



# 4,4'-Dibromobiphenyl

## Apollo Scientific

Chemwatch Hazard Alert Code: 3

Part Number: OR6695

Version No: 5.5

Safety Data Sheet

Issue Date: 03/07/2023

Print Date: 03/07/2023

S.GHS.GB-NIR.EN

### SECTION 1 Identification of the substance / mixture and of the company / undertaking

#### Product Identifier

|                               |  |
|-------------------------------|--|
| Product name                  | 4,4'-Dibromobiphenyl   |
| Chemical Name                 | 4,4'-dibromobiphenyl   |
| Synonyms                      | Not Available  |
| Proper shipping name          | POLYHALOGENATED BIPHENYLS, SOLID or HALOGENATED MONOMETHYLDIPHENYLMETHANES, SOLID or POLYHALOGENATED TERPHENYLS, SOLID |
| Chemical formula              | C12H8Br2   |
| Other means of identification | Not Available  |
| CAS number                    | 92-86-4*   |

#### Relevant identified uses of the substance or mixture and uses advised against

|                          |               |
|--------------------------|---------------|
| Relevant identified uses | Not Available |
|--------------------------|---------------|

#### Details of the manufacturer or supplier of the safety data sheet

| Registered company name | Apollo Scientific   | Apollo Scientific Ltd  |
|-------------------------|---|--|
| Address                 | Whitefield Road, Bredbury SK62QR United Kingdom                                     | Whitefield Road, Bredbury SK6 2QR United Kingdom (NI)              |
| Telephone               | 01614060505   | +44(0) 161 406 0505  |
| Fax                     | 0161 406 0506   | Not Available  |
| Website                 | <a href="http://www.apolloscientific.co.uk/">http://www.apolloscientific.co.uk/</a> | <a href="http://apolloscientific.co.uk">apolloscientific.co.uk</a> |
| Email                   | sales@apolloscientific.co.uk  | sales@apolloscientific.co.uk                                       |

#### Emergency telephone number

|                                   |               |
|-----------------------------------|---------------|
| Association / Organisation        | Not Available |
| Emergency telephone numbers       | Not Available |
| Other emergency telephone numbers | Not Available |

### SECTION 2 Hazards identification

#### Classification of the substance or mixture

|  |   |
|--|---|
| Classification according to regulation (EC) No 1272/2008 [CLP] and | H318 - Serious Eye Damage/Eye Irritation Category 1, H335 - Specific Target Organ Toxicity - Single Exposure (Respiratory Tract Irritation) Category 3, H302 - Acute Toxicity (Oral) Category 4, H315 - Skin Corrosion/Irritation Category 2, H317 - Sensitisation (Skin) Category 1, H410 - Hazardous to the Aquatic Environment Long-Term Hazard Category 1 |
|--|---|

**4,4'-Dibromobiphenyl**

|                                  |  |
|----------------------------------|--|
| <b>amendments</b> <sup>[1]</sup> |  |
| <b>Legend:</b>                   | 1. Classified by Chemwatch; 2. Classification drawn from Regulation (EU) No 1272/2008 - Annex VI |

**Label elements**

|                            |   |
|----------------------------|---|
| <b>Hazard pictogram(s)</b> |  |
| <b>Signal word</b>         | <b>Danger</b>   |

**Hazard statement(s)**

|             |   |
|-------------|---|
| <b>H318</b> | Causes serious eye damage.                            |
| <b>H335</b> | May cause respiratory irritation.                     |
| <b>H302</b> | Harmful if swallowed.                                 |
| <b>H315</b> | Causes skin irritation.                               |
| <b>H317</b> | May cause an allergic skin reaction.                  |
| <b>H410</b> | Very toxic to aquatic life with long lasting effects. |

**Precautionary statement(s) Prevention**

|             |  |
|-------------|--|
| <b>P271</b> | Use only outdoors or in a well-ventilated area.                                  |
| <b>P280</b> | Wear protective gloves, protective clothing, eye protection and face protection. |
| <b>P261</b> | Avoid breathing dust/fumes.  |
| <b>P264</b> | Wash all exposed external body areas thoroughly after handling.                  |
| <b>P270</b> | Do not eat, drink or smoke when using this product.                              |
| <b>P273</b> | Avoid release to the environment.  |
| <b>P272</b> | Contaminated work clothing should not be allowed out of the workplace.           |

**Precautionary statement(s) Response**

|                       |  |
|-----------------------|--|
| <b>P305+P351+P338</b> | IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. |
| <b>P310</b>           | Immediately call a POISON CENTER/doctor/physician/first aider.   |
| <b>P302+P352</b>      | IF ON SKIN: Wash with plenty of water.   |
| <b>P333+P313</b>      | If skin irritation or rash occurs: Get medical advice/attention.   |
| <b>P362+P364</b>      | Take off contaminated clothing and wash it before reuse.   |
| <b>P391</b>           | Collect spillage.  |
| <b>P301+P312</b>      | IF SWALLOWED: Call a POISON CENTER/doctor/physician/first aider if you feel unwell.  |
| <b>P304+P340</b>      | IF INHALED: Remove person to fresh air and keep comfortable for breathing.   |
| <b>P330</b>           | Rinse mouth.   |

**Precautionary statement(s) Storage**

|                  |  |
|------------------|--|
| <b>P405</b>      | Store locked up.   |
| <b>P403+P233</b> | Store in a well-ventilated place. Keep container tightly closed. |

**Precautionary statement(s) Disposal**

|             |  |
|-------------|--|
| <b>P501</b> | Dispose of contents/container to authorised hazardous or special waste collection point in accordance with any local regulation. |
|-------------|--|

**SECTION 3 Composition / information on ingredients**

**Substances**

| CAS No   | %[weight] | Name                        | Classification according to regulation (EC) No 1272/2008 [CLP] and amendments  | SCL / M-Factor |
|----------|-----------|-----------------------------|--|----------------|
| 92-86-4* | 100       | <u>4,4'-Dibromobiphenyl</u> | Serious Eye Damage/Eye Irritation Category 1, Specific Target Organ Toxicity - Single Exposure (Respiratory Tract Irritation) Category 3 , Acute | Not Available  |

## 4,4'-Dibromobiphenyl

| CAS No | %[weight] | Name | Classification according to regulation (EC) No 1272/2008 [CLP] and amendments   | SCL / M-Factor |
|--------|-----------|------|---|----------------|
|        |           |      | Toxicity (Oral) Category 4, Skin Corrosion/Irritation Category 2, Sensitisation (Skin) Category 1, Hazardous to the Aquatic Environment Long-Term Hazard Category 1; H318, H335, H302, H315, H317, H410 [1] |                |

**Legend:** 1. Classified by Chemwatch; 2. Classification drawn from Regulation (EU) No 1272/2008 - Annex VI; 3. Classification drawn from C&L; \* EU IOELVs available; [e] Substance identified as having endocrine disrupting properties

## Mixtures

See section above for composition of Substances

## SECTION 4 First aid measures

### Description of first aid measures

|                     |  |
|---------------------|--|
| <b>Eye Contact</b>  | <p>If this product comes in contact with eyes:</p> <ul style="list-style-type: none"> <li>▶ Wash out immediately with water.</li> <li>▶ If irritation continues, seek medical attention.</li> <li>▶ Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.</li> </ul> |
| <b>Skin Contact</b> | <p>If skin contact occurs:</p> <ul style="list-style-type: none"> <li>▶ Immediately remove all contaminated clothing, including footwear.</li> <li>▶ Flush skin and hair with running water (and soap if available).</li> <li>▶ Seek medical attention in event of irritation.</li> </ul>                    |
| <b>Inhalation</b>   | <ul style="list-style-type: none"> <li>▶ If fumes, aerosols or combustion products are inhaled remove from contaminated area.</li> <li>▶ Other measures are usually unnecessary.</li> </ul>  |
| <b>Ingestion</b>    | <ul style="list-style-type: none"> <li>▶ Immediately give a glass of water.</li> <li>▶ First aid is not generally required. If in doubt, contact a Poisons Information Centre or a doctor.</li> </ul>  |

### Indication of any immediate medical attention and special treatment needed

Treat symptomatically.

Presentation:

A: Acute symptoms related to overexposure to the PCBs and dioxins (PCDDs and PCDFs) and, presumably, other polyhalogenated polyaromatics (PHAHs) include irritation of the skin, eyes and mucous membranes and nausea, vomiting and myalgias.

B: After a latency period which may be prolonged (up to several weeks or more), chloracne, porphyria cutanea tarda, hirsutism, or hyper-pigmentation may occur. Elevated levels of hepatic transaminases and blood lipids may be found. Polyneuropathies with sensory impairment and lower-extremity motor weakness may also occur.

C: Useful laboratory studies might include glucose, electrolytes, BUN, creatinine, liver transaminase, and liver function tests, and uroporphyrins (where porphyria is suspected)

Treatment:

A: Emergency and Supportive Measures: Treat skin, eye and respiratory irritation symptomatically

B: There is no specific antidote

C: Decontamination:

- ▶ Inhalation; remove victims from exposure and give supplemental oxygen if available.
- ▶ Eyes and Skin: remove contaminated clothing and wash affected skin with copious soap and water; irrigate exposed eyes with copious tepid water or saline.
- ▶ Ingestion; (a) Prehospital: Administer activated charcoal if available. Ipecac-induced vomiting may be useful for initial treatment at the scene if it can be given within a few minutes exposure (b) Hospital: Administer activated charcoal. Gastric emptying is not necessary if activated charcoal can be given promptly.

D: Enhanced elimination: There is no known role for these procedures.

POISONING and DRUG OVERDOSE, Californian Poison Control System Ed. Kent R Olson; 3rd Edition

- ▶ If large amounts of PCB are ingested, gastric lavage is suggested.
- ▶ In the case of splashes to the eyes, a petrolatum-based ophthalmic ointment may be applied to the eye to relieve the irritating effects of PCBs.
- ▶ If electrical equipment arcs over, PCB dielectric fluids may decompose to produce hydrogen chloride (HCl), a respiratory irritant. [MONSANTO] Preplacement and annual medical examination of workers, likely to be exposed to PCBs and their congeners, is recommended; examination should emphasise liver function, skin condition, and reproductive history. [ILO]

## 4,4'-Dibromobiphenyl

## SECTION 5 Firefighting measures

## Extinguishing media

- Foam.
- Dry chemical powder.
- BCF (where regulations permit).
- Carbon dioxide.
- Water spray or fog - Large fires only.

## Special hazards arising from the substrate or mixture

|                             |  |
|-----------------------------|--|
| <b>Fire Incompatibility</b> | ▸ Avoid contamination with oxidising agents i.e. nitrates, oxidising acids, chlorine bleaches, pool chlorine etc. as ignition may result |
|-----------------------------|--|

## Advice for firefighters

|                              |   |
|------------------------------|---|
| <b>Fire Fighting</b>         | <ul style="list-style-type: none"> <li>▸ Alert Fire Brigade and tell them location and nature of hazard.</li> <li>▸ Wear breathing apparatus plus protective gloves.</li> <li>▸ Prevent, by any means available, spillage from entering drains or water courses.</li> <li>▸ Use water delivered as a fine spray to control fire and cool adjacent area.</li> <li>▸ <b>DO NOT</b> approach containers suspected to be hot.</li> <li>▸ Cool fire exposed containers with water spray from a protected location.</li> <li>▸ If safe to do so, remove containers from path of fire.</li> <li>▸ Equipment should be thoroughly decontaminated after use.</li> </ul>  |
| <b>Fire/Explosion Hazard</b> | <ul style="list-style-type: none"> <li>▸ Combustible solid which burns but propagates flame with difficulty; it is estimated that most organic dusts are combustible (circa 70%) - according to the circumstances under which the combustion process occurs, such materials may cause fires and / or dust explosions.</li> <li>▸ Organic powders when finely divided over a range of concentrations regardless of particulate size or shape and suspended in air or some other oxidizing medium may form explosive dust-air mixtures and result in a fire or dust explosion (including secondary explosions).</li> <li>▸ Avoid generating dust, particularly clouds of dust in a confined or unventilated space as dusts may form an explosive mixture with air, and any source of ignition, i.e. flame or spark, will cause fire or explosion. Dust clouds generated by the fine grinding of the solid are a particular hazard; accumulations of fine dust (420 micron or less) may burn rapidly and fiercely if ignited - particles exceeding this limit will generally not form flammable dust clouds; once initiated, however, larger particles up to 1400 microns diameter will contribute to the propagation of an explosion.</li> <li>▸ In the same way as gases and vapours, dusts in the form of a cloud are only ignitable over a range of concentrations; in principle, the concepts of lower explosive limit (LEL) and upper explosive limit (UEL) are applicable to dust clouds but only the LEL is of practical use; - this is because of the inherent difficulty of achieving homogeneous dust clouds at high temperatures (for dusts the LEL is often called the "Minimum Explosible Concentration", MEC).</li> <li>▸ When processed with flammable liquids/vapors/mists, ignitable (hybrid) mixtures may be formed with combustible dusts. Ignitable mixtures will increase the rate of explosion pressure rise and the Minimum Ignition Energy (the minimum amount of energy required to ignite dust clouds - MIE) will be lower than the pure dust in air mixture. The Lower Explosive Limit (LEL) of the vapour/dust mixture will be lower than the individual LELs for the vapors/mists or dusts.</li> <li>▸ A dust explosion may release of large quantities of gaseous products; this in turn creates a subsequent pressure rise of explosive force capable of damaging plant and buildings and injuring people.</li> <li>▸ Usually the initial or primary explosion takes place in a confined space such as plant or machinery, and can be of sufficient force to damage or rupture the plant. If the shock wave from the primary explosion enters the surrounding area, it will disturb any settled dust layers, forming a second dust cloud, and often initiate a much larger secondary explosion. All large scale explosions have resulted from chain reactions of this type.</li> <li>▸ Dry dust can be charged electrostatically by turbulence, pneumatic transport, pouring, in exhaust ducts and during transport.</li> <li>▸ Build-up of electrostatic charge may be prevented by bonding and grounding.</li> <li>▸ Powder handling equipment such as dust collectors, dryers and mills may require additional protection measures such as explosion venting.</li> <li>▸ All movable parts coming in contact with this material should have a speed of less than 1-meter/sec.</li> <li>▸ A sudden release of statically charged materials from storage or process equipment, particularly at elevated temperatures and/ or pressure, may result in ignition especially in the absence of an apparent ignition source.</li> <li>▸ One important effect of the particulate nature of powders is that the surface area and surface structure (and often moisture content) can vary widely from sample to sample, depending of how the powder was manufactured and handled; this means that it is virtually impossible to use flammability data published in the literature for dusts (in contrast to that published for gases and vapours).</li> <li>▸ Autoignition temperatures are often quoted for dust clouds (minimum ignition temperature (MIT)) and dust layers (layer ignition temperature (LIT)); LIT generally falls as the thickness of the layer increases.</li> </ul> <p>Combustion products include:<br/> carbon monoxide (CO)<br/> carbon dioxide (CO<sub>2</sub>)<br/> other pyrolysis products typical of burning organic material.</p> |

## SECTION 6 Accidental release measures

## 4,4'-Dibromobiphenyl

**Personal precautions, protective equipment and emergency procedures**

See section 8

**Environmental precautions**

See section 12

**Methods and material for containment and cleaning up**

|                     |   |
|---------------------|---|
| <b>Minor Spills</b> | <ul style="list-style-type: none"> <li>▶ Clean up all spills immediately.</li> <li>▶ Avoid contact with skin and eyes.</li> <li>▶ Wear impervious gloves and safety glasses.</li> <li>▶ Use dry clean up procedures and avoid generating dust.</li> <li>▶ Vacuum up (consider explosion-proof machines designed to be grounded during storage and use).</li> <li>▶ Do NOT use air hoses for cleaning</li> <li>▶ Place spilled material in clean, dry, sealable, labelled container.</li> </ul>  |
| <b>Major Spills</b> | <p>Moderate hazard.</p> <ul style="list-style-type: none"> <li>▶ <b>CAUTION:</b> Advise personnel in area.</li> <li>▶ Alert Emergency Services and tell them location and nature of hazard.</li> <li>▶ Control personal contact by wearing protective clothing.</li> <li>▶ Prevent, by any means available, spillage from entering drains or water courses.</li> <li>▶ Recover product wherever possible.</li> <li>▶ <b>IF DRY:</b> Use dry clean up procedures and avoid generating dust. Collect residues and place in sealed plastic bags or other containers for disposal. <b>IF WET:</b> Vacuum/shovel up and place in labelled containers for disposal.</li> <li>▶ <b>ALWAYS:</b> Wash area down with large amounts of water and prevent runoff into drains.</li> <li>▶ If contamination of drains or waterways occurs, advise Emergency Services.</li> </ul> |

Personal Protective Equipment advice is contained in Section 8 of the SDS.

**SECTION 7 Handling and storage****Precautions for safe handling**

|                      |   |
|----------------------|---|
| <b>Safe handling</b> | <ul style="list-style-type: none"> <li>▶ Avoid all personal contact, including inhalation.</li> <li>▶ Wear protective clothing when risk of exposure occurs.</li> <li>▶ Use in a well-ventilated area.</li> <li>▶ Prevent concentration in hollows and sumps.</li> <li>▶ <b>DO NOT enter confined spaces until atmosphere has been checked.</b></li> <li>▶ <b>DO NOT allow material to contact humans, exposed food or food utensils.</b></li> <li>▶ Avoid contact with incompatible materials.</li> <li>▶ <b>When handling, DO NOT eat, drink or smoke.</b></li> <li>▶ Keep containers securely sealed when not in use.</li> <li>▶ Avoid physical damage to containers.</li> <li>▶ Always wash hands with soap and water after handling.</li> <li>▶ Work clothes should be laundered separately. Launder contaminated clothing before re-use.</li> <li>▶ Use good occupational work practice.</li> <li>▶ Observe manufacturer's storage and handling recommendations contained within this SDS.</li> <li>▶ Atmosphere should be regularly checked against established exposure standards to ensure safe working conditions are maintained.</li> <li>▶ Organic powders when finely divided over a range of concentrations regardless of particulate size or shape and suspended in air or some other oxidizing medium may form explosive dust-air mixtures and result in a fire or dust explosion (including secondary explosions)</li> <li>▶ Minimise airborne dust and eliminate all ignition sources. Keep away from heat, hot surfaces, sparks, and flame.</li> <li>▶ Establish good housekeeping practices.</li> <li>▶ Remove dust accumulations on a regular basis by vacuuming or gentle sweeping to avoid creating dust clouds.</li> <li>▶ Use continuous suction at points of dust generation to capture and minimise the accumulation of dusts. Particular attention should be given to overhead and hidden horizontal surfaces to minimise the probability of a "secondary" explosion. According to NFPA Standard 654, dust layers 1/32 in. (0.8 mm) thick can be sufficient to warrant immediate cleaning of the area.</li> <li>▶ Do not use air hoses for cleaning.</li> <li>▶ Minimise dry sweeping to avoid generation of dust clouds. Vacuum dust-accumulating surfaces and remove to a chemical disposal area. Vacuums with explosion-proof motors should be used.</li> <li>▶ Control sources of static electricity. Dusts or their packages may accumulate static charges, and static discharge can be a source of ignition.</li> <li>▶ Solids handling systems must be designed in accordance with applicable standards (e.g. NFPA including 654 and 77) and other national guidance.</li> <li>▶ Do not empty directly into flammable solvents or in the presence of flammable vapors.</li> <li>▶ The operator, the packaging container and all equipment must be grounded with electrical bonding and grounding systems.</li> </ul> |
|----------------------|---|

## 4,4'-Dibromobiphenyl

|                          |   |
|--------------------------|---|
|                          | <p>Plastic bags and plastics cannot be grounded, and antistatic bags do not completely protect against development of static charges.</p> <p>Empty containers may contain residual dust which has the potential to accumulate following settling. Such dusts may explode in the presence of an appropriate ignition source.</p> <ul style="list-style-type: none"> <li>▸ Do NOT cut, drill, grind or weld such containers.</li> <li>▸ In addition ensure such activity is not performed near full, partially empty or empty containers without appropriate workplace safety authorisation or permit.</li> </ul>   |
| <b>Other information</b> | <ul style="list-style-type: none"> <li>▸ Store in original containers.</li> <li>▸ Keep containers securely sealed.</li> <li>▸ Store in a cool, dry area protected from environmental extremes.</li> <li>▸ Store away from incompatible materials and foodstuff containers.</li> <li>▸ Protect containers against physical damage and check regularly for leaks.</li> <li>▸ Observe manufacturer's storage and handling recommendations contained within this SDS.</li> </ul> <p>For major quantities:</p> <ul style="list-style-type: none"> <li>▸ Consider storage in bunded areas - ensure storage areas are isolated from sources of community water (including stormwater, ground water, lakes and streams).</li> <li>▸ Ensure that accidental discharge to air or water is the subject of a contingency disaster management plan; this may require consultation with local authorities.</li> </ul> |

## Conditions for safe storage, including any incompatibilities

|                                |  |
|--------------------------------|--|
| <b>Suitable container</b>      | <ul style="list-style-type: none"> <li>▸ Lined metal can, lined metal pail/ can.</li> <li>▸ Plastic pail.</li> <li>▸ Polyliner drum.</li> <li>▸ Packing as recommended by manufacturer.</li> <li>▸ Check all containers are clearly labelled and free from leaks.</li> </ul> |
| <b>Storage incompatibility</b> | <p>Avoid contamination of water, foodstuffs, feed or seed.</p> <ul style="list-style-type: none"> <li>▸ Avoid reaction with oxidising agents</li> <li>▸ Light sensitive</li> </ul>   |

## SECTION 8 Exposure controls / personal protection

## Control parameters

## Occupational Exposure Limits (OEL)

## INGREDIENT DATA

Not Available

## Emergency Limits

| Ingredient           | TEEL-1        | TEEL-2        | TEEL-3        |
|----------------------|---------------|---------------|---------------|
| 4,4'-Dibromobiphenyl | Not Available | Not Available | Not Available |

| Ingredient           | Original IDLH | Revised IDLH  |
|----------------------|---------------|---------------|
| 4,4'-Dibromobiphenyl | Not Available | Not Available |

## Occupational Exposure Banding

| Ingredient           | Occupational Exposure Band Rating | Occupational Exposure Band Limit |
|----------------------|-----------------------------------|----------------------------------|
| 4,4'-Dibromobiphenyl | E                                 | ≤ 0.01 mg/m <sup>3</sup>         |

**Notes:**

Occupational exposure banding is a process of assigning chemicals into specific categories or bands based on a chemical's potency and the adverse health outcomes associated with exposure. The output of this process is an occupational exposure band (OEB), which corresponds to a range of exposure concentrations that are expected to protect worker health.

## Exposure controls

|   |   |
|---|---|
| <b>Appropriate engineering controls</b> | <p>Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard. Well-designed engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide this high level of protection.</p> <p>The basic types of engineering controls are:</p> <p>Process controls which involve changing the way a job activity or process is done to reduce the risk.</p> <p>Enclosure and/or isolation of emission source which keeps a selected hazard "physically" away from the worker and ventilation that strategically "adds" and "removes" air in the work environment. Ventilation can remove or dilute an air contaminant if designed properly. The design of a ventilation system must match the particular process and chemical or contaminant in use. Employers may need to use multiple types of controls to prevent employee overexposure.</p> <ul style="list-style-type: none"> <li>▸ Local exhaust ventilation is required where solids are handled as powders or crystals; even when particulates are relatively</li> </ul> |
|---|---|

## 4,4'-Dibromobiphenyl

large, a certain proportion will be powdered by mutual friction.

- ▶ Exhaust ventilation should be designed to prevent accumulation and recirculation of particulates in the workplace.
- ▶ If in spite of local exhaust an adverse concentration of the substance in air could occur, respiratory protection should be considered. Such protection might consist of:

(a): particle dust respirators, if necessary, combined with an absorption cartridge;

(b): filter respirators with absorption cartridge or canister of the right type;

(c): fresh-air hoods or masks

- ▶ Build-up of electrostatic charge on the dust particle, may be prevented by bonding and grounding.
- ▶ Powder handling equipment such as dust collectors, dryers and mills may require additional protection measures such as explosion venting.

Air contaminants generated in the workplace possess varying "escape" velocities which, in turn, determine the "capture velocities" of fresh circulating air required to efficiently remove the contaminant.

| Type of Contaminant:   | Air Speed:                   |
|--|------------------------------|
| direct spray, spray painting in shallow booths, drum filling, conveyer loading, crusher dusts, gas discharge (active generation into zone of rapid air motion) | 1-2.5 m/s (200-500 ft/min)   |
| grinding, abrasive blasting, tumbling, high speed wheel generated dusts (released at high initial velocity into zone of very high rapid air motion).           | 2.5-10 m/s (500-2000 ft/min) |

Within each range the appropriate value depends on:

| Lower end of the range                                    | Upper end of the range           |
|---|----------------------------------|
| 1: Room air currents minimal or favourable to capture     | 1: Disturbing room air currents  |
| 2: Contaminants of low toxicity or of nuisance value only | 2: Contaminants of high toxicity |
| 3: Intermittent, low production.                          | 3: High production, heavy use    |
| 4: Large hood or large air mass in motion                 | 4: Small hood-local control only |

Simple theory shows that air velocity falls rapidly with distance away from the opening of a simple extraction pipe. Velocity generally decreases with the square of distance from the extraction point (in simple cases). Therefore the air speed at the extraction point should be adjusted, accordingly, after reference to distance from the contaminating source. The air velocity at the extraction fan, for example, should be a minimum of 4-10 m/s (800-2000 ft/min) for extraction of crusher dusts generated 2 metres distant from the extraction point. Other mechanical considerations, producing performance deficits within the extraction apparatus, make it essential that theoretical air velocities are multiplied by factors of 10 or more when extraction systems are installed or used.

#### Individual protection measures, such as personal protective equipment



#### Eye and face protection

- ▶ Safety glasses with side shields.
- ▶ Chemical goggles. [AS/NZS 1337.1, EN166 or national equivalent]
- ▶ Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants. A written policy document, describing the wearing of lenses or restrictions on use, should be created for each workplace or task. This should include a review of lens absorption and adsorption for the class of chemicals in use and an account of injury experience. Medical and first-aid personnel should be trained in their removal and suitable equipment should be readily available. In the event of chemical exposure, begin eye irrigation immediately and remove contact lens as soon as practicable. Lens should be removed at the first signs of eye redness or irritation - lens should be removed in a clean environment only after workers have washed hands thoroughly. [CDC NIOSH Current Intelligence Bulletin 59].

#### Skin protection

See Hand protection below

#### Hands/feet protection

##### NOTE:

- ▶ The material may produce skin sensitisation in predisposed individuals. Care must be taken, when removing gloves and other protective equipment, to avoid all possible skin contact.
- ▶ Contaminated leather items, such as shoes, belts and watch-bands should be removed and destroyed.

The selection of suitable gloves does not only depend on the material, but also on further marks of quality which vary from manufacturer to manufacturer. Where the chemical is a preparation of several substances, the resistance of the glove material can not be calculated in advance and has therefore to be checked prior to the application.

The exact break through time for substances has to be obtained from the manufacturer of the protective gloves and has to be observed when making a final choice.

Personal hygiene is a key element of effective hand care. Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed moisturiser is recommended.

Suitability and durability of glove type is dependent on usage. Important factors in the selection of gloves include:

- frequency and duration of contact,
- chemical resistance of glove material,
- glove thickness and
- dexterity

Select gloves tested to a relevant standard (e.g. Europe EN 374, US F739, AS/NZS 2161.1 or national equivalent).

- When prolonged or frequently repeated contact may occur, a glove with a protection class of 5 or higher (breakthrough time greater than 240 minutes according to EN 374, AS/NZS 2161.10.1 or national equivalent) is recommended.

## 4,4'-Dibromobiphenyl

- When only brief contact is expected, a glove with a protection class of 3 or higher (breakthrough time greater than 60 minutes according to EN 374, AS/NZS 2161.10.1 or national equivalent) is recommended.
- Some glove polymer types are less affected by movement and this should be taken into account when considering gloves for long-term use.

· Contaminated gloves should be replaced.

As defined in ASTM F-739-96 in any application, gloves are rated as:

- Excellent when breakthrough time > 480 min
- Good when breakthrough time > 20 min
- Fair when breakthrough time < 20 min
- Poor when glove material degrades

For general applications, gloves with a thickness typically greater than 0.35 mm, are recommended.

It should be emphasised that glove thickness is not necessarily a good predictor of glove resistance to a specific chemical, as the permeation efficiency of the glove will be dependent on the exact composition of the glove material. Therefore, glove selection should also be based on consideration of the task requirements and knowledge of breakthrough times.

Glove thickness may also vary depending on the glove manufacturer, the glove type and the glove model. Therefore, the manufacturers technical data should always be taken into account to ensure selection of the most appropriate glove for the task.

Note: Depending on the activity being conducted, gloves of varying thickness may be required for specific tasks. For example:

- Thinner gloves (down to 0.1 mm or less) may be required where a high degree of manual dexterity is needed. However, these gloves are only likely to give short duration protection and would normally be just for single use applications, then disposed of.
- Thicker gloves (up to 3 mm or more) may be required where there is a mechanical (as well as a chemical) risk i.e. where there is abrasion or puncture potential

Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed moisturiser is recommended.

Experience indicates that the following polymers are suitable as glove materials for protection against undissolved, dry solids, where abrasive particles are not present.

- polychloroprene.
- nitrile rubber.
- butyl rubber.
- fluorocautchouc.
- polyvinyl chloride.

Gloves should be examined for wear and/ or degradation constantly.

**Body protection** See Other protection below

**Other protection**

- Overalls.
- P.V.C apron.
- Barrier cream.
- Skin cleansing cream.
- Eye wash unit.

**Respiratory protection**

Type -P Filter of sufficient capacity. (AS/NZS 1716 & 1715, EN 143:2000 & 149:2001, ANSI Z88 or national equivalent)

| Required Minimum Protection Factor | Half-Face Respirator | Full-Face Respirator | Powered Air Respirator |
|------------------------------------|----------------------|----------------------|------------------------|
| up to 10 x ES                      | P1<br>Air-line*      | -<br>-               | PAPR-P1<br>-           |
| up to 50 x ES                      | Air-line**           | P2                   | PAPR-P2                |
| up to 100 x ES                     | -                    | P3<br>Air-line*      | -                      |
| 100+ x ES                          | -                    | Air-line**           | PAPR-P3                |

\* - Negative pressure demand \*\* - Continuous flow

A(All classes) = Organic vapours, B AUS or B1 = Acid gasses, B2 = Acid gas or hydrogen cyanide(HCN), B3 = Acid gas or hydrogen cyanide(HCN), E = Sulfur dioxide(SO<sub>2</sub>), G = Agricultural chemicals, K = Ammonia(NH<sub>3</sub>), Hg = Mercury, NO = Oxides of nitrogen, MB = Methyl bromide, AX = Low boiling point organic compounds(below 65 degC)

- Respirators may be necessary when engineering and administrative controls do not adequately prevent exposures.
- The decision to use respiratory protection should be based on professional judgment that takes into account toxicity information, exposure measurement data, and frequency and likelihood of the worker's exposure - ensure users are not subject to high thermal loads which may result in heat stress or distress due to personal protective equipment (powered, positive flow, full face apparatus may be an option).
- Published occupational exposure limits, where they exist, will assist in determining the adequacy of the selected respiratory protection. These may be government mandated or vendor recommended.
- Certified respirators will be useful for protecting workers from inhalation of particulates when properly selected and fit tested as part of a complete respiratory protection program.
- Where protection from nuisance levels of dusts are desired, use type N95 (US) or type P1 (EN143) dust masks. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU)
- Use approved positive flow mask if significant quantities of dust becomes airborne.
- Try to avoid creating dust conditions.

## 4,4'-Dibromobiphenyl

## SECTION 9 Physical and chemical properties

## Information on basic physical and chemical properties

|  |               |   |                |
|--|---------------|---|----------------|
| Appearance                                   | Not Available |   |                |
| Physical state                               | Solid         | Relative density (Water = 1)            | Not Available  |
| Odour  | Not Available | Partition coefficient n-octanol / water | Not Available  |
| Odour threshold                              | Not Available | Auto-ignition temperature (°C)          | Not Available  |
| pH (as supplied)                             | Not Available | Decomposition temperature (°C)          | Not Available  |
| Melting point / freezing point (°C)          | 167-168       | Viscosity (cSt)                         | Not Available  |
| Initial boiling point and boiling range (°C) | 355-360       | Molecular weight (g/mol)                | Not Available  |
| Flash point (°C)                             | Not Available | Taste                                   | Not Available  |
| Evaporation rate                             | Not Available | Explosive properties                    | Not Available  |
| Flammability                                 | Not Available | Oxidising properties                    | Not Available  |
| Upper Explosive Limit (%)                    | Not Available | Surface Tension (dyn/cm or mN/m)        | Not Applicable |
| Lower Explosive Limit (%)                    | Not Available | Volatile Component (%vol)               | Not Available  |
| Vapour pressure (kPa)                        | Not Available | Gas group                               | Not Available  |
| Solubility in water                          | Not Available | pH as a solution (1%)                   | Not Available  |
| Vapour density (Air = 1)                     | Not Available | VOC g/L                                 | Not Available  |

## SECTION 10 Stability and reactivity

|                                    |  |
|------------------------------------|--|
| Reactivity                         | See section 7  |
| Chemical stability                 | <ul style="list-style-type: none"> <li>▸ Unstable in the presence of incompatible materials.</li> <li>▸ Product is considered stable.</li> <li>▸ Hazardous polymerisation will not occur.</li> </ul> |
| Possibility of hazardous reactions | See section 7  |
| Conditions to avoid                | See section 7  |
| Incompatible materials             | See section 7  |
| Hazardous decomposition products   | See section 5  |

## SECTION 11 Toxicological information

## Information on toxicological effects

|           |   |
|-----------|---|
| Inhaled   | <p>The material is not thought to produce adverse health effects or irritation of the respiratory tract (as classified by EC Directives using animal models). Nevertheless, good hygiene practice requires that exposure be kept to a minimum and that suitable control measures be used in an occupational setting.</p> <p>Inhalation of vapours containing PCBs may cause respiratory irritation, eczema and skin burns.</p>  |
| Ingestion | <p>Digestion of PCBs and related substances can lead to nausea and vomiting, abdominal pain, loss of appetite, jaundice, liver damage, coma and death. Headache, dizziness, lethargy, depression, nervousness, loss of libido and muscle and joint pain may also occur.</p> <p>The material has <b>NOT</b> been classified by EC Directives or other classification systems as "harmful by ingestion". This is because of the lack of corroborating animal or human evidence.</p> |

## 4,4'-Dibromobiphenyl

|                     |   |
|---------------------|---|
| <b>Skin Contact</b> | <p>The material is not thought to produce adverse health effects or skin irritation following contact (as classified by EC Directives using animal models). Nevertheless, good hygiene practice requires that exposure be kept to a minimum and that suitable gloves be used in an occupational setting.</p> <p>Direct contact of the skin with liquid PCBs may result in irritation and defatting leading to dermatitis. PCBs may be absorbed by skin and as a result may be retained in body tissues.</p> <p>Exposure to the material may result in a skin inflammation called chloracne. This is characterised by white- and blackheads, keratin cysts, spots, excessive discolouration.</p> |
| <b>Eye</b>          | <p>Although the material is not thought to be an irritant (as classified by EC Directives), direct contact with the eye may cause transient discomfort characterised by tearing or conjunctival redness (as with windburn). Slight abrasive damage may also result. Vapours of PCBs may be irritating and may be absorbed by the eye.</p>   |
| <b>Chronic</b>      | <p>Skin contact with the material is more likely to cause a sensitisation reaction in some persons compared to the general population.</p>  |

**Legend:** 1. Value obtained from Europe ECHA Registered Substances - Acute toxicity 2. Value obtained from manufacturer's SDS. Unless otherwise specified data extracted from RTECS - Register of Toxic Effect of chemical Substances

|                             |   |
|-----------------------------|---|
| <b>4,4'-Dibromobiphenyl</b> | <p>The following information refers to contact allergens as a group and may not be specific to this product. Contact allergies quickly manifest themselves as contact eczema, more rarely as urticaria or Quincke's oedema. The pathogenesis of contact eczema involves a cell-mediated (T lymphocytes) immune reaction of the delayed type. Other allergic skin reactions, e.g. contact urticaria, involve antibody-mediated immune reactions. The significance of the contact allergen is not simply determined by its sensitisation potential: the distribution of the substance and the opportunities for contact with it are equally important. A weakly sensitising substance which is widely distributed can be a more important allergen than one with stronger sensitising potential with which few individuals come into contact. From a clinical point of view, substances are noteworthy if they produce an allergic test reaction in more than 1% of the persons tested.</p> |
|-----------------------------|---|

|  |   |                                 |   |
|--|---|---------------------------------|---|
| <b>Acute Toxicity</b>                    | ✓ | <b>Carcinogenicity</b>          | ✗ |
| <b>Skin Irritation/Corrosion</b>         | ✓ | <b>Reproductivity</b>           | ✗ |
| <b>Serious Eye Damage/Irritation</b>     | ✓ | <b>STOT - Single Exposure</b>   | ✓ |
| <b>Respiratory or Skin sensitisation</b> | ✓ | <b>STOT - Repeated Exposure</b> | ✗ |
| <b>Mutagenicity</b>                      | ✗ | <b>Aspiration Hazard</b>        | ✗ |

**Legend:** ✗ – Data either not available or does not fill the criteria for classification  
 ✓ – Data available to make classification

## SECTION 12 Ecological information

## Toxicity

|                |   |
|----------------|---|
| <b>Legend:</b> | <p>Extracted from 1. IUCLID Toxicity Data 2. Europe ECHA Registered Substances - Ecotoxicological Information - Aquatic Toxicity 4. US EPA, Ecotox database - Aquatic Toxicity Data 5. ECETOC Aquatic Hazard Assessment Data 6. NITE (Japan) - Bioconcentration Data 7. METI (Japan) - Bioconcentration Data 8. Vendor Data</p> |
|----------------|---|

## Persistence and degradability

| Ingredient           | Persistence: Water/Soil | Persistence: Air |
|----------------------|-------------------------|------------------|
| 4,4'-Dibromobiphenyl | HIGH                    | HIGH             |

## Bioaccumulative potential

| Ingredient           | Bioaccumulation    |
|----------------------|--------------------|
| 4,4'-Dibromobiphenyl | HIGH (BCF = 24000) |

## Mobility in soil

| Ingredient           | Mobility          |
|----------------------|-------------------|
| 4,4'-Dibromobiphenyl | LOW (KOC = 16400) |

## 4,4'-Dibromobiphenyl

## SECTION 13 Disposal considerations

## Waste treatment methods

|                                     |  |
|-------------------------------------|--|
| <b>Product / Packaging disposal</b> | <ul style="list-style-type: none"> <li>▸ Containers may still present a chemical hazard/ danger when empty.</li> <li>▸ Return to supplier for reuse/ recycling if possible.</li> </ul> <p>Otherwise:</p> <ul style="list-style-type: none"> <li>▸ If container can not be cleaned sufficiently well to ensure that residuals do not remain or if the container cannot be used to store the same product, then puncture containers, to prevent re-use, and bury at an authorised landfill.</li> <li>▸ Where possible retain label warnings and SDS and observe all notices pertaining to the product.</li> <li>▸ Recycle wherever possible.</li> <li>▸ Consult manufacturer for recycling options or consult local or regional waste management authority for disposal if no suitable treatment or disposal facility can be identified.</li> <li>▸ Dispose of by: burial in a land-fill specifically licensed to accept chemical and / or pharmaceutical wastes or Incineration in a licensed apparatus (after admixture with suitable combustible material)</li> <li>▸ Decontaminate empty containers. Observe all label safeguards until containers are cleaned and destroyed.</li> </ul> |
|-------------------------------------|--|

## SECTION 14 Transport information

## Labels Required

|                         |  |
|-------------------------|--|
|                         |   |
| <b>Marine Pollutant</b> |  |

## Land transport (ADR-RID)

|                                     |  |                |
|-------------------------------------|--|----------------|
| <b>UN number or ID number</b>       | 3152   |                |
| <b>UN proper shipping name</b>      | POLYHALOGENATED BIPHENYLS, SOLID or HALOGENATED MONOMETHYLDIPHENYLMETHANES, SOLID or POLYHALOGENATED TERPHENYLS, SOLID |                |
| <b>Transport hazard class(es)</b>   | Class  | 9              |
|                                     | Subsidiary risk  | Not Applicable |
| <b>Packing group</b>                | II   |                |
| <b>Environmental hazard</b>         | Environmentally hazardous  |                |
| <b>Special precautions for user</b> | Hazard identification (Kemler)   | 90             |
|                                     | Classification code  | M2             |
|                                     | Hazard Label   | 9              |
|                                     | Special provisions   | 203 305        |
|                                     | Limited quantity   | 1 kg           |
|                                     | Tunnel Restriction Code  | 0 (D/E)        |

## Air transport (ICAO-IATA / DGR)

|                                     |  |                |
|-------------------------------------|--|----------------|
| <b>UN number</b>                    | 3152   |                |
| <b>UN proper shipping name</b>      | Polyhalogenated biphenyls, solid; Halogenated monomethyldiphenylmethanes, solid; Polyhalogenated terphenyls, solid |                |
| <b>Transport hazard class(es)</b>   | ICAO/IATA Class  | 9              |
|                                     | ICAO / IATA Subrisk  | Not Applicable |
|                                     | ERG Code   | 9L             |
| <b>Packing group</b>                | II   |                |
| <b>Environmental hazard</b>         | Environmentally hazardous  |                |
| <b>Special precautions for user</b> | Special provisions   | A11 A95        |
|                                     | Cargo Only Packing Instructions  | 956            |

## 4,4'-Dibromobiphenyl

|   |           |
|---|-----------|
| Cargo Only Maximum Qty / Pack                             | 200 kg    |
| Passenger and Cargo Packing Instructions                  | 956       |
| Passenger and Cargo Maximum Qty / Pack                    | 100 kg    |
| Passenger and Cargo Limited Quantity Packing Instructions | Forbidden |
| Passenger and Cargo Limited Maximum Qty / Pack            | Forbidden |

## Sea transport (IMDG-Code / GGVSee)

|                              |  |                |
|------------------------------|--|----------------|
| UN number                    | 3152   |                |
| UN proper shipping name      | POLYHALOGENATED BIPHENYLS, SOLID or HALOGENATED MONOMETHYLDIPHENYLMETHANES, SOLID or POLYHALOGENATED TERPHENYLS, SOLID |                |
| Transport hazard class(es)   | IMDG Class   | 9              |
|                              | IMDG Subrisk   | Not Applicable |
| Packing group                | II   |                |
| Environmental hazard         | Marine Pollutant   |                |
| Special precautions for user | EMS Number   | F-A, S-A       |
|                              | Special provisions   | 203 305 958    |
|                              | Limited Quantities   | 1 kg           |

## Inland waterways transport (ADN)

|                              |  |                |
|------------------------------|--|----------------|
| UN number                    | 3152   |                |
| UN proper shipping name      | POLYHALOGENATED BIPHENYLS, SOLID or HALOGENATED MONOMETHYLDIPHENYLMETHANES, SOLID or POLYHALOGENATED TERPHENYLS, SOLID |                |
| Transport hazard class(es)   | 9  | Not Applicable |
| Packing group                | II   |                |
| Environmental hazard         | Environmentally hazardous  |                |
| Special precautions for user | Classification code  | M2             |
|                              | Special provisions   | 203; 305; 802  |
|                              | Limited quantity   | 1 kg           |
|                              | Equipment required   | PP, EP         |
|                              | Fire cones number  | 0              |

## Transport in bulk according to Annex II of MARPOL and the IBC code

Not Applicable

## Transport in bulk in accordance with MARPOL Annex V and the IMSBC Code

| Product name         | Group         |
|----------------------|---------------|
| 4,4'-Dibromobiphenyl | Not Available |

## Transport in bulk in accordance with the IGC Code

| Product name         | Ship Type     |
|----------------------|---------------|
| 4,4'-Dibromobiphenyl | Not Available |

## SECTION 15 Regulatory information

## Safety, health and environmental regulations / legislation specific for the substance or mixture

4,4'-Dibromobiphenyl is found on the following regulatory lists

## 4,4'-Dibromobiphenyl

Chemical Footprint Project - Chemicals of High Concern List

EU REACH Regulation (EC) No 1907/2006 - Annex XVII - Restrictions on the manufacture, placing on the market and use of certain dangerous substances, mixtures and articles

Europe EC Inventory

European Union - European Inventory of Existing Commercial Chemical Substances (EINECS)

International WHO List of Proposed Occupational Exposure Limit (OEL) Values for Manufactured Nanomaterials (MNMS)

United Nations List of Prior Informed Consent Chemicals

## National Inventory Status

| National Inventory                              | Status  |
|---|---|
| Australia - AIIC / Australia Non-Industrial Use | No (4,4'-Dibromobiphenyl)   |
| Canada - DSL                                    | No (4,4'-Dibromobiphenyl)   |
| Canada - NDSL                                   | No (4,4'-Dibromobiphenyl)   |
| China - IECSC                                   | Yes   |
| Europe - EINEC / ELINCS / NLP                   | Yes   |
| Japan - ENCS                                    | Yes   |
| Korea - KECI                                    | Yes   |
| New Zealand - NZIoC                             | No (4,4'-Dibromobiphenyl)   |
| Philippines - PICCS                             | No (4,4'-Dibromobiphenyl)   |
| USA - TSCA                                      | Yes   |
| Taiwan - TCSI                                   | Yes   |
| Mexico - INSQ                                   | No (4,4'-Dibromobiphenyl)   |
| Vietnam - NCI                                   | Yes   |
| Russia - FBEPH                                  | Yes   |
| <b>Legend:</b>                                  | Yes = All CAS declared ingredients are on the inventory<br>No = One or more of the CAS listed ingredients are not on the inventory. These ingredients may be exempt or will require registration. |

## SECTION 16 Other information

|               |            |
|---------------|------------|
| Revision Date | 03/07/2023 |
| Initial Date  | 04/07/2023 |

## SDS Version Summary

| Version | Date of Update | Sections Updated   |
|---------|----------------|--|
| 4.5     | 03/07/2023     | Hazards identification - Classification, Korean MSDS Number, Identification of the substance / mixture and of the company / undertaking - Supplier Information |

## Other information

Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.

The SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios. Scale of use, frequency of use and current or available engineering controls must be considered.

For detailed advice on Personal Protective Equipment, refer to the following EU CEN Standards:

EN 166 Personal eye-protection

EN 340 Protective clothing

EN 374 Protective gloves against chemicals and micro-organisms

EN 13832 Footwear protecting against chemicals

EN 133 Respiratory protective devices

## Definitions and abbreviations

PC - TWA: Permissible Concentration-Time Weighted Average

PC - STEL: Permissible Concentration-Short Term Exposure Limit

IARC: International Agency for Research on Cancer

ACGIH: American Conference of Governmental Industrial Hygienists

STEL: Short Term Exposure Limit

TEEL: Temporary Emergency Exposure Limit,

IDLH: Immediately Dangerous to Life or Health Concentrations

**4,4'-Dibromobiphenyl**

ES: Exposure Standard  
 OSF: Odour Safety Factor  
 NOAEL :No Observed Adverse Effect Level  
 LOAEL: Lowest Observed Adverse Effect Level  
 TLV: Threshold Limit Value  
 LOD: Limit Of Detection  
 OTV: Odour Threshold Value  
 BCF: BioConcentration Factors  
 BEI: Biological Exposure Index  
 AIIC: Australian Inventory of Industrial Chemicals  
 DSL: Domestic Substances List  
 NDSL: Non-Domestic Substances List  
 IECSC: Inventory of Existing Chemical Substance in China  
 EINECS: European INventory of Existing Commercial chemical Substances  
 ELINCS: European List of Notified Chemical Substances  
 NLP: No-Longer Polymers  
 ENCS: Existing and New Chemical Substances Inventory  
 KECI: Korea Existing Chemicals Inventory  
 NZIoC: New Zealand Inventory of Chemicals  
 PICCS: Philippine Inventory of Chemicals and Chemical Substances  
 TSCA: Toxic Substances Control Act  
 TCSI: Taiwan Chemical Substance Inventory  
 INSQ: Inventario Nacional de Sustancias Químicas  
 NCI: National Chemical Inventory  
 FBEPH: Russian Register of Potentially Hazardous Chemical and Biological Substances

**Classification and procedure used to derive the classification for mixtures according to Regulation (EC) 1272/2008 [CLP]**

| <b>Classification according to regulation (EC) No 1272/2008 [CLP] and amendments</b>              | <b>Classification Procedure</b> |
|---|---------------------------------|
| Serious Eye Damage/Eye Irritation Category 1, H318  | Expert judgement                |
| Specific Target Organ Toxicity - Single Exposure (Respiratory Tract Irritation) Category 3 , H335 | Expert judgement                |
| Acute Toxicity (Oral) Category 4, H302  | Expert judgement                |
| Skin Corrosion/Irritation Category 2, H315  | Expert judgement                |
| Sensitisation (Skin) Category 1, H317   | Calculation method              |
| Hazardous to the Aquatic Environment Long-Term Hazard Category 1, H410                            | Expert judgement                |