene oxide | 0.13 |
| cyclopropane | 0.17 | hydrogen sulphide | 0.068 | tetrahydrofuran | 0.54 |
| di-(tert)-butylperoxide | 0.5 | isooctane | 1.35 | tetrahydropyran | 0.22 |
| diethyl ether | 0.19 | isopentane | 0.21 | thiophene | 0.39 |
| 2,3-dihydroxypropan | 0.36 | isopropyl alcohol | 0.65 | triethyl amine | 0.75 |
| diisobutylene | 0.96 | isopropyl amine | 2.0 | 2,3-trimethyl butane | 1.0 |
| diisopropyl ether | 1.14 | isopropyl chloride | 1.55 | vinyl acetate | 0.7 |
| dimethyl amine | < 0.3 | isopropyl ether | 1.14 | vinyl acetylene | 0.082 |
| 2,2-dimethyl butane | 0.25 | isopropyl mercaptan | 0.53 | vinyl chloride | < 0.3 |

References:

- Haase, H. (1977) Statische Elektrizität als Gefahr, Verlag Chemie-Weinheim.
 Berufsgenossenschaften, Richtlinien Statische Elektrizität, ZHI/200, Ausgabe 4.1980, Bonn.
 Buschman, C.H. (1962) De Veiligheid 38: 20-28.

Calculation of the pH of medium strong or weak acids and bases

1. The pH is defined as the pH of the saturated solution of an acid or base in water at 20°C, with a maximum concentration of 10 molar.

For liquid acids or bases that will mix with water in any proportion to form one phase, the molarity of the acid or base itself can be considered to be not much more than 10.

1.1 Calculation of the molarity of the saturated solution (C_s):

$$C_s = \frac{1000 dS}{M(100d+S)} \quad \text{in which:}$$

C_s = concentration in mol/litre saturated solution in water at 20°C

S = solubility in g per 100 ml water at 20°C

d = density of the acid or base, relative to water

M = relative molecular mass

For liquid acids or bases, mixable with water in all proportions, this formula transforms into:

$$C_s = 1000 d/M$$

1.2 The molarity exponent of the saturated solution is defined as:

$$pC_s = -\log C_s$$

If $C_s > 10$, set $pC_s = -1$

1.3 The pH can now be calculated for acids:

$$pH = \frac{pK_a + pC_s}{2}$$

for bases:

$$pH = 14 - \frac{pK_b + pC_s}{2}$$

in which:

pK_a and pK_b are the dissociation exponents of the acid and the base respectively. Values for pK_a and pK_b are given in CRC Handbook of Chemistry and Physics or other handbooks.

N.B. : Sometimes the dissociation exponent of a base is given as a pK_a value; to get pK_b apply

$$pK_b = 14.0 - pK_a.$$

2. Derivation of the formula.



$$K_a = \frac{[\text{H}^+] \times [\text{Z}^-]}{[\text{HZ}]}$$

$$[\text{Z}^-] = [\text{H}^+] \quad [\text{HZ}] = [\text{C}_s] \text{ (by approximation)}$$

$$[\text{H}^+] = [K_a \times [\text{C}_s]]^{1/2}$$

$$-\log[\text{H}^+] = \text{pH}_s = -\log [K_a \times [\text{C}_s]]^{1/2}$$

$$-\log K_a = \text{p}K_a - \log[\text{C}_s] = \text{p}C_s$$

$$\text{pH} = \frac{\text{p}K_a + \text{p}C_s}{2}$$

3. Criteria for "strong", "medium strong" and "weak".

Strong acids and bases are chemically defined as having a dissociation exponent of nearly zero: they dissociate in water to a very high degree. Strong acids and bases such as hydrochloric acid and caustic soda etc., are generally known. The borderline for "strong" is set at $\text{pH} \leq 0.2$ for acids and at $\text{pH} \geq 13.0$ for bases. For bases a rather wide definition of "strong" has been chosen because of the very strong action on skin and eyes, even when chemically the base should not be regarded as strong.

A second area has been defined as "medium strong" for those acids and bases which cannot be regarded as chemically "strong" but are nevertheless harmful for the human skin and eyes. Because of the higher sensitivity of skin and eyes for bases the range for 'medium strong' has once more been chosen somewhat wider than for acids. The borderlines of $\text{pH} 2.5$ for acids and $\text{pH} 11.0$ for bases have been chosen from literature references and experience.

Because exposure of the skin to concentrated solutions should be taken into account (solid acids or bases form a saturated solution on a damp skin!) the borderlines are set for the pH values of saturated solutions up to 10 molar. Acids and bases weaker than medium strong should be called "weak" on the Card, in this way giving positive information to the reader of the Card on the strength of an acid or base that he/she is handling.

Relative Inhalation Risk index (RIR index)

The RIR index indicates how fast the OEL/ST value of a liquid (or solid) is reached on evaporation at 20°C under standard conditions. When the OEL/ST is used as toxicity parameter, the RIR index gives only a rough idea of acute inhalation hazards. OEL/ST values (and their definition) can be found in the appropriate national OEL list or in the List of Threshold Limit Values, issued by the ACGIH, Cincinnati, USA.

In this Appendix OEL/ST is also indicated as STEL (in ppm).

Calculation of the RIR index:

- a. if $p_{20} < 200$ mbar: $RIR = C_s/STEL$
- b. if $p_{20} \geq 200$ mbar: $RIR = (10^6/STEL) \ln(10^6/(10^6 - C_s))$

in which:

p_{20} = saturated vapour pressure of the substance in mbar at 20°C.
 \ln = natural logarithm
 C_s = saturated vapour concentration in ppm at 20°C.
 Calculation:
 $C_s = (10^6 / 1013) p_{20}$

If the list does not mention a STEL value then use instead:

- OEL/C (if applicable), or
- OEL/TWA value, multiplied by 3 (if TLV/TWA > 500, then multiply by 2), or
- an estimated STEL value, based on other toxicological data, provided that these data are sufficient. Even then great care should be taken!

(If a national system of occupational exposure limits deviates widely from the ACGIH concept, the latter should be used; see also ind. 13420. In the Card explanation the text should be adapted accordingly).

The classification of a substance by the value of its RIR index (phrases 13605/13) should always be done in association with other data for the substance.

Using the following standard conditions as an example, the RIR index can be used to calculate the time to reach the STEL value:

- liquid surface: 1 m²
- air velocity over the liquid surface: 0.1 m/s
- space volume: 100 m³
- temperature: 20°C
- no air change (closed space)
- homogeneous air vapour mixing

In that case the following applies:

$$t_{STEL} = 3714/RIR$$

t_{STEL} = time in minutes to reach the STEL value in the air of the closed space.

The following values for t_{STEL} can now be calculated:

| RIR index value | t_{STEL} in minutes |
|-----------------|-----------------------|
| 12 | 310 (ab. 5 hours) |
| 120 | 31 (1/2 hour) |
| 4000 | 0.9 (ab. 1 minute) |

(For gases RIR = 4 so $t_{STEL} = 0$)

The t_{STEL} values calculated in this way have a very limited practical value and should not be applied to real situations since there is always some ventilation.

The RIR class limits 12-120-4000 which are used for the selection of some of the standard phrases, are based on professional experience of the editorial staff of Handling Chemicals Safely, published by the Dutch Association of Safety Experts, the Dutch Chemical Industry Association and the Dutch Safety Institute.

Reference:

Mutgeert, B.J. (1979) Een index voor het relatieve inhalatie risico van organische oplosmiddelen. De veiligheid 55: 355-361 (a summary in English is available).

Odour Safety Factor (O.S.F.)

The Odour Safety Factor as introduced by Amoore and Hautala is defined as:

$$\text{O.S.F.} = \frac{\text{OEL/TWA (8h/d), ppm}}{\text{Odour Threshold Value, ppm}}$$

where

- OEL/TWA is the applicable occupational exposure limit value, time weighted average for 8h/d.
- Odour Threshold Value, as contained in the annexed list from the article of Amoore and Hautala.

If an appropriate applying value is not available, the most recent TLV from the ACGIH list can be used.

An O.S.F. value = 26 means that 50% of the distracted (not concentrated on perception of the odour) persons perceive a warning of the OEL concentration by the odour. Of the attentive persons 99% can detect the OEL at an O.S.F. value of 26.

Odour Threshold Values can deviate very strongly, depending on various factors. Amoore and Hautala made a critical selection from the available literature and averaged them in a justified manner. Therefore do not use Odour Threshold Values from other sources in calculating the Odour Safety Factor.

For further details refer to:

Amoore, J.E. and Hautala, E. (1983) Journal of Applied Toxicology, 3(6): 272.

| Substance | Air odour threshold (ppm v/v) |
|------------------|-------------------------------|
| Acetaldehyde | 0.050 |
| Acetic acid | 0.48 |
| Acetic anhydride | 0.13 |
| Acetone | 13 |
| Acetonitrile | 170 |
| Acetylene | 620 |
| Acrolein | 0.16 |
| Acrylic acid | 0.094 |
| Acrylonitrile | 17 |
| Allyl alcohol | 1.1 |
| Allyl chloride | 1.2 |
| Ammonia | 5.2 |
| n-Amyl acetate | 0.054 |
| sec-Amyl acetate | 0.0020 |
| Aniline | 1.1 |
| Arsine | 0.50 |
| Benzene | 12 |
| Benzyl chloride | 0.044 |
| Biphenyl | 0.00083 |
| Bromine | 0.051 |
| Bromoform | 1.3 |
| 1,3-Butadiene | 1.6 |
| Butane | 2700 |
| 2-Butoxyethano | 10.10 |
| n-Butyl acetate | 0.39 |
| n-Butyl acrylate | 0.035 |

| Substance | Air odour threshold (ppm v/v) |
|----------------------|-------------------------------|
| n-Butyl alcohol | 0.83 |
| sec-Butyl alcohol | 2.6 |
| tert-Butyl alcohol | 47 |
| n-Butylamine | 1.8 |
| n-Butyl lactate | 7.0 |
| n-Butyl mercaptan | 0.00097 |
| p-tert-Butyltoluene | 6.0 |
| Camphor | 0.27 |
| Carbon dioxide | 74000 |
| Carbon disulphide | 0.11 |
| Carbon monoxide | 100000 |
| Carbon tetrachloride | 96 |
| Chlorine | 0.31 |
| Chlorine dioxide | 9.4 |
| α-Chloroacetophenone | 0.035 |
| Chlorobenzene | 0.68 |
| Chlorobromomethane | 400 |
| Chloroform | 85 |
| Chloropicrin | 0.78 |
| β-Chloroprene | 15 |
| o-Chlorotoluene | 0.32 |
| m-Cresol | 0.00028 |
| trans-Crotonaldehyde | 0.12 |
| Cumene | 0.088 |
| Cyclohexane | 25 |
| Cyclohexano | 10.15 |

| Substance | Air odour threshold (ppm v/v) |
|------------------------------------|-------------------------------|
| Cyclohexanone | 0.88 |
| Cyclohexene | 0.18 |
| Cyclohexylamine | 2.6 |
| Cyclopentadiene | 1.9 |
| Decaborane | 0.060 |
| Diacetone alcohol | 0.28 |
| Diborane | 2.5 |
| o-Dichlorobenzene | 0.30 |
| p-Dichlorobenzene | 0.18 |
| trans-1,2-Dichloroethylene | 17 |
| β,β -Dichloroethyl ether | 0.049 |
| Dicyclopentadiene | 0.0057 |
| Diethanolamine | 0.27 |
| Diethylamine | 0.13 |
| Diethylaminoethanol | 0.011 |
| Diethyl ketone | 2.0 |
| Diisobutyl ketone | 0.11 |
| Diisopropylamine | 1.8 |
| N-Dimethylacetamide | 47 |
| Dimethylamine | 0.34 |
| N-Dimethylaniline | 0.013 |
| N-Dimethylformamide | 2.2 |
| 1,1-Dimethylhydrazine | 1.7 |
| 1,4-Dioxane | 24 |
| Epichlorhydrin | 0.93 |
| Ethane | 120000 |
| Ethanolamine | 2.6 |
| 2-Ethoxyethanol | 2.7 |
| 2-Ethoxyethyl acetate | 0.0056 |
| Ethyl acetate | 3.9 |
| Ethyl acrylate | 0.0012 |
| Ethyl alcohol | 84 |
| Ethylamine | 0.95 |
| Ethyl n-amyl ketone | 6.0 |
| Ethyl benzene | 2.3 |
| Ethyl bromide | 3.1 |
| Ethyl chloride | 4.2 |
| Ethylene | 290 |
| Ethylenediamine | 1.0 |
| Ethylene dichloride | 88 |
| Ethylene oxide | 430 |
| Ethylenimine | 1.5 |
| Ethyl ether | 8.9 |
| Ethyl formate | 31 |
| Ethylidene norbornene | 0.014 |
| Ethyl mercaptan | 0.00076 |
| N-Ethylmorpholine | 1.4 |
| Ethyl silicate | 17 |
| Fluorine | 0.14 |

| Substance | Air odour threshold (ppm v/v) |
|---------------------------|-------------------------------|
| Formaldehyde | 0.83 |
| Formic acid | 49 |
| Furfural | 0.078 |
| Furfuryl alcohol | 8.0 |
| Halothane | 33 |
| Heptane | 150 |
| Hexachlorocyclopentadiene | 0.030 |
| Hexachloroethane | 0.15 |
| Hexane | 130 |
| Hexylene glycol | 50 |
| Hydrazine | 3.7 |
| Hydrogen bromide | 2.0 |
| Hydrogen chloride | 0.77 |
| Hydrogen cyanide | 0.58 |
| Hydrogen fluoride | 0.042 |
| Hydrogen selenide | 0.30 |
| Hydrogen sulphide | 0.0081 |
| Indene | 0.015 |
| Iodoform | 0.0050 |
| Isoamyl acetate | 0.025 |
| Isoamyl alcohol | 0.042 |
| Isobutyl acetate | 0.64 |
| Isobutyl alcohol | 1.6 |
| Isophorone | 0.20 |
| Isopropyl acetate | 2.7 |
| Isopropyl alcohol | 22 |
| Isopropylamine | 1.2 |
| Isopropyl ether | 0.017 |
| Maleic anhydride | 0.32 |
| Mesityl oxide | 0.45 |
| 2-Methoxyethanol | 2.3 |
| Methyl acetate | 4.6 |
| Methyl acrylate | 0.0048 |
| Methyl acrylonitrile | 7.0 |
| Methyl alcohol | 100 |
| Methylamine | 3.2 |
| Methyl n-amyl ketone | 0.35 |
| N-Methylaniline | 1.7 |
| Methyl n-butyl ketone | 0.076 |
| Methyl chloroform | 120 |
| Methyl 2-cyanoacrylate | 2.2 |
| Methylcyclohexane | 630 |
| cis-3-Methylcyclohexanol | 500 |
| Methylene chloride | 250 |
| Methyl ethyl ketone | 5.4 |
| Methyl formate | 600 |
| Methyl hydrazine | 1.7 |
| Methyl isoamyl ketone | 0.012 |
| Methyl isobutyl carbinol | 0.070 |

| Substance | Air odour threshold (ppm v/v) |
|--------------------------|-------------------------------|
| Methyl isobutyl ketone | 0.68 |
| Methyl isocyanate | 2.1 |
| Methyl isopropyl ketone | 1.9 |
| Methyl mercaptan | 0.0016 |
| Methyl methacrylate | 0.083 |
| Methyl n-propyl ketone | 11 |
| α -Methyl styrene | 0.29 |
| Morpholine | 0.01 |
| Naphthalene | 0.084 |
| Nickel carbonyl | 0.30 |
| Nitrobenzene | 0.018 |
| Nitroethane | 2.1 |
| Nitrogen dioxide | 0.39 |
| Nitromethane | 3.5 |
| 1-Nitropropane | 11 |
| 2-Nitropropane | 70 |
| m-Nitrotoluene | 0.045 |
| Nonane | 47 |
| Octane | 48 |
| Osmium tetroxide | 0.0019 |
| Oxygen difluoride | 0.10 |
| Ozone | 0.045 |
| Pentaborane | 0.96 |
| Pentane | 400 |
| Phenol | 0.040 |
| Phenyl ether | 0.0012 |
| Phenyl mercaptan | 0.00094 |
| Phosgene | 0.90 |
| Phosphine | 0.51 |
| Phthalic anhydride | 0.053 |
| Propane | 16000 |
| Propionic acid | 0.16 |

| Substance | Air odour threshold (ppm v/v) |
|---------------------------------------|-------------------------------|
| n-Propyl acetate | 0.67 |
| n-Propyl alcohol | 2.6 |
| Propylene | 76 |
| Propylene dichloride | 0.25 |
| Propylene glycol 1-methyl ether | 10 |
| Propylene oxide | 44 |
| n-Propyl nitrate | 50 |
| Pyridine | 0.17 |
| Quinone | 0.084 |
| Styrene | 0.32 |
| Sulphur dioxide | 1.1 |
| 1,1,2,2-Tetrachloroethane | 1.5 |
| Tetrachloroethylene | 27 |
| Tetrahydrofuran | 2.0 |
| Toluene | 2.9 |
| Toluene-2,4-diisocyanate | 0.17 |
| o-Toluidine | 0.25 |
| 1,2,4-Trichlorobenzene | 1.4 |
| Trichloroethylene | 28 |
| Trichlorofluoromethane | 5.0 |
| 1,1,2-Trichloro-1,2,2-trifluoroethane | 45 |
| Triethylamine | 0.48 |
| Trimethylamine | 0.00044 |
| 1,3,5-Trimethylbenzene | 0.55 |
| Trimethyl phosphite | 0.00010 |
| n-Valeraldehyde | 0.028 |
| Vinyl acetate | 0.50 |
| Vinyl chloride | 3000 |
| Vinylidene chloride | 190 |
| Vinyl toluene | 10 |
| m-Xylene | 1.1 |
| 2,4-Xylidine | 0.056 |

Abbreviations

| | |
|------------------------|--|
| ACGIH | American Conference of Governmental Industrial Hygienists |
| AFFF | Aqueous Film Forming Foam |
| AFFF/ACT | AFFF + Alcohol Type Concentrate |
| BCF | Bioconcentration Factor |
| BOD | Biological Oxygen Demand |
| C | Ceiling Value (of OEL or TLV) |
| CAS | Chemical Abstract Service |
| CEFIC | Conseil Européen des Fédérations de l'Industrie Chimique |
| CEU | Commission of the European Union |
| COD | Chemical Oxygen Demand |
| CSI | Chemical Substances Inventory |
| CSST | Commission de la Santé et de la Sécurité du Travail |
| EC | European Community |
| EINECS | European Inventory of Existing Commercial Chemical Substances |
| EPA | Environmental Protection Agency (USA) |
| EU | European Union |
| IARC | International Agency for Research on Cancer |
| ICSC | International Chemical Safety Card |
| ILO | International Labour Office |
| IRPTC | International Register of Potentially Toxic Chemicals |
| IUPAC | International Union of Pure and Applied Chemistry |
| LC₅₀ | Lethal Concentration 50% |
| LD₅₀ | Lethal Dose 50% |
| LEL | Lower Explosive Limit |
| Log Pow | Logarithm of the octanol/water partition coefficient |
| MAK | Maximale Arbeitsplatz Konzentration |
| NFPA | National Fire Protection Association |
| NIOSH | National Institute for Occupational Safety and Health (USA) |
| OEL | Occupational Exposure Limits |
| OEL/??? | OEL combined with ??? abbreviation |
| P | Percutaneous (with PDK-absorption through skin) |
| PDK | Predel'no Dopustimeye Kontsentratsi (USSR-Maximum Allowable Concentration) |
| R | Risk - European Union System |
| RIR | Relative Inhalation Risk |
| RTECS | Registry of Toxic Effects of Chemical Substances |
| S | Safety - European Union System |
| SADT | Self-Accelerating Decomposition Temperature |
| STEL | Short-Term Exposure Limit |
| TEC | Transport Emergency Card |
| TLV | Threshold Limit Value |
| TSCA | Toxic Substances Control Act |
| TWA | Time Weighted Average |
| UN | United Nations |
| UN CETDG | United Nations Committee of Experts on Transport of Dangerous Goods |
| UNEP | United Nations Environment Programme |
| WHO | World Health Organization |

References and sources commonly used for compiling ICSC

For future development, we can start a list here.

| # | Name, title, et cera. |
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| <i>Sources regarding Occupational Exposure Limits (OELs)</i> |
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Name, URL, etc.

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| <i>Sources about physicochemical properties</i> |
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Name, URL, etc

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| <i>And so on...</i> |
|---------------------|

Name, URL, etc

| |
|---|
| <i>Toxicological books and publications</i> |
|---|

Goldfrank's Toxicologic Emergencies

Critical Care Toxicology. Brent, Wallace et al. (2005).

Medical Toxicology. RC Dart (3rd Ed. 2004).

Clinical Environmental Health and Toxic Exposures. Sullivan&Krieger (2nd Ed. 2001).