

Section Name	MSDS Guide.
Last Updated	11/14
Aim	Explain the common elements of an MSDS.
Scope	All common MSDS elements, warnings, codes and symbols.
References	

MSDS Guide

There are an abundance of potentially hazardous substances within the coatings industry, however the risks can be minimised with proper education and observation of precautions. The documentation that covers all these precautions is called a Material Safety Data Sheet, and it's an essential reference to any workplace handling industrial chemicals.

This document is intended as an aid to the understanding of the information an MSDS contains. The MSDS is arguably the most important document in a workplace as it describes the hazard a substance represents and how to deal with this in the safest, most effective manner. The documents, however, can be confusing to people unfamiliar with industry terminology and concepts. It is hoped that this confusion can be overcome in this document.

1 Content

The first step in understanding an MSDS document is to become familiar with the content. As you will see in the following section (1.1.5), the National Occupational Health and Safety Commission recommend a standard MSDS format consist of 16 headings that combine to give a thorough profile of the substance. At the very minimum, an MSDS should provide enough information to satisfy four main categories of material information (regardless of heading structure), which will be discussed now.

1.1 Identification

An MSDS should provide enough information to enable the user to make quick and thorough identification of the product. This includes –

- Product commercial name.
 - Supplier's company details.
 - Physical description/properties, e.g. specific gravity, viscosity, colour, danger hazards (see section 2.1).
 - Composition – includes a full disclosure of hazardous ingredients, their CAS numbers and the concentration ranges in which they are present. Ingredients may be omitted to protect sensitive intellectual property relating to formulations, which is permissible only if they do not add to the level or type of hazard a substance represents.
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1.2 Health Hazard Information

This is probably the most important section of an MSDS. It conveys the health hazards of the material (toxicity) and how to deal with incidents that may occur. There should be three sub-sections to the health hazard information –

- Health effects – a discussion on the health effects (toxicity, see section 1.2.2) of the product should be included. Such information should cover any short or long-term effects associated with exposure.
- First aid instructions – a basic first aid procedure should be included to aid untrained personnel in tending to the victim until trained people can do so (doctors, paramedics etc). This should be in clear, simple language so that an untrained person can easily follow it.
- Specific medical advice – medical advice should be included to aid medical practitioners on how best to treat the victim.

A key aspect to a thorough health hazard information section is the statement of relevant Risk and Safety Phrases. Risk Phrases are supplementary information that helps give a complete profile of the dangers a material may pose (both danger and health hazards – see section 1.2), whereas Safety Phrases describe important practices that need to be observed to safely handle and store materials. Most MSDS will contain these phrases in their abbreviated form of R13, S2 etc. For a complete index of the Risk Phrases, see section 1.3.5, and for a complete index of the Safety Phrases, see section 1.3.6.

1.3 Precautions for Use

This section should contain recommended precautions to be taken by workers during everyday usage of the material. It should clearly state the personal protection equipment (P.P.E.) that needs to be worn by workers when using the product, e.g. goggles, gloves, respirators etc., as well as any engineering controls that need to be in place, such as ventilation. Generally this section will also include data on the exposure limits of the material (see section 1.2.2).

1.4 Safe Handling Information

This section will often detail how the product should be handled outside of its intended applications, e.g. transport, emergency scenarios. The subsections should include information on –

- Storage and transport – in general, the measures recommended in this subsection will involve gaining official approval of the storage site by the local council. In the case of flammable materials, constructing the storage facilities out of non- flammable materials in clearly visible areas. They will also suggest good storage practices such as lids being securely closed when not in use, and conditions of the storage areas to be stable and of moderate temperature. This section should also detail any other specific storage requirements of the product, e.g. some facilities may need particular licensing depending on the quantity of stock they hold of a material.
- Spills and disposal – most of the instruction pertaining to spills and disposal will be from an environmental perspective. General measures such as making every effort to contain spills (including re-collection and proper disposal) thereby not allowing them to enter drains or natural waterways are common features. This section may also advise the workplace conduct thorough

HAZOP studies so that strategies and procedures can be put in place to deal with such events are dealt in a quick and efficient manner.

- Fire/explosion hazards – usually this section will recommend ensuring good preventative (see storage and transport) and fire-fighting measures are established. Basic issues such as ensuring sufficient fire-fighting equipment (e.g. fire extinguishers, blankets etc.) will generally be covered.
- Other information – any other relevant information may also be included. This may include information regarding the reactivity, stability and/or ecotoxicity.

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1.5 Contact Details and Issue Date

This section will often provide a general contact number, as well as indicate any revision date on the MSDS. This is an important feature of the MSDS as it allows the reader to ensure they have the most recent, up-to-date document in cases where the MSDS may change frequently. Although regular amendments to MSDS are not desirable, it is simply a fact that not all is known about certain materials, their properties and how they should be handled and therefore revisions of MSDS are inevitable.

1.6 NOHSC Recommended 16 Headings

As alluded to, the standard format of an MSDS recommended by the NOHSC contains 16 headings, which covers the four main sections. These headings are presented below –

- Section 1: Identification of the material and supplier.
- Section 2: Hazards Identification.
- Section 3: Composition/information on ingredients.
- Section 4: First aid measures.
- Section 5: Fire fighting measures.
- Section 6: Accidental release measures.
- Section 7: Handling and storage.
- Section 8: Exposure controls/personal protection.
- Section 9: Physical and chemical properties.
- Section 10: Stability and reactivity.
- Section 11: Toxicological information.
- Section 12: Ecological information.
- Section 13: Disposal considerations.
- Section 14: Transport information.
- Section 15: Regulatory information.
- Section 16: Other information.

2 Hazards

The primary role of the MSDS is to inform people of the hazards that substances carry. Below is a short summary of the main hazards that accompany the common materials used in paint manufacture and the measures that are taken to control them. As you will observe, the hazardous properties of chemicals can be classified into two main categories: dangerous properties and toxic (health) properties.

2.1 Dangerous Properties/Hazards

Dangerous properties relate to the physio-chemical properties of the chemical. In simpler terms, it is the danger posed through how the chemical reacts in certain conditions.

2.1.1 Explosives

An explosion is defined as a rapid and violent increase of pressure in a confined space. Therefore, an explosive substance is one that produces a dramatic pressure increase (usually through the formation of gas) upon being heated, ignited or detonated through other means. There are a number of well-known explosives including TNT (trinitrotoluene) and gunpowder. The major explosive concern for paint-related materials is solvents.

2.1.2 Flammables

The flammability of materials relates to the ability of the substance to be ignited. All forms of matter – solids, liquids, and gases – can be flammable. For paint-related material, once again the major concern is with solvents. Acetone, Xylene, Aromatics, Ethyl Acetate and other common paint solvents are all flammable materials. Also, some of the additives introduced into the paint system may be flammable and should therefore be checked.

Information pertaining to flammables within a MSDS should contain data on three (3) key parameters of flammability –

- Lower and Upper Explosion Levels (LEL/UEL) – these values describe the vapour concentration needed for a volatile substance to ignite. If the vapour concentration is below the LEL, there is not enough flammable material to burn. If the vapour concentration exceeds the UEL, there is too much vapour and not enough oxygen to sustain the burn.
- Flash Point – the flash point is another value often quoted in MSDS. It is the temperature at which the vapour/air mixture will reach the LEL. It will be lower for highly volatile substances.
- Autoignition Temperature – when mixtures of vapour and air lie between the LEL and the UEL (in the flammable zone) they can be heated to a certain temperature at which the mixture will automatically ignite, i.e. without any external source. Local “hotspots” around machinery etc. can autoignite mixtures if proper care isn’t taken.

2.1.3 Oxidizers

Oxidizers are materials that under specific conditions can release oxygen. These processes can be hazardous as increased oxygen can –

- Increase the risk of fire or explosion.
- Increase the combustion of other materials.
- Increase the intensity of an existing fire that may very well become an explosion.

2.1.4 Radioactive Materials

Radioactive materials are materials undergoing radioactive decay. This decay occurs in the nucleus of the atoms and is a release of either particles or energy. This phenomenon occurs naturally in a lot of substances and is only considered hazardous when the exposure exceeds certain safe limits. This level is characterised by a specific activity, which has the units of Becquerels per gram of material (Bq/g). In Australia, anything over 70 Bq/g is deemed radioactive. Fortunately the paint industry has little need to employ radioactive materials, and as such there is no real concern in this area.

2.1.5 Corrosive Materials

A corrosive material is any substance that causes the destruction, or irreversible damage to living tissue through chemical reaction upon contact. Examples of corrosive materials are the acids and bases: hydrochloric acid, sulphuric acid, sodium hydroxide etc. Within the paint/coating industry, care must be taken when handling materials as they could very well be corrosive. For two-pack epoxies, the curing component is where such dangers can lie.

2.1.6 Cryogenic Materials

The term cryogenic relates to the science of extremely cold temperatures. Any material having a boiling point of less than -150°C is considered to be a cryogenic substance, most of which are liquefied gases such as oxygen and nitrogen. The danger these substances represent is the damage that could be done upon contact. Severe burns or frostbite from brief contact can occur. These sorts of materials obviously aren't a factor in paint composition, however they are worthy of a mention for the completeness of this document.

2.2 Toxic Properties/Hazards

As mentioned previously, the danger hazards are a category of hazard connected to the way a substance behaves either physically or chemically (physico-chemical properties). The second class of hazard is connected to the interaction a substance has with the human body upon exposure – the toxic properties.

2.2.1 Toxic Materials

Any material that has an adverse effect on the normal function of the body can be classified as toxic. The ingress (entering) of a toxic substance can be through the skin (contact), mouth (ingestion) or lungs (inhalation).

When discussing the toxicity of substances, the questions that need to be asked are what sort of effect does ingress have and over what body region. The types of effects are presented below, accompanied by a brief discussion of each –

- Local effects – this relates to the effect a toxic substance has when it makes initial contact with any tissue (eye, lungs, gastro-intestinal tract). The severity of effect will vary depending on the substance, from minor reaction (such as runny nose, cough etc.) to a severe reaction (blindness, asphyxiation). Local effects are strongly connected to what's known as the acute effects of a substance. The acute effects describe the effects that are experienced over a short time frame.
- System effects – unlike local effects which describe the reactions that occur when initial contact to bodily tissue is made, system effects manifest after the toxin has been absorbed and transported to a particular organ or system. Any organ or system is susceptible to toxicity. Common examples of system effects are: Neurotoxicity (damage to the nervous system), Hepatotoxicity (damage to the liver), Nephrotoxicity (damage to the kidneys), Teratogenicity (damage to the reproductive/development system), Carcinogenicity (damage to cells that leads to cancer), and Mutanogenicity (damage to the genetic material within cells).
- Allergic effects – effects which aren't significant initially, however intensify upon repeated exposure. Allergic effects have a cumulative nature that worsens for each subsequent exposure. Examples of allergic effects are generally to do with the skin (sensitisers and irritants) and the lungs (asthma). Another term that is commonly used in MSDS when detailing the allergic effects is chronic effects. These are the effects that occur when exposed to tolerable levels over a long period of time and therefore can be used interchangeably with allergic effects.
- Idiosyncratic effects – these effects can be thought of as effects that are unique to the individual, i.e. are determined genetically. Essentially, one person may be more affected by a certain chemical than another without any apparent reason.
- Stochastic effects – this type of effect seems to defy the standard exposure-effect relationship that exists between most toxic substances and the effect they have. In other words, the actual effects of exposure to these substances are more random and difficult to predict than others. An example is the carcinogenic substances, which are extremely difficult to fully qualify in terms of the dangers they represent. The difficulty experienced with such substances is reflected in the fact that there are very few known carcinogens and classification tends to stop at "suspected" carcinogen level.

The overall effect that a toxic substance will have on the body is a function of many factors including the health of the subject, how the toxin ingress is treated (response time, doctor consultation etc.) and the presence of other chemicals in the body. The two principle factors however, are the exposure level or dose, and the time frame over which this dosage occurs.

In order to quantify a safe level of exposure for toxic substances, MSDS will generally supply a value called the Threshold Limit Value (T.L.V.). The T.L.V. is defined as the maximum airborne concentration that is safely withstood by the normal, healthy worker on a continuing basis. The T.L.V. is a time-weighted average taken over an 8-hour working day.

Also, MSDS may include data relating to the lethal dosage, LD 50, when swallowed. This figure is expressed in mg/kg, and quantifies the weight (mg) of substance swallowed per weight of subject (kg) that was sufficient to kill 50 out of 100 test subjects (usually rats or rabbits).

3 Hazard Labels and Codes

In addition to the information that has already been discussed, MSDS will provide information in various codes. This section will provide explanation to these codes, which relate to: Dangerous Goods Classes, Packing Group Numbers, National Fire Protection Agency (NFPA) Hazard Identification System, Poison Schedules, Risk Phrases and Safety Phrases.

3.1 DG Class Numbers

- Class 1: Explosives.
- Class 2: Flammable Gas.
- Class 2.2: Non-flammable, Non-toxic Gas.
- Class 2.3: Poison Gas.
- Class 3: Flammable Liquid.
- Class 4.1: Flammable Solid.
- Class 4.2: Spontaneous Combustion.
- Class 4.3: Dangerous When Wet.
- Class 5.1: Oxidizing Agent.
- Class 5.2: Organic Peroxide.
- Class 6.1: Poison or Harmful.
- Class 7: Radioactive.
- Class 8: Corrosive.
- Class 9: Miscellaneous.

3.2 Packing Group Numbers

- I: Items presenting GREAT DANGER
- II: Items presenting MEDIUM DANGER
- III: Items presenting MINOR DANGER

3.3 NFPA Hazard Identification System

3.3.1 Flammability (Red Diamond) – Susceptibility of Material to Burning

4: Material that will rapidly or completely vaporise at atmospheric pressure and normal ambient temperature, or that is readily dispersed in air and that will burn readily. Any liquid or gaseous material which is a liquid while under pressure with a flash point below 22.8°C and a boiling point below 37.8°C.

3: Liquids and solids that can be ignited under almost all ambient temperature conditions.

2: Material that must be moderately heated or exposed to relatively high ambient temperature before ignition can occur.

1: Material that must be pre-heated before ignition can occur.

0: Material that will not burn.

3.3.2 Health Hazard (Blue Diamond)

4: Material that, on very short exposure, could cause death or major residual injury despite medical treatment.

3: Material that, on short exposure, could cause serious temporary or residual injury.

2: Material that, on intense or continued but not chronic exposure, could cause temporary incapacitation or possible residual injury.

1: Material that, on exposure, would cause irritation but only minor residual injury.

0: Material which, on exposure under fire conditions, would offer no hazard beyond that of ordinary combustible material.

3.3.3 Reactivity (Yellow Diamond)

4: Material that, in itself, is readily capable of detonation or of explosive decomposition or reaction at normal temperatures and pressures.

3: Material that, in itself, is capable of detonation or explosive decomposition or reaction but requires a strong initiating source, must be heated under confinement before initiation, or which reacts explosively with water.

2: Material that readily undergoes violent chemical change at elevated temperatures and pressures, or which reacts violently with water, or which may form explosive mixtures with water.

1: Material which is normally stable but which can become unstable at elevated temperatures and pressures.

0: Material that is normally stable, even under fire exposure conditions, and is not reactive with water.

3.3.4 Special Warnings (White Diamond – May be Blank if Not Applicable)

: Material shows unusual reactivity with water (i.e. do not use water).


OX: Material possesses oxidizing properties.

ACID: Material is an acid.

ALK: Material is an alkali (base).

COR: Material is corrosive.

P: Material is subject to polymerisation when mixed with water.

: Material is radioactive.

3.4 Poison Schedules

<u>Schedule</u>	<u>Signal Words</u>	<u>Explanation</u>
S1	None Assigned	Intentionally Blank.
S2 from	Pharmacy Medicine	Therapeutic preparations available pharmacies.
S3 from	Pharmacist Only Medicine	Therapeutic preparations available pharmacies.
S4	Prescription Only Medicine, or Prescription Animal Remedy	Therapeutic preparations requiring professional management or available on prescription.
S5	Caution	Low toxicity or concentration.
S6	Poison	Moderate to high toxicity.
S7	Dangerous Poison	High to extremely high toxicity, can cause death or injury at low exposure.
S8	Controlled Drug	Therapeutic preparations requiring professional management or available on prescription.
S9	Prohibited Substance	Illicit substances.

3.5 Risk Phrases

R1: Explosive when dry.

R2: Risk of explosion by shock, friction, fire or other sources of ignition.

R3: Extreme risk of explosion by shock, friction, fire or other sources of ignition.

R4: Forms very sensitive explosive metallic compounds.

R5: Heating may cause an explosion.

R6: Explosive with or without contact with air.

R7: May cause fire.

R8: Contact with combustible material may cause fire.

R9: Explosive when mixed with combustible material.

R10: Flammable.

R11: Highly Flammable.

R12: Extremely flammable – refer to note 3 at end of this section.

R13: Refer to note 3 at end of this section.

R14: Reacts violently with water.

R15: Contact with water liberates highly flammable gases.

R16: Explosive when mixed with oxidizing substances.

R17: Spontaneously flammable in air.

R18: In use, may form flammable/explosive vapour-air mixture.

R19: May form explosive peroxides.
R20: Harmful by inhalation.
R20/R21: Harmful by inhalation and in contact with skin.
R20/21/22: Harmful by inhalation, in contact with skin and if swallowed.
R21: Harmful in contact with skin.
R21/R22: Harmful in contact with and if swallowed.
R22: Harmful if swallowed.
R23: Toxic by inhalation.
R23/24: Toxic by inhalation and in contact with skin.
R23/24/25: Toxic by inhalation, in contact with skin and if swallowed.
R23/25: Toxic by inhalation and if swallowed.
R24: Toxic in contact with skin.
R24/25: Toxic in contact with skin and if swallowed.
R25: Toxic if swallowed.
R26: Very toxic by inhalation.
R26/27: Very toxic by inhalation and in contact with skin.
R26/27/28: Very toxic by inhalation, in contact with skin and if swallowed.
R26/28: Very toxic by inhalation and if swallowed.
R27: Very toxic in contact with skin.
R27/28: Very toxic in contact with skin and if swallowed.
R28: Very toxic if swallowed.
R29: Contact with water liberates toxic gas.
R30: Can become highly flammable in use.
R31: Contact with acids liberates toxic gas.
R32: Contact with acids liberates very toxic gas.
R33: Danger of cumulative effects.
R34: Causes burns.
R35: Causes severe burns.
R36: Irritating to eyes.
R36/37: Irritating to eyes and respiratory system.
R36/37/38: Irritating to eyes, respiratory system and skin.
R36/38: Irritating to eyes and skin.
R37: Irritating to respiratory system.
R37/38: Irritating to respiratory system and skin.
R38: Irritating to skin.
R39: Danger of very serious irreversible effects.
R39/23: Toxic – danger of very serious irreversible effects through inhalation.
R39/23/24: Toxic – danger of very serious irreversible effects through inhalation and in contact with skin.
R39/23/24/25: Toxic – danger of very serious irreversible effects through inhalation, in contact with skin and if swallowed.
R39/23/25: Toxic – danger of very serious irreversible effects through inhalation and if swallowed.
R39/24: Toxic – danger of very serious irreversible effects in contact with skin.
R39/24/25: Toxic – danger of very serious irreversible effects in contact with skin and if swallowed.
R39/25: Toxic – danger of very serious irreversible effects if swallowed.
R39/26: Very Toxic – danger of very serious irreversible effects through inhalation.
R39/26/27: Very Toxic – danger of very serious irreversible effects through inhalation and in contact with skin.
R39/26/27/28: Very Toxic – danger of very serious irreversible effects through inhalation, in contact with skin and if swallowed.

R39/26/28: Very Toxic – danger of very serious irreversible effects through inhalation and if swallowed.
R39/27: Very Toxic – danger of very serious irreversible effects in contact with skin.
R39/27/28: Very Toxic – danger of very serious irreversible effects in contact with skin and if swallowed.
R39/28: Very Toxic – danger of very serious irreversible effects if swallowed.
R40: Possible risk of irreversible effects.
R40/20: Harmful – possible risk of irreversible effects through inhalation.
R40/20/21: Harmful – possible risk of irreversible effects through inhalation and in contact with skin.
R40/20/21/22: Harmful – possible risk of irreversible effects through inhalation, in contact with skin and if swallowed.
R40/20/22: Harmful – possible risk of irreversible effects through inhalation and if swallowed.
R40/21: Harmful – possible risk of irreversible effects in contact with skin.
R40/21/22: Harmful – possible risk of irreversible effects in contact with skin and if swallowed.
R40/22: Harmful – possible risk of irreversible effects if swallowed.
R41: Risk of serious damage to eyes.
R42: May cause sensitisation by inhalation.
R42/43: May cause sensitisation by inhalation and skin contact.
R43: May cause sensitisation by skin contact.
R44: Risk of explosion if heated under confinement.
R45: May cause cancer.
R46: May cause heritable birth defects.
R48: Danger of serious damage to health by prolonged exposure.
R48/20: Harmful – danger of serious damage to health by prolonged exposure through inhalation.
R48/20/21: Harmful – danger of serious damage to health by prolonged exposure through inhalation and in contact with skin.
R48/20/21/22: Harmful – danger of serious damage to health by prolonged exposure through inhalation, in contact with skin and if swallowed.
R48/20/22: Harmful – danger of serious damage to health by prolonged exposure through inhalation and if swallowed.
R48/21: Harmful – danger of serious damage to health by prolonged exposure in contact with skin.
R48/21/22: Harmful – danger of serious damage to health by prolonged exposure in contact with skin and if swallowed.
R48/22: Harmful – danger of serious damage to health by prolonged exposure if swallowed.
R48/23: Toxic – danger of serious damage to health by prolonged exposure through inhalation.
R48/23/24: Toxic – danger of serious damage to health by prolonged exposure through inhalation and in contact with skin.
R48/23/24/25: Toxic – danger of serious damage to health by prolonged exposure through inhalation, in contact with skin and if swallowed.
R48/23/25: Toxic – danger of serious damage to health by prolonged exposure through inhalation and if swallowed.
R48/24: Toxic – danger of serious damage to health by prolonged exposure in contact with skin.
R48/24/25: Toxic – danger of serious damage to health by prolonged exposure in contact with skin and if swallowed.
R48/25: Toxic – danger of serious damage to health by prolonged exposure if swallowed.
R49: May cause cancer by inhalation.
R50: Very toxic to aquatic organisms.
R51: Toxic to aquatic organisms.
R52: Harmful to aquatic organisms.
R53: May cause long-term adverse effects in the aquatic environment.
R54: Toxic to flora.
R55: Toxic to fauna.

R56: Toxic to soil organisms.
R57: Toxic to bees.
R58: May cause long-term adverse effects in the environment.
R59: Dangerous for the ozone layer.
R60: May impair fertility.
R61: May cause harm to the unborn child
R62: Possible risk of impaired fertility.
R63: Possible risk of harm to the unborn child.
R64: May cause harm to breastfed babies.
R65: Harmful: may cause lung damage if swallowed.
R66: Repeated exposure may cause skin dryness and cracking.
R67: Vapours may cause drowsiness and dizziness.

Notes –

1. Risk phrases convey a general description of the hazard to supplement the dangerous goods class and subsidiary risk(s) or signal word(s). These phrases should give notice of the hazards present with the normal, or reasonably foreseeable, handling or use of the substance.
2. The most appropriate risk phrases are selected in accordance with criteria. Additional risk phrases may be used for risks not identified.
3. R12 and R13 are not recommended for use in Australia as they are covered by appropriate dangerous goods requirements.

3.6 Safety Phrases

S1: Keep locked up.
S1/2: Keep locked up and out of reach of children.
S2: Keep out of reach of children.
S3: Keep in a cool place.
S3/7: Keep container tightly closed in a cool place.
S3/9/14: Keep in a cool well ventilated place away from...(incompatible materials to be indicated by manufacturer).
S3/9/14/49: Keep only in the original container in a cool well ventilated place away from...(incompatible materials to be indicated by manufacturer).
S3/9/49: Keep only in the original container in a cool well-ventilated place.
S3/14: Keep in a cool place away from...(incompatible materials to be indicated by the manufacturer).
S4: Keep away from living quarters.
S5: Keep contents under...(appropriate material to be specified by the manufacturer).
S6: Keep under...(inert gas to be specified by the manufacturer).
S7: Keep container tightly closed.
S7/8: Keep container tightly closed and dry.
S7/9: Keep container tightly closed and in a well ventilated space.
S7/47: Keep container tightly closed and at a temperature not exceeding...(temperature to be specified by manufacturer).
S8: Keep container dry.
S9: Keep container in a well-ventilated place.
S10: Refer to note 3.
S11: Refer to note 3.

- S12: Do not keep the container sealed.
- S13: Keep away from food, drink and animal feeding stuffs.
- S14: Keep away from...(incompatible materials to be specified by the manufacturer).
- S15: Keep away from heat.
- S16: Keep away from sources of ignition – No smoking.
- S17: Keep away from combustible material.
- S18: Handle and open container with care.
- S19: Refer to note 3.
- S20: When using, do not eat or drink.
- S20/S21: When using do not eat, drink or smoke.
- S21: When using do not smoke.
- S22: Do not breathe dust.
- S23: Do not breathe gas/fumes/vapour/spray (appropriate wording to be specified by the manufacturer).
- S24: Avoid contact with skin.
- S24/25: Avoid contact with skin and eyes.
- S25: Avoid contact with eyes.
- S26: In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
- S27: Take off immediately all contaminated clothing.
- S28: After contact with skin, wash immediately with plenty of soap suds.
- S29: Do not empty into drains.
- S29/56: Do not empty into drains, dispose of this material and its container to hazardous or special waste collection point.
- S30: Never add water to this product.
- S31: Refer to note 3.
- S32: Refer to note 3.
- S33: Take precautionary measures against static discharges.
- S34: Avoid shock and friction.
- S35: This material and its container must be disposed of in a safe way.
- S36: Wear suitable protective clothing.
- S36/37: Wear suitable protective clothing and gloves.
- S36/37/39: Wear suitable protective clothing, gloves and eye/face protection.
- S36/39: Wear suitable protective clothing and eye/face protection.
- S37: Wear suitable gloves.
- S37/39: Wear suitable gloves and eye/face protection.
- S38: In case of insufficient ventilation, wear suitable respiratory equipment.
- S39: Wear eye/face protection.
- S40: To clean the floor and all objects contaminated by this material, use...(material to be specified by manufacturer).
- S41: In case of fire and/or explosion, do not breathe fumes.
- S42: During fumigation/spraying, wear suitable respiratory equipment (appropriate wording to be specified by the manufacturer).
- S43: In case of fire use...(manufacturer to specify the precise type of fire fighting equipment).
- S44: If you feel unwell, contact a doctor or Poisons Information Centre immediately.
- S45: In case of accident or if you feel unwell, seek medical advice immediately.
- S46: If swallowed, seek medical advice immediately and show this container or label.
- S47: Keep at temperature not exceeding...(to be specified by the manufacturer).
- S47/49: Keep only in the original container at temperature not exceeding...(to be specified by the manufacturer).
- S48: Keep wetted with...(appropriate material to be specified by the manufacturer).

S49: Keep only in the original container.

S50: Do not mix with...(incompatible materials to be specified by the manufacturer).

S51: Use only in well ventilated areas.

S52: Not recommended for interior use on large surface areas.

S53: Avoid exposure – obtain special instructions before use.

S56: Dispose of this material and its container at hazardous or special waste collection point.

S57: Use appropriate container to avoid environmental contamination.

S59: Refer to manufacturer/supplier for information on recovery/recycling.

S60: This material and its container must be disposed of as hazardous waste.

S61: Avoid release to the environment. Refer to special instructions/safety data sheets.

S62: If swallowed, do not induce vomiting; seek medical advice immediately and show this container or label.

Notes –

1. Safety phrases provide information on safe storage, handling and personal protection.
2. The most appropriate safety phrases are selected in accordance with criteria. Additional safety phrases may be used for risk situations not identified.
3. S10, S11, S19, S31 and S32 are not recommended for use in Australia.