International Chemical Safety Cards

Compiler's Guide

Updated August 2010

Compiler's Guide - Updated August 2010

TABLE OF CONTENTS

NB: Phrases with @ sign can no longer be selected for use in the ICSCs

10000000: HISTORY

10010000 Authors: []

Expl. Name of Participating Institute with primary responsibility for completion of this ICSC.

Ind. If an update, also indicate the Participating Institute of previous versions. Add also to the section 'History'.

10030000 Second Reviewer:

Expl. Name of Participating Institute that reviewed draft ICSC.

Ind. If an update, also indicate the Participating Institute of previous versions. Add also to the section 'History'.

10040000 Date of Review by Scientific Editor:

Expl. Date of review by the Scientific Editor in the ICSC project.

Ind. Date to be added by the Scientific Editor to the section 'History'.

10050000 Date of Peer-Review:

Ind. Add also to the section 'History'.

11000000: IDENTIFICATION

11000000 CHEMICAL NAME

Expl. 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.

11101000 [name]

Expl. 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.

If the chemical name is very long and the chemical is mainly known by its trade name then the trade name be used instead.

Ind. 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- (α-), beta- (ß-), gamma- (γ-), etc.; primary (prim-), secondary (sec-), tertiary (tert-); cis-, trans-; dextro- (d-), laevo- (l-); normal (n-), N- (link to the nitrogen atom).

11102000 [syn1]

Ind. IUPAC name if different from 11101. Trivial names may be used without the stating the valency, e.g., copper sulfate for $CuSO_4$.5H2O

11103000 [syn2]

Expl. In addition to the MAIN NAME, and the IUPAC name, EINECS (European Inventory of Existing Chemical Substances) name is given here. Main names and synonyms are indexed.

Ind. Trivial names may be used without stating the valency, e.g., copper sulfate for $CuSO_4.5H_2O$.

11104000 [syn3]

Expl. In addition to the MAIN NAME, other important synonyms are given here and 11105. Main names and synonyms are indexed.

Ind. Trivial names may be used without stating the valency, e.g., copper sulfate for $CuSO_4.5H_2O$.

11105000 [syn4]

Expl. In addition to the MAIN NAME, other important synonyms are given here and 11105. Main names and synonyms are indexed.

Ind. Trivial names may be used without stating the valency, e.g., copper sulfate for $CuSO_4.5H_2O$.

11301000 (cylinder)

Ind. Applies if the substance is held in a cylinder suitable to keep gases or liquefied gases above atmospheric pressure.
(13603) (13103/05/07) (22101/03) 22301 (22309) (22313)

11303000 (liquefied)

Ind. 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 11301 instead.
(13603) 13109 19205

11305000 (liquefied, cooled)

Ind. 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).
(13603) 22303

11307000 (powder)

Ind. Should normally be used only for metal powders.

11501000 [formula]

Ind. 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.

11503000 Atomic mass: []

Expl. 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.

Ind. Round off to the nearest 0.1.

11505000 Molecular mass: []

Expl. 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.

Ind. Round off to the nearest 0.1.

11505010 variable

11701000 CAS # [#####-##-#]

Expl. Unique Chemical Abstracts Service (CAS) registry numbers are used for identification as substances often have a number of synonyms.

11703000 RTECS # [AA#######]

Expl. The number of the substance as given in the Registry of Toxic Effects of Chemical Substances published by the National Institute for Occupational Safety and Health (NIOSH) in USA. Important for looking up toxicological data of the substance, many of the synonyms can also be found in this Registry.

11901000 ICSC # [####]

Expl. The number of the International Chemical Safety Card (ICSC) is recorded.

11911000 UN # [####]

Expl. The United Nations has numbered a great 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 Identification. 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.

11921000 EC Annex 1 Index # [###-###-##-#]

Expl. Annex I of Directive 67/548/EEC contains a list of harmonised classifications and labellings for substances or groups of substances that are legally binding within the EU. The EC number has replaced the EINECS / ELINCS / NLP number designation.

Entries (i.e. substance/substances indicated by the same Index number) in Annex I are listed according to the atomic number of the most characteristic element of the substances' properties. The

Index number for each substance is in the form of a digit sequence of the type ABC-RST-VW-Y, where:

- ABC is either the atomic number of the most characteristic chemical element (preceded by one or two zeros to make up the sequence) or the usual class number for organic substances (cf. Appendix I),
- RST is the consecutive number of the substance in the series ABC,
- VW denotes the form in which the substance is produced or placed on the market, and
- Y is the check-digit calculated in accordance with the ISBN (International Standard Book Number) method.

Ind. Complete with the Index number of European Community. Apply according to the official interpretation of the EC criteria as described in 'Legislation on Dangerous Substances, Classification and Labelling in the European Communities', DIRECTIVE 67/548/EEC and as amended in Adaptation to Technical Progress, published by the Office for Official Publications EC, Luxembourg.

11923000 EC/EINECS # [###-###-#]

Expl. This 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).

Ind. Complete with the European Inventory of Existing Commercial Chemical Substances number.

12000000 PHYSICAL PROPERTIES

12101000 Boiling point: []°C

Expl. Indicates the boiling point or range of the anhydrous substance at normal atmospheric pressure (101.3 kPa).

Ind. Round off to the nearest degree Celsius, use one decimal. If a different pressure is stated, use 12102.

12102000 Boiling point at []kPa: []°C

Expl. Indicates the boiling point or range of the anhydrous substance at an atmospheric pressure different from the normal (101.3 kPa), which is preferred.

Ind. Applies if there is a special reason to mention the boiling point at a pressure other than normal atmospheric pressure (101.3 kPa). Round off to the nearest degree Celsius, use one decimal.

12103000 Boiling point []

12104000 Sublimation point: []°C

Expl. A substance sublimes if on heating it passes directly from the solid to the vapour phase without melting.

Ind. If the pressure at the triple point is >101.3 kPa. Round off to the nearest degree Celsius.

12105000 Sublimation []

12106000 Decomposes

Expl. 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.

12107000 @Decomposes below boiling point at []°C

Ind. If decomposition temperature is unknown, complete with 'see Notes'. Round off to the nearest degree Celsius.

Phrase disallowed in April 2007 in favour of 12106 and 12111

12108000 @Decomposes below boiling point []

Ind. (24111)

Phrase disallowed in April 2007 in favour of 12106 and 12111

12110000 @Boiling point (decomposes): []°C

Expl. If the substance decomposes during boiling at normal atmospheric pressure.

Ind. Round off to the nearest degree Celsius.

Phrase disallowed in April 2007 in favour of 12106 and 12111

12111000 Decomposes at [] °C

Expl. 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.

12111500 [See Notes]

12113000 Melting point: []°C

Expl. Indicates the melting point (or range) of the 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. In case of hydrated substances (i.e., those with crystal water), the apparent melting point is given; this is then mentioned in NOTES (e.g., 24101).

Ind. Round off to the nearest degree Celsius, use one decimal.
(24113/24115)

12114000 Melting point []

12116000 Decomposes

Expl. 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 a special temperatures with 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.

12117000 @Decomposes below melting point at []°C

(Ind. If decomposition temperature is unknown, complete with 'see Notes'; combine with 24111. Round off to nearest degree Celsius, use one decimal.)

Phrase disallowed in April 2007 in favour of 12116 and 12121.

12118000 @Decomposes below melting point: []

Phrase disallowed in April 2007 in favour of 12116 and 12121

12120000 @Melting point (decomposes): []°C

(Expl. If the substance decomposes during melting at normal atmospheric pressure.

Ind. Round off to nearest degree Celsius.)

Phrase disallowed in April 2007 in favour of 12116 and 12121

12121000 Decomposes at [] °C

Expl. 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 a special temperature with 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.

12121500 [See Notes]

12129000 Critical Temperature (NOT on card): []°C
Ind. Use only in case of gases or liquids with a boiling point < 30°C. Round off to nearest degree Celsius.

12301000 Relative density (water = 1): []

NB: Phrases with @ sign can no longer be selected for use in the ICSCs

Expl. Indicates whether the substance floats or sinks on water. For gases condensed to the liquid phase the density of the liquid phase is given. The density mentioned (specific gravity) applies to normal ambient temperatures; other values, if relevant, are given in NOTES. Compressed gases (so-called permanent gases) do not have a liquid phase, so no value is mentioned. In case of a gas liquefied by cooling, the density of the liquid at atmospheric pressure is given in NOTES.

Ind. 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. Gases in cylinders:
- if the critical temperature >= 15°C: mention the relative density to water of the liquid phase at 15 to 25°C.
- if the critical temperature lies between -10 and 15°C: complete with 'see Notes' and mention in NOTES the density in kg/l at the critical temperature and mention this temperature (use a free phrase).
- if the critical temperature < -10°C: skip phrase.
Gases in a Dewar vessel (liquefied by cooling):
- complete with 'see Notes'. Mention in NOTES (i.e., 24119) the density in kg/l at the atmospheric boiling point.
(24119)

12302000 Density: []

Expl. Relative density (12301) 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.

Ind. Use this phrase in preference to 12301 if data are available. 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.

12302010 g/cm^3

12302020 g/l

12302030 kg/m^3

12304000 Solubility in water, g/100 ml at []°C: []

Expl. The solubility is given preferably in g/100 ml water at 20°C. Give both the value for the solubility and the qualitative description based on the values below. If the solubility is not accurately known then just give the qualitative description.

'very poor'	(< 1 g/l)	i.e. <0.1g/100 mL
'poor'	(1 - 10 g/l)	i.e. 0.1 - 1 g/100 mL
'moderate'	(10 - 100 g/l)	i.e. 1 - 10 g/100 mL
'good'	(100 - 1000 g/l)	i.e. 10 - 100 g/100 mL
'very good'	(> 1000 g/l)	i.e. >100 g/100 mL

If the substance reacts spontaneously with water this is indicated by the term 'reaction'. A liquid which forms one liquid phase, when mixed with water in any proportion, is indicated with 'miscible'. For gases, the solubility under a pressure of 1 atmosphere (101.3 kPa) is given.

12307000 Solubility in water, g/100 ml: []

Expl. The solubility is given preferably in g/100 ml water at 20°C (see 12304). Give both the value for the solubility and the qualitative description based on the values below. If the solubility is not accurately known then just give the qualitative description.

'very poor'	(< 1 g/l)	i.e. <0.1g/100 mL
'poor'	(1 - 10 g/l)	i.e. 0.1 - 1 g/100 mL
'moderate'	(10 - 100 g/l)	i.e. 1 - 10 g/100 mL

'good' (100 - 1000 g/l) i.e. 10 - 100 g/100 mL
'very good' (> 1000 g/l) i.e. >100 g/100 mL
If the substance reacts spontaneously with water this is indicated by the term 'reaction'. A liquid which forms one liquid phase, when mixed with water in any proportion, is indicated with 'miscible'. For gases, the solubility under a pressure of 1 atmosphere (101.3 kPa) is given.

Ind. Use this phrase if a value without a temperature is known.

12310000 Solubility in water: []

Expl. The solubility is given preferably in g/100 ml water at 20°C (see 12304). Give both the value for the solubility and the qualitative description based on the values below. If the solubility is not accurately known then just give the qualitative description.
'very poor' (< 1 g/l) i.e. <0.1g/100 mL
'poor' (1 - 10 g/l) i.e. 0.1 - 1 g/100 mL
'moderate' (10 - 100 g/l) i.e. 1 - 10 g/100 mL
'good' (100 - 1000 g/l) i.e. 10 - 100 g/100 mL
'very good' (> 1000 g/l) i.e. >100 g/100 mL
If the substance reacts spontaneously with water this is indicated by the term 'reaction'. A liquid which forms one liquid phase, when mixed with water in any proportion, is indicated with 'miscible'. For gases, the solubility under a pressure of 1 atmosphere (101.3 kPa) is given.

Ind. If the solubility is not accurately known complete this phrase with an adjective (poor, moderate, good,...). If possible, add to the adjective the applicable range between parentheses, using the following scale:
'very poor' (< 1 g/l) i.e. <0.1g/100 mL
'poor' (1 - 10 g/l) i.e. 0.1 - 1 g/100 mL
'moderate' (10 - 100 g/l) i.e. 1 - 10 g/100 mL
'good' (100 - 1000 g/l) i.e. 10 - 100 g/100 mL
'very good' (> 1000 g/l) i.e. >100 g/100 mL
This phrase can also be completed with 'reaction', but this is not to be used if the reaction with water has an (estimated) half-life >1 hour. In those cases the solubility is given in g/l while further indications are given with 13383/89.
(13383) (13389) (13383120) (13389290)

12313000 Solubility in water, ml/100 ml at []°C: []

Expl. The solubility is given preferably in g/100 ml water at 20°C (see 12304). Give both the value for the solubility and the qualitative description based on the values below. If the solubility is not accurately known then just give the qualitative description.
'very poor' (< 1 g/l) i.e. <0.1g/100 mL
'poor' (1 - 10 g/l) i.e. 0.1 - 1 g/100 mL
'moderate' (10 - 100 g/l) i.e. 1 - 10 g/100 mL
'good' (100 - 1000 g/l) i.e. 10 - 100 g/100 mL
'very good' (> 1000 g/l) i.e. >100 g/100 mL
If the substance reacts spontaneously with water this is indicated by the term 'reaction'. A liquid which, when mixed with water in any proportion, forms one liquid phase is indicated with 'miscible'. For gases, the solubility under a pressure of 1 atmosphere (101.3 kPa) is given.

Ind. Use this phrase for gases.

12501000 Vapour pressure, kPa at []°C: []

Expl. 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.

Ind. 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 13400). Use this phrase for a vapour pressure >= 0.1 kPa. Rounding off:
>= 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.
If no value can be found, a calculated value is used; see Appendix 1.
Rounding off calculated values:
>= 5 kPa : to the nearest unit;
2-5 kPa : to the nearest 0.5 kPa;
0.1-2 kPa : to the nearest 0.01 kPa;
10-100 Pa : to the nearest 10 Pa;
< 10 Pa : state as < 10 Pa.

12504000 Vapour pressure, Pa at []°C: []

Expl. 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.

Ind. Use 12501 for a vapour pressure >= 0.1 kPa.
Rounding off:
>= 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.
IF no value can be found, a calculated value is used; see Appendix 1.
Rounding off calculated values:
>= 5 kPa : to the nearest unit;
2-5 kPa : to the nearest 0.5 kPa;
0.1-2 kPa : to the nearest 0.01 kPa;
10-100 Pa : to the nearest 10 Pa;
< 10 Pa : state as < 10 Pa.

12504010 negligible

12507000 Relative vapour density (air = 1): []

Expl. 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.

Ind. 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 (see Appendix 2):

$$d = \frac{M}{29}$$

NB: Phrases with @ sign can no longer be selected for use in the ICSCs

12510000 Relative density of the vapour/air-mixture at 20°C (air = 1): []

Expl. 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.

Ind. 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 (see Appendix 2):
$D_m = 1 + (34 \times P_{20} \times 0.000001 \times [M-29])$

1260000: Viscosity, mm^2/s at 40 ^oC: []

Expl. This property gives an indication of the risk of pulmonary aspiration of organic liquids at 40 ^oC (i.e. close to body temperature). Low viscosity hydrocarbons are associated with a higher risk of aspiration.

The kinematic viscosity should be given. Conversion between dynamic and kinematic viscosity is as follows:

$$\frac{\text{Dynamic viscosity (mPa.s)}}{\text{Density (g/cm}^3\text{)}} = \text{Kinematic viscosity (mm}^2\text{/s)}$$

If the kinematic viscosity is expressed in Stokes (St) or centiStokes (cSt) then:

1 St = 100 cSt = $1x10^{-4}$ m^2/sec
1 cSt = 1 mm^2/sec .

Ind. 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 at 40 ^oC, then 13733 and 20309 should be selected as well. (GHS category 1).

For other liquids, if the kinematic viscosity is 14 mm^2/s or less and, based upon animal studies and expert judgment, 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 13733 and 20309. NB In the GHS this category includes n-primary alcohols with a composition of at least 3 carbon atoms but not more than 13; isobutyl alcohol and ketones with a composition of no more than 13 carbon atoms.

13733, 20309

1260100: Viscosity, mm^2/s at [] ^oC: []

Expl. This property gives an indication of the risk of pulmonary aspiration of organic liquids at a specific temperature. Low viscosity hydrocarbons are associated with a higher risk of aspiration. A hydrocarbon with a kinematic viscosity of 20.5 mm2/s at a temperature below 40 C is likely to have an even lower viscosity at 40 C.

The kinematic viscosity should be given. Conversion between dynamic and kinematic viscosity is as follows:

Dynamic viscosity (mPa.s) = Kinematic viscosity (mm^2/s)
Density (g/cm^3)

If the kinematic viscosity is expressed in Stokes (St) or centiStokes (cSt) then:

1 St = 100 cSt = $1x10^{-4}$ m^2/sec
1 cSt = 1 mm^2/sec .

Ind. 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 mm2/s or less at a temperature below 40 C, then 13733 and 20309 should be selected as well. (GHS category 1).

For other liquids, if the kinematic viscosity is 14 mm2/s or less and, based upon animal studies and expert judgment, 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 13733 and 20309. NB In the GHS this category includes n-primary alcohols with a composition of at least 3 carbon atoms but not more than 13; isobutyl alcohol and ketones with a composition of no more than 13 carbon atoms.

(13733, 20309)

12701000 Flash point: []°C

Expl. 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.

Ind. 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. State 'see Notes' if no flash point in literature can be found although the substance is combustible; combine with 24213. Skip if the substance is not combustible. See 12704 for flammable gases.
(14101/03/05/07) (24213)

12702000 Flash point: [] °C c.c.

12703000 Flash point: [] °C o.c.

12704000 Flash point: Flammable Gas

Ind. Apply if a gas (see 13101) with flash point <0°C.
14101/03/05/07

12705000 @Flash point: []
Use 12702, 12703, or 12704 instead of this phrase. Decision November 2007.

12707000 Auto-ignition temperature: []°C

Expl. 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.

Ind. Round off to the nearest degree Celsius.

12710000 Explosive limits, vol% in air: []

Expl. 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.

Ind. The upper and lower explosive limits should be given, rounded off to 0.1%, separated by a 'hyphen'. Use '?' if the upper value is unknown.
If the substance is combustible but explosive limits are not known and the (estimated) flash point <=61°C: add 'see Notes' and also use 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.

12713000 Minimum ignition energy (NOT on card): []mJ

Ind. A list of minimum ignition energy values taken from the literature is given in Appendix 3. This value has to be used in determining the possible selection of 15213.
(15213)

12716000 Electrical conductivity (NOT on card): []pS/m

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.
(13221) (15207) (15209)

12801000 Octanol/water partition coefficient as log Pow: []

Expl. The octanol/water partition coefficient 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 logarithm of the Pow is used.

Ind. Values determined at about 20°C and 1 atmosphere should be given. Many log Pow values can be found in the Handbook of Environmental Data on Organic Chemicals, K. Verschueren. (1983), van Nostrand Reinhold; or in Leo, A., Hansch, C., and Elkins, D. (1971), Partition coefficients and their uses. Chemical Reviews, 71(6), 525-616.

12801500 (calculated)

Ind: Use where the value for the Octanol/water partition coefficient has been calculated and is therefore an estimated rather than a measured value.

13000000 I M P O R T A N T D A T A

13100000 PHYSICAL STATE; APPEARANCE:

Expl. Substances are classified as gas, liquid, or solid according to their boiling and melting points at atmospheric pressure (101.3 kPa).

	b.p °C	m.p. °C
gas	< 15	< 15
gas or liquid	15 - 30	< 15
liquid	>= 30	< 15
liquid or solid	>= 30	15 - 30
solid	>= 30	>= 30

N.B.: Other definitions may be used in national legislation!

Ind. 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'.

13101000 []GAS

Expl. Substances are classified as gas, liquid, or solid according to their boiling and melting points at atmospheric pressure (101.3 kPa).

	b.p °C	m.p. °C
gas	< 15	< 15
gas or liquid	15 - 30	< 15
liquid	>= 30	< 15
liquid or solid	>= 30	15 - 30
solid	>= 30	>= 30

N.B.: Other definitions may be used in national legislation!

Ind. 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.

13102000 ODOURLESS

Ind. Generally not to be used for solid.

(24502)

13103000 []COMPRESSED GAS

Expl. Substances are classified as gas, liquid, or solid according to their boiling and melting points at atmospheric pressure (101.3 kPa).

	b.p °C	m.p. °C
Gas	< 15	< 15
Gas or liquid	15-30	< 15
Liquid	>= 30	< 15
Liquid or solid	>= 30	15-30
Solid	>= 30	>= 30

N.B.: Other definitions may be used in national legislation!

Ind. 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 liquid. The COLOUR and/or 'ODOURLESS' may be added. Do not describe the odour because this is highly subjective and will depend on the concentration.
11301

13105000 []COMPRESSED LIQUEFIED GAS

Expl. Substances are classified as gas, liquid, or solid according to their boiling and melting points at atmospheric pressure (101.3 kPa).

	b.p °C	m.p. °C
Gas	< 15	< 15
Gas or liquid	15-30	< 15
Liquid	>= 30	< 15
Liquid or solid	>= 30	15-30
Solid	>= 30	>= 30

N.B.: Other definitions may be used in national legislation!

Ind. 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. The COLOUR and/or 'ODOURLESS' may be added. Do not describe the odour because this is highly subjective and will depend on the concentration.
(18125 18303) 11301 13741 18203 21239 24519

13107000 []GAS DISSOLVED IN []UNDER PRESSURE

Expl. Substances are classified as gas, liquid, or solid according to their boiling and melting points at atmospheric pressure (101.3 kPa).

	b.p °C	m.p. °C
Gas	< 15	< 15
Gas or liquid	15-30	< 15
Liquid	>= 30	< 15
Liquid or solid	>= 30	15-30
Solid	>= 30	>= 30

N.B.: Other definitions may be used in national legislation!

Ind. 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'. The COLOUR and/or 'ODOURLESS' may be added. Do not describe the odour because this is highly subjective and will depend on the concentration. For this phrase, mention the name of the solvent in which the gas is dissolved.
11301

13109000 []CRYOGENIC LIQUID

Expl. Substances are classified as gas, liquid, or solid according to their boiling and melting points at atmospheric pressure (101.3 kPa).
Cryogenic is a term applied to substances in very low temperatures.

Ind. Use this phrase in the case of liquefied gases kept in open containers (Dewar vessels) with a boiling point <-30°C at atmospheric pressure.
11303 18303 18125 21239 13743 18203

13111000 []COLOURLESS LIQUID

Expl. Substances are classified as gas, liquid, or solid according to their boiling and melting points at atmospheric pressure (101.3 kPa).

	b.p °C	m.p. °C
Gas	< 15	< 15
Gas or liquid	15-30	< 15
Liquid	>= 30	< 15
Liquid or solid	>= 30	15-30
Solid	>= 30	>= 30

N.B.: Other definitions may be used in national legislation!

Ind. 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 b.p. <40°C). Other indications, e.g., the COLOUR or ODOUR (see 13143), may be added.

13113000 []LIQUID

Expl. Substances are classified as gas, liquid, or solid according to their boiling and melting points at atmospheric pressure (101.3 kPa).

	b.p °C	m.p. °C
Gas	< 15	< 15
Gas or liquid	15-30	< 15
Liquid	>= 30	< 15
Liquid or solid	>= 30	15-30
Solid	>= 30	>= 30

N.B.: Other definitions may be used in national legislation!

Ind. 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 (see 13143), may be added.

13115000 []VISCOUS LIQUID

Expl. Substances are classified as gas, liquid, or solid according to their boiling and melting points at atmospheric pressure (101.3 kPa).

	b.p °C	m.p. °C
Gas	< 15	< 15
Gas or liquid	15-30	< 15
Liquid	>= 30	< 15
Liquid or solid	>= 30	15-30
Solid	>= 30	>= 30

N.B.: Other definitions may be used in national legislation!

Ind. 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 (see 13143), may be added.

13117000 []FUMING LIQUID

Expl. Substances are classified as gas, liquid, or solid according to their boiling and melting points at atmospheric pressure (101.3 kPa).

	b.p °C	m.p. °C
Gas	< 15	< 15
Gas or liquid	15-30	< 15
Liquid	>= 30	< 15
Liquid or solid	>= 30	15-30
Solid	>= 30	>= 30

N.B.: Other definitions may be used in national legislation!

Ind. 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 (see 13143), may be added.

13119000 []HYGROSCOPIC LIQUID

Expl. Substances are classified as gas, liquid, or solid according to their boiling and melting points at atmospheric pressure (101.3 kPa).

	b.p °C	m.p. °C
Gas	< 15	< 15
Gas or liquid	15-30	< 15
Liquid	>= 30	< 15
Liquid or solid	>= 30	15-30
Solid	>= 30	>= 30

N.B. Other definitions may be used: in national legislation!

Ind. 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 (see 13143), may be added.

NB: Phrases with @ sign can no longer be selected for use in the ICSCs

(22305)

13121000 []SOLUTION IN []

Expl. Some substances are generally supplied dissolved in a solvent. This phrase describes what percentage of the substance is present and the solvent.

Ind. Complete this phrase with the concentration (%), the name of the substance, and the name of the solvent.

13123000 []CRYSTALS

Expl. 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.

Ind. A substance with both a boiling point and a melting point greater than 30°C should be classified as a 'solid'; a substance with a boiling point greater than 30°C and a melting point between 15 and 30°C should be classified as 'liquid or solid'. Complete this phrase with the COLOUR and/or adjectives such as HYGROSCOPIC, DELIQUESCENT, DRY, etc. Combinations of the phrases may be made: e.g., 13123 'RED CRYSTALS'; 13131 'OR DRY RED POWDER'. Use a free phrase if necessary, in cases where a good description is not possible using fixed phrases.
(22305)

13125000 []PELLETS

Expl. 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 pellets.

Ind. Use this phrase if the substance is generally supplied as pellets.
(22305)

13127000 []FLAKES

Expl. 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.

Ind. Use this phrase if the substance is normally supplied as flakes.
(22305)

13129000 []LUMPS

Expl. 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.

Ind. Use this phrase if the substance is normally supplied in the form of lumps.
(22305)

13131000 []POWDER

Expl. 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.

Ind. Use this phrase if the substance is normally supplied as a powder.
(22305)

13133000 []CRYSTALLINE POWDER

Expl. 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 finely divided but crystalline form.

Ind. Use this phrase if the substance is normally supplied in finely divided, but crystalline form.
(22305)

13135000 []PASTE

Expl. 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).

Ind. Use this phrase if the substance is normally supplied in the form of a paste.
(22305)

13137000 []SOLID IN VARIOUS FORMS

Expl. 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 which is generally supplied in a number of forms.

Ind. Use this phrase if the substance is normally supplied as a solid in a variety of forms.
(22305)

13139000 []

13141000 , WITH PUNGENT ODOUR.

Ind. Use for example for vapours from hydrochloric acid, sulfur oxides, ammonia, etc. Do not use if this property is only slight. Use only if the chemical has a clearly recognizable odour that is specific to the chemical. Do not describe the odour, as this is highly subjective, and will depend on the concentration.

13143000 , WITH CHARACTERISTIC ODOUR.

Expl. Many substances have a characteristic odour, but as this is subjective and depends on the concentration, it is not further described on the ICSC. Odour limits (thresholds) are also unreliable and are, therefore, not given. In NOTES an indication may be found concerning the relation between the odour limit and the Occupational Exposure Limit.

13145000 TURNS [] ON EXPOSURE TO [].

Expl. Some substances may change colour under certain conditions such as on exposure to air or to light.

Ind. Complete this phrase with the colour and condition, e.g., 'TURNS YELLOW ON EXPOSURE TO AIR/LIGHT'.

13146000 []

13147000 []

13200000 PHYSICAL DANGERS:

13201000 The gas is heavier than air[].

Expl. Relates to gases with a relative vapour density greater than 1.1. When these gases are released, they will travel along the ground.

Ind. If a gas with relative vapour density (air = 1) >= 1.1

13203000 The vapour is heavier than air[]

Expl. Relates to substances for which the relative density of the vapour/air mixture relative to air is greater than 1.1. When these vapours are released they will travel along the ground.

Ind. If relative density of vapour/air-mixture at 20°C (air = 1) >= 1.1

13205000 and may travel along the ground; distant ignition possible[].

Expl. 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 < 21°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.

Ind. Apply 13205 if 13201 or 13203 is used and the flash point < 21°C.

13207000 and may accumulate in lowered spaces causing a deficiency of oxygen.

Expl. 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.

Ind. Apply 13207 if 13201 is used and the gas:
- has no pungent odour (13141 is not used)
Apply 13207 if 13203 is used and the vapour:
- has no pungent odour (13141 is not used) AND
- has a vapour pressure (at 20°C) > 10 kPa
This phrase also applies to simple asphyxiants as defined by the ACGIH and having a density with respect to air >= 1.1.
(Refer to 13400 for OEL and ACGIH discussions).
24429 24431

13211000 The gas mixes well with air, explosive mixtures are formed easily.

Expl. This phrase applies to gases with a vapour density of the gas between 0.9 and 1.1 and with a flash point < 21°C. Although less dangerous than heavier gases or vapours, there is still a possibility of explosion.

Ind. Use if a flammable gas and the density relative to air >= 0.9 and < 1.1.

13213000 The vapour mixes well with air, explosive mixtures are formed easily.

Expl. 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 < 21°C. Although less dangerous than heavier vapours there is still a possibility of explosion.

Ind. 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 flash point < 21°C.

13217000 The gas is lighter than air.

Expl. 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.

Ind. Use if a combustible gas with relative density to air < 0.9.

13221000 As a result of flow, agitation, etc., electrostatic charges can be generated.

Expl. 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.

Ind. If a liquid (including liquefied compressed gas) with conductivity lower than 10 000 pS/m.
15207 (15209)

13222000 Dust explosion possible if in powder or granular form, mixed with air.

Expl. 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.

Ind. 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.
15107 15217

13223000 If dry, it can be charged electrostatically by swirling, pneumatic transport, pouring, etc.

Expl. In such cases it is imperative to take special preventive measures. An expert should be consulted.

Ind. Applies if 13222 has been used and the substance is non-hygroscopic.
15219

13224000 May decompose if not stabilized

Ind. Use if decomposition of the substance creates a hazard e.g. production of heat or generation of toxic or flammable substances.
22405

NB: Phrases with @ sign can no longer be selected for use in the ICSCs

13225000 []

13226000 Adequate data not found.

Ind. The data that were found were considered insufficient to make a judgement.

13227000 Not applicable.

Ind: The data found were considered adequate to make the judgement that there are no physical dangers associated with this chemical.

13300000 CHEMICAL DANGERS:

13301000 The substance can form explosive peroxides[].

Expl. 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)

Ind. 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.
22301 22307 24513 (22405)

13303000 The substance can readily form explosive peroxides[].

Expl. 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.

Ind. 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.
22301 22307 24513 (22405)

13305000 he substance can presumably form explosive peroxides[].

Ind. Apply only to substances that are not listed as peroxidizable compounds in Data Sheet 1-655 and when other definite indication are also lacking, but the chemical structure permits formation of peroxides.
22307 22301 24513

13307000 The substance can under specific circumstances []form peroxides, initiating explosive polymerization.

Expl. In some cases peroxides initiate polymerization. Peroxides are generally neutralized with ferrous thiocyanate or by passing the liquid over a column with activated alumina.

Ind. Applies if mentioned in list C of Data Sheet 1-655. For butadiene, chloroprene, and tetrafluoroethylene the phrase is completed with 'readily'.
(22301) (22307) (22401) (22405) 24513

13311000 The substance []polymerize[]

Expl. 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.

Ind. This series of phrases (13311/19) may be combined as desired. This phrase can be used as such (i.e., The substance polymerizes.....) or can be completed with 'may' (i.e., The substance may polymerize .....).

13311010 may

13311030 will

13313000 due to warming[]

Ind. This phrase is used in connection with temperatures < 80°C. If known, temperatures should be mentioned, e.g., due to warming above 75°C.
22301

13315000 due to heating[]

Ind. This phrase is used in connection with temperatures > 80°C. If known, temperatures should be mentioned, e.g., due to heating above 100°C.
(22301)

13317000 under the influence of []

Ind. With this phrase, only general polymerization conditions/catalysts such as heat, light, acids/bases, metals, etc., should be mentioned; restrict to 4 items. Polymerization with other substances should only be mentioned if common chemicals.
(22307) (22401) 22405

13317010 acid(s)

13317020 base(s)

13317030 heat

13317040 light

13317050 metals

13317060 temperatures above ##° C

13319000 with fire or explosion hazard.

Ind. (22301) (22307) (22401) (22405)

13321000 Heating may cause violent combustion or explosion[].

Expl. 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.

Ind. Base the application of this and other phrases on explosion depending on data found in relevant literature.
14121 (24225)

NB: Phrases with @ sign can no longer be selected for use in the ICSCs

13323000 May decompose explosively on shock, friction, or concussion.

Ind. Base the application of this and other phrases on explosion depending on data found in relevant literature.
14121 15215

13325000 May explode on heating[].

Ind. Base the application of this and other phrases on explosion depending on data found in relevant literature.
(14121) (24225)

13327000 Shock-sensitive compounds are formed with [].

Ind. 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 24223 instead.
(14121) (24227) (24225)

13329000 The substance may ignite spontaneously on contact []with air[].

Ind. Use the brackets to distinguish the reaction of the substance with water from the reaction with oxygen. For example 'The substance may ignite spontaneously on contact with[moisture in]air[]. '

13331000 On combustion, forms [].

Expl. 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.

Ind. 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 suffices. 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 13341/13357 for more complicated cases.

13331010 acetic acid fumes

13331020 acrolein

13331030 ammonia fumes

13331040 arsenic oxides

13331050 arsenic fumes

13331060 carbon monoxide

13331070 carbon sulfide

13331080 chlorine fumes

13331090 chlorine dioxide

13331100 corrosive gases

13331110 corrosive fumes

13331120 dioxins

13331130 hydrides

13331140 hydrogen bromide

13331150 hydrogen chloride

13331160 hydrogen cyanide

13331170 hydrogen iodide

13331180 hydrogen fluoride

13331190 hydrogen sulfide

13331200 hydrogen

13331210 nitrogen oxides

13331220 ozone

13331230 phosgene

13331240 phosphorus oxides

13331250 sulfur oxides

13331251 sulfuric acid

13331260 toxic gases

13331270 toxic fumes

13331280 toxic and corrosive gases

13331290 toxic and corrosive fumes

13331310 including

13333000 On contact with hot surfaces or flames this substance decomposes forming [].

Ind. 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. Phosgene is formed from chlorinated hydrocarbons if the chlorine atom is linked to an unsaturated carbon atom; in other cases only HCl is formed. Some nitrogen-compounds may develop nitrous fumes (i.e., nitrogen oxides or NO_x).
24511

13333010 acetic acid fumes

13333020 acrolein

13333030 ammonia fumes

13333040 arsenic oxides

13333050 arsenic fumes

13333060 carbon monoxide

13333070 carbon sulfides

13333080 chlorine fumes

13333090 chlorine dioxide

13333100 corrosive gases

13333110 corrosive fumes

13333120 dioxins

13333130 hydrides

13333140 hydrogen bromide

13333150 hydrogen chloride

13333160 hydrogen cyanide

13333170 hydrogen iodide

13333180 hydrogen fluoride

13333190 hydrogen sulfide

13333200 hydrogen

13333210 nitrogen oxides

13333220 ozone

13333230 phosgene

13333240 phosphorus oxides

13333250 sulfur oxides

13333251 sulfuric acid

13333260 toxic gases

13333270 toxic fumes

13333280 toxic and corrosive gases

NB: Phrases with @ sign can no longer be selected for use in the ICSCs

13333290 toxic and corrosive fumes

13333310 including

13341000 The substance decomposes []

Ind. Do not use for elemental substances; use 13359 instead. Can be combined when appropriate with any of the phrases.

13341010 rapidly

13341020 slowly

13343000 on warming []

Ind. Complete with a temperature value if one is known, e.g. '(above 70°C)'; use for temperatures <80°C. Can be combined when appropriate with any of the phrases.

13345000 on heating []

Ind. Complete with a temperature value if one is known, e.g. '(above 85°C)'; use 13343 for temperatures < 80°C; if the temperature is unknown and the substance is combustible, use 13347. Can be combined when appropriate with any of the phrases.

13347000 on burning []

Ind. Use if the substance is combustible. If no flash point, use 14129 where appropriate.

13349000 on contact with []

Ind. 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 (13353) should be highlighted. Can be combined when appropriate with any of the phrases.
(22201)

13349010 hot surfaces or flames

13349020 acids

13349030 bases

13349040 oxidants

13349050 water

13349080 or

13349090 and

13351000 under the influence of []

Ind. Can be combined when appropriate with any of the phrases.
(22305) (22307) (22308)

13351010 air

13351020 light

13351030 UV light

13351040 moisture

13353000 producing []

Ind. 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 suffices. With aromatic and hetero-aromatic compounds the formation of CO is so predominant that it should be mentioned. If oxygen is produced, then combine with 13355. Can be combined when appropriate with any of the phrases.

13353010 acetic acid fumes

13353020 acrolein

13353030 ammonia

13353040 arsenic oxides

13353050 arsenic fumes

13353060 carbon monoxide

13353070 carbon sulfide

13353080 chlorine

13353090 chlorine dioxide

13353100 corrosive gases

13353110 corrosive fumes

13353120 dioxins

13353130 hydrides

13353140 hydrogen bromide

13353150 hydrogen chloride

13353160 hydrogen cyanide

13353170 hydrogen iodide

13353180 hydrogen fluoride

13353190 hydrogen sulfide

13353200 hydrogen

13353210 nitrogen oxides

13353220 ozone

13353230 phosgene

13353240 phosphorus oxides

13353250 sulfur oxides

13353251 sulfuric acid

13353260 toxic gases

13353270 toxic fumes

13353280 toxic and corrosive gases

13353290 toxic and corrosive fumes

13353300 irritating fumes

13353320 including

13353330 and

13355000 , which increases fire hazard.

Ind. Apply to oxygen-carriers, e.g., nitrates, some organic peroxides, and other 'per'- compounds; see also UN Class 5.1. Can be combined when appropriate with any of the phrases.
(14113)

13357000 , causing fire and explosion hazard.

Ind. Only use if the decomposition itself causes fire or explosion hazard; not on the fact that, for example, a combustible gas is produced. Can be combined when appropriate with any of the phrases.

13359000 On heating, toxic fumes are formed.

Ind. Can be used instead of 13341 for elemental substances, especially metals.
(14129)

13361000 The substance is a strong oxidant and reacts []with combustible and reducing materials[].

Ind. After 'reacts' the word 'violently' can be entered. The phrase can be completed by mentioning examples/special conditions. 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.
(13703) (13709-17) (14113) 14205 18307 (19203) 21237 22201-02 24509

13361010 violently

13363000 The substance is a strong reducing agent and reacts []with oxidants[].

Ind. After 'reacts' the word 'violently' can be entered. The phrase can be completed by mentioning examples/special conditions. 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 13381.
18307 21237 22201-03 24509

13363010 violently

13365000 The substance[] may reduce the oxygen content of air.

Expl. The substance, when in contact with air in confined spaces, may deplete the oxygen content to a dangerous extent.

Ind. This hazard is most relevant for solid reducing agents.
24429 24431

13367000 The substance is a strong acid, it reacts violently with bases and is corrosive[].

Expl. 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 pH < 0.2.

Ind. Use for liquid acids with pH <= 0.2; use 13368 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 'forming flammable/explosive gas (hydrogen - see ICSC0001)'.
(13703) (13711/13/15/17) 22201 22205 23105 (24515)

13367010 to

13367020 aluminium

13367030 copper

13367040 iron

13367050 zinc

13367060 forming flammable/explosive gas (hydrogen - see ICSC0001)

13368000 The solution in water is a strong acid, it reacts violently with bases and is corrosive[].

Expl. This phrase is used when the substance dissolved in water is a strong acid (with pH < 0.2).

Ind. Use for solid salts which hydrolyze in water to acids with pH <= 0.2; use 13367 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 'forming flammable/explosive gas (hydrogen - see ICSC0001)'.
(13703) (13711/13/15/17) 22201 22205 (23105) (24515)

13368010 to

13368020 aluminium

13368030 copper

13368040 iron

13368050 zinc

13368060 forming flammable/explosive gas (hydrogen - see ICSC0001)

13369000 the substance is a medium strong acid[].

Expl. The term medium strong acid applies to substances with a pH between 0.2 and 2.0.

Ind. Use for liquid acids with 0.2 <= pH < 2.0 (between 0.2 and 2.0). Use for liquid acids; use 13370 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 13381. 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.
(13703) (13711/13/15/17) 22201 22205

13370000 The solution in water is a medium strong acid[].

Expl. This phrase is used when the substance dissolved in water is a medium strong acid (with pH between 0.2 and 2.0).

Ind. Use for solid salts which hydrolyze in water to medium strong acids with 0.2 <= pH < 2.0 (between 0.2 and 2.0). Use 13369 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. Reactions of medium strong acids with other substances are preferably mentioned using a phrase such as 13381. 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.
(13703) (13711/13/15/17) 22201 22205

13371000 The substance is a weak acid[].

Expl. The term weak acid applies to substances with a pH between 2.0 and 6.0.

Ind. Use for liquid acids with 2.0 <= pH < 6.0 (between 2.0 and 6.0). Use 13372 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.

13372000 The solution in water is a weak acid[].

Expl. This phrase is used when the substance dissolved in water is a weak acid (with pH between 2.0 and 6.0).

Ind. Use for solid salts which hydrolyze in water to weak acids with 2.0 <= pH < 6.0 (between 2.0 and 6.0). Use 13371 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.

13373000 The substance is a strong base, it reacts violently with acid and is corrosive[].

Expl. The term strong base applies to the well known chemically strong bases (almost totally dissociating in water), including borderline cases with pH > 13.

Ind. Use for liquid bases with pH >= 13; use 13374 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 'forming flammable/explosive gas (hydrogen - see ICSC0001)'.
(13703) (13711/13/15/17) 22201 22207 (23105) (24515)

13373010 to

13373020 aluminium

13373030 copper

13373040 iron

13373050 zinc

13373060 forming flammable/explosive gas (hydrogen - see ICSC0001)

13374000 The solution in water is a strong base, it reacts violently with acid and is corrosive[].

Expl. This phrase is used when the substance dissolved in water is a strong base (with pH > 13).

Ind. Use for solid salts which hydrolyze in water to bases with pH >= 13; use 13373 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 'forming flammable/explosive gas (hydrogen - see ICSC0001)'.
(13703) (13711/13/15/17) 22201 22207 (23105) (24515)

13374010 to

13374020 aluminium

13374030 copper

13374040 iron

13374050 zinc

13374060 forming flammable/explosive gas (hydrogen - see ICSC0001)

13375000 The substance is a medium strong base[].

Expl. The term medium strong base applies to substances with a pH between 11.5 and 13.0.

Ind. Use for liquid bases with 11.5 <= pH < 13.0 (between 11.5 and 13.0); use 13376 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 13381. 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.
(13703) (13711/13/15/17) 22201 22207

13376000 The solution in water is a medium strong base[].

Expl. This phrase is used when the substance dissolved in water is a medium strong base (with pH between 11.5 and 13.0).

Ind. Use for solid salts which hydrolyze in water to bases with 11.5 <= pH < 13.0 (between 11.5 and 13.0); use 11375 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 13381. 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.
(13703) (13711/13/15/17) 22201 22207

13377000 The substance is a weak base[].

Expl. The term weak strong base applies to substances with a pH between 8.0 and 11.5.

Ind. Use for liquid bases with 8.0 <= pH < 11.5 (between 8.0 and 11.5). Use 13378 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.

13378000 The solution in water is a weak base[].

Expl. This phrase is used when the substance dissolved in water is a weak base (with pH between 8.0 and 11.5).

Ind. Use for solid salts which hydrolyze in water to bases with 8.0 <= pH < 11.5 (between 8.0 and 11.5). Use 13377 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.

13381000 Reacts []with []oxidants[].

Expl. The only chemicals mentioned as reactants with the 'ICSC substance' are those which are expected to be present and constitute a main hazard. Many substances react vigorously with, for instance, alkali metals (e.g., sodium) but as these are not be likely to be readily available on the workfloor, the reaction with these materials is not mentioned on the ICSC.

Ind. This phrase can be completed with several indications such as 'reacts violently with strong oxidants' and can be combined with one of the other phrases, e.g., 13387: 'Reacts violently with strong oxidants causing fire and explosion hazard'.
22201 22203

13381010 violently

13381030 strong

13383000 Reacts []

Expl. 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.

Ind. 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, whether or not combined with 13385 and 13387. (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.
(22201)

13383010 violently with

13383050 acids

13383060 strong acids

13383070 bases

13383080 strong bases

13383090 halogens

13383100 reducing agents

13383110 strong reducing agents

13383120 water

13385000 violently with []

Expl. 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.

Ind. 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, whether or not combined with 13385 and 13387. (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.

13387000 causing fire and explosion hazard.

Expl. 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.

Ind. 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. 13331; names of substances with which the substance in question reacts, should not be mentioned.

13389000 Reacts []

Expl. 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.

Ind. This phrase can be completed with several indications.
(22201)

13389010 violently with

13389020 with

13389030 acids

13389040 acid anhydrides

13389050 acid chlorides

13389060 alkali metals

13389070 alcohols

13389080 aluminium

13389090 amines

13389100 ammonia

13389110 anhydrides

13389120 bases

13389130 combustible substances

13389140 copper

13389150 halogens

13389160 iron

13389170 light

13389180 metals

13389190 oils and fats

13389200 organic compounds

13389205 most organic and inorganic compounds

13389210 oxidants

13389220 oxygen

13389230 powdered metals

13389240 reducing agents

13389250 strong acids

13389260 strong bases

13389270 strong oxidants

13389280 strong reducing agents

13389290 water

13389300 zinc

13389320 moist air

13389330 to produce

13389340 hydrogen chloride (see ICSC0163)

13391000 causing []hazard.

Expl. 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.

Ind. 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 due to the formation of a flammable gas, reference should be made to the ICSC for that substance. Also see ind. 13331; names of substances with which the substance in question reacts, should not be mentioned.

13391010 explosion

13391020 fire

13391030 fire and explosion

13391040 toxic

13393000 On contact with air it emits [].

Expl. Some substances may give off a gas which forms a fume with the water vapour in the surrounding air.

Ind. 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'.
22308

13395000 Attacks many metals in the presence of water[].

Expl. Many chlorinated hydrocarbons split off HCl slowly when humid. This will attack metal.

Ind. Applies to many chlorinated hydrocarbons split off HCl slowly when humid.
(22305) (22308)

13396000 Attacks many metals forming flammable/explosive gas (hydrogen - see ICSC 0001)[].

Ind. Do not use for strong acids or bases; use 13367/13368 or 13373/13374 instead.

13397000 Attacks [].

Ind. Can be completed with 'plastics', 'ceramics,' etc. if referred.

13397010 ceramics

13397020 glass

13397030 metal

13397040 plastic

13397050 rubber

13397060 coatings

13397070 some forms of

13397500 (See ICSC [])

13398000 []

13399000 []

13399500 Adequate data not found.

Ind. The data that were found were considered insufficient to make a judgement.

13399600 Not applicable.

Ind: The data found were considered adequate to make the judgement that there are no chemical dangers associated with this chemical.

13400000 OCCUPATIONAL EXPOSURE LIMITS (OELs):

Expl. Occupational Exposure Limits (OELs, TLVs values, etc.) can in general be described as limits for airborne concentrations of substances, which it is believed do not cause health effects to nearly all workers exposed day after day to those substances during their working lives. Some countries have OELs which originate from the list of Threshold Limit Values (TLVs) published each year by the American Conference of Governmental Industrial Hygienists (ACGIH). Other countries have OELs which are based on principles they have developed themselves. On the ICSCs, the OEL values of ACGIH are given. If a value from some other list was used, the source and year would be indicated.

For the interpretation of national OELs or TLVs values, the original references should be consulted. If an OEL value has not been established this will be indicated. This does not mean that the substance should be considered as being non harmful to man; there are many thousands of substances widely used on an industrial scale, but OELs have been set for only about 800 of them.

Limits are intended for the use in the practice of industrial hygiene as guidelines or recommendations in the control of potential workplace health hazard. Three categories of TLVs are specified by ACGIH: Threshold Limit Value-Time Weighted Average (TLV-TWA), Threshold Limit Value-Short Term Exposure Limit (TLV-STEL), and Threshold Limit Value-Ceiling (TLV-C).

MAK (Maximale Arbeitsplatzkonzentrationen) are the official OELs in Germany. They will be updated every year and published by the Deutsche Forschungsgemeinschaft, Verlag Chemie, Weinheim.
N.B.: as the value on the ICSC may have been updated since the publication of the ICSC, always consult the latest official list in your country.

When there is no OEL, i.e. no TLV or MAK is available, then use another available value e.g. the RIR. This can be calculated by finding the TEEL-1 (Temporary Emergency Exposure Limits) and dividing it by 3 e.g. Dimethyl hydrogen phosphite, TEEL1= 60mg/m³; /3 = 20mg/m³; RIR=100. TEELs can be found at http://www.eh.doe.gov/chem_safety/teel.html.

When an EC OEL becomes available then this should replace the MAK value if this is given on the card.

13401000 TLV: [] ppm; [] mg/m^3 [] (ACGIH 199?).

Expl. See expl. 13400. TLVs preceded by 'C' are ceiling values, meaning that they should not be exceeded during any part of the working exposure. Other values are time-weighted averages (TWA), defined as the time-weighted average concentration for a normal 8-hour workday and a 40-hour workweek, to which nearly all workers may repeatedly be exposed, day after day, without adverse effect. TLVs are given in ppm (parts by volume of gas or vapour per million parts by volume of contaminated air) or in mg/m^3 (milligrams per cubic meter). If only a value in mg/m^3 is given this applies to the aerosol of the substance. (Aerosol: a suspension of liquid or solid particles in air). Use 24317 for C values.
(24317)

13403000 TLV: [] ppm; [] mg/m^3 [] (skin) (ACGIH 199?).

Expl. See expl. 13400. TLVs preceded by 'C' are ceiling values, meaning that they should not be exceeded during any part of the working exposure. Other values are time-weighted averages (TWA), defined as the TWA concentration for a normal 8-hour workday and a 40-hou workweek, to which nearly all workers may repeatedly be exposed, day after day, without adverse effect. The addition of '(skin)' refers to the potential contribution to the overall intake by the cutaneous route because of the possibility of absorption of the substance through the skin, mucous membranes, or the eyes. TLVs are given in ppm (parts by volume of gas or vapour per million parts by volume of contaminated air) or in mg/m^3 (milligrams per cubic meter). If only a value in mg/m^3 is given this applies to the aerosol of the substance. (Aerosol: a suspension of liquid or solid particles in air). Use 24317 for C values.
(24317)

13405000 TLV (as []): [] ppm; [] mg/m^3 [] (ACGIH 199?).

Expl. See expl. 13400. TLVs preceded by 'C' are ceiling values, meaning that they should not be exceeded during any part of the working exposure. Other values are time-weighted averages (TWA), defined as the TWA concentration for a normal 8-hour workday and a 40-hourwork week, to which nearly all workers may repeatedly be exposed, day after day, without adverse effect. TLVs are given

in ppm (parts by volume of gas or vapour per million parts by volume of contaminated air) or in mg/m^3 (milligrams per cubic meter). If only a value in mg/m^3 is given this applies to the aerosol of the substance. (Aerosol: a suspension of liquid or solid particles in air).This phrase which includes '(as ...)' can be completed with the symbol of the element, etc., into which the TLV is expressed; also can be completed with 'dust', 'fume', etc. Use 24317 for C values.
(24317)

13407000 TLV (as []): [] ppm; [] mg/m^3 [] (skin) (ACGIH 199?).

Expl. See expl. 13400. TLVs preceded by 'C' are ceiling values, meaning that they should not be exceeded during any part of the working exposure. Other values are time-weighted averages (TWA), defined as the TWA concentration for a normal 8-hour workday and a 40-hour workweek, to which nearly all workers may repeatedly be exposed, day after day, without adverse effect. TLVs are given in ppm (parts by volume of gas or vapour per million parts by volume of contaminated air) or in mg/m^3 (milligrams per cubic meter). If only a value in mg/m^3 is given this applies to the aerosol of the substance. (Aerosol: a suspension of liquid or solid particles in air). This phrase which includes '(as .....)' can be completed with the symbol of the element, etc., into which the TLV is expressed; also can be completed with 'dust', 'fume', etc. The addition of '(skin)' refers to the potential contribution to the overall intake by the cutaneous route because of the possibility of absorption of the substance through the skin, mucous membranes, or the eyes. Use 24317 for C values.
(24317)

13409000 TLV not established.

Expl. See expl. 13400

13410000 TLV: []

Expl. See Explanation in 13400.

Ind. Select appropriate options from 1341010-17. First after the units, select 'as TWA' or 'as STEL'. If both are assigned, always put TWA first, and then STEL. Use format
TLV: [xx] ppm as TWA; [yy] ppm as STEL [(ACGIH 200x)].
If 'Ceiling value' is assigned use format
TLV: [yy] ppm as STEL (Ceiling value) [(ACGIH 200x)].
If indication 'skin' or notation for carcinogenicity (A1-A5) use format
TLV: [xx] ppm as TWA (skin; BEI)
Complete the year of publication of the TLVs. In the field reserved for comments in the programme indicate the basis of the TLV, critical effects, as indicated in the ACGIH booklet of TLVs.

13410010 [] ppm

13410020 [] mg/m^3

13410030 [] fibre/cc

13410040 Simple asphyxiant

Expl. A number of gases and vapours, when present in high concentrations in air, act primarily as simple asphyxiant without other significant physiologic effects. The limiting factor is the available oxygen. The minimal oxygen content should be 18% by volume under normal atmospheric pressure (equivalent to a partial pressure of oxygen =135 torr =18.0 kPa). Atmospheres deficient in oxygen do not provide adequate warning and most simple asphyxiants are odourless. Several simple asphyxiants present an explosion hazard.

13410045 (inhalable fraction)

13410047 (inhalable fraction & vapour)

13410050 as TWA

Expl. Threshold Limit Value-Time Weighted Average is the time weighted average concentration for a conventional 8-hour workday and a 40-hour workweek, to which it is believed that nearly all workers may be repeatedly exposed, day after day, without adverse effect.

13410060 as STEL

Expl. Threshold Limit Value-Short Term Exposure Limit is the concentration to which it is believed that worker can be exposed continuously for a short period of time without suffering from
1) irritation,
2) chronic or irreversible damage, or
3) narcosis of sufficient degree to increase the likelihood of accidental injury, impair self-rescue or materially reduce work efficiency,
and provided that the daily TLV-TWA is not exceeded. It is not a separate independent exposure limit; rather, it supplements the time-weighted average (TWA) limit where there are recognized acute effects from a substance whose toxic effects are primarily of chronic nature. STELs are recommended only where toxic effects have been reported from high short-term exposures in either humans or animals. A STEL is defined as a 15-minute TWA exposure which should not be exceeded at any time during the a workday even if 8-hour TWA is within the TLV-TWA. Exposure above TLV-TWA up to STEL should not be longer than 15 minutes and should not occur more than four times per day. There should be at least 60 minutes between successive exposures in this range. An averaging period other than 15 minutes may be recommended when this is warranted by observed biological effects.

13410070 (Ceiling value)

Expl. The Threshold Limit Value-Ceiling is the concentration that should not be exceeded during any part of the working exposure.
In conventional industrial hygiene practice if instantaneous monitoring is not feasible, then the TLV-C can be assessed by sampling over a period that should not exceed 15 minutes, except for those substances that may cause immediate irritation when exposures are short.
For some substances, e.g., irritant gases, only one category, the TLV-Ceiling, may be relevant. For other substances, one or two categories may be relevant, depending upon their physiologic action. It is important to observe that if any one of these types of TLVs is exceeded, a potential hazard from that substance is presumed to exist.
The Chemical Substances TLV Committee holds the opinion that TLVs are based on physical irritation should be considered no less binding than those based on physical impairment. There is increasing evidence that physical irritation may initiate, promote, or accelerate physical impairment through interaction with other chemical or biological agents.

13410080 (skin)

Expl. Listed substances followed by the designation 'skin' refer to the potential significant contribution to the overall exposure by the cutaneous route, including mucous membranes and eyes, either by contact with vapour, or, of probable greater significance, by direct skin contact with the substance. Vehicles present in solutions or mixtures can also significantly enhance the potential skin absorption. It should be noted that while some materials are capable of causing irritation, dermatitis, and sensitization in workers, these properties are not considered relevant when assigning a skin notation. It should be noted, however, that the development of a dermatological condition can significantly affect the dermal absorption.

13410090 A1 (confirmed human carcinogen);

Expl. A1 Confirmed human carcinogen

13410100 A2 (suspected human carcinogen);

Expl. A2 Suspected human carcinogen

13410110 A3 (confirmed animal carcinogen with unknown relevance to humans);

Expl. A3 Confirmed animal carcinogen with unknown relevance to humans

13410120 A4 (not classifiable as a human carcinogen);

Expl. A4 Not classifiable as human carcinogen

13410130 A5 (not suspected as a human carcinogen);

Expl. A5 Not suspected as human carcinogen

13410140 BEI issued

Expl. The note 'BEI' is listed when BEI is also recommended for the substance. Biological monitoring should be instituted for such substances to evaluate the total exposure from all sources, including dermal, ingestion, or non-occupational.

13410150 SEN

Expl. Listed substances followed by the designation 'SEN' refer for the confirmed potential for worker sensitization as result of dermal contact and/or inhalation exposure, based on the weight of scientific evidence. Lack of the sensitizer notation does not necessarily mean that the substance is not a sensitizer.

13410160 Intended change

Expl. These substances with their corresponding values and notations, comprise those for which a limit has been proposed for the first time or for which a change in the Adopted listing has been proposed. In each case, the proposed values should be considered trial values for the year following ratification by ACGIH Board of Directors. If, during the year, no evidence comes to light that questions the appropriateness of these proposals, the values will be reconsidered for adoption as TLVs. Documentation is available for each of these substances and their proposed values.

13410170 [(ACGIH 200#)].

13411000 Quick decomposition in moist air results in [] exposure.

Expl. Some substances on contact with water or moist air will rapidly form very toxic and/or corrosive gases (e.g. HCl, H_2S, PH_3, SO_2, NH_3, HCN, HBr, HF, Br_2, H_2SO_4, Cl_2, HI). The risk will depend on the severity of the effect and on the evolution rate of the gas formed. By giving the OEL of this toxic/corrosive gas as a product of contact with moist air, attention will be drawn so that the risk will not be underestimated.

Ind. Apply 13411 with the name of the toxic/corrosive gas formed, followed by the OEL of this gas, if:
- this gas is reported in the section 'Chemical dangers' under 'react with moist air'
- the toxic effects reported by inhalation are the effects primarily due to the gas emitted
- the OEL of the gas can be reasonably reached in less than 8 hours

13420000 Other OEL values (NOT on card): []

Expl. See expl. 13400. In (name country) national OELs are set by (name of national authority). The meaning of these OELs is defined as follows: ... Further information can be found in ...

Ind. All relevant and available OEL values for the substance in question as well as the ACGIH values should be mentioned on the Card matrix, e.g., those from the International Register of Potentially Toxic Chemicals (IRPTC) Legal File. The Peer-Review Committee will decide which OEL value will be printed on the ICSC. On an ICSC for a specific country, the national OEL value, if present, will have preference, using the relevant abbreviations. Text changes in the User's Guide should be applied if necessary to all phrases in which the generally applied abbreviation "OEL" has been used.
N.B.: It is assumed that values in the applied OEL system are based on OEL/TWA values of 8 hours a day, more or less conforming to the ACGIH system. It is also assumed that this system has values for short-term (maximum 15 minutes) exposure comparable with the STELs of the ACGIH. In this Guide these short-term OELs are denoted as OEL/ST values. The RIR index used later on (see Appendix 5.) has been developed from an OEL system on the principle of avoiding adverse effects as e.g., in the ACGIH system.

13421000 MAK: [] ppm; [] mg/m^3; [] (199?)

13423000 MAK as []: [] ppm; [] mg/m^3; [] (199?)

13425000 MAK: class [] (199?)

13426000 MAK: []

Ind. To apply MAK values need compiler and Peer-Review Group decision.

13426001 (Inhalable fraction)

13426002 (Respirable fraction)

13426003 IIb (not established but data is available)

Expl. Substances for which a scientifically founded MAK value cannot be established.

13426010 [] ppm

13426020 [] mg/m^3

13426030 skin absorption (H);

Expl. Substances are designated with an 'H' (Haut) following criteria based on:
- workplace studies, well documented percutaneous absorption in workers handling the substance;
- animal studies, exposure contributing to toxic effects;
- in vitro studies, standard methods showing quantifiable contribution to toxic effects;
- theoretical models.

Ind. Use according to the latest available version of the DFG publication.

13426040 sensitization of respiratory tract (Sa);

Expl. Danger of sensitization of the airways. The phrase is used to designate substances, which can cause symptoms of the airways and also the conjunctiva, substances causing airway sensitization.

Ind. Use according to the latest available version of the DFG publication.

NB: Phrases with @ sign can no longer be selected for use in the ICSCs

13426050 sensitization of skin (Sh);

Expl. Danger of sensitization of skin. The phrase is used to designate substances, which can cause allergic reactions of the skin and the mucosa close to the skin, skin-sensitizing substances.

Ind. Use according to the latest available version of the DFG publication.

13426060 sensitization of respiratory tract and skin (Sah);

Expl. Danger of sensitization of the airways and the skin. The phrase designates substances which have sensitizing effects on both the airways and the skin.

Ind. Use according to the latest available version of the DFG publication.

13426070 photosensitization (PS);
Expl. Danger of photo-contact sensitization. The phrase is used the designate photosensitizing substances.

Ind. Use according to the latest available version of the DFG publication.

13426090 @sensitization

Expl. Use the appropriate phrase: 13426040 Sa, 13426050 Sh, 13426060 Sah, 13426070 PS.

13426100 [(DGF 200#)]

13427000 MAK not established.

13428000 []

13428010 Peak limitation category: []

Expl. Two categories are distinguished:
- Substances for which local irritant effects determine the MAK value, also respiratory allergens. For substances in category I the excursion factor is 1.
- Substances with systemic effects. For substances in category II the excursion factor is 2.
The peak values for the substances in both categories have been established for the average value of sampling period of 15 minutes, four times per shift with one hour interval.

Ind. Use according to the latest available version of the DFG publication.

13428020 Carcinogen category: []

Expl. The following criteria have been followed to assign carcinogenic substances to 5 different categories:
1. Substances that cause cancer in man and can be assumed to make a significant contribution to cancer risk.
2. Substances that are considered to be carcinogenic for man because sufficient data from long-term animal studies or limited evidence from animal studies substantiated by evidence from epidemiological studies indicate that they can make a significant contribution to cancer risk.
3. Substances that cause concern that they could be carcinogenic for man but cannot be assessed conclusively because of lack of data. The classification in category 3 is provisional.
3A. Substances for which the criteria for classification in category 4 or 5 are fulfilled but for which the database is insufficient for the establishment of a MAK value.

NB: Phrases with @ sign can no longer be selected for use in the ICSCs

3B. Substances for which in vitro or animal studies have yielded evidence of carcinogenic effects that is not sufficient for classification of the substance in one of the other categories. A MAK or BAT value can be established provided no genotoxic effects have been detected.
4. Substances with carcinogenic potential for which a non-genotoxic mode of action is of prime importance and genotoxicity plays no or at most a minor part. No significant contribution to human cancer risk is expected provided the MAK value is observed.
5. Substances with carcinogenic and genotoxic effects, the potency of which is considered to be so low that, provided the MAK and BAT values are observed, no significant contribution to human cancer risk is to be expected.

Ind. Use according to the latest available version of the DFG publication.

13428030 Germ cell mutagen group: []

Expl. The categories for classification of germ cell mutagens are:
1. Germ cell mutagens, which have been shown to increase the mutant frequency in the progeny of exposed humans.
2. Germ cell mutagens, which have been shown to increase the mutant frequency in the progeny of exposed mammals.
3A. Substances, which have been shown to induce genetic damage in germ cells of human or animals, or which produce mutagenic effects in somatic cells of mammals in vivo and have been shown to reach the germ cells in an active form.
3B. Substances which are suspected of being germ cell mutagens because of their genotoxic effects in mammalian somatic cells in vivo; in exceptional cases, substances for which there are no in vivo data but which are clearly mutagenic in vivo and structurally related to known in vivo mutagens.
4. Not applicable. Category 4 carcinogenic substances are those with non-genotoxic mechanisms of action.
5. Germ cell mutagens, the potency of which is considered to be so low that, provided the MAK value is observed, their contribution to generic risk for man is expected not to be significant.

Ind. Use according to the latest available version of the DFG publication.

13428040 Pregnancy risk group: []

Expl. The categorization of the substances according to their prenatal toxicity has been established as follows:
Group A. A risk of damage to the embryo or foetus has been unequivocally demonstrated. Exposure of pregnant women can lead to damage the developing organism even when MAK and BAT values are observed.
Group B. Currently available information indicates that a risk of damage to the embryo or foetus must be considered to be probable. Damage to the developing organism cannot be excluded when a pregnant women are exposed, even when MAK and BAT values are observed.
Group C. There is no reason to fear a risk of damage to the embryo or foetus when MAK and BAT values are observed.
Group D. Either there are no data for an assessment of damage to the embryo or foetus or the currently available data are not sufficient for classification in one of the groups A– C
@IIc. MAK value has been issued but no pregnancy risk group classification due to absence of adequate data. - *no longer used in MAK classification*

Ind. Use according to the latest available version of the DFG publication.

13428050 BAT issued.

Expl. BAT value (biological tolerance value for occupational exposures) is established on the basis of sufficient occupational-medical and toxicological data indicating that these concentrations based on

an exposure of 8 hours daily and 40 hours weekly do not cause adverse effects on the health of the employee. BAT values can be defined as concentrations or rates of formation or excretion in blood and/or urine, being conceived as ceiling values for healthy individuals. They provide a basis for deciding whether the amount of a chemical substance taken up by the organism may be harmful or not.

Ind. Use according to the latest available version of the DFG publication.

13428060 BLW issued.

Expl. BLWs are assigned only for hazardous materials which do not have sufficient toxicological or occupational-medical data for the establishment of BAT values (i.e. for carcinogenic substances, suspected carcinogens and for non-carcinogens with inadequate toxicological data). The observance of the BLW values does not exclude a risk of adverse effects on health, but they can provide a basis for biomonitoring of exposed persons by the physician.

Ind. Use according to the latest available version of the DFG publication.

13428070 BAR issued

Expl. BAR describes the background level of a substance that is present in the environment at a particular time in a reference population of people of working age who are not occupationally exposed to the substance. The BAR is based on the 95th centile without regard to the effects on health. This reference level is derived from a measured level in a random sample from a defined population group. Occupational exposures can be assessed by comparing biomonitoring values in occupationally exposed persons with the BAR.

Ind. Use according to the latest available version of the DFG publication.

13429000 EU OEL: []

Expl. IOELV (Indicative Occupational Exposure Limit)

Ind. Select appropriate options from 13429000-07. After units select TWA or STEL. If both are assigned, always put TWA first, and then STEL; use format
EU OEL: [xx] ppm as TWA; [yy] ppm as STEL [(EU 2000)].
If there is a notation attached to the value use format
EU OEL: [xx] ppm as TWA (skin); [yy] ppm as STEL (skin) [(EU 2000)].
Complete the year of publication of the OELs.

13429010 [] ppm

13429020 [] mg/m³

13429030 [] fibres/cc

13429040 (skin)

13429050 as TWA

13429060 as STEL

13429070 [(EU 200#)].

13500000 ROUTES OF EXPOSURE:

13501000 The substance can be absorbed into the body []

Expl. 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 (.).
Explanation of some terms:
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.
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.
Mist: a suspension of liquid particles in the air, formed by condensation of a vapour.
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.
Dust-cloud: fine particles of powder of a solid substance, dispersed in the air.
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'.

Ind. The important routes of exposure resulting in absorption should be mentioned by making a choice out of one or more of the 13500 series according to human or acute experimental animal evidence. 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 use to make a choice of phrases from the 13500 series.
For corrosives: If the substance is classified corrosive by specific route of exposure then select the corresponding phrase in section 13500. If the substance is corrosive to the skin, the respiratory tract and the digestive tract then select: 'Serious local effects by all routes of exposure'. Some exceptions such as phenol and hydrogen fluoride may exist to such approach for corrosive. Exception has to be documented carefully by the PI for peer-review meeting.

13502000 in hazardous amounts[]

Expl. In some cases it could be difficult to qualify the route of absoption.

Ind. Use only if the substance is classified by GHS as toxic, categories 1, 2 or 3.

13503000 by inhalation and through the skin[]

Expl. 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. Substances as liquid, solid, gas, mist or aerosol can be absorbed through the skin. This is the second most frequent mode of exposure of substances in industrial situations All of these subphrases can be completed with particulars; always close with a full stop (.).
See also 13501.

Ind. Apply to gases, vapours and aerosols that can be absorbed by inhalation in harmful quantities, i.e. if LC50 (4hr) inhalation, mammals (rat)* according to OECD guidelines and GHS 3.1.2.3, for aerosols or particulates <= 5 mg/l or for gases <= 5000 ppm or vapours <= 20 mg/l. Apply for chemicals with 'skin' notation, if appropriate, in the list of OELs, or if LD50 dermal, rat or rabbit* according to GHS 3.1.2.3 <= 2000 mg/kg by weight.
* Values for rats are the primary choice but also other species could be used (Peer-review decision).

Multiple exposure animal studies information or epidemiological studies indicating the substance may have long term effect (cancer, reprotoxicity (F1, F2), specific target organ toxicity) through inhalation or data derived from human inhalation accidental report could be used to assume that inhalation may result in significant toxic effects (Peer-review decision).
For corrosives select: Serious local effects.
Add LD50 and LC50 values in comments field for reference.
18103 18207 (19103)

13504000 by inhalation[]

Expl. 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. All of these subphrases can be completed with particulars; always close with a full stop (.).
See also 13501.

Ind. Apply to gases, vapours and aerosols that can be absorbed by inhalation in harmful quantities, i.e. if LC50 (4hr) inhalation, mammals (rat)* according to OECD guidelines and GHS 3.1.2.3, for aerosols or particulates <= 5 mg/l or for gases <= 5000 ppm or vapours <= 20 mg/l.
* Values for rats are the primary choice but also other species could be used (Peer-review decision).
Multiple exposure animal studies information or epidemiological studies indicating the substance may have long term effect (cancer, reprotoxicity (F1, F2), specific target organ toxicity) through inhalation or data derived from human inhalation accidental report could be used to assume that inhalation may result in significant toxic effects (Peer-review decision).
For corrosives select: Serious local effects.
Add LD50 and LC50 values in comments field for reference.

13504020 and

13505000 by inhalation of its vapour[]

Expl. 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. All of these subphrases can be completed with particulars; always close with a full stop (.).
See also 13501.

Ind. Can be used for liquids or solids with a boiling point < 350°C which can be absorbed in harmful quantities. Apply to gases, vapours and aerosols that can be absorbed by inhalation in harmful quantities, i.e. if LC50 (4hr) inhalation, mammals (rat)* according to OECD guidelines and GHS 3.1.2.3, for aerosols or particulates <= 5 mg/l or for gases <= 5000 ppm or vapours <= 20 mg/l.
* Values for rats are the primary choice but also other species could be used (Peer-review decision).
Multiple exposure animal studies information or epidemiological studies indicating the substance may have long term effect (cancer, reprotoxicity (F1, F2), specific target organ toxicity) through inhalation or data derived from human inhalation accidental report could be used to assume that inhalation may result in significant toxic effects (Peer-review decision).
For corrosives select: Serious local effects.
Add LD50 and LC50 values in comments field for reference.

13505020 and

13507000 by inhalation of its aerosol[]

Expl. 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. All of these subphrases can be completed with particulars; always close with a full stop (.).
See also 13501.

Ind. Can be used for a liquid or a solid with a boiling point >= 350°C, which is handled or may occur as an aerosol and which can be absorbed in harmful quantities. Apply to gases, vapours and aerosols that can be absorbed by inhalation in harmful quantities, i.e. if LC50 (4hr) inhalation, mammals (rat)* according to OECD guidelines and GHS 3.1.2.3, for aerosols or particulates <= 5 mg/l or for gases <= 5000 ppm or vapours <= 20 mg/l.
* Values for rats are the primary choice but also other species could be used (Peer-review decision).
Multiple exposure animal studies information or epidemiological studies indicating the substance may have long term effect (cancer, reprotoxicity (F1, F2), specific target organ toxicity) through inhalation or data derived from human inhalation accidental report could be used to assume that inhalation may result in significant toxic effects (Peer-review decision).
For corrosives select: Serious local effects.
Add LD50 and LC50 values in comments field for reference.

13507020 and

13509000 []through the skin[]

Expl. Substances as liquid, solid, gas, mist or aerosol can be absorbed through the skin. This is the second most frequent mode of exposure of substances in industrial situations. All of these sub phrases can be completed with particulars; always close with a full stop. See also 13501.

Ind. Apply for chemicals with 'skin' notation, if appropriate, in the list of OELs, or if LD50 dermal, rat or rabbit* accords with GHS Acute Toxicity categories 1-4 , i.e. <= 2000 mg/kg by weight.
Multiple exposure animal studies information or epidemiological studies indicating the substance may have long-term effect (cancer, reprotoxicity (F1, F2), specific target organ toxicity) through skin, or data derived from human dermal accidental report could be use instead (Peer-review decision).
* Use of values of other species need to be justified in all cases. Guinea pig value is supported by OECD guideline 402 (Peer-Review decision).
For corrosives select: Serious local effects [on contact to skin].
18103 18207

13509020 and

13511000 []by ingestion[]

Expl. Liquid and solid substances can be absorbed by swallowing. This is the least frequent mode of exposure of substances in industrial situations. All of these sub phrases can be completed with particulars; always close with a full stop. See also 13501.

Ind. Apply if the substance has LD50 oral, mammals (rat)* according to GHS 3.1.2.3 or OECD guidelines <= 2000 mg/kg by weight.
Multiple exposure animal studies information or epidemiological studies indicating the substance may have long-term effect (cancer, reprotoxicity (F1, F2), specific target organ toxicity) through ingestion, or data derived from human ingestion accidental report could be use instead (Peer-review decision).
* LD values for rats are the primary choice but also other species could be used (Peer-review decision).

13513000 , also as a vapour!

Expl. 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. See also 13501.

Ind. Use in combination with 13509 for substances whose vapour can be absorbed through the skin and are hazardous. (Normally the skin notation refers to contact with the liquid or solid itself; the vapours of only a few liquids are known to be absorbed through the skin at a dangerous rate. Example: carbon disulfide.

13515000 []

Ind. To be used for special cases, e.g., absorption by eyes.

13516000 Serious local effects[].

Ind. Use for corrosive substances that cause local tissue damage but are not necessarily absorbed.

13516005 Serious local effects by all routes of exposure

Ind. Use for corrosive substances that cause local tissue damage by any route of exposure but that are not necessarily absorbed.

13516010 @by all routes of exposure

Ind. Use for substances that are corrosive to the skin, the eyes, the respiratory and digestive tracts.

Disallowed in meeting of May 2010 - use 13516005 instead.

13516020 on contact with skin

Ind. Use according to GHS criteria for concentration limits and animal species.

13600000 INHALATION RISK:

Ind. Select only ONE phrase.

13601000 On loss of containment, a harmful concentration of this gas in the air will be reached very quickly[].

Expl. 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.

Ind. In order to estimate the acute inhalation risk of a gas, the OEL/ST value has to be used; refer to 13400 (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 Appendix 5. Use 13601 if gas with OEL/ST <= 5000 ppm or OEL/ST has not been established and cannot be estimated.

13601010 especially in confined spaces

13602000 On loss of containment this gas can cause suffocation by lowering the oxygen content of the air in confined areas.

Expl. 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.

Ind. In order to estimate the acute inhalation risk of a gas, the OEL/ST value has to be used; refer to 13400 (OELs) 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 Appendix 5. Use 13602 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 13601).
24431

13603000 On loss of containment this liquid evaporates very quickly displacing the air and causing a serious risk of suffocation when in confined areas.

Expl. Liquid and liquefied gases evaporate very quickly and may create a toxic atmosphere or displace the air when released, especially in confined spaces. Even if only slightly or non-toxic, a resultant decrease in oxygen content can cause suffocation. A decrease of oxygen to less than 18% is enough to be dangerous.

Ind. In order to estimate the acute inhalation risk of a gas, the OEL/ST value has to be used; refer to 13400 (OELs) 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 Appendix 5. Use for liquid and liquefied gas (11303).
24431

13604000 A harmful contamination of the air will [] on evaporation of this substance at 20°C[].

Expl. The selection of one of the phrases 13604000 and 13604010-14 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.

Ind. See individual indications in 13604010-14.

13604010 will not or will only very slowly be reached

Ind. Applies to liquids and solids with boiling points < 350°C and with RIRs < 12. (RIR = Relative Inhalation Risk; refer to Appendix 5 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.

13604020 be reached slowly

Expl. The selection of one of the phrases 13604010-14 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.

Ind. Applies to liquids and solids with boiling points < 350°C and with RIRs between 12 - 120. (RIR = Relative Inhalation Risk; refer to Appendix 5 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.

13604030 be reached quickly

Expl. The selection of one of the phrases 13604010-14 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.

Ind. Applies to liquids and solids with boiling points < 350°C and with RIRs between 120 - 4000. (RIR = Relative Inhalation Risk; refer to Appendix 5 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.

13604040 be reached very quickly

Expl. The selection of one of the phrases 13604010-14 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.

Ind. Applies to liquids and solids with boiling points < 350°C and with RIRs >= 4000. (RIR = Relative Inhalation Risk; refer to Appendix 5 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 13613. 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.

13604050 ; on spraying or dispersing, however, much faster.

13605000 A harmful contamination of the air will not or will only very slowly be reached on evaporation of this substance at 20°C[]

Expl. The selection of one of the phrases 13605-19 is based on how quickly 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.

Ind. Applies to liquids and solids with boiling points < 350°C and with RIRs < 12. (RIR = Relative Inhalation Risk; refer to Appendix 5 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.

13605010 ; on spraying or dispersing, however, much faster.

13607000 A harmful contamination of the air will be reached rather slowly on evaporation of this substance at 20°C[].

Expl. The selection of one of the phrases 13605-19 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.

Ind. Applies to liquids and solids with boiling points < 350°C and with RIRs between 12 - 120. (RIR = Relative Inhalation Risk; refer to Appendix 5 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.

13607010 ; on spraying or dispersing, however, much faster

13609000 A harmful contamination of the air can be reached rather quickly on evaporation of this substance at 20°C[].

Expl. The selection of one of the phrases 13605-19 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.

Ind. Applies to liquids and solids with boiling points < 350°C and with RIRs between 120 - 4000. (RIR = Relative Inhalation Risk; refer to Appendix 5 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.

13611000 A harmful contamination of the air can be reached very quickly on evaporation of this substance at 20°C[].

Expl. The selection of one of the phrases 13605-19 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.

Ind. Applies to liquids and solids with boiling points < 350°C and with RIRs >= 4000. (RIR = Relative Inhalation Risk; refer to Appendix 5 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 13613. 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.

13613000 No indication can be given about the rate in which a harmful concentration in the air is reached on evaporation of this substance at 20°C.

Expl. The selection of one of the phrases 13605-19 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.

NB: Phrases with @ sign can no longer be selected for use in the ICSCs

Ind. 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, 13611 is generally used; when in doubt, use this phrase.

13615000 No indication can be given about the rate in which a harmful concentration of this substance in the air is reached.

13617000 Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly[].

Expl. 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.

Ind. 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.
(16203)

13617010 on spraying

13617020 when dispersed

13617030 when dispersed, especially if powdered

13617040 on spraying or when dispersed, especially if powdered

13617050 especially if powdered

13618000 A [] concentration of airborne particles can be reached quickly[].

Ind. Applies to solids with b.p. >= 350°C, using the window 'harmful' if:
- OEL/TWA < 10 mg/m^3 (particle concentrations); or
- OEL/TWA not established nor estimated; or
- solids regarded as carcinogenic (refer to 13833/13835).
Applies to solids with boiling point > or = 350°C, using the window 'nuisance-causing' if the (estimated) OEL/TWA is > or = 10 mg/m^3 (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.
Link to 16201 in case of 'harmful concentration'.
16201 (16203)

13618010 harmful

13618020 nuisance-causing

13618030 on spraying

13618040 when dispersed

13618050 when dispersed, especially if powdered

13618060 on spraying or when dispersed, especially if powdered

13618070 especially if powdered

13619000 Evaporation at 20°C is negligible; a nuisance-causing concentration of airborne particles can, however, be reached quickly[].

Expl. 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!

Ind. 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.
(16201) (16203)

13619010 on spraying

13619020 when dispersed

13619030 when dispersed, especially, if powdered

13619040 on spraying or when dispersed, especially if powdered

13619050 especially if powdered

13621000 []

13700000 EFFECTS OF SHORT-TERM EXPOSURE:

Expl. 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 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.

Ind. 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 series 13360/80 may be used. Although allowance should be made for exceptions, the following table could be used as a guide.

Chemical property	irritating to	corrosive to	very corrosive to
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

13701000 Corrosive.

Ind. Use 13711 instead, to avoid repetition.

13702000 Lachrymator.

Expl. Some substances, known as lachrymators, cause the eyes to water.

Ind. Apply to typical lachrymators, i.e., gases or liquids of which the vapours induce lachrymation NOT due to ordinary irritation of the eyes. See 19104.

13703000 The substance []

Expl. The substance, its vapour or an aerosol may be irritating or corrosive to the skin eyes or respiratory tract, depending on the severity of its action. This phrase is not used, however, when the reaction is purely a result of mechanical irritation caused, for example by dust.

Ind. Use this phrase when there is a good literature evidence that the substance causes irritation or corrosivity other than by mechanical means. See indications for when to use phrase appropriate for irritation and for corrosivity.

13705000 The vapour []

Expl. The substance, its vapour or an aerosol may be irritating or corrosive to the skin eyes or respiratory tract, depending on the severity of its action. This phrase is not used, however, when the reaction is purely a result of mechanical irritation caused, for example by dust.

Ind. Use this phrase when there is a good literature evidence that the vapour causes irritation or corrosivity. See indications for when to use phrase appropriate for irritation and for corrosivity.

13707000 The aerosol []

Expl. The substance, its vapour or an aerosol may be irritating or corrosive to the skin eyes or respiratory tract, depending on the severity of its action. This phrase is not used, however, when the reaction is purely a result of mechanical irritation caused, for example by dust.

Ind. Use this phrase when there is a good literature evidence that the aerosol causes irritation or corrosivity other than by mechanical means. See indications for when to use phrase appropriate for irritation and for corrosivity.

13709000 is []irritating to []

Expl. Irritating means that the substance may cause significant inflammation of the skin or a significant injury to the eyes, other than mechanical means.

Ind. Complete with 'the eyes', 'the skin', or 'the respiratory tract' if the criteria for R36 (eyes), R38 (skin), or R37 (respiratory tract) are met. Use the related subphrase, for example: 'The substance is irritating to the skin and is corrosive to the eyes.'
19107 (19109) 19201 19301 18107 (18113) 18201 17115 17135

13709010 the eyes

13709020 the skin

13709030 the respiratory tract

13709040 mildly

13709050 severely

13709060 and

13710000 May cause mechanical irritation[].

Ind. Use this phrase when there is a good literature evidence that the substance causes irritation by mechanical means.
17115 19107 19109

13710010 to

13711000 is []corrosive to []

Expl. Corrosive means that the substance can destroy tissue of the skin or the respiratory tract or can seriously damage the eyes.

Ind. Complete with 'the eyes', if criteria for R41 (serious damage to the eyes) is met; 'the skin' if the criteria for R34 (causes burn to skin) is met; 'respiratory tract' if the substance may cause more damage to the respiratory tract than by irritation (more serious than the criteria for R37). Insert 'very' before 'corrosive' if R35 criteria apply to the substance (i.e., causes severe burns); if R35 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.
(13719-17313) (16207) 17135-15-11-33-29-45 18113-07 (18117) 18110 19301 19109-07-17 (19115) (19203/05/07/09) 20109-05-30 (20309) (21311) (21319)

13711010 and

13713000 the eyes[]

13715000 the skin[]

Ind. Applies if either the criteria for R38 (irritating to skin) or R34 (causes burns) are met.

13717000 the respiratory tract.

Ind. Applies if the criteria for R37 (irritating to the respiratory system) are met. If the criteria for R41 (serious eye damage) or R34 (causes burns) apply, it can be generally assumed that the substance is corrosive to the respiratory tract.

13718000 Corrosive on ingestion[].

Ind. If the substance applies to criteria for R34 or R35; if the substance only applies to the criteria for R38, the compilers should evaluate whether it should be considered to be corrosive to the digestive tract or not.
20109-05-30 (20133) (20309) (20134)

13719000 @Inhalation of [] may cause lung oedema (see Notes).
Phrase disallowed April 07 in favour of 13719100 for linguistic reasons.

13719100 Inhalation [] may cause lung oedema (see Notes).

Expl. 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.

Ind. 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 13720 for lung oedema caused by corrosive and/or water-soluble substances).
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 24419 in NOTES.
17303 (optional) 13782 17309 24418 24419

13719110 of the fumes

13720000 Inhalation [] may cause lung oedema, but only after initial corrosive effects on eyes and/or airways have become manifest.

Ind: 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 137191 for lung oedema caused by non-corrosive substances). NB 13711 and 13717 (.. is corrosive to the respiratory tract) should also have been selected.

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.
13782, 17303, 17309, 17129 , 17133

13721000 @Inhalation of [] may cause asthma-like reactions.
Phrase disallowed April 07 in favour of 13721100 for linguistic reasons.

13721100 Inhalation [] may cause asthma-like reactions.

Expl. This phrase indicates certain effects which may be caused if the substance is inhaled.

Ind. 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.
13805 24422 24423

13721110 of the fumes

13722000 Inhalation [] may cause [].

Expl. This phrase indicates certain effects which may be caused if the substance is inhaled.

Ind. 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 part of this phrase may be completed with effect(s). Do not include symptoms, these are described in 17000 series.

13722020 of the fumes

13723000 @Inhalation of [] may cause [].
Phrase disallowed April 07 in favour of 13723000 for linguistic reasons.

13723010 Severe swelling of the throat

Ind. For inhalation of severely corrosive, water-soluble gases

13724000 Inhalation of fumes may cause metal fume fever.

Expl. Some metal fumes can induce a particular fever known as metal fume fever.

Ind. 17125 17141
24418

13725000 []

13727000 Suffocation.

Expl. 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.

Ind: Apply to gases and vapours that cause suffocation by asphyxiation rather than as an effect of systemic toxicity.

13733000 @If this liquid is swallowed, aspiration into the lungs may result in chemical pneumonitis.

Expl. Swallowing of some organic liquids with a low viscosity can cause coughing and vomiting, or impair deglutition. As a consequence, liquid droplets can be aspirated into the lungs, with a risk of chemical pneumonitis.

Ind. Applies if an organic liquid with a viscosity < 7 mm^2 /s or about 7 mm^2 /s at 40°C (1 mm^2 /s = 1 cSt; 1 centipoise = centistokes multiplied by density at given temperature).
(20309)
Phrase disallowed in November 2008 in favour of 13734 and 13735

13734000 If swallowed the substance easily enters the airways and could result in aspiration pneumonitis.

Expl: 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).

Ind: Applies when substance meets GHS criteria for aspiration risk of Category 1.
203180 20145 20309

NB: Phrases with @ sign can no longer be selected for use in the ICSCs

13735000 If swallowed the substance may cause vomiting, and could result in aspiration pneumonitis.

Expl: 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 more than 13; isobutyl alcohols, and ketones with a composition of no more than 13 carbon atoms.

Ind: Applies when substance does not meets 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. NB These criteria are close to, but not identical with, those for GHS Category 2.
20309 20145

13741000 Rapid evaporation of the liquid may cause frostbite.

Expl. 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.

Ind. Applies to compressed liquefied gases and to liquids with a boiling point < 20°C. Also see 13743.
(18125) 18203 18303

13743000 The liquid may cause frostbite.

Expl. 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).

Ind. Applies to liquids with a temperature < -30°C, e.g., gases liquefied by cooling (cryogenics). Also see 13741.
18121 18203 18303

13745000 The hot liquid may cause severe skin burns.

Ind. Applies to solids which are transported and generally handled in liquid state at a temperature >= 50°C.
18205

13747000 []

13751000 The substance may cause effects on the []

Expl. 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 and, if possible, what consequences this may have.

Ind. Complete with target organs in terms understandable to a lay person (nervous system, liver, blood, etc.) and combine if possible with 13753 (toxicological data available). Otherwise close 13751 with a full stop. The phrase should not be used to indicate hypoxia due to superseding of oxygen by an inert gas.

13751010 bladder

13751020 blood

13751030 bone marrow

13751040 cardiovascular system

13751050 central nervous system

13751060 endocrine system

13751070 gastrointestinal tract

13751080 immune system

13751090 kidneys

13751100 liver

13751110 lungs

13751120 lymphatic system

13751130 nervous system

13751140 peripheral nervous system

13751150 respiratory tract

13751160 spleen

13751170 thyroid

13753000 , resulting in []

Expl. 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 and, if possible, what consequences this may have.

Ind. Use this phrase to indicate the effects only if it adds useful information to 13751 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 17100, 18100, and 19100.
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.

'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 13751: 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 ventilation and perfusion of the lung. When this expression is chosen include the following in phrase 13751: central nervous system.

13753010 asphyxia

13753020 cardiac disorders

13753030 convulsions

13753040 cyanosis

13753050 impaired functions

13753060 insomnia

13753070 irritability

13753080 kidney impairment

13753090 lesions of blood cells

13753095 destruction of blood cells

13753100 liver impairment

13753110 respiratory failure

13753120 tissue lesions

13753130 shock

13753140 jaundice

13753150 respiratory depression

13754000 the formation of methaemoglobin.

Expl. The blood contains a substance called haemoglobin which is important in the transport of oxygen from the lungs to all parts of the human body. Some substances can - when absorbed - alter haemoglobin into a form called methaemoglobin which cannot transport oxygen. Too much methaemoglobin in the blood will mean that the internal organs become starved of oxygen.

Ind. Apply for chemicals which can cause significant methaemoglobinaemia on short-term exposure. Chemicals that can generate methaemoglobin in vivo include nitrite and some aminophenols, N-hydroxyarylamines, aromatic amines, and arylnitro compounds. Combine with 13751 with 'blood' selected in the window of subphrases.
13781-82 (17108-09-13-14-19-25-31-37) 17309 (18103) (18118-19-23) 20143 (20106-07-19-25-27) (24417) 24425

13755000 []

13756000 Cholinesterase inhibition[].

Expl. 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.

Ind. Apply for chemicals (carbamate or organophosphorous esters) which can cause significant cholinesterase inhibition. Combine with 13751 with 'nervous system'.
13751-53-73 13781-82 (16211) 17110-42-27-31-19-14-37-29 (18103-20-23) 20110-03-17-37-43 24417-25

13761000 Exposure []could cause lowering of consciousness.

Expl. This phrase is used when exposure at realistic levels may lead to a lowering of consciousness.

Ind. Judgement must be made as to whether the effect could occur at realistic exposure levels.
a) Substances with an OEL (not a 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 then 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'.

13763000 Exposure []could cause [].

Expl. This phrase indicates certain effects which may be caused by exposure to the substance.

Ind. 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 then 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'.

13771000 Exposure []may result in unconsciousness.

Expl. This phrase is used when exposure at realistic levels may lead to unconsciousness.

Ind. Judgement must be made as to whether the effect could occur at realistic exposure levels.
a) Substances with an OEL (not a 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 then 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'.

13773000 Exposure []may result in death.

Expl. This phrase is used when exposure at realistic levels may lead to death.

Ind. Judgement must be made as to whether the effect could occur at realistic exposure levels.
a) Substances with an OEL (not a 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 then 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'.

13775000 Exposure []may result in [].

Expl. This phrase indicates certain effects which may be caused by exposure to the substance.

Ind. a) Substances with an OEL value (not a 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 then 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'.

13775010 at high levels

13775030 cardiac dysrhythmia

13775040 death

13775050 lowering of consciousness

13775060 unconsciousness

13775070 above the OEL

13775080 far

13781000 The effects may be delayed[].

Expl. The effects of exposure to some substances do not become manifest until some time (possibly hours) after the exposure.

Ind. Can be completed with '(see Notes)' if additional information given in NOTES (e.g., 24101).

13782000 Medical observation is indicated.

Expl. 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.

Ind. This phrase can be used with 13781.

13783000 See Notes.

13784000 Health effects of exposure to the substance have not been investigated [].

Expl. The potential toxicity 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.

Ind. For chemicals for which adequate data could not be found to make a judgment on effects of short-term exposure. Close with full stop if no data is available because no research has been done. Complete with 'adequately' if evidence shows that the available data were obtained through inadequately conducted research.

13785000 Health effects of exposure to the substance have been investigated extensively but none has been found.

Expl. Some chemicals do not represent a hazard to human health even at high, and improbably high, levels of exposure.

Ind. 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 24405 in cases where the chemical has not been investigated adequately. The selection of this phrase **has to be approved by the Peer Review group.**

13800000 EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:

Effects listed under Short-Term can be duplicated here, however, to do so is a **peer review decision.**

13801000 Repeated or prolonged contact with skin may cause dermatitis[].

Expl. Repeated or prolonged exposure to a number of substances may lead to effects on the skin. This may take the form of inflammed or reddened skin, known as dermatitis.

Ind. Applies if positive human experience is available; refer to toxicological handbooks. May be completed with further short details; also see 13807.

13803000 Repeated or prolonged contact may cause skin sensitization[].

Expl. 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.

Ind. 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.
A decision to use this phrase must be considered by the Peer-Review Committee.
18207 (16207)

13805000 Repeated or prolonged inhalation exposure may cause asthma[].

Expl. A respiratory sensitizer is a substance that will induce hypersensitivity of the airways following inhalation of the substance. This may result in rhinitis/conjuntivitis and alveolitis, or asthma. People with an existing allergy should avoid contact with this substance.

Ind. Apply if there is evidence in humans that the substance can induce specific respiratory hypersensitivity, and/or where there are positive results from an appropriate animal test. Evidence will normally be based on human evidence and will generally be seen as asthma. Other hypersensitivity reactions such as rhinitis/conjunctivitis and alveolitis should also be considered. A decision on classification should take into account the size of the population exposed and the extent of the exposure. A decision to use this phrase must be considered by the Peer-Review Committee.
(16207) 24422 24423

13807000 The liquid defats the skin[].

Expl. Many liquids have no direct effect on the skin and will not lead to an allergy, but will defat the skin upon prolonged or repeated contact. As a result, the skin may become rough, dry, and red. After the skin has been in frequent contact with, or is cleaned with, a defatting liquid, it should be washed off with water and soap and then treated with an ointment or cream.

Ind. Do not use if phrase 13801 has already been used. If both apply, preference should be given to 13801.
18105 18201

13807100 Repeated contact with skin may cause dryness and cracking

Expl. Some substances have a weak defatting action that will not result in dry skin from short-term exposure, but after long-term or repeated exposure may eventually deplete the skin of its natural oils resulting in dry, cracked skin (not necessarily dermatitis).

Ind. Use for substances where this effect has been shown to happen.
(18201)

13808000 Inhalation[] may cause asthma-like reactions (RADS).

13809000 Lungs may be affected by repeated or prolonged exposure[].

Expl. 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.

Ind. 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.

13809010 to the aerosol

13809020 to dust particles

13809030 to fibres

13809040 to fumes

13809050 to the gas

13809060 to the vapour

13809070 and

13811000 Lungs may be affected by inhalation of high concentrations[].

Expl. 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. This phrase is used when the effects are only caused if relatively high concentrations are inhaled.

Ind. Applies when effects are only caused on inhalation of high concentration, while 13809 has to be used when exposure without intensive contact is sufficient to cause the effects. The phrase has to be completed with 'gas', 'vapour', 'fume', 'mist', or 'dust particles'.

13813000 The substance may have effects on the []

Expl. This sentence indicates what organs or systems may be affected and what consequences this may have, but with relevance to long-term exposure.

Ind. Complete with the target organs using terms understandable to the lay person (nervous system, liver, blood, etc.) and combine if possible with 13815. Otherwise close 13813 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.

13813010 bladder

13813020 blood

13813030 bone marrow

13813040 cardiovascular system

13813050 central nervous system

13813060 endocrine system

13813070 gastrointestinal tract

13813080 immune system

13813090 kidneys

13813100 liver

13813110 lungs

13813120 lymphatic system

13813130 nervous system

13813140 peripheral nervous system

13813150 respiratory tract

13813160 spleen

13813170 thyroid

13813180 and

13813190 when ingested

13815000 , resulting in []

Expl. This phrase combined with 13813 indicates what organs or systems may be affected and what consequences this may have, but with relevance to long-term exposure.

Ind. Use this phrase to indicate the effects only if it adds useful information to 13813 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.

13815010 anaemia

13815020 cardiac disorders

13815030 cyanosis

13815040 fibrosis

13815050 impaired functions

13815060 kidney impairment

13815070 lesions of blood cells

13815080 liver impairment

13815090 respiratory failure

13815100 tissue lesions

13815110 and

13817000 the formation of methaemoglobin[].

Expl. The blood contains a substance called haemoglobin which is important in the transport of oxygen from the lungs to all parts of the human body. Some substances can, when absorbed, alter haemoglobin into a form called methaemoglobin which cannot transport oxygen. Too much methaemoglobin in the blood causes internal organs to become starved of oxygen. This phrase is used when methaemoglobineamia is a result of long-term or repeated exposure.

Ind. Apply for chemicals which can cause methaemoglobinaemia generally only after long-term or repeated exposure. Chemicals that create methaemoglobin in vivo include nitrite and some aminophenols, N-hydroxylamines, aromatic amines, and arylnitro compounds. Do not use in addition to 13754 unless there is an important reason to do so.
(16207) 17108-09-13-14-19-25-31-37 17309 (18103) (18118-19-23) 20143 (20106-07-19-25-27) 24417-25 (20317)

13818000 Cholinesterase inhibitor[]; cumulative effect is possible: see acute hazards/symptoms.

Expl. 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 as a result of long-term or repeated exposure.

Ind. 17110-14-19-27-31-37-42 (18103-20-23) 20110-03-17-37-43 24417-25 (16211)

13819000 []

13831000 This substance is carcinogenic to humans.

Expl. 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.

Ind. 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).
16207

13833000 This substance is probably carcinogenic to humans.

Expl. 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.

Ind. 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).
16207

13835000 This substance is possibly carcinogenic to humans.

Expl. 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.

Ind. 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).
16207

13837000 Tumours have been detected in experimental animals but may not be relevant to humans.

Expl. 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.

Ind. 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.
(16207)

13839000 Other data on carcinogenicity (NOT on card): []

Ind. Mention all other important data on the carcinogenicity, mutagenicity and reproductive toxicity of the substance.

13840000 []

13841000 @May cause heritable genetic damage in humans.

Expl. 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 to suggest that the substance should be regarded as if it induces heritable mutations in germ cells.

Ind. The phrase was deleted in Hanover meeting 16.3.2001
Apply this phrase if there is sufficient evidence to establish a causal association between human exposure to the substance and heritable genetic damage, e.g., from human epidemiological studies, or when there is sufficient evidence to provide a strong presumption that human exposure to the substance may result in the development of heritable genetic damage, generally on the basis of
1) positive result(s) from in vivo heritable germ cell mutagenicity tests in mammals (e.g., specific locus test, heritable translocation, etc.),
2) positive result(s) from in vivo somatic cell mutagenicity in mammals in combination with evidence that the substance has potential to cause mutations to germ cells. This supporting evidence may, for example, be derived from mutagenicity/genotoxic tests in germ cells in vivo, or by demonstrating the ability of the substance or its metabolite(s) to interact with the genetic material of germ cell,
3) positive result(s) from tests showing mutagenic effects in the germ cells of humans, without demonstration of transmission to progeny; for example, an increase in the frequency of aneuploidy in sperm cells of exposed people.
A decision to use this phrase must be a conclusion taken by the Peer-Review Committee.
16207

13843000 @May cause genetic damage in humans.

Expl. There is some evidence to suggest that the substance may cause mutations in the germ cells (ova or spermatozoa) of humans.

Ind. The phrase was deleted in Hanover meeting 16.3.2001.
Apply this phrase if there is positive evidence obtained from experiments in mammals and/or in some cases in vitro experiments, obtained from
1) somatic cell mutagenicity test in vivo, in mammals,
2) other in vivo somatic cell genotoxicity tests which are to be supported by positive results from in vitro mutagenicity assays.
Chemicals which are positive in vitro mammalian mutagenicity assays, and which also show chemical structure activity relationship to known germ cell mutagens should also be considered.
A decision to use this phrase must be a conclusion taken by the Peer-Review Committee.
16207

13845000 May cause heritable genetic damage to human germ cells.

Expl. 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 (13831-13837).

Ind. 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.
A decision to use this phrase must be a conclusion taken by the Peer-Review Committee.
16207

13851000 Causes toxicity to human reproduction or development.

Expl. 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.

Ind. 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.
16205 16209

13853000 May cause toxicity to human reproduction or development.

Ind. This phrase can be used instead of phrase 13851 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.
16205 16209

13855000 Animal tests show that this substance possibly causes toxicity to human reproduction or development.

Expl. Causes developmental retardation (in utero or after birth) and embryolethality 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.

Ind. A decision to use this phrase must be a conclusion taken by the Peer-Review Committee.
(16209)

13857000 @Animal tests show that this substance possibly causes malformations in human babies.

Expl. Causes malformations at dose levels which do not cause severe maternal toxicity (i.e. substantial reduction in weight gain, persistent emesis, hypo- or hyper-activity, or convulsions). There may be accompanying embryolethality. It is desirable to have confirmatory data from independent experiments, particularly involving a second species.

Ind. The phrase was deleted in Hanover meeting 16.3.2001.
A decision to use this phrase must be a conclusion taken by the Peer-Review Committee.
(16209)

13859000 []

13860000 See Notes.

13871000 Health effects of exposure to the substance have not been investigated [].

Expl. The potential toxicity 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.

Ind. For chemicals for which adequate data could not be found to make a judgment on effects of short-term exposure. Close with full stop if no data is available because no research has been done. Complete with 'adequately' if evidence shows that the available data were obtained through inadequately conducted research.

13872000 Health effects of exposure to the substance have been investigated extensively but none has been found.

Expl. Some chemicals do not represent a hazard to human health even at high, and improbably high, levels of exposure.

Ind. 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 24405 in cases where the chemical has not been investigated adequately. The selection of this phrase **has to be approved by the Peer Review group**.

13900000 ENVIRONMENTAL TOXICITY:

13901000 []

13902000 The substance is [] to aquatic organisms.

Ind. Complete with 'very toxic', 'toxic' or 'harmful' according to the following criteria:
1) very toxic: 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
Select also phrase 13909 if, in addition, the substance is not readily degradable or the log Pow >=3.0 (unless the experimentally determined BCF <= 100).
2) toxic: 96 hr LC50 (for fish) 1mg/l < LC50 <=10mg/l
or 48 hr EC50 (for daphnia) 1mg/l< EC50 <=10mg/l
or 72 hr IC50 (for algae) 1mg/l< IC50 <=10mg/l

Select also phrase 13909 if, in addition, the substance is not readily degradable or the log Pow >=3.0 (unless the experimentally determined BCF <= 100).
3) harmful: 96 hr LC50 (for fish) 10mg/l < LC50 <=100mg/l
or 48 hr EC50 (for daphnia) 10mg/ l< EC50 <=100mg/l
or 72 hr IC50 (for algae) 10mg/ l< IC50 <=100mg/l
Select also phrase 13909 if, in addition, the substance is not readily degradable. See also ind. in phrase 13907.
21245 (22409)

NB It may not be possible to find a 96 hour value for fish, but there may be a 24 hour value where all the fish have died. The decision to use this value in assessing toxicity is a peer review decision.

13902010 very toxic

Ind. (22105) (22409)

13902020 toxic

Ind. (22105) (22409)

13902030 harmful

13903000 This substance may be hazardous in the environment; special attention should be given to [].

Ind. The use of this phrase is a peer-review decision. The phrase can be used to specify the target.
21245 (22409)

13903010 air quality

13903020 indoor air quality

13903030 algae

13903040 bacteria

13903050 birds

13903060 crustacea

13903070 fish

13903080 honey bees

13903090 mammals

13903100 its impact on the ozone layer

13903110 plankton

13903120 plants

13903130 soil contamination

13903140 water quality

13903150 ground water contamination

NB: Phrases with @ sign can no longer be selected for use in the ICSCs

13903160 aquatic organisms

13903170 aquatic plants

13903200 soil organisms

13903210 and

13905000 Bioaccumulation of this chemical may occur [].

Ind. Apply if bioconcentration factor (BCF) >= 100.
If log Pow >= 3.0 (see 12801) and BCF < 100 but there 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.
21245 (22409)

13905010 in crustacea

13905020 in fish

13905030 in milk

13905040 in plants

13905050 in seafood

13905060 in molluscs

13905070 in mammals

13905080 along the food chain, for example

13907000 It is strongly advised that this substance does not enter the environment.

Ind. Use this phrase if:
- the substance is 'toxic' or 'very toxic' (to the aquatic environment) in 13902 or
- the substance is 'harmful' (to the aquatic environment) in 13902 or the substance is 'hazardous' (to the environment) in 13903 AND where there is evidence of bioaccumulation (13905 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 BOD5/COD >= 0.5 ; or
c) there is other evidence showing degradability in the aquatic of > 70% within a 28-day period.
21245 (22409)

13909000 The substance may cause long-term effects in the aquatic environment.

Expl. Normally used in combination with 13902. 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.
21245 (22409)

13911000 This substance does enter the environment under normal use. Great care, however, should be given to avoid any additional release, e.g. through inappropriate disposal.

Expl. Apply chemicals such as pesticides that are released to the environment under normal use.

13920000 Environmental effects from the substance have not been investigated [].

Expl. 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.

Ind. Close with full stop if no data is available because no research has been done. Complete with 'adequately' if evidence shows that the available data were obtained through inadequately conducted research.

13920010 adequately

14000000 FIRE:

14100000 Fire: ACUTE HAZARDS.

14101000 Extremely flammable.

Expl. Relates to liquids that have a flash point < 0°C and an initial boiling point less or equal to 35°C, and to flammable gases, when liquefied.

Ind. Apply if flammable gas or liquid with flash point < 0°C and a boiling point (or in case of a boiling range, the initial boiling point) < 35°C, and to gases which are flammable in contact with air at ambient temperature and pressure. For explosive substances use 14121.
14201 15213 22101

14103000 Highly flammable.

Expl. 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.
Liquid substances having a flash point < 21°C, but which are not extremely flammable.
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.
Substances which become hot and finally catch fire in contact with air at ambient temperature without any input of energy.

Ind. Apply if flammable gas or liquid with flash point > 0°C but < 21°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 14121. '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 14121).
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 4.2 should be included for application of this phrase.
14201 15213 22101

14105000 Flammable.

Expl. Relates to liquids and solids with flash point more or equal to 21 and < 61°C and to solids that continue to burn after removal of the source of ignition, but do not readily catch fire.

Ind. For explosive substances use 14121. Includes organic peroxides with relatively high ignition energy (i.e., SADT value > 35°C) and not regarded as explosive. Apply also if the flash point of a liquid is not available but is unlikely to exceed 61°C.
14201 22101

14107000 Combustible.

Expl. Relates to liquids and solids with flash point > 61°C, and to liquids and solids classified by UN as flammable even if there is no flash point available. Also applies to solids which, although difficult to ignite in normal air, are capable of supporting combustion if brought to a high temperature.

Ind. For explosive substances use 14121. Use for substances that are neither flammable (14101, 14103, and 14105 do not apply) nor explosive (14121). If both 14107 and 14115 apply, then use 14115.
14203 (22101)

14109000 Combustible under specific conditions.

Expl. 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.

Ind. For explosive substances use 14121. 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. 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.
(13331) (13341-43-45-47) 14203 (24219) (24221)

14111000 Not combustible.

Expl. Relates to substances that cannot (or only under very extreme conditions) be oxidized.

Ind. 'Very extreme conditions' are understood to be conditions which are not to be found generally in industry or normal laboratories. Also see 14113 and 14115.

14113000 Not combustible but enhances combustion of other substances.

Expl. Some non-combustible substances can give off oxygen which may enhance the combustion of other substances. Examples include: perchlorates, peroxides, and other oxidants.

Ind. Apply to inorganic chlorites, chlorates, perchlorates (and similar halogen compounds), permanganates, persulfates, some peroxides, nitrates, nitrites, and other non-combustible strong oxidants.

14115000 Not combustible but forms flammable gas on contact with water or damp air.

Ind. Substances such as Na or K that are neither flammable (14101,14103, and 14105 do not apply) nor explosive (14121), but that on contact with water or humid air evolve flammable gas in dangerous quantities (1 litre/kg/hour or more). If both 14107 AND 14115 apply, then use 14115.
(22101) 22305

14117000 []

14119000 Liquid formulations containing organic solvents may be flammable.

Expl. A substance, which may in itself be non-combustible, may commonly occur dissolved in a flammable solvent.

Ind. Apply to substances which in practice are often used in flammable commercial formulations.
(15109) 24437

14121000 Explosive.

Expl. 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.

Ind. 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. Use 15109 or 15111 to give further data.
14201 22101 (22301/03)

14123000 Many reactions may cause fire or explosion.

Ind. Use 14123 only when more appropriate than the use of 15109.

14125000 Heating will cause rise in pressure with risk of bursting.

Ind. Applies to liquids with boiling points < 100°C.

14127000 See Notes.

14129000 Gives off irritating or toxic fumes (or gases) in a fire.

Expl. 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.

Ind. (13341)

14200000 Fire: PREVENTION.

14201000 NO open flames, NO sparks, and NO smoking.

Expl. 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.

Ind. Applies if any of 14101, 14103, 14105, 14115, or 14121 is used.

14203000 NO open flames.

Expl. 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.

Ind. Applies if 14107 or 14109 is used.

14205000 NO contact with flammable substances.

Expl. This warning is used for strong oxidants, including organic peroxides.

Ind. Applies if 14113 is used or if the substance is a flammable organic peroxide as mentioned in indication of 14103 and 14105.

14207000 NO contact with [].

Expl. This applies to substances that can react very violently (involving fire or explosion risks) with the materials mentioned.

Ind. Can also be used in sub-section Explosion (phrases 15100000).

14207010 acid(s)

14207020 alcohol

14207030 base(s)

14207040 combustibles

14207050 halogens

14207060 oxidants

14207070 reducing agents

14207080 water

14209000 NO contact with hot surfaces[].

Ind. 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 (.).

14209500 No contact with incompatible materials: see Chemical dangers

14300000 Fire: EXTINGUISHING AGENTS.

NB: Phrases with @ sign can no longer be selected for use in the ICSCs

NB: This phrase is a heading and should not be selected.

Expl. 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., 24101).

Ind. 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, 14351 or 14353 should normally be used. For flammable gases, normally the combination of 14301, 14313 and 14317 should be used. For all other flammable or combustible substances, use the following table for selection of the agents; if possible, put extinguishing agents in the order of preference. One of the series 14343/49 must be used to indicate 'forbidden' agents. Use 14303 and 14351 for non-combustible substances. (14109)

Substance description			Phrase	Example
solids with melting point >=60°C	- organic peroxides		14303	benzoyl peroxide, ammonium nitrate
	- light metals		14323	magnesium
	- metal hydrides			
	- pyrophoric metals			
	self-igniting substances, not violently reacting with water		14325	(dry) potassium sulfide
	other solid substances		14327	sulfur, naphthalene
liquids and solids with melting point <60°C	solubility in water >=300g/L	f.p.<30°C	14329	acetone
		f.p.>=30°C	14331	glycerol
	solubility in water<300g/L	d<1.1	14335	toluene
		d>=1.1	14337	carbon disulfide
gases			14339	methane

NB: Phrases with @ sign can no longer be selected for use in the ICSCs

normally preceded by 14301 ¦(14301)

14301000 Shut off supply; if not possible and no risk to surroundings, let the fire burn itself out; in other cases extinguish with []

Expl. 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.

Ind. Use for flammable gases, combined (usually) with 14313 and 14317.

14303000 water in large amounts,

Expl. 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 expl. 14300.
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.

Ind. 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 14305 [Fine] water spray.
Do not use if it reacts violently with water.

14305000 water spray,

Expl. In this way the water is distributed more effectively over the burning substance, thereby enhancing its cooling and sealing effect. Also see expl. 14300.
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.

Ind. Do not use if the substance reacts violently with water.
Consider 'Fine water spray' if any of the following apply:
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 >= 93°C).
4) It is a liquid which is combustible (flash point <= 93°C) and an oxidiser (UN class 5 or sub-risk 5.1).

5) It is a liquid which is combustible (flash point <= 93°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 <= 93°C) immiscible liquid with relative density >1.1 at 20°C.
Consider 'Coarse water spray' if any of the following apply:
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).

14305010 Fine

14305020 Coarse

14307000 @AFFF if available,

Expl. Abbreviation for Aqueous Film Forming Foam, a liquid which, when mixed with water, yields a foam or sealing film. For its extinguishing effect see 'foam'. Also see expl. 14300.
Water-based extinguishing media should not be used 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.

Ind. Do not use if it react violently with water.
Not to be used in the Cards (decision 6.10.2000)

14309000 Foam.

Expl. 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 expl. 14300. 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.

Ind. 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 14311.

14311000 Alcohol-resistant foam.

Expl. 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 expl. 14300.

Ind. Use for combustible liquids (flash point <= 93°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 14309 and 14311.

14313000 Dry powder.

Expl. 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 expl. 14300.

Ind. Applies if the application of water would increase the overall hazard.
Use if any of the following apply:
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 5
5) Substances of class 6.1, ADR Item 44
6) 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.

14315000 @halons,

Expl. Halons are compounds of fluorine, chlorine, and/or bromine with hydrocarbons such as methane and ethane. More specifically, BCF and BTM are meant. The extinguishing action appears to consist of inhibiting the chain reactions which keep the fire burning; this phenomenon is called negative catalysis. Because of the environmental drawbacks (i.e., interference with the ozone layer in the atmosphere), halons should only be used in special situations. Therefore halons are in general not recommended on the ICSCs as fire extinguishing agents, except for those substances which can hardly be extinguished by other agents. Also see explanation 14300.

Ind. Not used in the cards (decision 6.10.2000).

14317000 Carbon dioxide.

Expl. 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 explanation 14300.

14319000 Dry sand.

14321000 Special powder.

Expl. These agents are mentioned for metal fires and special cases.

14323000 @ Special powder, dry sand, NO other agents.

Ind. Not to be used in the Cards (decision 6.10.2000).

14325000 @ Water in large amounts, water spray.

Ind. Not to be used in the Cards (decision 6.10.2000).

14327000 @ Water spray, powder.

Ind. Not to be used in the Cards (decision 6.10.2000).

NB: Phrases with @ sign can no longer be selected for use in the ICSCs

14329000 @ Powder, alcohol-resistant foam, water in large amounts, carbon dioxide.

Ind. Not to be used in the Cards (decision 6.10.2000).

14331000 @ Powder, alcohol-resistant foam, water spray, carbon dioxide.

Ind. Not to be used in the Cards (decision 6.10.2000).

14335000 @ Powder, AFFF, foam, carbon dioxide.

Ind. Not to be used in the Cards (decision 6.10.2000).

14337000 @ Water spray, foam, powder, carbon dioxide.

Ind. Not to be used in the Cards (decision 6.10.2000).

14339000 @ Powder, carbon dioxide.

Ind. Not to be used in the Cards (decision 6.10.2000).

14343000 @ NO hydrous agents.

Ind. Not to be used in the Cards (decision 6.10.2000).
24229

14345000 @ NO other hydrous agents.

Ind. Not to be used in the Cards (decision 6.10.2000).
24229

14347000 @ NO water.

Ind. Not to be used in the Cards (decision 6.10.2000).
24229

14349000 NO [].

Ind. 24229

14349010 carbon dioxide

14349020 foam

14349030 water spray

14349040 water

14349050 hydrous agents

14349060 other hydrous agents

14351000 In case of fire in the surroundings: use appropriate extinguishing media.

Expl. This is only used for non-combustible substances.

Ind. Applies if this non-combustible substance cannot increase the fire risk by reacting with an extinguishing agent.

14353000 In case of fire in the surroundings: []

Expl. 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.

Ind. 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.

14353010 @AFFF

Ind. Not to be used in the Cards (decision 6.10.2000).

14353020 alcohol-resistant foam

14353030 carbon dioxide

14353040 dry sand

14353050 foam

14353060 @halons

14353070 powder, carbon dioxide

14353080 water spray, foam, powder, carbon dioxide

14353090 powder, alcohol-resistant foam, water spray, carbon dioxide

14353100 @ powder, AFFF, foam, carbon dioxide

Ind. Not to be used in the Cards (decision 6.10.2000).

14353110 powder

14353120 powder, alcohol-resistant foam, water in large amounts, carbon dioxide

14353130 special powder, dry sand, NO other agents

14353140 special powder

14353150 water spray

14353160 water spray, powder

14353170 water in large amounts, water spray

14353190 water in large amounts

NB: Phrases with @ sign can no longer be selected for use in the ICSCs

14353200 use appropriate extinguishing agent

14353210 NO hydrous agents

14353220 NO other hydrous agents

14353230 NO water

14353240 NO []

14353250 water spray

14353260 foam

14353270 carbon dioxide

14354000 []

14355000 @Fire fighters should wear complete protective clothing including self-contained breathing apparatus.

Ind. Not to be used in the Cards.

15000000 EXPLOSION:

15100000 Explosion: ACUTE HAZARDS.

15101000 Gas/air mixtures are explosive.

Expl. 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.

Ind. Apply if flammable gas.
14201 22101 (22301/03)

15103000 Vapour/air mixtures are explosive.

Expl. This applies to highly flammable liquids (i.e., those with a flash point < 21°C). There is a great risk of explosive vapour/air mixtures being formed upon release of the liquid at ambient temperatures.

Ind. Apply if liquid with flash point < 21°C.
14201 22101 (22301/03)

15104000 Heating will cause rise in pressure with risk of bursting.

Ind. Applies to liquids with boiling points < 100°C.

15105000 Above []°C explosive vapour/air mixtures may be formed.

Expl. This relates to substances with a flash point between 21 and 100°C, the specific value of the flash point should be mentioned.

Ind. Apply if flash point is > 21°C and < 100°C.

15107000 Finely dispersed particles form explosive mixtures in air.

Expl. This is mentioned if dust explosions are possible. Mists of combustible liquids are generally also explosive.

Ind. Applies if 13222 was used.
15217 16201

15108000 Risk of explosion[]

15109000 Risk of fire and explosion[].

Ind. 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!

15109010 on contact with

15109020 acid(s)

15109030 alcohol

15109040 base(s)l

15109050 combustible substances

15109060 halogens

15109070 oxidants

15109080 reducing agents

15109090 water

15109100 if formulations contain flammable/explosive solvents

15111000 []

15200000 Explosion: PREVENTION.

15201000 Closed system, ventilation, explosion-proof electrical equipment and lighting.

Expl. This applies to liquids with a flash point below 21°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.

Ind. Applies to liquids with flash point < 21°C and to flammable gases.

15203000 Above []°C use a closed system, ventilation, and explosion-proof electrical equipment.

Expl. This applies to all liquids with a flash point >= 21°C but <= 61°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.

Ind. Complete with the value of the flash point.

15205000 Above []°C use a closed system, ventilation.

Expl. This applies to all liquids with a flash point > 61°C but < 100°C. In the case of liquids with a flash point >=100°C, no special attention is paid to the explosion hazard which exists at temperatures above the flash point.

Ind. Complete with the value of the flash point.

15206000 PREVENT DISPERSION OF DUST

Expl. This is applicable to cases where finely dispersed powder in air is explosive.

15207000 Prevent build-up of electrostatic charges (e.g., by grounding).

Expl. 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.

Ind. Applies if a liquid with a flash point < 100°C and an electric conductivity < 10 000 pS/m (see 12716 for value).

15209000 Prevent build-up of electrostatic charges (e.g., by grounding) if in liquid state.

Expl. 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.

Ind. Applies to flammable gases liquefied by compression or cooling.

15211000 Do NOT use compressed air for filling, discharging, or handling.

Expl. 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.

Ind. Applies to liquids with a flash point < 21°C; NOT to compressed liquefied gases.

15213000 Use non-sparking handtools.

Expl. 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.

Ind. Applies if the minimum ignition energy is < 0.6 mJ; see 12713 for the value.

15215000 Do NOT expose to friction or shock.

Expl. Relates to substances which may undergo explosive decomposition as a result of concussion or friction.

Ind. Applies if 13323 is used.

15217000 Prevent deposition of dust; closed system, dust explosion-proof electrical equipment and lighting.

Expl. 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.

Ind. Applies if 13222 was used.

15219000 Prevent build-up of electrostatic charges (e.g., by grounding).

Expl. The risk of dust explosion can be diminished by taking suitable measures which prevent generation and accumulation of electrostatic charges; consult an expert.

Ind. Applies if 13223 was used.

15219500 No contact with incompatible materials: see Chemical dangers

15300000 Explosion: FIRE EXTINGUISHING AGENTS.

15301000 In case of fire: keep drums, etc., cool by spraying with water.

Expl. 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.

Ind. Applies if the boiling point < 100°C, or flash point <= 61°C, or decomposition temperature < 100°C AND no dangerous reaction with water.

15303000 In case of fire: keep cylinder cool by spraying with water.

Expl. 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.

Ind. Applies if a boiling point < 100°C, or flash point <= 61°C, or decomposition temperature < 100°C AND no dangerous reaction with water.

15305000 In case of fire: cool drums, etc., by spraying with water but avoid contact of the substance with water.

Expl. 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.

Ind. Applies if a boiling point < 100°C, or flash point <= 61°C, or decomposition temperature < 100°C AND a dangerous reaction with water is possible.

15307000 In case of fire: cool cylinder by spraying with water but avoid contact of the substance with water.

Expl. 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 induces dangerous reactions with water.

Ind. Applies if a boiling point < 100°C, or flash point <= 61°C, or decomposition temperature < 100°C AND a dangerous reaction with water is possible.

15309000 Combat fire from a sheltered position.

Expl. Used if an explosion due to instability, etc., is likely to occur.

Ind. Applies if the NFPA reactivity code is 3 or 4, or if explosive (14121), or if the UN transport classification is 1.1, 1.2, or 1.3, or if gas in cylinder. For the NFPA code, see 24801.

15313000 @Fire fighters should wear complete protective clothing including self-contained breathing apparatus.

Ind. Not to be used in the Cards.

16000000 EXPOSURE

16100000 Physical contact: ACUTE HAZARDS/SYMPTOMS.

Expl. 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.

Ind. 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'.

16101000 See EFFECTS OF LONG-TERM OR REPEATED EXPOSURE.

16102000 See NOTES.

16200000 Physical contact: PREVENTION.

Expl. 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:
- 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.

Ind. 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.

16201000 PREVENT DISPERSION OF DUST!

Expl. This recommendation concerns solids that may induce formation of powder or dust on handling and may cause serious adverse effects.

Ind. If 13618 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.

16203000 PREVENT GENERATION OF MISTS!

Expl. This recommendation concerns liquids with high boiling points that may induce formation of mists on handling and may cause serious adverse effects.

Ind. If 13617 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.

16205000 STRICT HYGIENE!

Expl. 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.

Ind. The application of this phrase should be considered if the substance is:
- a gas with an OEL <= 10 ppm or a rat LC50 (< 4hr) <= 0.5 mg/l;
- a liquid or solid with a RIR >= 4000; or
- a solid (powder) with an OEL < 1 mg/m^3 or a rat oral LD50 <= 25 mg/kg.
The possible effects should also be considered.

16207000 AVOID ALL CONTACT!

Expl. This warning is given only for highly dangerous substances. The symptoms may appear either immediately or after some time has passed.

Ind. Apply if the substance is:
- a very corrosive or easily sensitizing substance;
- GHS Category 1a or 1b for carcinogenicity
- GHS Category 1a or 1b for mutagenicity
- GHS Category 1 for reprotoxicity; or
- one for which all contact should be avoided because of serious hazard of irreversible damage. '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.

NB: Phrases with @ sign can no longer be selected for use in the ICSCs

16209000 @AVOID EXPOSURE OF (PREGNANT) WOMEN!

(Expl. This warning is given for substances which are toxic to the reproduction and/or with a teratogenic effect (i.e., causing injury or deformity in unborn children after absorption of the substance by the pregnant woman). Exposure of women in the child-bearing age of life and expectant mothers should be as low as achievable and in any case always below the teratogenic level. Women, prior to being required to handle such a substance, should be informed of the potential effect. When the substance is used, it is also desirable to first ask the occupational physician and/or the safety officer for advice as to whether and in what way the substance should be handled.

Ind. Applies to (suspected) teratogenic substances and to substances toxic to the reproduction.)

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.

16210000 AVOID EXPOSURE OF BREASTFEEDING WOMEN!

Ind. Use this phrase if there is evidence that the substance has been detected in the milk and the one phrases 13851-13855 has been selected. A decision to use this phrase must be a conclusion taken by the Peer-Review Committee.

16211000 AVOID EXPOSURE OF ADOLESCENTS AND CHILDREN!

Expl. 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.

Ind. Use this phrase
- 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.

The use of this phrase should be decided by the Peer Review group.

16300000 Physical contact: FIRST AID.

Expl. 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.

16301000 IN ALL CASES CONSULT A DOCTOR!

Expl. 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.

Ind. Apply if serious effect can occur by any route of exposure, phrase 17309, 18315, 20317 is selected, and there is justification to highlight medical consultation. Apply to extreme cases. Peer-review group decision needed.
17309 18315 20317

NB: Phrases with @ sign can no longer be selected for use in the ICSCs

16302000 FIRST AID: USE PERSONAL PROTECTION

Expl: 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, mask etc. For certain chemicals e.g. nerve gases full body protection with a chemical protection suit and respiratory protection may be needed.

Ind: 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 16301, 18317 or 20315.

17100000 Inhalation.

17100000 Inhalation: ACUTE HAZARDS/SYMPTOMS.

Expl. 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.

Ind. 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'.

17101000 []

17102000 No acute symptoms expected.

Ind: Use for chemicals where the physico-chemical and/or toxicological data indicate that symptoms are unlikely by this route.
(18315030)

17104000 Loss of movement co-ordination.

17105000 Abdominal pain.

17107000 Abdominal cramps.

17108000 Blue lips or finger nails.

Ind. Early symptoms of cyanosis due to methaemoglobinaemia.

NB: Phrases with @ sign can no longer be selected for use in the ICSCs

17109000 Blue skin.

Ind. An early symptom of cyanosis due to methaemoglobinaemia. Can be used if exposure is likely to be sufficient.

17110000 Muscle twitching.

17111000 Burning sensation[].

17111010 behind the breastbone

Expl: A burning sensation behind the breastbone is caused by irritation or corrosion of the tissues of the upper respiratory tract.

Ind: Use for gases, vapours, mists, and aerosols that are irritant or corrosive to mucous membranes.

17113000 Confusion.

17114000 Convulsions.

17115000 Cough.

17117000 Diarrhoea.

17119000 Dizziness.

17121000 Drowsiness.

17122000 Blurred vision

Ind. Use for chemicals that cause blurred vision as a systemic effect once absorbed, e.g. by causing dilated or constricted pupils.

17123000 Dullness.

17125000 Headache.

17126000 Fever or elevated body temperature.

17127000 Sweating. []

17129000 Laboured breathing.

Ind. 17303

17130000 Suffocation.

Ind: Apply to gases and vapours that cause suffocation by asphyxiation rather that as an effect of systemic toxicity.

17131000 Nausea.

17133000 Shortness of breath.

Ind. 17303

17135000 Sore throat.

17137000 Unconsciousness.

17139000 Vomiting.

17140000 Tremor.

17141000 Weakness.

17142000 Pupillary constriction, muscle cramp, excessive salivation.

17143000 Wheezing. []

17144000 []

17145000 Symptoms may be delayed (see Notes).

Ind. Only to be used in special cases; use NOTES for further information.
(24424)

17146000 See EFFECTS OF LONG-TERM OR REPEATED EXPOSURE.

Ind. Apply when there is no acute hazard but significant amount of chronic hazard (e.g. carcinogenicity).

17147000 see Ingestion.

17147010 Further

17149000 See Notes.

17200000 Inhalation: PREVENTION.

Expl. 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.

Ind. Do NOT use combinations of the 17200 series; use 17211 or 17213 only in special cases, see indication 17211 and 17213. If the 17200 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.

17201000 Ventilation.

Expl. 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.

Ind. Applies if the RIR < 12 and the substance is not a powder. Do NOT use combinations of the 17200 series. If not 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.

17202000 Avoid inhalation of []

17202010 dust

Ind. Use for substances that produce insoluble, inhalable nuisance dust.

17202020 mist

17203000 Ventilation (not if powder).

Expl. 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.

Ind. Applies if the RIR < 12 and exposure to the substance as a powder. Do NOT use combinations of the 17200 series. If not 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.

17204000 Avoid inhalation of fine dust and mist.

17205000 Local exhaust or breathing protection.

Expl. This applies to solid substances that are normally handled as powder or crystals. Even when the crystals are relatively large a certain portion will be powdered by mutual friction. In those cases local exhaust should be considered as a means of inhalation protection in the first place. If in spite of local exhaust an adverse concentration of the substance in the air could occur, one should use respiratory protective equipment such as:
- fresh-air hoods or masks;
- filter respirators with adsorption cartridge or canister of the right type;
- particle dust respirators, if necessary combined with an adsorption cartridge.
For the selection of respiratory protective equipment always consult a safety officer or an occupational hygienist. Rules for the selection may differ by nation. Important points for all types of respiratory protective equipment are:
- choice of appropriate equipment;
- clear operating instructions;
- frequent checks on proper use; and
- for filters: observance of the guarantee period, their limited absorption capacity, and the concentration of oxygen in ambient air (it should be > 18%).

Ind. Applies for solids which can develop dust on handling. Do NOT use combinations of the 17200 series. If not applicable, use a free phrase.

17206000 Local exhaust.

17207000 Ventilation, local exhaust, or breathing protection.

Expl. One of these measures has to be employed for a liquid or gas whose OEL can be exceeded under normal conditions. When using closed apparatus, ventilation may be adequate; in other cases local exhaust or respiratory protective equipment has to be used. N.B. Dust respirators are inappropriate and inadequate for the handling of aerosols and atomized liquids (e.g., in paint spraying).

Ind. Applies if the substance is a liquid or gas with a RIR >= 12. Do NOT use combinations of the 17200 series. If not applicable, use a free phrase.

17209000 Ventilation (not if powder), local exhaust, or breathing protection.

Ind. Applies if the substance is a liquid or gas and also for solids with a RIR >= 12 which may come in dusting as well in non-dusting form. Do NOT use combinations of the 17200 series. If not applicable, use a free phrase.

17211000 Breathing protection.

Ind. 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 17200 series. If not applicable, use a free phrase.

17213000 Closed system and ventilation.

Expl. This phrase is to be used for those substance for which the inhalation hazard of vapour or dust is so high that the application is only acceptable in totally closed systems. Even then ventilation is necessary as minimal leakage could occur. When handling such substances (e.g., for internal transport) the containers should be of high quality and leak-proof.

Ind. Apply only to those few substances for which processing in a closed system is the only solution, e.g., IARC Class I carcinogens. Consider first the alternatives 17205/09 as detailed in their ind. and expl. ('Avoid contact' does not necessarily imply 'closed system'!) Do NOT use combinations of the 17200 series. If not applicable, use a free phrase.

17215000 []

17216000 Closed system.

17300000 Inhalation: FIRST AID.

17301000 Fresh air, rest.

Ind. This applies to all cases where the inhalation of a substance has given rise to complaints or symptoms.

17303000 Half-upright position.

Expl. 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.

Ind. Apply to substances likely to cause lung oedema.

17305000 Artificial respiration may be needed.

Expl. 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.

Ind. 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 24425.

17306000 No mouth-to-mouth artificial respiration.

Ind. 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.

17307000 []

17309000 Refer[] for medical attention[].

Exp1. 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.

Ind. 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 is a **peer-review decision**.

17309010 immediately

Ind. Use the phrase if the substance has acute toxicity by inhalation (GHS criteria I or II).

17309020 Seek medical attention if you feel unwell

Ind. 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.**

17311000 []

17313000 See Notes.

18100000 Skin

18100000 Skin: ACUTE HAZARDS/SYMPTOMS.

Expl. 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.

Ind. 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'.

18101000 []

18102000 Easily absorbed.

Ind. Select if the skin absorption is the principal route of exposure.

18103000 MAY BE ABSORBED!

Ind. Applies if absorption (13503 or 13509) is to 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.
18201 18207 (16101) (19205) (19207) (19209)

18105000 Dry skin.

Ind. Apply to substances which may defat the skin.

18107000 Redness.

Ind. (18113)

18109000 Roughness.

18110000 []skin burns.

Ind. Use for substances with GHS skin corrosion classification 1A to 1C, or EU R34. May be completed with 'serious'.

18110010 Serious

Ind. Use for substances with GHS skin corrosion classification 1A to 1B, or EU R35

18111000 Burning sensation.

18113000 Pain.

Ind. 'Pain' is rarely combined with 'redness' alone.

18115000 []

18117000 Blisters.

Ind. Applies not only to substances that produce effect similar to thermal burns, but also to vesicants such as CS_2, some chemical warfare agents and some allergens that do not produce pain and/or reddening.

18118000 Blue lips or fingernails.

18119000 Blue skin.

18120000 Muscle twitching.

18121000 Serious frostbite.

Ind. Applies if a liquefied gas stored under atmospheric pressure (cryogenics).
18203 18303

18123000 ([]see Inhalation).

18123010 Further

18123020 (See Ingestion)

Ind: Use for chemicals that are also absorbed through the skin causing systemic effects.

18125000 ON CONTACT WITH LIQUID: FROSTBITE.

Ind. Applies if a compressed liquefied gas or liquid with a boiling point < 20°C.
18203 18303

18126000 See EFFECTS OF LONG-TERM OR REPEATED EXPOSURE.

Ind. Apply when there is no acute hazard but significant amount of chronic hazard (e.g. carcinogenicity).

18200000 Skin: PREVENTION.

18201000 Protective gloves.

Expl. 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).

Ind. Applies to all substances with the exception of:
- 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 (13105).

18203000 Cold-insulating gloves.

Expl. 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 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.

Ind. Use this phrase for:
- liquids with a temperature < -30°C;
- liquids with a boiling point < 20°C; or
- liquefied gases in cylinders (13105).

18205000 Heat-insulating gloves.

Expl. 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.

Ind. Use this phrase for liquids frequently handled at a temperature > 50°C.

18207000 Protective clothing.

Expl. 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.

Ind. Applies to the following substances:
- 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.

18207200 Apron

18207400 Overalls

18209000 []

18300000 Skin: FIRST AID.

18301000 Remove contaminated clothes.

Expl. 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.

Ind. Use with 18309, 18311 or 18313. Apply when criteria for GHS corrosive for skin (Category 1) is met, 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). Apply when repeated or prolonged contact may cause skin sensitization.
Do not apply in case of thermal burning or frostbite because of the increased risk of infection when blisters burst.
NB use 18307010 for gases or liquids with flash point between 0°C 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.
Indication revised at November 2008 meeting - for flammable chemicals better to use 18307010

18301010 @Put clothes in sealable container (SEE Notes)

Expl: Contaminated clothing can be a source of secondary exposure to first aiders and medical staff. It is important therefore that these clothes are isolated e.g. by placing in a sealable bag or other container.

Ind: 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. 24510000

Phrase disallowed at April 09 meeting and replaced by 18301020

18301020 (See Notes)

Expl: Refers to the need to isolate contaminated clothing, which can be a source of secondary exposure to first aiders and medical staff.

Ind: 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. 24510000

18303000 ON FROSTBITE: rinse with plenty of water, do NOT remove clothes.

Expl. 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.

Ind. Applies to substances that can cause frostbite, i.e., if 13741 or 13743 is used.

18305000 @Rinse with plenty of water, do NOT remove clothes.
Phrase disallowed in November 2008 - use 1830510 instead.

18305010 Rinse with plenty of water for at least 15 minutes, do NOT remove clothes.

Expl. In case of burning or 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.

Ind. To be used in special cases.

18307000 @First rinse with plenty of water, then remove contaminated clothes and rinse again.
Phrase disallowed in November 2008 - use 1830710 instead.

18307010 First rinse with plenty of water for at least 15 minutes, then remove contaminated clothes and rinse again.

Expl. When the skin and clothing are heavily contaminated with highly flammable substances or with strong oxidants or with strong reducing agents, 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.

Ind. 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 13361 or 13363 is used.

18309000 Rinse and then wash skin with water and soap.

Expl. This means active, thorough cleaning of the skin; 18311 applies for passive cleaning of the skin with water only. Do not wash if the skin is damaged or likely to be damaged.

18311000 Rinse skin with plenty of water or shower [].

Expl. This means the passive cleaning of the skin with water only; 18309 applies for active, thorough cleaning of the skin. Do not wash if the skin is damaged or likely to be damaged.

Ind: use with 18311010 if appropriate.

[] added in November 2008

18311010 for at least 15 minutes

Ind: Use for chemicals with GHS corrosive Category 1A to C.

18313000 To remove or neutralize substance use []; do NOT use water.

Expl. This phrase is used in those exceptional cases where water could make things worse. The solvent to be used is mentioned.

18315000 Refer[] for medical attention[].

Expl. 1. Treat the patient by observation and supportive measures as indicated by his/her condition.

2. If the services of a Medical Officer or 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.

Ind. 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**.

18315010 immediately

Ind. 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.

18315020 if skin irritation occurs

Ind. Use the phrase if GHS criteria for skin corrosion/irritation 2 or 3 apply.

18315030 Seek medical attention if you feel unwell

Ind. 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.**

18317000 Wear protective gloves when administering first aid.

Expl. 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.

Ind: 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.
(24510)

18319000 []

19100000 Eyes

19100000 Eyes: ACUTE HAZARDS/SYMPTOMS.

Expl. 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.

Ind. See expl. and ind. 16100. List the symptoms in sequence, if appropriate. The sequence should be based on occurrence of the symptoms on increasing exposure to the substance.

19101000 []

19103000 VAPOUR WILL BE ABSORBED!

Ind. Should be used if absorption by the eyes causes a special hazard.

19104000 Causes watering of the eyes.

Expl. Some substances, known as lachrymators, cause the eyes to water.

Ind. Apply to typical lachrymators, i.e., gases or liquids of which the vapours induce lachrymation NOT due to ordinary irritation of the eyes.

19105000 []

19107000 Redness.

Ind. (19109)

19109000 Pain.

19111000 []

19113000 Blurred vision.

Ind. Blurred vision may be caused by direct contact with chemicals that may damage the cornea. N.B. This phrase should not be used when blurred vision is a consequence of systemic toxicity (see other routes of exposure).

19115000 []Loss of vision.

19115010 Temporary

19115020 Permanent

19116000 Burns

19117000 @Severe deep burns.
Phrase re-allowed April 2007. Indication awaited.
Phrase disallowed in April 2009 in favour of 19117500 - this was after consultation with an eye expert.

19117500 Severe burns.

19118000 @Severe effects.
Phrase disallowed 3 April 2006 because no indication could be defined.

19119000 []

19123000 []

19200000 Eyes: PREVENTION.

Expl. 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.

19201000 Safety spectacles

Expl. 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.

Ind. This phrase can be combined with 19205 or 19207. 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.

19203000 Safety goggles

Expl. 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.

Ind. Applies if the substance is corrosive to the eyes but not to the skin (see 13705 and its alternatives), or if the substance occurs as a powder and is a nuisance to the eyes. This phrase can be combined with 19205 or 19207.

19205000 Face shield

Expl. 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.

Ind. Applies if the substance is corrosive to skin (see 13705 or its alternatives), or if an acute absorption hazard (18103), or if 11303 (liquefied gas) was used. This phrase can be combined with 19201 or 19203 by starting it with 'or'; without 'or' it can also be applied either alone or in combination with 19207.

19205010 or

19205020 and

19207000 eye protection in combination with breathing protection.

Expl. 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).

Ind. 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.

19209000 eye protection in combination with breathing protection if powder.

Ind. This phrase should be used for solids which may come as a powder. Applies if 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.

19211000 []

19300000 Eyes: FIRST AID.

19301000 First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.

Expl. 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.

Ind. Apply where symptoms have been listed under eye exposure.

19302000 Rinse with plenty of water (remove contact lenses if easily possible).

Expl. 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 ho harm could result to the eye, for example even inert chemicals may cause physical abrasion.

Ind: Use when **no** symptoms are listed for eye exposure.

19303000 Refer[] for medical attention.

Ind. 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**.

19303010 immediately

Ind. Use the phrase if the substance causes eye damage/irritation (GHS eye damage /irritation 2).

20100000 Ingestion

20100000 Ingestion: ACUTE SYMPTOMS.

Expl. 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 (use 20150). See explanation 16100.

Ind. 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:
- the rat oral LD50 < 2 g/kg,
- 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
- other data are known, indicating serious effects on ingestion.
Further see ind. 16100.

20102000 No acute symptoms expected

Ind: 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 use if the only reports of symptoms are from deliberate/unusually high exposures and none are expected from more routine types of exposure. In this case combine with 20144 See NOTES.
(20317020) (24426)

20101000 []

20103000 Abdominal cramps.

20105000 Abdominal pain.

20106000 Blue lips or fingernails.

20107000 Blue skin.

20109000 Burning sensation[].

Ind. Complete with location of effect (e.g., 'behind breastbone' or 'in throat and chest').

20109010 in the throat and chest

20110000 Muscle twitching.

20111000 Confusion.

20113000 Constipation.

20114000 Convulsions.

20115000 Cough.

20117000 Diarrhoea.

20119000 Dizziness.

20121000 Drowsiness.

20122000 Blurred vision

Ind. Use for chemicals that cause blurred vision as a systemic effect once absorbed, e.g. by causing dilated or constricted pupils.

20123000 Dullness.

20125000 Headache.

20127000 Laboured breathing.

20129000 Nausea.

20130000 Shock or collapse.

20131000 Shortness of breath.

20133000 Sore throat.

20133200 Burns in mouth and throat

Ind: Use for corrosive substances, GHS category 1 skin corrosion.

20135000 Unconsciousness.

20137000 Vomiting.

20139000 Weakness.

20140000 Pupillary constriction, muscle cramps, excessive salivation.

Ind. For OP compounds.

20141000 []

20142000 See EFFECTS OF LONG-TERM OR REPEATED EXPOSURE.

Ind. Apply when there is no acute hazard but significant amount of chronic hazard (e.g. carcinogenicity).

20143000 ([]see Inhalation).

20144000 See NOTES

Ind. 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.
(24426)

20145000 Aspiration hazard!

Ind: Apply for chemicals classified as GHS aspiration category 1
13734; 20318

20143010 Further

20200000 Ingestion: PREVENTION.

20201000 Do not eat, drink, or smoke during work.

Expl. 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.

Ind. Generally applies to all substances. It should be a Peer-Review decision not to select.

20202000 Wash hands before eating.

Expl. It is highly advisable to wash one's hands before eating.

Ind. Applies to pesticides, toxic and very toxic substances. Peer-review decision not to select.

20300000 Ingestion: FIRST AID.

20301000 Rinse mouth.

Expl. This is especially important when the throat and mouth are likely to be affected.

Ind. Application to be considered per substance. In any case if a corrosive or irritant liquid or solid.

20303000 []

20305000 Give a slurry of activated charcoal in water to drink.

Expl. 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!

Ind. 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..

20307000 Induce vomiting (ONLY IN CONSCIOUS PERSONS!).

Expl. Inducing vomiting is dissuaded as a first aid measure because there is little evidence that it is of benefit, particularly when it is induced by means other than emetic syrup of ipecacuanha. Moreover, some methods of inducing vomiting are harmful such as salt water emetics. There are also contraindications to its use: those who have reduced reflexes for protecting their airway (e.g. because of drowsiness, coma or convulsions), or who may rapidly become unconscious or have convulsions. Also following ingestion of hydrocarbons with high aspiration potential and ingestion of a corrosive substance, such as an alkali or strong acid.

It is better to take medical or poisons centre advice to decide on the necessity and method of emptying the stomach. This phrase will therefore only be applied in special cases. NEVER INDUCE VOMITING IN AN UNCONSCIOUS PERSON!

Ind. Apply to substances with an oral LD50 < 200 mg/kg, where there is clinical evidence that inducing vomiting is effective in reducing absorption. Do not use for corrosive or caustic substances and organic solvents of low viscosity. The use of this phrase is a **peer-review decision**.

20309000 Do NOT induce vomiting.

Expl. 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.

Ind. 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.

20310000 Give one or two glasses of water to drink.

Ind. Use for irritants and severe irritants.

20311000 Give nothing to drink.

20312000 @Give plenty of water to drink.

Phrase disallowed April 2007 since replaced by 2031000, on the grounds that it is safer to suggest a limit to the volume of water to be given/taken

20313000 @Rest.
This phrase was disallowed in May 2010 because no adequate Indication could be given for its use.

20315000 Wear protective gloves when inducing vomiting.

20317000 Refer[] for medical attention[].

NB: Phrases with @ sign can no longer be selected for use in the ICSCs

Expl. 1. Treat the patient by observation and supportive measures as indicated by his/her condition.
2. If the services of a Medical Officer or 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.

Ind. 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**.

20317010 immediately

Ind. Use the phrase if the substance has oral acute toxicity (GHS criteria I, II or III) or there is risk of aspiration (GHS aspiration toxicity 1 or 2).

20317020 Seek medical attention if you feel unwell

Ind. 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.**

20318000 Refer immediately for medical attention since delayed breathing difficulties and/or fever are possible.

Expl: 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.

Ind. 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).

20319000 []

20321000 See Notes.

21000000 SPILLAGE DISPOSAL

Expl. 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 fire fighting. 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:
- 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.

In connection with this the following aids should be available at all times:
- 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.

Detailed disposal procedures are given in various handbooks on chemical safety detailed disposal. 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.

Ind. Read this instruction first! Select the phrases in this section in order:
1. Personal protection
2. Environmental precautions
3. Clean-up procedures

Disposal phrases are presented twice, first as phrase combinations and then as single phrases. 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 can use the fixed combination of disposal phrases appropriate to that group. If there is no fixed combination that applies to a particular substance the compiler should select the appropriate phrase(s). Ind. and expl. relative to the disposal phrases are provided only with the single phrases. Compilers using fixed combination phrases may need to refer to the single phrases when ind. and expl. are required to confirm the appropriateness of a combination. For disposal of gases see 21105, 21107, and 21241.

N.B.: The classification into the groups A, B, and C is based on generally accepted ideas on the prevention of water pollution.

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 21237/39/41/45.

Specification of the groups A, B, and C:

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.

A1: Solid: neutral or weak or medium strong acid or base.

A2: Solid: strong acid or base.

A3: Liquid: neutral or weak acid or base.

A4: Liquid: medium or strong acid or base.

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.

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.

NB: Phrases with @ sign can no longer be selected for use in the ICSCs

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 21207, 21209 and 21227.
All phrases with '[]containers' can be completed with material specification. Use this possibility only when strictly necessary.

21101000 Evacuate danger area[]!

Expl. 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.

Ind. In general, 21101 and 21103 are used in combination although a situation could occur when only one of them is selected. Apply 21101 if:
- a flammable gas 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 liquid with a RIR >= 4000; or
- liquid with the ratio p_{20}/LEL >= 10 (where p_{20} = saturated vapour pressure at 20°C in kPa and LEL = lower explosive limit in vol. %).
Both 21101 and 21103 can, if necessary, be completed with an indication of the circumstances under which these measures should be taken.
21103

21101010 immediately

21102200 Isolate and ventilate the area until gas has dispersed

Expl. 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.

Ind. Use for all gases presenting a hazard, including simple asphyxiants.

21102400 Shut off cylinder if possible; isolate and ventilate the area until the gas has dispersed

Expl. 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.

Ind. Use for all gases presenting a hazard, including simple asphyxiants.

21103000 Consult an expert[]!

Expl. 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.

Ind. In general, 21101 and 21103 are used in combination although a situation could occur when only one of them is selected. Apply 21103 if:
- a flammable gas 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 liquid with a RIR >= 4000; or
- liquid with the ratio p_{20}/LEL >= 10 (where p20 = 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 < 21°C,
- for extremely and highly flammable substances (in Fire hazard section).
- 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).
Both 21103 and 21101 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.
21101

Clean-up procedures:

21104000 Cover the spilled material with [].

Expl. Liquid chemicals when spilled in small or moderate amounts should be covered in order to prevent evaporation.

Ind. Apply for liquids meeting the criteria for F or F+ chemicals. Complete the phrase with foam-blanket. Apply also for liquids meeting the criteria for T+, T or C 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.

21104010 absorbent

21104020 non-combustible

21104030 inert

21105000 Ventilation.

Expl. 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:

NB: Phrases with @ sign can no longer be selected for use in the ICSCs

- 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.

Ind Ventilation should be applied judiciously and NEVER for solids which occur as a powder, and in general not for substances with a boiling point >= 350°C.
Use when phrase 13601 or phrase 13603 or phrase 13604040 (a harmful contamination of the air - will be reached very quickly- on evaporation of this substance at 20°C) is selected.

21107000 []

21109000 Remove all ignition sources.

Expl. Select when a gas/air mixture or vapour/air mixture of a spill can easily be ignited.

Ind. Use this phrase for highly flammable (F+) substances.

21201000 Collect leaking liquid in sealable []containers.

Expl. 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.

Ind. 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 21000.

21201010 metal

21201020 plastic

21201030 non-metallic

21203000 Collect leaking liquid in covered []containers.

Expl. 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.

Ind. 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 21000.

21203010 metal

21203020 plastic

21205000 Cautiously neutralize spilled liquid[].

Expl. 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.

Ind. 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 indication 21000..

21207000 @Collect leaking and spilled liquid in sealable []containers as far as possible.

Ind. In all phrases with '[] containers' this 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. Applies to substances belonging to Group B or C. Also see ind. 21000. (Decision, Helsinki 2003).

21207010 metal

21207020 plastic

21207030 non-metallic

21209000 Treat remaining liquid[].

Ind. To be used for toxic, strongly oxidizing liquids, etc., that can be made harmless with relatively simple means, resulting in a transfer of the substance from Group C to Group B. Complete the phrase with: 'with....' or 'by....' mentioning the chemicals or process to be used. If more than 10 words, complete with 'see Notes' and give details in NOTES. Also see indication 21000.

21211000 Wash away spilled liquid with plenty of water.

Expl. 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 washed away with plenty of water. Insoluble solids and liquids are not easily dispersed with water and may well block the drains.

Ind. Should only be used if the substance in question cannot cause serious environmental pollution or an explosive atmosphere in the sewer. Also see indication 21000. Should not be used if the substance reacts violently with water, or is insoluble in water.

21215000 Absorb remaining liquid in []sand or inert absorbent and remove to safe place.

Expl. This applies to liquids which must not be allowed to enter the sewer because they are highly flammable (i.e., flash point < 21°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.

Ind. 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 21000.

21217000 Do NOT wash away into sewer.

Expl. 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.).

Ind. Applies for liquids with flash-point < 21°C and a solubility in water < 1 g/100 ml (i.e. not or only slightly soluble). Also see indication 21000. Do not use for environmental hazard - use 21245 instead.

21219000 Let solidify.

Expl. 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.

Ind. 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. 21000.

21221000 @Vacuum spilled material.

Expl. Spill of powders can effectively cleaned up by vacuum cleaner.

Ind. Apply for powders when they are not highly flammable or can be loaded by statistical electricity.

Phrase disallowed in April 2009 in favour of 212214 & 212215 in order to emphasize that a specialised vacuum cleaner should be used rather than, say, a domestic vacuum cleaner.

21221010 or

21221020 Use specialized equipment.

21221400 Vacuum with specialized equipment (See Notes) or carefully sweep into [] containers; if appropriate moisten first to prevent dispersion of dust.

Expl. A spill of powder 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

Ind. Apply for substances that are toxic and very toxic.
24514

21221500 Vacuum with specialist equipment (See Notes) or carefully sweep into [] containers.

Expl. 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

Ind. Apply for substances that are toxic and very toxic.
24514

21222000 Sweep spilled substance into []containers.

Expl. Apply when the spill does not need special treatment.

21222010 Moisten remainder

21223000 Sweep spilled substance into []containers; if appropriate, moisten first to prevent dusting.

Expl. Try to prevent dusting of powders by moistening; use a dust respirator as specified.

Ind. In all phrases with '[] containers' this 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 ind. 21000.

21223010 air tight

21223020 covered

21223030 dry

21223040 metal

21223050 plastic

21223060 sealable

21223070 water filled

21223080 non-metallic

21225000 Cautiously neutralize remainder[].

Ind. 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 ind. 21000.

21227000 Then wash away with plenty of water.

Ind. 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., 21205 or 21225. Also see indication 21000.

21229000 Wash away remainder with plenty of water.

Ind. 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.

21231000 Carefully collect remainder,

Expl. This applies if the dispersion of the substance must definitely be prevented.

Ind. Applies to solids whose dispersion should not be allowed due to:
- high toxicity (rat oral LD50 < 200 mg/kg or T-label according to EC rules); or
- capability of spontaneous ignition; or
- highly flammable or explosive (14101, 14103, or 14121); or
- environmental pollution (group C).
Also see indication 21000.

21233000 Wipe up remainder in []

Ind. This and 21235 are alternatives for 21215, also applicable for solids; they can be used together or separately. Complete this with the material or chemical to be used. Also see indication 21000.

21235000 then remove to safe place.

Ind. This and 21233 are alternatives for 21215, also applicable for solids; they can be used together or separately. Also see indication 21000.

21237000 Do NOT absorb in saw-dust or other combustible absorbents.

Expl. Applies to substances which could cause self-heating and ignition of combustible adsorbents.

Ind. Applies to liquids or solid strong oxidants or reductants (13361 or 13363). Also see indication 21000.
(13361/63)

21239000 NEVER direct water jet on liquid.

Expl. 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.

Ind. Applies if a compressed liquefied gas, liquid with a temperature < -30°C, or a liquid which violently reacts with water.

21241000 Remove [] with fine water spray.

Ind. Applies to gases, vapours, or fumes (complete with one of these) which are fairly soluble in water or react with water producing water-soluble compounds.

21241010 airborne particles

21241020 fumes

21241030 gas

21241040 vapour

21243000 []

Environmental precautions

21245000 Do NOT let this chemical enter the environment.

Expl. 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.

Ind. Apply this phrase when section Environmental Data is filled in.
(13903, 13905, 13907, 13909).

Personal protection:
With regard to respiratory protection equipment (RPE) the choice of RPE is dependent on the Protection Factor needed in any particular situation. The Protection Factor is calculated using the airborne concentration of the chemicals and a limit value e.g. TLV. It also depends on other factors such as the types of mask (half-mask, full mask, powered hood etc), the level of efficiency of the filter and the manufacturer of the filter and/or mask. The Compiler cannot make a recommendation on the level of efficiency of the filter, only on the TYPE of filter to use.

21301000 Personal protection: self-contained breathing apparatus.

Expl. This is recommended for extra protection when a toxic gas or the vapour from a liquid or solid may reach a harmful concentration during disposal activities. Also see expl. 21300.

N.B.: Permission to wear self-contained breathing apparatus must only be granted to people who have current medical clearance for its use and who practice regular use of the apparatus.

Ind. Applies if a gas, or a liquid or solid with a RIR >= 120, or powders with an OEL/TWA <= 0.1 mg/m^3 and a RIR between 12 and 120. Applies also for freons.

21302000 Personal protection: particulate filter adapted to the airborne concentration of the substance.

Expl. Equipment of this type is recommended as extra personal protection against substances that, when dispersed in air, will be harmful if inhaled. Dust masks or respirators for particles consist of a face piece and a filter, sometimes combined together. Respirators for particle filtration are only effective if the air contains a minimum of 18% oxygen and is free from harmful gases and vapours. They should only be used in situations where a high level of mobility of the wearer is required. Additional information can be given in ADDITIONAL INFORMATION.

Ind. Applies for substances with a b.p. >= 350°C, which may come as a fine powder or as mist (i.e., hazard of dispersion in air on handling). The dust respirator phrases should not be used if the substance is physiologically inert (i.e. 13619 is used) or if the spontaneous dispersion of the substance in air is highly unlikely for any reason, including its hygroscopic properties. Applies to substances with a OEL/TWA with a RIR <120. It also applies to solid carcinogens and mutagens (see 13831, 13833, 13841, and 13843).

21303000 @Personal protection: P1 filter respirator for inert particles.
Phrase disallowed at April 07 meeting in favour of 21302

(Expl. Equipment of this type is recommended as extra personal protection against substances that, when dispersed in air, will be harmful if inhaled. Dust masks or respirators for particles consist of a face piece and a filter, sometimes combined together. The mesh of the filter is selected according to the toxicity of the particles. Instead of describing the respirator being effective against inert, harmful, or toxic particles, it is often specified as respirator with a P1, P2, or P3 filter, respectively (P for particle). Respirators for particle filtration are only effective if the air contains a minimum of 18% oxygen and is free from harmful gases and vapours. They should only be used in situations where a high level of mobility of the wearer is required. The choice of the respirator's face piece also depends on the toxicity of the particles. Additional information can be given in ADDITIONAL INFORMATION.

Ind. Applies for substances with a b.p. >= 350°C, which may come as a fine powder or as mist (i.e., hazard of dispersion in air on handling). The dust respirator phrases should not be used if the substance is physiologically inert (i.e. 13619 is used) or if the spontaneous dispersion of the substance in air is highly unlikely for any reason, including its hygroscopic properties. Applies if the (estimated) OEL/TWA >= 10 mg/m^3.)

Phrase disallowed in April 2007 in preference for 21302 on the grounds that the ICSC can only advise on the type of filter needed and the user must decide on the level of protection according to the circumstances of the incident.

21305000 @Personal protection: P2 filter respirator for harmful particles.
Phrase disallowed at April 07 meeting in favour of 21302

Expl. Equipment of this type is recommended as extra personal protection against substances that, when dispersed in air, will be harmful if inhaled. Dust masks or respirators for particles consist of a face piece and a filter, sometimes combined together. The mesh of the filter is selected according to the toxicity of the particles. Instead of describing the respirator being effective against inert, harmful, or toxic particles, it is often specified as respirator with a P1, P2, or P3 filter, respectively (P for particle). Respirators for particle filtration are only effective if the air contains a minimum of 18%

oxygen and is free from harmful gases and vapours. They should only be used in situations where a high level of mobility of the wearer is required. The choice of the respirator's face piece also depends on the toxicity of the particles. Additional information can be given in ADDITIONAL INFORMATION.

Ind. Apply for substances with a b.p. >= 350°C, which may come as a fine powder or as a mist. (Hazard of dispersion in air on handling). The dust respirator phrases should not be used if the substance is physiologically inert or if the spontaneous dispersion of the substance in air is highly unlikely for any reason, including its hygroscopic properties. Applies if the (estimated) OEL/TWA < 10 mg/m^3 and > 0.1 mg/m^3.

21307000 @Personal protection: P3 filter respirator for toxic particles.
Phrase disallowed at April 07 meeting in favour of 21302

Expl. Equipment of this type is recommended as extra personal protection against substances that, when dispersed in air, will be harmful if inhaled. Dust masks or respirators for particles consist of a face piece and a filter, sometimes combined together. The mesh of the filter is selected according to the toxicity of the particles. Instead of describing the respirator being effective against inert, harmful or toxic particles, it is often specified as respirator with a P1, P2 or P3 filter, respectively (P for particle). Respirators for particle filtration are only effective if the air contains a minimum of 18% oxygen and is free from harmful gases and vapours. They should only be used in situations where a high level of mobility of the wearer is required. The choice of the respirator's face piece also depends on the toxicity of the particles. Additional information can be given in ADDITIONAL INFORMATION.

Ind. Applies for substances with a b.p. >= 350°C, which may come as a fine powder or a mist (hazard of dispersion in air on handling). The dust respirator phrases should not be used if the substance is physiologically inert (i.e. 13619 is used) or if spontaneous dispersion of the substance in air is highly unlikely for any reason, including its hygroscopic properties. Applies if the (estimated) OEL/TWA <= 0.1 mg/m^3 (and RIR < 12). Also for solid carcinogens and mutagens (see 13831, 13833, 13841, and 13843).

21309000 @Personal protection: A/P2 filter respirator for organic vapour and harmful dust.

(Expl. Applies to solid substances which may form aerosols of harmful dust and also generate noxious vapours.

Ind. Applies if an organic substance with an (estimated) OEL/TWA < 10 mg/m^3 and a RIR index between 12 and 120.)

Phrase disallowed in April 2007 in preference for 213091 on the grounds that the ICSC can only advise on the type of filter needed and the user must decide on the level of protection according to the circumstances of the incident.

21309100 Personal protection: filter respirator for organic gases and particulates adapted to the airborne concentration of the substance

Expl. Applies to organic solid substances that may form aerosols of harmful dust and also generate noxious vapours.

Ind. Applies if an organic substance with an (estimated) OEL/TWA < 10 mg/m3 and a RIR index between 12 and 120.

NB: Phrases with @ sign can no longer be selected for use in the ICSCs

21309200 Personal protection: filter respirator for inorganic gases and particulates adapted to the airborne concentration of the substance

Expl. Applies to inorganic solid substances that may form aerosols of harmful dust and also generate noxious vapours.

Ind. Applies if an inorganic substance with an (estimated) OEL/TWA < 10 mg/m3 and a RIR index between 12 and 120.

21311000 Personal protection: complete protective clothing including self-contained breathing apparatus.

Expl. This is recommended for extra personal protection when the gas, vapour, or mist may cause injury both to the respiratory tract and the undamaged skin. The safety officer should be consulted for further details.

Ind. Applies to gases:
- if corrosive to the skin, or
- if absorbed by the skin
Applies to liquids and solids:
1) if the RIR > 120 and the vapour of the substance:
a) is corrosive to the skin, or
b) will be absorbed by the skin. Or
2) if the substance on contact with (humid) air produces gases, vapours, or mists which
a) are corrosive to the skin, or
b) will be absorbed by the skin.
3) applies to compounds with RIR above 20 000 and which are absorbed through the skin.
Liquids and solids that can be absorbed by the skin should note regarded as also being absorbed in the gas or vapour phase. Absorption of gas/vapour is often much less serious than absorption of liquid/solid. Only when absorption of the substance in the gas or vapour phase is clearly mentioned in toxicological literature should this be used in the decision to apply 21311. Liquids whose vapours are absorbed by the skin to a high degree include, e.g., carbon disulphide, hydrogen cyanide, and methyl bromide (the latter is more a gas than a liquid).
N.B.: the application of 16207 'avoid all contact' does not automatically imply the use of 21311. 'Complete protective clothing including self-contained breathing apparatus' means practically a 'moonsuit' and should therefore only be applied in accordance with the criteria. Arguments should be provided for exceptions.

21313000 Use face shield.

Ind. This phrase applies to compounds which are corrosive to eyes and skin, to skin sensitizers, to medium strong acids/bases, to liquefied gases and to strongly irritating compounds.

21315000 Personal protection: []

Expl. This phrase has a window allowing a choice of the following phrases:
15 filter respirator for organic gases and vapours adapted to the airborne concentration of the substance.
25 filter respirator for organic gases and vapours of low boiling point adapted to the airborne concentration of the substance.
35 filter respirator for inorganic gases and vapours adapted to the airborne concentration of the substance.
37 filter respirator for ammonia and organic ammonia derivates adapted to the airborne concentration of the substance.
39 filter respirator for mercury adapted to the airborne concentration of the substance.
45 filter respirator for acid gases and vapours adapted to the airborne concentration of the

substance.
47 filter respirator for oxides of nitrogen and particulates adapted to the airborne concentration of the substance.

The choice of respiratory protection equipment is dependent on the Protection Factor needed in any particular situation. This is calculated using the airborne concentration of the chemicals and a limit value e.g. TLV. It also depends on other factors such as the types of mask (half-mask, full mask, powered hood etc), the level of efficiency of the filter and the manufacturer of the filter and/or mask. The Compiler cannot make a recommendation on the level of efficiency of the filter, only on the TYPE of filter to use.

- Chemical protection suits provide complete protection from liquid splashes and most toxic and corrosive vapours. They are made of various materials and may be all encapsulating or may have separate gloves and/or boots.
06 gas-tight chemical protection suit including self-contained breathing apparatus
-Gas-tight chemical protection suits are usually made of the most resistant materials such as Viton and neoprene. It is encapsulating: has integral gloves and boots and cover for a positive pressure breathing apparatus.
Chemical protective clothing is required where the hazard to skin is more than can safely be met with normal overalls. This is of particular importance for liquefied and refrigerated gases with boiling point < -20°C because of the risk of frost bite, necessitating the adoption of thermal protection.

21315010 @filter respirator for organic gases and vapours.

Phrase disallowed in April 2007 in preference for 213015 on the grounds that the ICSC can only advise on the type of filter needed and the user must decide on the level of protection according to the circumstances of the incident.

21315015 filter respirator for organic gases and vapours adapted to the airborne concentration of the substance.

Ind: For substances with a boiling point >65ºC

21315020 @filter respirator for organic vapours of low boiling compounds.

(Ind. For organic vapours of low boiling compounds (less than 65 °C).)

Phrase disallowed in April 2007 in preference for 213025 on the grounds that the ICSC can only advise on the type of filter needed and the user must decide on the level of protection according to the circumstances of the incident.

21315025 filter respirator for organic gases and vapours of low boiling point adapted to the airborne concentration of the substance.

Ind. For organic vapours of low boiling compounds (less than 65 °C).

21315030 @ filter respirator for inorganic gases, vapours and halogens.

(Ind. For such as chlorine, hydrogen sulfide, cyanides.)

NB: Phrases with @ sign can no longer be selected for use in the ICSCs

Phrase disallowed in April 2007 in preference for 213035 on the grounds that the ICSC can only advise on the type of filter needed and the user must decide on the level of protection according to the circumstances of the incident.

21315035 filter respirator for inorganic gases and vapours adapted to the airborne concentration of the substance.

Ind. For such as chlorine, hydrogen sulfide, cyanides.

21315037 filter respirator for ammonia and organic ammonia derivates adapted to the airborne concentration of the substance.

Ind: For ammonia and ammonia derivates instead of filter for organic vapours.

21315039 filter respirator for mercury adapted to the airborne concentration of the substance.

Ind: For mercury and mercury compounds.

21315040 @filter respirator for acid gases.

Ind. For sulfur oxides, hydrogen chloride.

Phrase disallowed in April 2007 in preference for 213035 on the grounds that the ICSC can only advise on the type of filter needed and the user must decide on the level of protection according to the circumstances of the incident.

21315045 filter respirator for acid gases and vapours adapted to the airborne concentration of the substance.

Ind. For sulfur oxides, hydrogen chloride.

21315047 filter respirator for oxides of nitrogen and particulates adapted to the airborne concentration of the substance.

Ind: For oxides of nitrogen, this type of filter is always associated with a particulate filter.

21315050 chemical protection suit including self-contained breathing apparatus.

Expl. Chemical protection suit provides for a wearer protection from the liquid splashes and most of the toxic and corrosive vapours. They are made of various materials and may be all encapsulating or may be separate gloves and/or boots.

Ind. Recommended for:
- Substances with LD50 (dermal) less than 200 mg/kg
- Toxic substances classified toxic by inhalation or ingestion with evidence of skin absorption. Skin absorption may be identified by TLV skin notation or EC risk phrases R21, R24, R27. The suit is also recommended for toxic/harmful pesticides which may be formulated with solvents that increase skin absorption.
- Corrosive substances and substances that release toxic and corrosive vapours
- Molten substances at temperatures above 55°C

NB: Phrases with @ sign can no longer be selected for use in the ICSCs

- Liquefied and refrigerated gases.

21315060 gas-tight chemical protection suit including self-contained breathing apparatus.

Expl. Gas tight chemical protection suits are usually made of the most resistant materials such as Viton and neoprene. It is encapsulating: has integral gloves, boots and cover for positive pressure breathing apparatus. The suit maintains an internal pressure.

Ind. Recommended for highly toxic and corrosive gases, for example, hydrogen cyanide, hydrogen fluoride, ammonia (concentrated solutions), bromine. The suit may be used also in case of gases and liquids which attack many protective clothing materials. Gas-tight suit provides greater protection for liquids and vapours because it maintains a positive pressure inside the suit.

21315070 protective gloves.

21315080 safety goggles.

21317000 Chemical protection suit.

Ind. Recommended for compounds which have RIR above 400 and are corrosive or are strong sensitizing agents, or RIR above 4000 with skin absorption, or RIR above 4000 and which are fuming releasing corrosive and/or toxic vapours (hydrogen chloride, hydrogen cyanide), or have a label of T or T+.

21319000 Chemical protection suit including self-contained breathing apparatus.

Ind. Use phrase 21315050.

21321000 Gas-tight chemical protection suit including self-contained breathing apparatus.

Ind. Use phrase 21315060.

22000000 STORAGE

Expl. 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.

Ind. The Peer-Review Committee should decide whether a particular instruction is strictly necessary.

22101000 Fireproof.

Expl. 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 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.

Ind. Applies to:
- gases in cylinders, only if combustible;
- substances with flash points < 61°C and all those for which 14101, 14103, 14105, 14115, or 14121 has been used; 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 22301 ('cool').

22103000 Fireproof if in building.

Expl. 'Fire-proof' applies to gas-cylinders stored within a building, even if the gas is not combustible. See expl. 22000 and 22101.

Ind. Applies if non-combustible gas in cylinders. Also see ind. 22101.

22105000 Provision to contain effluent from fire extinguishing.

Expl. 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 provisions should be taken to prevent the effluent water from reaching sewers and/or surrounding surface waters.

Ind. Applies to substances responding to the criteria of the phrases 13902 with the mention "very toxic" or "toxic", or 13907, or 23507.

22107000 []

22201000 Separated from []

Expl. This is recommended if the substance can react violently with the substances mentioned. IMPORTANT DATA, contains information about reactivity.

Ind. Combine with one or more of 22202/03/05/07/08. These should not be used for substances in gas-cylinders!

22202000 combustible and reducing substances,

22203000 strong oxidants,

Expl. This is recommended if the substance can react violently with the substances mentioned. IMPORTANT DATA, contains information about reactivity.

Ind. Apply to reducing agents and to substances which may react vigorously with strong oxidants. See application of 13363 or 13381.

22205000 strong bases,

Expl. This is recommended if the substance can react violently with the substances mentioned. IMPORTANT DATA, contains information about reactivity.

Ind. If strong or medium strong acid (see 13367/68 or 13369/70).

22207000 strong acids,

Expl. This is recommended if the substance can react violently with the substances mentioned. IMPORTANT DATA, contains information about reactivity.

Ind. If strong or medium strong base (see 13373/74 or 13375/76).

22209000 acids,

Expl. This is recommended if the substance can react violently with the substances mentioned. IMPORTANT DATA, contains information about reactivity.

Ind. Applies to cyanides, nitrites, sulfides, sulfites, and other substances which may react with (medium) strong acids developing toxic gases/vapours.

22211000 []

Expl. This is recommended if the substance can react violently with the substances mentioned. IMPORTANT DATA, contains information about reactivity.

Ind. 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. 'Food and feedstuff' should be used for all pesticides regardless of the classification in EU countries or by UN Recommendations on the Transport of Dangerous Goods. 'Incompatible materials' is to be used in rare cases.

22211010 acid anhydrides

22211020 acid chlorides

22211030 alcohols

22211040 alkali metals

22211050 aluminium

22211060 amines

22211070 anhydrides

22211080 bases

22211090 copper

22211100 food and feedstuffs

Ind. Apply for pesticides, chemicals classified as 6.1 or 8 by the UN Committee of Experts for Transport of Dangerous Goods, corrosive substances, and substances with oral LD50 < 300 mg/kg (GHS).

22211110 halogens

22211120 iron

22211130 metals

22211140 oils and fats

22211150 organics

22211160 oxidants

22211170 oxygen

22211180 powdered metals

22211190 strong reducing agents

22211200 water

22211210 zinc

22211230 []incompatible materials

22211240 and

22211250 or

22213000 []

22215000 See Chemical Dangers.

Expl. 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.

Ind. Use the phrase after selecting 22201and 22211230 'Separated from incompatible materials'. In the case, some chemicals are already cited in the phrase 22211, use 'Separated from... and [other] incompatible materials. See chemical dangers.'

22301000 Cool.

Expl. 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.

Ind. Applies if 'very volatile' is used (see indication 13113), or if an undesired reaction occurs, or dissolved gas comes free on warming above 30°C.

22303000 Cooled.

Ind. Applies if a storage temperature < 10°C is necessary.

22305000 Dry.

Expl. his applies to hygroscopic and deliquescent substances as well as to substances which may react with water and/or moist air.

Ind. Applies to hygroscopic and deliquescent substances, and chemicals that may react with water or moist air.

22307000 Keep in the dark.

Ind. 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.

22308000 Well closed.

Ind. Use for toxic or very toxic 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.
(22301)

22309000 Ventilation along the floor.

Expl. This applies to substances which may form dense vapour/air mixtures that stay near the floor.

Ind. Applies if boiling point is < 350°C and flash point > 61°C or if non-combustible and the relative density of vapour/air mixture >= 1.0 at 20°C.

22311000 Ventilation along the floor and ceiling.

Ind. Applies if a gas with molecular mass < 29 (check 11503/11505).

22313000 Keep in a well-ventilated room.

Ind. For substances for which 22309 does not apply, but nevertheless on long storage need ventilation because they very slowly release harmful vapours, e.g., high boiling pesticides.

22401000 Keep under inert gas.

Expl. This applies to substances which readily react or polymerise on contact with air. Nitrogen or a noble gas is generally suitable for use as an inert gas. If flue gas or carbon dioxide is available, an expert must first be consulted.

Ind. Apply if the substance reacts or polymerises readily on contact with air.

22402000 Store in original container.

Expl. The original container will have been designed-selected to take in account the compatibilities and reactivity issues related to the substance

Ind. Use for chemicals that are classified as T+, C and N.

22403000 Keep under [].

22403010 alcohol

22403020 mineral oil

22403030 oxygen

22403040 petroleum

22403050 water

22405000 Store only if stabilized.

Expl. 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.

Ind. Apply if the substance polymerises or may react violently or form hazardous compounds during storage (with, e.g., atmospheric oxygen, peroxide formation, etc.).
24435

22407000 Do not store or transport in [].

Expl. 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.

Ind. Select the phrase in case of reaction with material that is used for storing or transport (temporary storage), like Al, Zn, plastics, glass.

22409000 Store in an area without drain or sewer access.

Expl. 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.

Ind. Use the phrase when 21217 or 21245 is selected.

23000000 PACKAGING & LABELLING

Expl. In general, the original packing will be the best. With some substances, such as organic peroxides, a change of packing material may even involve great risks. Generally, closed packaging or packaging capable of being closed is necessary because:
- dissipation of the substance (e.g., evaporation) is always undesirable;
- open packaging can lead to contamination resulting in a risk of undesirable reactions.

23101000 Airtight.

Expl. This condition is specified when contact of the substance with air causes danger.

Ind. Especially for substances that react with humid air and to prevent the formation of peroxides. Not to be used to control (normal) evaporation.

23103000 Special material.

Expl. 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.

23105000 Unbreakable packaging; put breakable packaging into closed unbreakable container.

Expl. 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.

Ind. Apply if:
- a liquid with a RIR >= 4000;
- a liquid with a ratio of the p_{20} to LEL >= 300 (see 21103);
- a liquid concentrated strong acid or base; or
- a powder with an OEL/TWA <= 0.1 mg/m^3.

23107000 Special insulated container.

Ind. Apply to gases liquefied by cooling, and kept in open containers (i.e., 13109).

23109000 Special insulated cylinder.

Ind. Apply to compressed liquefied gases which have to be stored cooled, e.g., for reasons of stability.

23110000 Do not transport with food and feedstuffs.

Ind. Apply for chemicals classified as 6.1 or 8 by the UN Committee of Experts for Transport of Dangerous Goods.

H226 EU Classification

Expl. In countries of European Union, chemicals have to be labelled with symbols of the most important hazards to man. The meanings of these symbols are related to the 'nature of the special risks attaching to dangerous substances' (R phrases), and to the 'safety advice concerning dangerous substances' (S phrases). Their precise meaning can be found in Annexes to EC Directive 93/21/EEC, as amended.
As the use of these symbols is fairly widespread, they will be understood when used on ICSCs in many countries. In addition to these symbols, the ICSCs should also contain Risk and Safety phrases, according to the criteria system devised by the European Union. In ICSCs, R and S phrases are only mentioned by their numbers. A 'Note' is sometimes attached and indicated by a letter: Note A, B,...

Ind. Complete with applicable numbers, separated by hyphens. The numbers of combined phrases are separated by slashes.
Example: R: 14-21/22-43.
Applies according to the official interpretation of the EC Directive.
Examine whether the selected ICSC Standard Phrases are compatible with the applicable R and S phrases for the substance in question. Check the draft of your ICSC for the differences and if correct, keep it that way. The deviations have to be discussed by the Peer-Review Committee.

H415 Symbol

NB: Phrases with @ sign can no longer be selected for use in the ICSCs

H030 R phrases

H036 S phrases

23305000 Note: []

Expl. A The name of the substance must appear on the label. The symbols, R- and S-phrases are required to be used as shown in Annex I to Directive 67/548/EEC.
B The percentage of the concentration of the solution must be stated on the label.
C It must be stated in the label whether the substance is a specific isomer or a mixture of isomers.
D Substances susceptible to spontaneous polymerization are generally placed on the market in a stabilized form. However, they are sometimes placed on the market in non-stabilized form. In this case, the label must contain the name of the substance followed by 'non-stabilized'.
E Substances that are classified carcinogenic, mutagenic and/or toxic for reproduction (categories 1 and 2), are ascribed Note E if they are also classified as T+, T or Xn , the risk phrases (R20, 21, 22, 23, 24, 25, 26, 27, 28, 39, 68, 48, 65) and all combinations of these phrases shall be preceded by the word 'also'.
F If the added stabilizer changes the dangerous properties of the substance (Annex I) a label should be provided in accordance with the rules for the labelling of dangerous preparations.
G If the substance is in an explosive form a label should be provided reflecting its explosive property.
H Applies to certain coal and oil-derived substances.
J Applies only to certain complex coal and oil-derived substances; the classification of carcinogen need not apply if it can be shown that the substance contains benzene < 0.1% by volume.
K Applies only to certain complex oil-derived substances; the classification of carcinogen need not apply if it can be shown that the substance contains 1,3-butadiene < 0.1% by volume. If the substance is not classified as a carcinogen, at least S (2-)9-16 should apply.
L Applies only to certain complex oil-derived substances; the classification of carcinogen need not apply if it can be shown that the substance contains less than 3% DMSO extract as measured by IP346.
M Applies only to certain complex coal-derived substances; the classification of carcinogen need not apply if it can be shown that the substance contains benzo(a)-pyrene < 0.005% by volume.
N Applies only to certain complex coal and oil-derived substances; the classification of carcinogen need not apply if the full refining history is known and it can be shown that the substance from which it is produced is not a carcinogen.
P The classification of carcinogen need not apply if it can be shown that the substance contains benzene < 0.1% by volume. When the substance is classified as a carcinogen, Note E shall also apply. When the substance is not classified as a carcinogen at least S (2-)23-24-62 shall apply. Applies only to certain complex oil-derived substances.
Q The classification of carcinogen need not apply if it can be shown that the substance fulfils one of the following conditions:
-short biopersistence test (inhalation) shows that the fibres longer than 20 micrometer have a weighted half-life < 10 days
-short biopersistence test (intratrancheal) shows that the fibres longer than 20 micrometer have a weighted half-life < 40 days
-an appropriate intra-peritoneal test has shown no excess carcinogenicity
-absence of relevant pathogenicity or neoplastic changes in a suitable long term inhalation test.
R The classification of carcinogen need not apply to fibres with a length weighted geometric mean diameter less than two standard errors greater than 6 micrometers.
S This substance may not require a standard label according to Article 23 (Annex VI, section 8 Commission Directive 98/98/EC).

Ind. Use if applicable and complete with A, B, C, D, E, G, H, J, K, L, M, N, P, Q, R and S. Apply according to the official interpretation of the EC criteria as described in 'Legislation on Dangerous Substances, Classification and labelling in the European Communities', vol. I and II, published by the

NB: Phrases with @ sign can no longer be selected for use in the ICSCs

Office for Official Publications of the EC, Luxembourg 1987, and the latest Adaptation to Technical Progress. Examine whether the selected ICSC standard phrases are compatible with the applicable R and S phrases for the substance in question. Check the draft of your ICSC for differences and if correct, keep it that way. The deviations have to be discussed by the Peer-Review Committee.

23500000 UN Classification

23503000 UN Hazard Class

Ind. Mention the UN Hazard Class when available; see 11911 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. 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 (23504) and Packing Group (23505).
Class 1. Explosives:
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.)
Division 1.2 Substances & articles which have a projection hazard but not a mass explosion hazard.
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.
Division 1.4 Substances & articles which present no significant hazard.
Division 1.5 Very insensitive substances & articles; mass explosion hazard.
Division 1.6 Extremely insensitive articles; no mass explosion hazard.
Class 2. Gases (compressed, liquefied, dissolved under pressure, or refrigerated):
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.
Division 2.1 Flammable gases
Division 2.2 Non-flammable, non-toxic gases
Division 2.3 Toxic gases.
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.
Class 4. Flammable Solids: Substances liable to spontaneous combustion; substances which, on contact with water, emit flammable gases.
Division 4.1 Flammable solids. 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.
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.
Class 5. Oxidizing substances; organic peroxides
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.
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.
Class 6. Poisonous (toxic) and infectious substances.
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.
23110
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.

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).
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.
23110
Class 9. Miscellaneous dangerous substances. These are substances and articles which during the transport present a danger not covered by other classes.

23504000 UN Subsidiary Risks: []

Ind. Mention when available; see 11911 for the UN number. Complete with applicable numbers. These can be found in the United Nations Recommendations for Transport of Dangerous Goods, prepared by the Committee of Experts on the Transport of Dangerous Goods, New York, latest edition. See also the Legal File of the International Register of Potentially Toxic Chemicals (IRPTC) of United Nations Environment Programme, Geneva, latest edition.

23505000 UN Packing Group: []

Ind. Mention when available; see 11911 for the UN number. Complete with applicable numbers. These can be found in the United Nations Recommendations for Transport of Dangerous Goods prepared by the Committee of Experts on the Transport of Dangerous Goods, latest edition. See also the Legal File of the International Register of Potentially Toxic Chemicals (IRPTC) of United Nations Environment Programme, Geneva, latest edition. 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 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.
Dangerous goods of all classes other than UN Hazard Classes 1, 2, 6.2, and 7 (see 23503) 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.

23507000 [] marine pollutant.

Expl. The United Nations Maritime Organization (IMO) has developed a classification system for chemicals with regard to their toxicity to marine life.
Complete with 'Severe' when appropriate.

Ind. The most recent list of marine pollutants established by the United Nations IMO should be consulted. See also the Legal File of the International Register of Potentially Toxic Chemicals (IRPTC) of the United Nations Environment Programme, Geneva, latest edition.

23507010 Severe

23601000 []

23603000 []

23605000 []

Globally Harmonized System of Classification & Labelling of Chemicals (GHS)

Hazard statements are listed below in alphabetical order. The selection of the appropriate hazard statement , signal word and pictogram should be in accordance with the classification criteria in the second revised version of the GHS (http://www.unece.org/trans/danger/publi/ghs/ghs_rev02/02files_e.html). The justification for each selection should be given in the notes box in the GHS section of PrettyBit. 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 notes box e.g. Acute Toxicity Category 1.

GHS001	Catches fire spontaneously if exposed to air
GHS002	Causes damage to [organs] if in contact with skin
GHS003	Causes damage to [organs] if inhaled
GHS004	Causes damage to [organs] if swallowed
GHS005	Causes damage to [organs] through prolonged or repeated exposure if in contact with skin
GHS006	Causes damage to [organs] through prolonged or repeated exposure if inhaled
GHS007	Causes damage to [organs] through prolonged or repeated exposure if swallowed
GHS008	Causes damage to organs
GHS009	Causes damage to organs through prolonged or repeated exposure
GHS010	Causes eye irritation
GHS011	Causes mild skin irritation
GHS012	Causes serious eye damage
GHS013	Causes serious eye irritation
GHS014	Causes severe skin burns and eye damage
GHS015	Causes skin irritation
GHS0155	Causes skin and eye irritation
GHS016	Combustible liquid
GHS017	Contains gas under pressure; may explode if heated
GHS019	Contains refrigerated gas; may cause cryogenic burns or injury
GHS020	Explosive; fire, blast or projection hazard
GHS021	Explosive; mass explosion hazard
GHS022	Explosive; severe projection hazard
GHS023	Extremely flammable aerosol
GHS024	Extremely flammable gas
GHS025	Extremely flammable liquid and vapour
GHS026	Fatal if inhaled dust
GHS027	Fatal if inhaled gas
GHS028	Fatal if inhaled mist
GHS029	Fatal if inhaled vapour
GHS030	Fatal if swallowed
GHS0305	Fatal if swallowed or in contact with skin
GHS0306	Fatal if swallowed or if inhaled
GHS0307	Fatal if swallowed, in contact with skin or if inhaled
GHS031	Fatal in contact with skin
GHS0315	Fatal in contact with skin or if inhaled
GHS032	Fire or projection hazard
GHS033	Flammable aerosol
GHS034	Flammable gas
GHS035	Flammable liquid and vapour
GHS036	Flammable solid
GHS037	Harmful if inhaled dust
GHS038	Harmful if inhaled gas
GHS039	Harmful if inhaled mist
GHS040	Harmful if inhaled vapour
GHS041	Harmful if swallowed
GHS0415	Harmful if swallowed or if inhaled

NB: Phrases with @ sign can no longer be selected for use in the ICSCs

GHS0416	Harmful if swallowed or in contact with skin
GHS0417	Harmful if swallowed, in contact with skin, or if inhaled
GHS042	Harmful in contact with skin
GHS0425	Harmful in contact with skin or if inhaled
GHS043	Harmful to aquatic life
GHS044	Harmful to aquatic life with long-lasting effects
GHS045	Heating may cause a fire
GHS046	Heating may cause a fire or explosion
GHS047	Heating may cause an explosion
GHS048	Highly flammable liquid and vapour
GHS049	In contact with water releases flammable gases
GHS050	In contact with water releases flammable gases which may ignite spontaneously
GHS051	May be corrosive to metals
GHS052	May be fatal if swallowed and enters airways
GHS053	May be harmful if inhaled dust
GHS054	May be harmful if inhaled gas
GHS055	May be harmful if inhaled mist
GHS056	May be harmful if inhaled vapour
GHS057	May be harmful if swallowed
GHS0575	May be harmful if swallowed or if inhaled
GHS0576	May be harmful if swallowed or in contact with skin
GHS0577	May be harmful if swallowed, in contact with skin, or if inhaled
GHS058	May be harmful if swallowed and enters airways
GHS059	May be harmful in contact with skin
GHS0595	May be harmful in contact with skin or if inhaled
GHS060	May cause allergic or asthmatic symptoms or breathing difficulties if inhaled
GHS061	May cause allergic skin reaction
GHS062	May cause cancer
GHS063	May cause damage to [organs] if in contact with skin
GHS064	May cause damage to [organs] if inhaled
GHS065	May cause damage to [organs] if swallowed
GHS066	May cause damage to [organs] through prolonged or repeated exposure if in contact with skin
GHS067	May cause damage to [organs] through prolonged or repeated exposure if inhaled
GHS068	May cause damage to [organs] through prolonged or repeated exposure if swallowed
GHS069	May cause damage to organs
GHS070	May cause damage to organs through prolonged or repeated exposure
GHS071	May cause fire or explosion; strong oxidizer
GHS072	May cause genetic defects
GHS073	May cause harm to breast-fed children
GHS075	May cause long lasting effects to aquatic life
GHS076	May cause long lasting harmful effects to aquatic life
GHS077	May cause or intensify fire; oxidizer
GHS078	May damage fertility or the unborn child
GHS079	May explode in the fire
GHS080	May intensify fire; oxidizer
GHS081	May mass explode in fire
GHS082	May cause respiratory irritation
GHS083	May cause drowsiness or dizziness
GHS085	Self-heating in large quantities; may catch fire
GHS086	Self-heating; may catch fire
GHS087	Suspected of causing cancer
GHS088	Suspected of causing genetic defects
GHS089	Suspected of damaging fertility or the unborn child
GHS090	Toxic if inhaled dust
GHS091	Toxic if inhaled gas
GHS092	Toxic if inhaled mist

NB: Phrases with @ sign can no longer be selected for use in the ICSCs

GHS093 Toxic if inhaled vapour
GHS094 Toxic if swallowed
GHS0945 Toxic if swallowed or if inhaled
GHS0946 Toxic if swallowed or in contact with skin
GHS0947 Toxic if swallowed, in contact with skin or if inhaled
GHS095 Toxic in contact with skin
GHS0955 Toxic in contact with skin or if inhaled
GHS096 Toxic to aquatic life
GHS097 Toxic to aquatic life with long-lasting effects
GHS098 Unstable explosive
GHS099 Very toxic to aquatic life
GHS100 Very toxic to aquatic life with long-lasting effects
GHS101 Harms public health and the environment by destroying ozone in the upper atmosphere
GHS110 No hazard classification according to GHS criteria
GHS111 Insufficient data for GHS classification

24000000 N O T E S

24101000 []

24111000 Temperature of decomposition unknown in literature.

Ind. Can be combined with 12107 or 12117.

24113000 The apparent melting point caused by loss of crystal water is given.

Ind. See 12113.

24115000 Other melting points: []

Ind. See 12113.

24119000 Density of the liquid at boiling point: [] kg/l.

Ind. Combine with 12301 for gases liquefied by cooling (e.g., stored in Dewar vessels); mention the absolute density in kg/l at the atmospheric boiling point.

24213000 The substance is combustible but no flash point is available in literature.

Ind. See 12701.

24215000 Explosive limits are unknown in literature, although the substance is combustible and has a flash point < 61°C.

Ind. See 12710.

24217000 Combustible vapour/air mixtures difficult to ignite, may be developed under certain conditions[].

Ind. Combine with 14109.

24219000 Addition of small amounts of a flammable substance or an increase in the oxygen content of the air strongly enhances combustibility.

24221000 Turns combustible on addition of small amounts of a flammable substance or an increase in the oxygen content of the air.

Expl. Many non-combustible substances, e.g., chloroform and trichloroethylene turn combustible and even form explosive vapour/air mixtures when the oxygen content of the air is higher than normal (e.g., during cleaning of oxygen lines) or when the substance is contaminated with a flammable liquid.

24223000 Will turn shock-sensitive if contaminated with [].

Ind. Complete with applicable chemical group name, e.g., 'organic substances'.

24225000 Combustion in a confined space may turn into detonation.

Ind. Combine with 13321.

24227000 Piping material for this gas must not contain over 63% of copper.

Expl. Relates to gases which may form explosive compounds if in contact with metals containing more than 63% of copper.

Ind. Combine with 13327.

24229000 Reacts violently with fire extinguishing agents such as [].

Ind. Many non-combustible substances, e.g., chloroform and trichloroethylene turn combustible and even form explosive vapour/air mixtures when the oxygen content of the air is higher than normal (e.g., during cleaning of oxygen lines) or when the substance is contaminated with a flammable liquid.

Expl. Combine with 14343, 14345, 14347, or 14349 and complete by naming the agent or agent group.

24229010 water

24229020 foam

24229030 powder

24229040 carbon dioxide

24229050 and

24317000 The occupational exposure limit value should not be exceeded during any part of the working exposure.

Expl. The OELs of some substances are so-called 'ceiling' values, denoted with a 'C' preceding the value. In such cases this is clarified by using this phrase in the Notes. Refer also to Occupational Exposure Limits of this guide.

Ind. The application of this phrase depends on the OEL which will be printed on the ICSC. Compilers should use a tentative marking for the application of this phrase.

24403000 @Health effects of exposure to the substance have been investigated extensively but none has been found.

Expl. Some chemicals do not represent a hazard to human health even at high, and improbably high, levels of exposure.

Ind. 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 24405 in cases where the chemical has not been investigated adequately. The selection of this phrase has to be approved by the Peer Review group.

This phrase moved to Effects of Short Term Exposure (13785) and effects of Long Term Exposure (13872) in May 2010

24405000 @Health effects of exposure to the substance have not been investigated[].

Expl. The potential toxicity 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.

Ind. Close with full stop if no data is available because no research has been done. Complete with 'adequately' if evidence shows that the available data were obtained through inadequately conducted research.

This phrase moved to Effects of Short Term Exposure (13784) and effects of Long Term Exposure (13871) in May 2010.

24405010 adequately

24407000 Environmental effects from the substance have been investigated but none has been found.

Expl. Some chemicals do not represent a hazard to the environment even at high, and improbably high, levels of exposure.

Ind. Applies if the available literature (following a thorough search) indicates that potential ecotoxicity has been extensively and reliably investigated and indicates that there is no evidence of likely adverse effects. Use 24409 in cases where the chemical has not been investigated adequately. The selection of this phrase has to be approved by the Peer Review group.

24409000 @Environmental effects from the substance have not been investigated[].

Expl. 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.

Ind. Close with full stop if no data is available because no research has been done. Complete with 'adequately' if evidence shows that the available data were obtained through inadequately conducted research.
This phrase has been moved to the Environment section (13920000), November 2008

24409010 @adequately
This phrase has been moved to the Environment section (13920010), November 2008

24413000 Use of alcoholic beverages enhances the harmful effect.

24415000 []

24417000 Depending on the degree of exposure, periodic medical examination is suggested.

Expl. Depending on the situation, periodical medical examination of persons exposed to a substance may be desirable. The need, if any, must be assessed in joint consultation between the medical officer and the safety officer.

24418000 Refer for medical attention if breathing difficulties or fever develop.

Expl. Exposure to certain substances may cause delayed onset of respiratory symptoms.

Ind. Use for substances that may cause chemical pneumonitis or metal fume fever.

24419000 The symptoms of lung oedema often do not become manifest until a few hours have passed and they are aggravated by physical effort. Rest and medical observation is therefore essential.

Expl. With some substances there is a distinct interval between the moment of exposure and the onset of the first symptoms. In such cases, observation (if possible in a hospital) may be necessary in order to have instant medical aid available, should the need arise.

Ind. Applies in combination with 137191.

24421000 @Immediate administration of an appropriate inhalation therapy by a doctor or a person authorized by him/her, should be considered.
(137191) (24419)
Phrase disallowed in May 2010 because this is a medical decision and does not need to be signalled on the Card.

24422000 The symptoms of asthma often do not become manifest until a few hours have passed and they are aggravated by physical effort. Rest and medical observation are therefore essential.

Expl. With some substances there is a distinct interval between the moment of exposure and the onset of the first symptoms. In such cases, observation (if possible in a hospital) may be necessary in order to have instant medical aid available, should the need arise.

Ind. 24423 should always be used with this phrase. Apply in combination with 13721.
24423

24423000 Anyone who has shown symptoms of asthma due to this substance should avoid all further contact.

Ind. 24422 should always be used with this phrase. Apply in combination with 13721.

24424000 The symptoms of [] do not become manifest until [].

Expl. With some substances there is a distinct interval between the moment of exposure and the onset of the first symptoms. In such cases, observation (if possible in a hospital) may be necessary in order to have instant medical aid available, should the need arise.

Ind. Apply in combination with 13723 and/or 17145.

24424020 a few hours or even a few days have passed and they are aggravated by physical

24424030 hours

24424040 days

NB: Phrases with @ sign can no longer be selected for use in the ICSCs

24424050 weeks

24424060 after exposure

24424100 The symptoms of [] may become manifest after [].

24424150 several

24425000 Specific treatment is necessary in case of poisoning with this substance; the appropriate means with instructions must be available.

Ind. Apply if the substance causes rapid and serious intoxication and therefore it is important to treat the victim on the spot, i.e. treatment measures and/or antidotes must be available at the workplace (e.g. calcium gluconate gel, oxygen).

24425100 Specific treatment may be necessary in case of poisoning with this substance; the appropriate means with instructions should be available.

Ind. Use where specific treatment measures/antidotes are available but need not be given on the spot and for which use will, in any case, be a clinical decision.

24426000 A severe intoxication is only likely after ingestion of large amounts.

Expl. For certain chemicals much of the information about clinical effects of exposure comes from case reports of intentional ingestion . This usually involves exposure to larger amounts than are likely from unintentional exposure in an occupational setting. The purpose of this note is to guide the reader in interpreting the information written in the Exposure section of the Card.

Ind. Use as follows:
1) When the only reports of symptoms are from deliberate/unusually high exposures and none are expected from more routine types of exposures. In addition, under Symptoms use "No acute symptoms expected (See Notes)"
2) Symptoms are listed from the occupational setting and are relatively mild, however, there are case reports of more severe symptoms in deliberate/unusually high exposures. In addition, under Symptoms use: "See Notes". In this situation the more severe symptoms are not listed in Exposure-symptoms.
3) When there is a general lack of data about the chemical and it is uncertain what symptoms might be expected following more routine types of exposure but there are case reports of deliberate or unusually high exposures. Here, list the initial/direct symptoms but do not include secondary effects (e.g. renal failure secondary to hypotension). In addition, under Symptoms use: "See Notes".

24427000 Insufficient data are available on the effect of this substance on human health, therefore utmost care must be taken.

Ind. To be used only if there is no selected phrase in the section 13700 or 13800, or if the selected phrases are based on the analogy with the substances belonging to the same class.

24428000 Data on similar substances suggest that there may be environmental effects of this substance.

24428010 Therefore utmost care must be taken to avoid release into the environment.

Ind. Use when no data are available and data with similar compounds suggest that there may be potential environmental effects. Complete with phrase 24409 and 24409010 'adequately' if evidence shows that the available data were obtained through inadequately conducted research.

24429000 High concentrations in the air cause a deficiency of oxygen with the risk of unconsciousness or death.

Expl. This applies to gases with little or no direct harmful action (so-called simple asphyxiants) and some liquids with a high vapour pressure. When these substances are dissipated in the work space the oxygen concentration in the air may drop below the limit required for breathing, especially in a confined workspace with poor ventilation. Special care is necessary when working with suffocating gases liquefied by cooling (so-called cryogenics). If accidentally released the liquid will evaporate quickly causing a very hazardous situation. When dealing with cryogenics, strict procedures have to be followed regarding instruction, supervision, ventilation, personal protection, monitoring, and rescue. Oxygen deficiency often leads to a sudden loss of consciousness without any preliminary symptoms. If this hazard is present, always work with a self-contained breathing apparatus; a filter respirator does not give any protection.

Ind. Applies if 13207 was used, or if the substance is a simple asphyxiant, as e.g.:
acetylene, argon, ethane, ethylene, helium, hydrogen, methane, nitrogen, propane, propylene.
N.B.: Always check whether a gas is still considered to be a simple asphyxiant. The limit of a saturated vapour pressure > 100 mbar at 20°C (see 13207) has been chosen because the evaporation of a liquid with that vapour pressure can theoretically lower the oxygen content of the air in a closed space from a normal of 20.7 vol % to 18.6%, which is dangerously low.
24431

24431000 Check oxygen content before entering area.

Ind. Applies if 24429 or 13365 was used.

24432000 If the substance is formulated with solvents also consult the ICSCs of these materials.

Ind. (24437)

24433000 []

24434040 The technical product may contain impurities which alter the health effects; for further information see ICSC----.

24435000 An added stabilizer or inhibitor can influence the toxicological properties of this substance, consult an expert.

Ind. Applies if 22405 was used.

24436000: The physico-chemical properties may vary according to the chemical composition.

Ind: Use for complex mixtures e.g. petroleum fractions where the proportions of the component chemicals may vary.

24436100: The toxicological properties may vary according to the chemical composition.

Ind: Use for complex mixtures e.g. petroleum fractions where the proportions of the component chemicals may vary.

24437000 Carrier solvents used in commercial formulations may change physical and toxicological properties.

Ind. Applies for pure substances which in practice are often used in commercial formulations. Refer to the relevant ICSCs (i.e., use 24621).

24438000 Uses of this substance as ultra-fine particles (<100nm) (nanoparticles) may produce adverse effects at concentrations well below those indicated on this Card. Utmost care should be taken.

Ind. This phrase should ONLY be used if ultrafine particles are generated during manufacture or use or the substance is specifically prepared and used in an ultrafine form AND there are specific references in the literature to biological effects of ultrafine particles on human and/or experimental animals for that substance. The inclusion of this statement should be a peer-review group decision

24501000 The odour warning when the exposure limit value is exceeded is insufficient.

Expl. Assessment of the quality of air based on the presence or absence of odours is not reliable and is discouraged. Odour threshold values are therefore not mentioned on the ICSCs. Odour may, nevertheless, provide a warning of the presence of a dangerous gas or vapour although this should not be depended on as an indication that an OEL has or has not been reached. One or another of these phrases can be used as an extra warning.

Ind. Use this phrase if the Odour Safety Factor < 26 and > 0. (Refer to Appendix 7).

24502000 There is no odour warning even when toxic concentrations are present.

Expl. Assessment of the quality of air based on the presence or absence of odours is not reliable and is discouraged. Odour threshold values are therefore not mentioned on the ICSCs. Odour may, nevertheless, provide a warning of the presence of a dangerous gas or vapour although this should not be depended on as an indication that a toxic concentration has or has not been reached. One or another of these phrases can be used as an extra warning.

Ind. Use this phrase if the substance is odourless and has a boiling point < 350°C.

24503000 The relation between odour and the occupational exposure limit cannot be indicated.

Expl. Assessment of the quality of air based on the presence or absence of odours is not reliable and is discouraged. Odour threshold values are therefore not mentioned on the ICSCs. Odour may, nevertheless, provide a warning of the presence of a dangerous gas or vapour although this should not be depended on as an indication that an OEL has or has not been reached. One or another of these phrases can be used as an extra warning.

Ind. Use this phrase if the boiling point < 350°C and the OEL/TWA or odour threshold value are not available. If Odour Safety Factor >= 26 or the substance has a boiling point >=350°C, none of these phrases should be used. (Substances with a b.p. >= 350°C are considered to not generate noxious vapours in harmful concentrations).

24505000 []

24507000 Do NOT take working clothes home.

Expl. This warning is only given for some very toxic substances. Work clothing contaminated with these substances could endanger the health of family members.

Ind. Applies if a solid or a high boiling liquid with OEL/TWA <= 0.1 mg/m^3 or with a rat oral LD50 <= 25 mg/kg. Also applies if it is a carcinogen or sensitizer or for the substances with high risk of fire hazard.

NB: Phrases with @ sign can no longer be selected for use in the ICSCs

24509000 Rinse contaminated clothing with plenty of water because of fire hazard.

Expl. This applies to strong oxidants and to strong reducing agents as these can initiate burning of textile.

24510000 Isolate contaminated clothing by sealing in a bag or other container.

Expl: Contaminated clothing can be a source of secondary exposure to first aiders and medical staff. It is important therefore that these clothes are isolated e.g. by placing in a sealable bag or other container.
(18301020)

Ind: 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.

24511000 Do NOT use in the vicinity of a fire or a hot surface, or during welding.

Expl. While this phrase could also be applicable to combustible substances, its inclusion means that the substance, though not combustible, may release phosgene at high temperatures or under influence of UV radiation. This applies in particular to certain non-combustible compounds containing chlorine.

Ind. Combine with 13333 for those substances which may develop phosgene or fluophosgene.

24513000 Check for peroxides prior to distillation; eliminate if found.

Expl. Treatment with ferrous sulfate or ferrous thiocyanate or by passing the liquid over a column of activated alumina are suitable methods to eliminate peroxides.

Ind. Combine with 13301/07.

24514000 NEVER use a domestic-type vacuum cleaner to vacuum the substance, only use specialist equipment.

24515000 NEVER pour water into this substance; when dissolving or diluting always add it slowly to the water.

Expl. This warning is used for substances which develop much heat on dissolving or diluting. The heat could cause sudden boiling or formation of corrosive mists.

Ind. Use e.g., for concentrated sulfuric acid or solid sodium hydroxide.

24517000 Do NOT spray water on leaking cylinder (to prevent corrosion of cylinder).

Ind. Applies if the cylinder contains a gas that is corrosive to steel.

24519000 Turn leaking cylinder with the leak up to prevent escape of gas in liquid state.

Ind. Applies if the cylinder contains liquefied or dissolved gases.

24520000 Wear protective equipment during this operation.

24521000 After use for welding, turn valve off; regularly check tubing, etc., and test for leaks with soap and water.

Ind. Applies to welding gases contained in cylinders.
24522

24522000 The measures mentioned in section PREVENTION are applicable to production, filling of cylinders, and storage of the gas.

Ind. Applies to welding gases contained in cylinders.

24611000 The recommendations on this Card also apply to [].

Ind. This phrase can sometimes be used to mention chemicals which are toxicologically and chemically closely related to the substance on this ICSC. In such cases the recommendations on this ICSC can be used for those chemicals as well. The names of those chemicals should be included in the register of substances, with reference to the MAIN NAME of the ICSC.

24613000 @[] is a trade name.

Ind. All available trade names should be mentioned for the ICSC database. Apply in the case of trade names which are used world-wide.

Phrase disallowed in May 2010 - trade names no longer listed in cards

24615000 @[] are examples of trade names.

Ind. It may not be possible to list all trade names used world wide since these may not all be known.

Phrase disallowed in May 2010 - trade names no longer listed in cards

24616000 Common name: [].

24617000 Also consult publication [].

Ind. If relevant national publications on the substance in question are available, these should be mentioned (e.g., Labour Inspectorate guidelines on specific use of a substance).

24621000 See[] ICSC [####].

Ind. References should be made to ICSCs of related substances (ICSC # and MAIN NAME).

24622000 Consult national legislation.

H018 Emergency Response

24711000 Transport Emergency Card: TEC (R)-[]

Expl. The CEFIC (Conseil Européen des Fédérations de l'Industrie Chimique) publishes a dangerous cargo card of this substance, which specifies the measures to be taken in the event of an accident during transport. Consult the head office of CEFIC at Brussels for further information.

Ind. Use this phrase if relevant and complete with the applicable number.

24801000 NFPA Code: H[]; F[]; R[]; []

NB: Phrases with @ sign can no longer be selected for use in the ICSCs

Expl. In this code the National Fire Protection Association (NFPA), Boston (USA) indicates:
- the relative risk to health H (blue)
- the flammability F (red)
- the instability or reactivity R (yellow)
- possible specific hazards (white)

Each of the first three aspects is assigned a value from 0 to 4, the greater the risk, the higher the value assigned. Labelling with the so-called 'hazard diamond' is used frequently on fixed installations. The meaning of the numbers in hazard categories H, F, and R is summarized in National Fire Protection Association, NFPA Standard 704.
N.B.: The NFPA assessment of risks sometimes differs from that adopted by the Editorial Staff of the ICSCs. In addition, decomposition products arising from a fire are sometimes included among the health hazards. The fourth space of the diamond is used for special hazards. The NFPA specifies these special hazards as follows:
- Materials which demonstrate unusual reactivity with water shall be identified with the letter W with a horizontal line through the centre;
- Materials which possess oxidizing properties shall be identified by the letters OX; or
- Materials possessing radioactivity hazards shall be identified by the standard radioactivity symbol.

Ind. Use this symbol and complete it with the appropriate numbers. The numbers can be found in NFPA Standards 49 and 325, latest editions. If 'non-fire' and 'fire' numbers are given use the non-fire numbers. Do NOT use this phrase if the substance is not mentioned in the NFPA standards. The NFPA hazard ratings should be checked on compatibility with the draft of the ICSC. If there are significant differences check for the correct application of the standard phrases used. When in doubt, keep to the phrases based on the indications of this guide and on your professional judgement.

24900000 Card has been partially updated in []: see [].

24901000 Occupational Exposure Limits

24902000 Environmental Data

24903000 Effects of Long-Term or Repeated Exposure

24904000 Effects of Short-term Exposure

24905000 EU Classification

24905400 Packaging and Labelling

24905500 GHS classification

24906000 Emergency Response

24906500 Physical Properties

24907000 Ingestion First Aid

24908000 Fire fighting

24909000 Spillage Disposal

24909500 Storage

27000000 REFERENCES

27001000 1. *ACGIH (year) Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices. American Conference of Governmental Industrial Hygienists. Cincinnati.

27002000 2. *BERUFSGENOSSENSCHAFT DER CHEMISCHEN INDUSTRIE (cont.) Toxikologische Bewertungen (toxicological evaluations).

27003000 3. *CEFIC (year) Tremcards reference edition. CEFIC transport emergency cards. National Chemical Emergency Centre - Harwell, UK.

27004000 4. *CHEMDATA: National Chemical Emergency Centre - Harwell, UK, Emergency response information system indexed on approximately 70 000 substance names.

27005000 5. *CLAYTON, G.D. & CLAYTON, F.E., ed., (year), Patty's industrial hygiene and toxicology, xx edition, New York, John Wiley and Sons.

27006000 6. *CRC HANDBOOK CHEMISTRY AND PHYSICS (year) A ready reference book of chemical and physical data, xx edition, Boca Raton, Florida, CRC Press.

27007000 7. *DEUTSCHE FORSCHUNGSGEMEINSCHAFT DFG (cont.) MAK-Werte - Maximale Arbeitsplatskonzentrationen (OEL's), Verlag Chemie, Weinheim (in German).

27008000 8. *IARC (year) IARC Monographs on the evaluation of carcinogenic risk of chemicals to man. Volume xx, Lyon, International Agency for Research on Cancer.

27009000 9. *ILO (year) Encyclopaedia of occupational health and safety, xrd edition. In: xxx, ed., International Labour Office, Geneva.

27010000 10. *INRS (1978-20--) Fiches toxicologiques, recueil des fiches parues dans les cahiers de notes documentaires, Institut National de la Recherche Scientifique (INRS), Paris, France.

27011000 11. *SAX, N.I. (year) Hazardous chemicals information annual, van Nostrand Reinhold Company, Inc.

27012000 12. *WHO (year) Environmental Health Criteria xx, name of the chemical, Geneva, World Health Organization.

27013000 13. *BUDAVARI, S. ed. (year) The Merck Index, an encyclopedia of chemicals, drugs and biologicals, xx ed., Rahway, New Jersey, Merck and Company, Inc.

27014000 14. *TOMLIN C. (year) The Pesticide Manual, A World Compendium, xx ed., Croyden, The British Crop Protection Council and Royal Society of Chemistry.

27015000 15. *GOSSELIN, R.E et al., (year) Clinical Toxicology of Commercial Products, xx ed, Williams & Wilkins.

27016000 16. *UNITED NATIONS Recommendations on the Transport of Dangerous Goods. (year), xx ed, New York.

27017000 17. *US DOT. (1987) Emergency Response Guidebook. DOT P 5800.4

27018000 18. *NIOSH (year) Pocket Guide to Chemical Hazards, NIOSH Publications, Cincinnati

NB: Phrases with @ sign can no longer be selected for use in the ICSCs

27019000 19. *Journal Officiel des Communautis Europiennes (Official Journal of the European Communities). Directive 67/548/CEE. APT --, 20--.

27020000 20. * Richtlinien statischer Elektrizität (Guidelines for Static Electricity), ZHI/200, Hauptverband Berufsgenossenschaften, Bonn (FRG).

27021000 21. *HAYES, W.J. & LAWS, E.R. (year) Handbook of Pesticide Toxicology. Academic Press, London.

27022000 22. *NIKUNEN E. et al. (1991) Environmental Properties of Chemicals. Research Report 91, 1990, Ministry of the Environment, Finland.

27023000 23. *VERSCHUEREN K. (1983) Handbook of Environmental Data of Organic Chemicals, 2nd ed., Van Nostrand Reinhold, New York.

APPENDICES

1. Calculation of the saturated vapour pressure of organic liquids
2. Calculation of the density of vapours as a means of estimating their pattern of dispersion
3. Minimum ignition energy in mJ
4. Calculation of the pH of medium strong or weak acids and bases
5. Relative Inhalation Risk index (RIR)
6. Odour Safety Factor and Odour Threshold Values
7. Abbreviations

NB: Phrases with @ sign can no longer be selected for use in the ICSCs

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.

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

t_b = boiling point at 1013 mbar in °C.
n = substance or compound group number

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

Group number classification:

Substance group	n
- hydrocarbons and substances with relatively few elements other than C and H - ethers - silicones - sulphides	2
- aldehydes - epoxy-compounds - esters (higher) - ketones - compounds containing N	3
- esters (lower; relatively high O_2 content) - phenols (also higher and polyvalent phenols)	4
- carboxylic acids - acid anhydrides	5
- alcohols - glycols - water	7

Halogen derivatives: same group as though halogen were H.
Select n = 4 for substances difficult to classify.

NB: Phrases with @ sign can no longer be selected for use in the ICSCs

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:

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

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

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:

d_m = density of the vapour/air mixture which is formed at 20°C in relation to air.

$$= \frac{\text{vapour mass + air mass (in 1 1itre mixture) at 20°C and 1013 mbar}}{\text{air mass (in 1 1itre air)}}$$

$$= \frac{(M/22.4 \times 273/293 \times p_{20}/1013) + (29/22.4 \times 273/293 \times (1013 - p_{20})/1013)}{29/22.4 \times 273/293 \times 1013/1013}$$

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

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

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

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	
acetone		1.15
acetylene	0.017	
acrolein		0.16
acrylonitrile	l0.16	
ammonia (NH_3)		680
aziridine		0.48
benzene		0.20
1,3-butadiene	0.13	
butane		0.25
carbon monoxide		<0.3
carbon disulphide		0.009
cyclohexane	0.22	
cyclopentane	0.54	
1,3-cyclopentadiene	0.67	
cyclopropane	0.17	
di-(tert)-butylperoxide	0.5	
diethyl ether	0.19	
2,3-dihydropyran		0.36
diisobutylene	0.96	
diisopropyl ether		1.14
dimethyl amine		<0.3
2,2-dimethyl butane	0.25	
dimethyl ether	0.29	
dimethyl propane		1.57
dimethyl sulfide		0.5
dioxane		<0.3
ethane		0.24
ethene		0.07
ether		0.19
ethyl acetate	0.46	
ethyl amine	2.4	
ethyl chloride	<0.3	
ethylene oxide	0.065	
furan		0.22
heptane		0.24
hexane		0.24
hydrogen	0.011	
hydrogen sulphide	0.068	
isooctane	1.35	
isopentane	0.21	
isopropyl alcohol		0.65
isopropyl amine		2.0
isopropyl chloride	1.55	
isopropyl ether	1.14	
isopropyl mercaptan	0.53	
methane		0.28

NB: Phrases with @ sign can no longer be selected for use in the ICSCs

methanol	0.14	
methyl acetylene		0.11
methylal		0.5
methyl cyclohexane	0.27	
methyl ethyl ketone	0.27	
methylformate	0.5	
pentane		0.22
2-pentene	0.18	
propane		0.25
propene		0.28
propionaldehyde		0.4
propylchloride	1.08	
propylene	0.28	
propylene oxide		0.13
tetrahydrofuran	0.54	
tetrahydropyran		0.22
thiophene	0.39	
triethyl amine	0.75	
2,3-trimethyl butane	1.0	
vinyl acetate	0.7	
vinyl acetylene	0.082	
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):

$$C_s = \frac{1000\ dS}{M(100d+S)}$$ 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.

$HZ \longleftrightarrow H^+ + Z^-$

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

$[Z^-] = [H^+]$ $[HZ]=[C_s]$ (by approximation)

$[H^+] = [K_a \times [C_s]]^{1/2}$

$-\log[H^+] = pH_s = -\log [K_a \times [C_s]]^{1/2}$

$-\log K_a = pK_a - \log[C_s] = pC_s$

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

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 pH <= 0.2 for acids and at pH >= 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 pH 2.5 for acids and 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.

Appendix 5

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} >= 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 m^2
- air velocity over the liquid surface: 0.1 m/s
- space volume: 100 m^3
- temperature: 20°C
- no air change (closed space)
- homogeneous air vapour mixing

In that case the following applies:

$t_{STEL} = 3714/RIR$

NB: Phrases with @ sign can no longer be selected for use in the ICSCs

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:

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

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)	Substance	Air odour threshold (ppm; v/v)
Acetaldehyde	0.050	Butane	2700
Acetic acid	0.48	2-Butoxyethano	l0.10
Acetic anhydride	0.13	n-Butyl acetate	0.39
Acetone	13	n-Butyl acrylate	0.035
Acetonitrile	170	n-Butyl alcohol	0.83
Acetylene	620	sec-Butyl alcohol	2.6
Acrolein	0.16	tert-Butyl alcohol	47
Acrylic acid	0.094	n-Butylamine	1.8
Acrylonitrile	17	n-Butyl lactate	7.0
Allyl alcohol	1.1	n-Butyl mercaptan	0.00097
Allyl chloride	1.2	p-tert-Butyltoluene	6.0
Ammonia	5.2	Camphor	0.27
n-Amyl acetate	0.054	Carbon dioxide	74000
sec-Amyl acetate	0.0020	Carbon disulphide	0.11
Aniline	1.1	Carbon monoxide	100000
Arsine	0.50	Carbon tetrachloride	96
Benzene	12	Chlorine	0.31
Benzyl chloride	0.044	Chlorine dioxide	9.4
Biphenyl	0.00083	α-Chloroacetophenone	0.035
Bromine	0.051	Chlorobenzene	0.68
Bromoform	1.3	Chlorobromomethane	400
1,3-Butadiene	1.6	Chloroform	85

Chloropicrin	0.78	Fluorine	0.14
ß-Chloroprene	15	Formaldehyde	0.83
o-Chlorotoluene	0.32	Formic acid	49
m-Cresol	0.00028	Furfural	0.078
trans-Crotonaldehyde	0.12	Furfuryl alcohol	8.0
Cumene	0.088	Halothane	33
Cyclohexane	25	Heptane	150
Cyclohexano	l0.15	Hexachlorocyclopentadiene	0.030
Cyclohexanone	0.88	Hexachloroethane	0.15
Cyclohexene	0.18	Hexane	130
Cyclohexylamine	2.6	Hexylene glycol	50
Cyclopentadiene	1.9	Hydrazine	3.7
Decaborane	0.060	Hydrogen bromide	2.0
Diacetone alcohol	0.28	Hydrogen chloride	0.77
Diborane	2.5	Hydrogen cyanide	0.58
o-Dichlorobenzene	0.30	Hydrogen fluoride	0.042
p-Dichlorobenzene	0.18	Hydrogen selenide	0.30
trans-1,2-Dichloroethylene	17	Hydrogen sulphide	0.0081
ß,ß-Dichloroethyl ether	0.049	Indene	0.015
Dicyclopentadiene	0.0057	Iodoform	0.0050
Diethanolamine	0.27	Isoamyl acetate	0.025
Diethylamine	0.13	Isoamyl alcohol	0.042
Diethylaminoethanol	0.011	Isobutyl acetate	0.64
Diethyl ketone	2.0	Isobutyl alcohol	1.6
Diisobutyl ketone	0.11	Isophorone	0.20
Diisopropylamine	1.8	Isopropyl acetate	2.7
N-Dimethylacetamide	47	Isopropyl alcohol	22
Dimethylamine	0.34	Isopropylamine	1.2
N-Dimethylaniline	0.013	Isopropyl ether	0.017
N-Dimethylformamide	2.2	Maleic anhydride	0.32
1,1-Dimethylhydrazine	1.7	Mesityl oxide	0.45
1,4-Dioxane	24	2-Methoxyethanol	2.3
Epichlorhydrin	0.93	Methyl acetate	4.6
Ethane	120000	Methyl acrylate	0.0048
Ethanolamine	2.6	Methyl acrylonitrile	7.0
2-Ethoxyethanol	2.7	Methyl alcohol	100
2-Ethoxyethyl acetate	0.0056	Methylamine	3.2
Ethyl acetate	3.9	Methyl n-amyl ketone	0.35
Ethyl acrylate	0.0012	N-Methylaniline	1.7
Ethyl alcohol	84	Methyl n-butyl ketone	0.076
Ethylamine	0.95	Methyl chloroform	120
Ethyl n-amyl ketone	6.0	Methyl 2-cyanoacrylate	2.2
Ethyl benzene	2.3	Methylcyclohexane	630
Ethyl bromide	3.1	cis-3-Methylcyclohexanol	500
Ethyl chloride	4.2	Methylene chloride	250
Ethylene	290	Methyl ethyl ketone	5.4
Ethylenediamine	1.0	Methyl formate	600
Ethylene dichloride	88	Methyl hydrazine	1.7
Ethylene oxide	430	Methyl isoamyl ketone	0.012
Ethylenimine	1.5	Methyl isobutyl carbinol	0.070
Ethyl ether	8.9	Methyl isobutyl ketone	0.68
Ethyl formate	31	Methyl isocyanate	2.1
Ethylidene norbornene	0.014	Methyl isopropyl ketone	1.9
Ethyl mercaptan	0.00076	Methyl mercaptan	0.0016
N-Ethylmorpholine	1.4	Methyl methacrylate	0.083
Ethyl silicate	17	Methyl n-propyl ketone	11

NB: Phrases with @ sign can no longer be selected for use in the ICSCs

α-Methyl styrene	0.29	m-Xylene1.1 2,4-Xylidine	0.056
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		
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		
Trichlorofluormethane	5.0		
1,1,2-Trichloro-1,2,2-trifluorethane	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		

NB: Phrases with @ sign can no longer be selected for use in the ICSCs

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
LC_{50}	Lethal Concentration 50%
LD_{50}	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

Revisions to the Compiler's Guide approved in April 2010

Revised text is underlined

12000000 PHYSICAL PROPERTIES

12103000 Boiling point []

12114000 Melting point []

12801500 (calculated)

Ind: Use where the value for the Octanol/water partition coefficient has been calculated and is therefore an estimated rather than a measured value.

13200000 PHYSICAL DANGERS:

13226000 Adequate data not found.

Ind. The data that were found were considered insufficient to make a judgement.

13227000 Not applicable

Ind: The data found were considered adequate to make the judgement that there are no physical dangers associated with this chemical.

13300000 CHEMICAL DANGERS:

13399500 Adequate data not found.

Ind. The data that were found were considered insufficient to make a judgement.

13399600 Not applicable.

Ind: The data found were considered adequate to make the judgement that there are no chemical dangers associated with this chemical.

13400000 OCCUPATIONAL EXPOSURE LIMITS (OELs):

TLV:
13410045 (inhalable fraction)

13410047 (inhalable fraction & vapour)

MAK:
13428070 BAR issued

Expl. BAR describes the background level of a substance that is present in the environment at a particular time in a reference population of people of working age who are not occupationally exposed to the substance. The BAR is based on the 95th centile without regard to the effects on health. This reference level is derived from a measured level in a random sample from a defined population group. Occupational

exposures can be assessed by comparing biomonitoring values in occupationally exposed persons with the BAR.

Ind. Use according to the latest available version of the DFG publication.

13500000 ROUTES OF EXPOSURE:

13516005 Serious local effects by all routes of exposure

Ind. Use for corrosive substances that cause local tissue damage by any route of exposure but that are not necessarily absorbed.

13700000 EFFECTS OF SHORT-TERM EXPOSURE:

13724000 Inhalation of fumes may cause metal fume fever.

Expl. Some metal fumes can induce a particular fever known as metal fume fever.

Ind. 17125 17141
24418

13784000 Health effects of exposure to the substance have not been investigated [].

Expl. The potential toxicity 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.

Ind. For chemicals for which adequate data could not be found to make a judgment on effects of short-term exposure. Close with full stop if no data is available because no research has been done. Complete with 'adequately' if evidence shows that the available data were obtained through inadequately conducted research.

13785000 Health effects of exposure to the substance have been investigated extensively but none has been found.

Expl. Some chemicals do not represent a hazard to human health even at high, and improbably high, levels of exposure.

Ind. 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 24405 in cases where the chemical has not been investigated adequately. The selection of this phrase has to be approved by the Peer Review group.

13800000 EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:

13871000 Health effects of exposure to the substance have not been investigated [].

Expl. The potential toxicity 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.

Ind. For chemicals for which adequate data could not be found to make a judgment on effects of short-term exposure. Close with full stop if no data is available because no research has been done. Complete with 'adequately' if evidence shows that the available data were obtained through inadequately conducted research.

13872000 Health effects of exposure to the substance have been investigated extensively but none has been found.

Expl. Some chemicals do not represent a hazard to human health even at high, and improbably high, levels of exposure.

Ind. 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 24405 in cases where the chemical has not been investigated adequately. The selection of this phrase has to be approved by the Peer Review group.

16000000 EXPOSURE

16207000 AVOID ALL CONTACT!

Expl. This warning is given only for highly dangerous substances. The symptoms may appear either immediately or after some time has passed.

Ind. Apply if the substance is:
- a very corrosive or easily sensitizing substance;
- GHS Category 1a or 1b for carcinogenicity
- GHS Category 1a or 1b for mutagenicity
- GHS Category 1 for reprotoxicity; or
- one for which all contact should be avoided because of serious hazard of irreversible damage. '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.

17100000 Inhalation.

17102000 No acute symptoms expected

Ind: for chemicals where the physico-chemical and/or toxicological data indicate that symptoms are unlikely by this route. NB
(18315030)

19300000 Eyes: FIRST AID

19301000 First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.

Expl. 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.

Ind. ~~Apply in call cases~~. Apply where symptoms have been listed under eye exposure.

19302000 Rinse with plenty of water (remove contact lenses if easily possible).

Expl. 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 ho harm could result to the eye, for example even inert chemicals may cause physical abrasion.

Ind: Use when **no** symptoms are listed for eye exposure.

20100000 Ingestion: ACUTE SYMPTOMS.

20102000 No acute symptoms expected

Ind: 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 use if the only reports of symptoms are from deliberate/unusually high exposures and none are expected from more routine types of exposure. In this case combine with 20144 See NOTES.
(20317020) (24426)

20144000 See NOTES

Ind. 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.
(24426)

20145000 Aspiration hazard!

Ind: Apply for chemicals classified as GHS aspiration category 1
13734 20318

20300000 Ingestion: FIRST AID.

20313000 @Rest.
This phrase was disallowed in May 2010 because no adequate Indication could be given for its use.

20318000 Refer immediately for medical attention since delayed breathing difficulties and/or fever are possible.

Expl: 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.

Ind. 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).

23000000 PACKAGING & LABELLING

New GHS combination phrases added

GHS0155 Causes skin and eye irritation
GHS0305 Fatal if swallowed or in contact with skin
GHS0306 Fatal if swallowed or if inhaled
GHS0307 Fatal if swallowed, in contact with skin or if inhaled
GHS0315 Fatal in contact with skin or if inhaled
GHS0415 Harmful if swallowed or if inhaled
GHS0416 Harmful if swallowed or in contact with skin

GHS0417 Harmful if swallowed, in contact with skin, or if inhaled
GHS0425 Harmful in contact with skin or if inhaled
GHS0575 May be harmful if swallowed or if inhaled
GHS0576 May be harmful if swallowed or in contact with skin
GHS0577 May be harmful if swallowed, in contact with skin, or if inhaled
GHS0595 May be harmful in contact with skin or if inhaled
GHS0945 Toxic if swallowed or if inhaled
GHS0946 Toxic if swallowed or in contact with skin
GHS0947 Toxic if swallowed, in contact with skin or if inhaled
GHS0955 Toxic in contact with skin or if inhaled
GHS101 Harms public health and the environment by destroying ozone in the upper atmosphere
GHS110 No hazard classification according to GHS criteria
GHS111 Insufficient data for GHS classification

24000000 N O T E S

24403000 @Health effects of exposure to the substance have been investigated extensively but none has been found.
This phrase moved to Effects of Short Term Exposure (13785) and effects of Long Term Exposure (13872) .

24405000 @Health effects of exposure to the substance have not been investigated[].
This phrase moved to Effects of Short Term Exposure (13784) and effects of Long Term Exposure (13871) .

24418000 **@**Refer for medical attention if breathing difficulties or fever develop.
Moved to Inhalation First Aid 173

Expl. Exposure to certain substances may cause delayed onset of respiratory symptoms.

Ind. Use for substances that may cause chemical pneumonitis or metal fume fever.

24426000 A severe intoxication is only likely after ingestion of large amounts.

Expl. For certain chemicals much of the information about clinical effects of exposure comes from case reports of intentional ingestion . This usually involves exposure to larger amounts than are likely from unintentional exposure in an occupational setting. The purpose of this note is to guide the reader in interpreting the information written in the Exposure section of the Card.

Ind. Use as follows:
1) When the only reports of symptoms are from deliberate/unusually high exposures and none are expected from more routine types of exposures. In addition, under symptoms use "No acute symptoms expected (See Notes)"
2) Symptoms are listed from the occupational setting and are relatively mild, however, there are case reports of more severe symptoms in deliberate/unusually high exposures. In addition, under symptoms use: "See Notes". In this situation the more severe symptoms are not listed in Exposure-symptoms.
3) When there is a general lack of data about the chemical and it is uncertain what symptoms might be expected following more routine types of exposure but there are case reports of deliberate or unusually high exposures. Here, list the initial/direct symptoms but do not include secondary effects (e.g. renal failure secondary to hypotension). In addition, under symptoms use: "See Notes".

24421000 @ Immediate administration of an appropriate inhalation therapy by a doctor or a person authorized by him/her, should be considered.
Phrase disallowed because this is a medical decision and does not need to be signalled on the Card.

24425000 Specific treatment is necessary in case of poisoning with this substance; the appropriate means with instructions must be available.

Ind. Apply if the substance causes rapid and serious intoxication and therefore it is important to treat the victim on the spot, i.e. treatment measures and/or antidotes must be available at the workplace (e.g. calcium gluconate gel, oxygen).

24425100 Specific treatment may be necessary in case of poisoning with this substance; the appropriate means with instructions should be available.

Ind. Use where specific treatment measures/antidotes are available but need not be given on the spot and for which use will, in any case, be a clinical decision.

24613000 **@**[] is a trade name.

24615000 **@**[] are examples of trade names.

Revisions to the Compiler's Guide approved in April 2009

Revised text is underlined

11000000: IDENTIFICATION

11101000 [name]

Expl. 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.

If the chemical name is very long and the chemical is mainly known by its trade name then the trade name be used instead.

13300000 CHEMICAL DANGERS:

13389205 most organic and inorganic compounds

13700000 EFFECTS OF SHORT-TERM EXPOSURE:

13702000 ~~Lachrymation~~ Lachrymator.

Expl. Some substances, known as lachrymators, cause the eyes to water.

Ind. Apply to typical lachrymators, i.e., gases or liquids of which the vapours induce lachrymation NOT due to ordinary irritation of the eyes. See 19104.

13734000 If swallowed the substance easily enters the airways and could result in aspiration pneumonitis.

Ind: Applies when substance meets GHS criteria for aspiration risk of Category 1.
(203180) 20145 20309

13735000 If swallowed the substance may cause vomiting, and could result in aspiration pneumonitis.

Ind: Applies when substance does not meets 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. NB These criteria are close to, but not identical with, those for GHS Category 2.
20309

13800000 EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:

Effects listed under Short-Term can be duplicated here, however, to do so is a **peer review decision.**

14000000 FIRE: ACUTE HAZARDS.

14101000 Extremely flammable.

Ind. Apply if flammable gas or liquid with flash point < 0°C and a boiling point (or in case of a boiling range, the initial boiling point) < 35°C, and to gases which are flammable in contact with air at ambient temperature and pressure. For explosive substances use 14121.
14201 15213 22101

14103000 Highly flammable.

Ind. Apply if flammable gas or liquid with flash point > 0°C but < 21°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 14121. '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 14121).
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 4.2 should be included for application of this phrase.
14201 15213 22101

14200000 Fire: PREVENTION.

14209500 No contact with incompatible materials: see Chemical dangers

15200000 Explosion: PREVENTION.

15219500 No contact with incompatible materials: see Chemical dangers

17100000 INHALATION - Symptoms

17111010 behind the breastbone.

Expl: A burning sensation behind the breastbone is caused by irritation or corrosion of the tissues of the upper respiratory tract.

Ind: Use for gases, vapours, mists, and aerosols that are irritant or corrosive to mucous membranes.

17122000 Blurred vision

Ind. Use for chemicals that cause blurred vision as a systemic effect once absorbed, e.g. by causing dilated or constricted pupils.

18300000 Skin: FIRST AID.

18317000 Wear protective gloves when administering first aid.

Expl. 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.

Ind: 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.
24510

~~18301010 Put clothes in sealable container (SEE Notes)~~

~~Expl: Contaminated clothing can be a source of secondary exposure to first aiders and medical staff. It is important therefore that these clothes are isolated e.g. by placing in a sealable bag or other container.~~

~~Ind: 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.~~
~~24510000~~

18301020 (SEE Notes)

Expl: Refers to the need to isolate contaminated clothing, which can be a source of secondary exposure to first aiders and medical staff.

Ind: 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.
24510

19100000 EYE - Acute Symptoms

~~19117000 Severe deep burns.~~

19117500 Severe burns.

20100000 Ingestion- ACUTE SYMPTOMS.

20100000 Ingestion:

20122000 Blurred vision

Ind. Use for chemicals that cause blurred vision as a systemic effect once absorbed, e.g. by causing dilated or constricted pupils.

20100000 Ingestion - First Aid

20310000 Give one or two glasses of water to drink.

Ind. Use for irritants and severe irritants.

20318000 Refer for medical attention if breathing difficulties and/or fever develop.

Expl: Exposure to certain substances may cause delayed onset of respiratory symptoms.

Ind. Use for substances that may cause 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.
13733, 13724, 17145

21000000 SPILLAGE DISPOSAL

21102200 Isolate and ventilate the area until gas has dispersed

Ind. Use for all gases presenting a hazard, including simple asphyxiants.

Expl. 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.

21102400 Shut off cylinder if possible; isolate and ventilate the area until the gas has dispersed

Ind. Use for all gases presenting a hazard, including simple asphyxiants.

Expl. 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.

~~21221000 Vacuum spilled material.~~

21221400 Vacuum with specialized equipment (See Notes) or carefully sweep into [] containers; if appropriate moisten first to prevent dispersion of dust.

Expl. A spill of powder 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

Ind. Apply for substances that are toxic and very toxic.
24514

21221500 Vacuum with specialist equipment (See Notes) or carefully sweep into [] containers.

Expl. 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

Ind. Apply for substances that are toxic and very toxic.
24514

21317000 Chemical protection suit.

Ind. Recommended for compounds which have RIR above 400 and are corrosive or are strong sensitizing agents, or RIR above 4000 with skin absorption, or RIR above 4000 and which are fuming releasing corrosive and/or toxic vapours (hydrogen chloride, hydrogen cyanide), or have a label of T or T+.

22000000 STORAGE

22402000 Store in original container,

Expl. The original container will have been designed-selected to take in account the compatibilities and reactivity issues related to the substance

Ind. Use for chemicals that are classified as T+, C and N.

24000000 N O T E S

~~24418000 Refer for medical attention if breathing difficulties and/or fever develop.~~
Moved to 20318000 and Indication revised

24514000 NEVER use a domestic-type vacuum cleaner to vacuum the substance, only use specialist equipment.

Revisions to the Compiler's Guide approved in November 2008

13700000: Effects of Short-Term Exposure

1) New phrase:

13720000 Inhalation [] may cause lung oedema, but only after initial corrosive effects on eyes and/or airways have become manifest.

Ind: 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 137191 for lung oedema caused by non-corrosive substances). NB 13711 and 13717 (… is corrosive to the respiratory tract) should also have been selected.

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.
13782, 17303, 17309, 17129 , 17133

2) Revised Indication

13719100 Inhalation [] may cause lung oedema.

Ind: 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 13720 for lung oedema caused by corrosive and/or water-soluble substances).

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 with 24419 in NOTES.
17303 (optional), 13782, 17309 24419

3) Replacement of phrases with 2 new phrases:

13733000 @If this liquid is swallowed, aspiration into the lungs may result in chemical pneumonitis
Replaced by 13734 and 13735

13734000 If swallowed the substance easily enters the airways and could result in aspiration pneumonitis.

Expl: 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).

Ind: Applies when substance meets GHS criteria for aspiration risk of Category 1.

20145

13735000 If swallowed the substance may cause vomiting, and could result in aspiration pneumonitis.

Expl: 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 more than 13; isobutyl alcohols, and ketones with a composition of no more than 13 carbon atoms.

Ind: Applies when substance does not meets 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. NB These criteria are close to but not identical with those for GHS Category 2.

13900000 ENVIRONMENTAL TOXICITY:

New phrases:

NB these are existing phrases that have been moved to this section from the Notes section (24409000 and 24409010)

13920000 Environmental effects from the substance have not been investigated [].

Expl. 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.

Ind. Close with full stop if no data is available because no research has been done. Complete with 'adequately' if evidence shows that the available data were obtained through inadequately conducted research.

13920010 adequately

16300000 Physical contact: FIRST AID.

New phrase:

16302000 FIRST AID: USE PERSONAL PROTECTION

Expl: 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, mask etc. For certain chemicals e.g. nerve gases full body protection with a chemical protection suit and respiratory protection may be needed.

Ind: 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 16301,18317 or 20315.

17100000 Inhalation: ACUTE HAZARDS/SYMPTOMS.

New Indication

1713000 Suffocation.

Ind: Apply to gases and vapours that cause suffocation by asphyxiation rather than as an effect of systemic toxicity.

18100000 Skin: ACUTE HAZARDS/SYMPTOMS.

Revised indications

18110000 []skin burns.

Ind. Use for substances with GHS skin corrosion classification 1A to 1C, or EU R34. May be completed with 'serious'.

18110010 Serious

Ind. Use for substances with GHS skin corrosion classification 1A to 1B, or EU R35

18300000 Skin: FIRST AID.

1) Revised indications

18301000 Remove contaminated clothes.

Ind. Use with 18309, 18311 or 18313. Apply when criteria for GHS corrosive for skin (Category 1) is met, 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).

Apply when repeated or prolonged contact may cause skin sensitization.

Do not apply in case of thermal burning or frostbite because of the increased risk of infection when blisters burst.

NB Use 18307010 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.

18301010 Put clothes in sealable container (SEE Notes)

Expl: Contaminated clothing can be a source of secondary exposure to first aiders and medical staff. It is important therefore that these clothes are isolated e.g. by placing in a sealable bag or other container.

Ind: 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. 24510000

18307010 First rinse with plenty of water for at least 15 minutes, then remove contaminated clothes and rinse again.

Expl. When the skin and clothing are heavily contaminated with highly flammable substances or with strong oxidants or with strong reducing agents, 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.

Ind. 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 13361 or 13363 is used.

2) Replacement of existing phrases

18305000 @ Rinse with plenty of water, do NOT remove clothes.

18305010 Rinse with plenty of water for at least 15 minutes, do NOT remove clothes.

Expl. In case of burning or 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.

Ind. To be used in special cases.

Revised because 15 min should be minimum period of rinsing

18307000 @ First rinse with plenty of water, then remove contaminated clothes and rinse again.

18307010 First rinse with plenty of water for at least 15 minutes, then remove contaminated clothes and rinse again.

Expl. When the skin and clothing are heavily contaminated with strong oxidants or with strong reducing agents, 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.

Ind. Applies if 13361 or 13363 is used.

Revised because 15 min should be minimum period of rinsing

3) Revision of existing phrase (addition of []) and addition of new sub-phrase

18311000 Rinse skin with plenty of water or shower [ ].

Expl. This means the passive cleaning of the skin with water only; 18309 applies for active, thorough cleaning of the skin. Do not wash if the skin is damaged or likely to be damaged.

18311010 for at least 15 minutes

Ind: Use for chemicals with GHS corrosive Category 1A to C.

20100000 Ingestion: ACUTE SYMPTOMS.

New phrase:

20145000 Aspiration hazard!

Ind: Apply for chemicals classified as GHS aspiration category 1
13734

21000000 SPILLAGE DISPOSAL

Phrases disallowed:

21303000 @Personal protection: P1 filter respirator for inert particles.

NB: Phrases with @ sign can no longer be selected for use in the ICSCs

21305000 @Personal protection: P2 filter respirator for harmful particles.
21307000 @Personal protection: P3 filter respirator for toxic particles.

These were disallowed in April 2007 and replaced by 21302, but this was not marked in the hard copy version of the CG.

New phrase:

21309200 Personal protection: filter respirator for inorganic gases and particulates adapted to the airborne concentration of the substance

Expl. Applies to inorganic solid substances which may form aerosols of harmful dust and also generate noxious vapours.

Ind. Applies if an inorganic substance with an (estimated) OEL/TWA < 10 mg/m3 and a RIR index between 12 and 120.

Revised Indication

21315000 Personal protection []:

Additional Explanation:
The choice of respiratory protection equipment is dependent on the Protection Factor needed in any particular situation. This is calculated using the airborne concentration of the chemicals and a limit value e.g. TLV. It also depends on other factors such as the types of mask (half-mask, full mask, powered hood etc), the level of efficiency of the filter and the manufacturer of the filter and/or mask. The Compiler cannot make a recommendation on the level of efficiency of the filter, only on the TYPE of filter to use.

24000000 NOTES

24510000 Isolate contaminated clothing by sealing in a bag or other container.

Expl: Contaminated clothing can be a source of secondary exposure to first aiders and medical staff. It is important therefore that these clothes are isolated e.g. by placing in a sealable bag or other container.

(18301010)

Revisions to the Compiler's Guide approved in April 2008

13700000: Effects of Short-Term Exposure

The phrases 13719000, 1372000 and 1372300 were disallowed and replaced by:

13719100 Inhalation [ ] may cause lung oedema (see Notes).
13721100 Inhalation [ ] may cause asthma-like reactions.
13722000 Inhalation [ ] may cause [ ].

However, the Explanation, Indication and Links were not copied over. This is now done.

23000000 PACKAGING & LABELLING

GHS
All hazard statements are now listed in the Compiler's Guide. Incorrect phrases included in PrettyBit have been deleted:

GHS018 Contains refri**d**gerated gas; may cause cryogenic burns or injury
GHS074 May cause harm to **the** breast-fed children
GHS084 No hazard statement

NB: Phrases with @ sign can no longer be selected for use in the ICSCs

Revisions to the Compiler's Guide approved in November 2007

1) 11000000 IDENTIFICATION - EC Number

New phrase: ELINCS number

11925000 EC / ELINCS No. [4##-###-#]

Expl. This is the reference number for the chemical inventory European List of Notified Chemical Substances (ELINCS). ELINCS list reports substances on the EU market since 18 September 1981. This is a seven-digit system number of the type 4XX-XXX-X which starts at 400-010-9.These number can be found on the ECB ESIS website (http://ecb.jrc.it/esis/)

Ind. Complete with European List of Notified Chemical Substances number.

NB This will be added to the database after the Helsinki meeting.

---

2) 12000000 Physical properties – Flashpoint

Disallowed phrases:

	@12705000	Flash point:	[]
@12705000	12705010	##°C c.c.	
@12705000	12705020	##°C o.c.	
@12705000	12705030	##°C	
@12705000	12705040	flammable gas	

New phrases:

12702000	Flash point:	[] °C c.c.
12703000	Flash point:	[] °C o.c.

These changes facilitate translation and avoid the need for nesting of phrases.

3) 15000000 EXPLOSION – ACUTE HAZARDS SYMPTOMS

New phrase:

151004000 Heating will cause rise in pressure with risk of bursting.

Ind. Applies to liquids with boiling points < 100°C.

4) 19100000 - EXPOSURE - EYE SYMPTOMS

New Indication

19113000 Blurred vision

Ind. Blurred vision may be caused by direct contact with chemicals that may damage the cornea. N.B. This phrase should not be used when blurred vision is a consequence of systemic toxicity (see other routes of exposure).

NB: Phrases with @ sign can no longer be selected for use in the ICSCs

5) 21000000 SPILLAGE DISPOSAL

New optional link

21245000 Do NOT let this chemical enter the environment.
Optional link from: 13831,13833, 13835

6) 24000000 NOTES

1. Proposed changes to existing phrases

24621000 See[] ICSC [####].

Period and #### deleted.

NB: Phrases with @ sign can no longer be selected for use in the ICSCs