

PHENOL REAGENT

GHS Safety Data Sheet

Version No:5

Page 1 of 21

Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME

PHENOL REAGENT

OTHER NAMES

PROPER SHIPPING NAME

CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S.
 (contains hydrochloric and phosphoric acids)

PRODUCT USE

General laboratory reagent.

SUPPLIER

Company: S D FINE- CHEM LIMITED

Address:

315- 317, T.V. INDUSTRIAL ESTATE,

248, WORLI,

MUMBAI- 400030.INDIA.

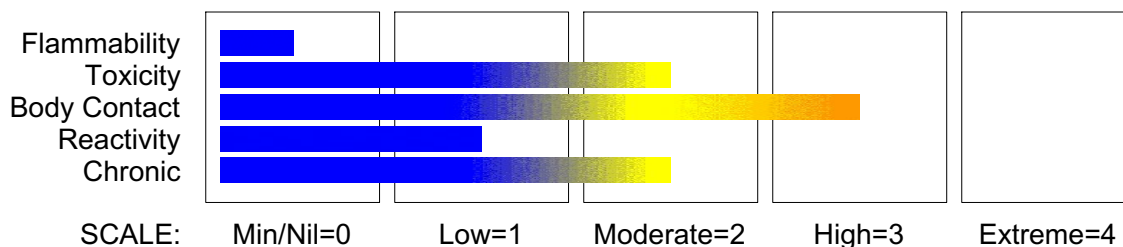
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Telephone: 91- 22- 24959898

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HAZARD RATINGS



Section 2 - HAZARDS IDENTIFICATION

GHS Classification

Acute Toxicity (Inhalation) Category 4

Acute Toxicity (Oral) Category 5

Chronic Aquatic Hazard Category 3

Eye Irritation Category 2A

Metal Corrosion Category 1

Organ Damage Category 2

continued...

PHENOL REAGENT

GHS Safety Data Sheet

Version No:5

Page 2 of 21

Section 2 - HAZARDS IDENTIFICATION

Reproductive Toxicity Category 2
Respiratory Irritation Category 3
Skin Corrosion/Irritation Category 2



EMERGENCY OVERVIEW

HAZARD

WARNING

Determined by using GHS criteria:

H335 H332 H303 H315 H319 H361 H373 H290 H412

May cause respiratory irritation

Harmful if inhaled

May be harmful if swallowed

Causes skin irritation

Causes serious eye irritation

Suspected of damaging the unborn child

May cause damage to organs through prolonged or repeated exposure.

May be corrosive to metals

Harmful to aquatic life with long lasting effects

PRECAUTIONARY STATEMENTS

Prevention

Wash hands thoroughly after handling.

Use only outdoors or in a well ventilated area.

Wash thoroughly after handling.

Avoid breathing dust/fume/gas/mist/vapours/spray.

Do not breathe dust/fume/gas/mist/vapours/spray.

Use personal protective equipment as required.

Obtain special instructions before use.

Do not handle until all safety precautions have been read and understood.

Response

IF INHALED: Remove to fresh air and keep at rest in a position comfortable for breathing.

If eye irritation persists, get medical advice/attention.

If exposed or concerned: Get medical attention advice.

Wear eye/face protection.

IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

If skin irritation occurs, seek medical advice/attention.

Specific treatment: refer to Label or MSDS.

Get medical advice/attention if you feel unwell.

Absorb spillage to prevent material damage.

IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell.

Remove/Take off immediately all contaminated clothing

Wash/Decontaminate removed clothing before reuse.

IF ON SKIN: Gently wash with plenty of soap and water.

Call a POISON CENTER or doctor/physician if you feel unwell.

continued...

PHENOL REAGENT

GHS Safety Data Sheet

Version No:5

Page 3 of 21

Section 2 - HAZARDS IDENTIFICATION

Storage

- Store locked up.
- Store in a corrosive resistant container with a resistant inliner.

Disposal

- Dispose of contents and container in accordance with relevant legislation.

Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

NAME	CAS RN	%
lithium sulfate	10377-48-7	9-12
sodium tungstate	13472-45-2	5-10
phosphoric acid	7664-38-2	5-8
hydrochloric acid	7647-01-0	2-3
sodium molybdate	7631-95-0	1-2
bromine	7726-95-6	<0.01
hydrogen peroxide	7722-84-1	<0.01
water	7732-18-5	>60
reaction products include:		
phosphomolybdic acid	11104-88-4	
phosphotungstic acid	12067-99-1	

Section 4 - FIRST AID MEASURES

SWALLOWED

- For advice, contact a Poisons Information Centre or a doctor at once.
- Urgent hospital treatment is likely to be needed.
- If swallowed do NOT induce vomiting.
- If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration.
- Observe the patient carefully.
- Never give liquid to a person showing signs of being sleepy or with reduced awareness; i.e. becoming unconscious.
- Give water to rinse out mouth, then provide liquid slowly and as much as casualty can comfortably drink.
- Transport to hospital or doctor without delay.

EYE

- If this product comes in contact with the eyes:
- Immediately hold eyelids apart and flush the eye continuously with running water.
 - Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids.
 - Continue flushing until advised to stop by the Poisons Information Centre or a doctor, or for at least 15 minutes.
 - Transport to hospital or doctor without delay.
 - Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.

SKIN

- If skin or hair contact occurs:
- Immediately flush body and clothes with large amounts of water, using safety shower if available.
 - Quickly remove all contaminated clothing, including footwear.
 - Wash skin and hair with running water. Continue flushing with water until advised to stop by the Poisons Information Centre.

continued...

PHENOL REAGENT

GHS Safety Data Sheet

Version No:5

Page 4 of 21

Section 4 - FIRST AID MEASURES

- Transport to hospital, or doctor.

INHALED

- If fumes or combustion products are inhaled remove from contaminated area.
- Lay patient down. Keep warm and rested.
- Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures.
- Apply artificial respiration if not breathing, preferably with a demand valve resuscitator, bag-valve mask device, or pocket mask as trained. Perform CPR if necessary.
- Transport to hospital, or doctor, without delay.

NOTES TO PHYSICIAN

Treat symptomatically.

For acute or short term repeated exposures to strong acids:

- Airway problems may arise from laryngeal edema and inhalation exposure. Treat with 100% oxygen initially.
- Respiratory distress may require cricothyroidotomy if endotracheal intubation is contraindicated by excessive swelling
- Intravenous lines should be established immediately in all cases where there is evidence of circulatory compromise.
- Strong acids produce a coagulation necrosis characterised by formation of a coagulum (eschar) as a result of the dessicating action of the acid on proteins in specific tissues.

INGESTION:

- Immediate dilution (milk or water) within 30 minutes post ingestion is recommended.
- DO NOT attempt to neutralise the acid since exothermic reaction may extend the corrosive injury.
- Be careful to avoid further vomit since re-exposure of the mucosa to the acid is harmful. Limit fluids to one or two glasses in an adult.
- Charcoal has no place in acid management.
- Some authors suggest the use of lavage within 1 hour of ingestion.

SKIN:

- Skin lesions require copious saline irrigation. Treat chemical burns as thermal burns with non-adherent gauze and wrapping.
- Deep second-degree burns may benefit from topical silver sulfadiazine.

EYE:

- Eye injuries require retraction of the eyelids to ensure thorough irrigation of the conjunctival cul-de-sacs. Irrigation should last at least 20-30 minutes. DO NOT use neutralising agents or any other additives. Several litres of saline are required.
- Cycloplegic drops, (1% cyclopentolate for short-term use or 5% homatropine for longer term use) antibiotic drops, vasoconstrictive agents or artificial tears may be indicated dependent on the severity of the injury.
- Steroid eye drops should only be administered with the approval of a consulting ophthalmologist).

[Ellenhorn and Barceloux: Medical Toxicology].

Section 5 - FIRE FIGHTING MEASURES

EXTINGUISHING MEDIA

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

continued...

PHENOL REAGENT

GHS Safety Data Sheet

Version No:5

Page 5 of 21

Section 5 - FIRE FIGHTING MEASURES

FIRE FIGHTING

- Alert Fire Brigade and tell them location and nature of hazard.
- Wear full body protective clothing with breathing apparatus.
- Prevent, by any means available, spillage from entering drains or water course.
- Use fire fighting procedures suitable for surrounding area.
- Do not approach containers suspected to be hot.
- Cool fire exposed containers with water spray from a protected location.
- If safe to do so, remove containers from path of fire.
- Equipment should be thoroughly decontaminated after use.

FIRE/EXPLOSION HAZARD

- Non combustible.
 - Not considered to be a significant fire risk.
 - Acids may react with metals to produce hydrogen, a highly flammable and explosive gas.
 - Heating may cause expansion or decomposition leading to violent rupture of containers.
 - May emit corrosive, poisonous fumes. May emit acrid smoke.
- Decomposition may produce toxic fumes of: hydrogen bromide, phosphorus oxides (POx), sulfur oxides (SOx), metal oxides, hydrogen chloride.

FIRE INCOMPATIBILITY

None known.

Personal Protective Equipment

Gas tight chemical resistant suit.

Section 6 - ACCIDENTAL RELEASE MEASURES

EMERGENCY PROCEDURES

MINOR SPILLS

- Clean up all spills immediately.
- Avoid breathing vapours and contact with skin and eyes.
- Control personal contact by using protective equipment.
- Contain and absorb spill with sand, earth, inert material or vermiculite.
- Wipe up.
- Place in a suitable labelled container for waste disposal.

MAJOR SPILLS

- Clear area of personnel and move upwind.
- Alert Fire Brigade and tell them location and nature of hazard.
- Wear full body protective clothing with breathing apparatus.
- Prevent, by any means available, spillage from entering drains or water course.
- Consider evacuation (or protect in place).
- Stop leak if safe to do so.
- Contain spill with sand, earth or vermiculite.
- Collect recoverable product into labelled containers for recycling.
- Neutralise/decontaminate residue.
- Collect solid residues and seal in labelled drums for disposal.
- Wash area and prevent runoff into drains.
- After clean up operations, decontaminate and launder all protective clothing and equipment before storing and re-using.
- If contamination of drains or waterways occurs, advise emergency services.

EMERGENCY RESPONSE PLANNING GUIDELINES (ERPG)

The maximum airborne concentration below which it is believed that nearly all individuals could be exposed for up to one hour WITHOUT experiencing or developing

continued...

PHENOL REAGENT

GHS Safety Data Sheet

Version No:5

Page 6 of 21

Section 6 - ACCIDENTAL RELEASE MEASURES

life-threatening health effects is:

lithium sulfate	500 mg/m ³
sodium tungstate	75 mg/m ³
phosphoric acid	500 mg/m ³
hydrochloric acid	150 ppm
water	500 mg/m ³

irreversible or other serious effects or symptoms which could impair an individual's ability to take protective action is:

lithium sulfate	3.5 mg/m ³
sodium tungstate	7.5 mg/m ³
phosphoric acid	5 mg/m ³
hydrochloric acid	20 ppm
water	500 mg/m ³

other than mild, transient adverse effects without perceiving a clearly defined odour is:

lithium sulfate	0.5 mg/m ³
sodium tungstate	5 mg/m ³
phosphoric acid	3 mg/m ³
hydrochloric acid	3 ppm
water	500 mg/m ³

The threshold concentration below which most people will experience no appreciable risk of health effects:

lithium sulfate	0.15 mg/m ³
sodium tungstate	1.5 mg/m ³
phosphoric acid	1 mg/m ³
hydrochloric acid	0.5 ppm
water	500 mg/m ³

American Industrial Hygiene Association (AIHA)

Ingredients considered according to the following cutoffs

Very Toxic (T+)	>= 0.1%	Toxic (T)	>= 3.0%
R50	>= 0.25%	Corrosive (C)	>= 5.0%
R51	>= 2.5%		
else	>= 10%		

where percentage is percentage of ingredient found in the mixture

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

Section 7 - HANDLING AND STORAGE

PROCEDURE FOR HANDLING

- Avoid all personal contact, including inhalation.
- Wear protective clothing when risk of exposure occurs.
- Use in a well-ventilated area.
- Avoid contact with moisture.
- Avoid contact with incompatible materials.
- When handling, DO NOT eat, drink or smoke.
- Keep containers securely sealed when not in use.
- Avoid physical damage to containers.
- Always wash hands with soap and water after handling.
- Work clothes should be laundered separately. Launder contaminated clothing before re-use.
- Use good occupational work practice.
- Observe manufacturer's storing and handling recommendations.

continued...

PHENOL REAGENT

GHS Safety Data Sheet

Version No:5

Page 7 of 21

Section 7 - HANDLING AND STORAGE

- Atmosphere should be regularly checked against established exposure standards to ensure safe working conditions are maintained.
- DO NOT allow clothing wet with material to stay in contact with skin.

SUITABLE CONTAINER

- DO NOT use aluminium or galvanised containers.
- Check regularly for spills and leaks.

STORAGE INCOMPATIBILITY

- Segregate from alkalis, oxidising agents and chemicals readily decomposed by acids, i.e. cyanides, sulfides, carbonates.
- Reacts with mild steel, galvanised steel / zinc producing hydrogen gas which may form an explosive mixture with air.
- Avoid strong bases.

STORAGE REQUIREMENTS

- Store in original containers.
 - Keep containers securely sealed.
 - Store in a cool, dry, well-ventilated area.
 - Store away from incompatible materials and foodstuff containers.
 - Protect containers against physical damage and check regularly for leaks.
 - Observe manufacturer's storing and handling recommendations.
- Store below 15 deg.C (Refrigerate, do NOT freeze).

SAFE STORAGE WITH OTHER CLASSIFIED CHEMICALS



- +: May be stored together
O: May be stored together with specific preventions
X: Must not be stored together

Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE CONTROLS

The following materials had no OELs on our records

- | | | |
|-------------------------|------------------|-----------------------------------|
| • lithium sulfate: | CAS:10377- 48- 7 | CAS:10102- 25- 7 |
| • sodium tungstate: | CAS:13472- 45- 2 | CAS:10213- 10- 2 CAS:53125- 86- 3 |
| • phosphoric acid: | CAS:7664- 38- 2 | |
| • hydrochloric acid: | CAS:7647- 01- 0 | CAS:7698- 05- 7 |
| • sodium molybdate: | CAS:7631- 95- 0 | CAS:10102- 40- 6 |
| • bromine: | CAS:7726- 95- 6 | |
| • hydrogen peroxide: | CAS:7722- 84- 1 | |
| • water: | CAS:7732- 18- 5 | |
| • phosphomolybdic acid: | CAS:11104- 88- 4 | CAS:51429- 74- 4 CAS:12026- 57- 2 |
| • phosphotungstic acid: | CAS:12067- 99- 1 | CAS:12501- 23- 4 |

EMERGENCY EXPOSURE LIMITS

Material	Revised IDLH Value (mg/m3)	Revised IDLH Value (ppm)
phosphoric acid	1, 000	

continued...

PHENOL REAGENT

GHS Safety Data Sheet

Version No:5

Page 8 of 21

Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

hydrochloric acid		50
sodium molybdate	1, 000	
bromine		3
hydrogen peroxide		75 [Unch]
phosphomolybdic acid	1, 000	

MATERIAL DATA

Not available. Refer to individual constituents.

INGREDIENT DATA

PHOSPHOTUNGSTIC ACID:

SODIUM TUNGSTATE:

Soluble tungsten products are those for which water solubility is listed as greater than 0.01 gm/100 cc water. The recommended TLV-TWA and STEL reflects the systemic toxicity of soluble compounds of tungsten. OSHA concluded that these limits would protect workers against anorexia, gastrointestinal distress, incoordination, trembling and dyspnoea.

BROMINE:

LITHIUM SULFATE:

Sensory irritants are chemicals that produce temporary and undesirable side-effects on the eyes, nose or throat. Historically occupational exposure standards for these irritants have been based on observation of workers' responses to various airborne concentrations. Present day expectations require that nearly every individual should be protected against even minor sensory irritation and exposure standards are established using uncertainty factors or safety factors of 5 to 10 or more. On occasion animal no-observable-effect-levels (NOEL) are used to determine these limits where human results are unavailable. An additional approach, typically used by the TLV committee (USA) in determining respiratory standards for this group of chemicals, has been to assign ceiling values (TLV C) to rapidly acting irritants and to assign short-term exposure limits (TLV STELs) when the weight of evidence from irritation, bioaccumulation and other endpoints combine to warrant such a limit. In contrast the MAK Commission (Germany) uses a five-category system based on intensive odour, local irritation, and elimination half-life. However this system is being replaced to be consistent with the European Union (EU) Scientific Committee for Occupational Exposure Limits (SCOEL); this is more closely allied to that of the USA.

OSHA (USA) concluded that exposure to sensory irritants can:

- cause inflammation
- cause increased susceptibility to other irritants and infectious agents
- lead to permanent injury or dysfunction
- permit greater absorption of hazardous substances and
- acclimate the worker to the irritant warning properties of these substances thus

increasing the risk of overexposure.

PHOSPHOMOLYBDIC ACID:

SODIUM MOLYBDATE:

An increased incidence of non-specific symptoms including headache, weakness, fatigue, anorexia and joint and muscle weakness has been reported to occur in mining and metallurgy workers exposed to 60-600 mg (as Mo). Some investigators have attributed gout and elevated uric acid concentration found in some Armenians to result from exposures to Armenian soils rich in molybdenum, whilst exposure has been implicated as a cause of bone disease amongst Indians. "These involvements are speculative". [US National Research Council]. As far as it is known, the recommended TLV-TWA incorporates a large margin of safety against potential pulmonary or systemic effects.

LITHIUM SULFATE:

It is the goal of the ACGIH (and other Agencies) to recommend TLVs (or their equivalent) for all substances for which there is evidence of health effects at airborne

continued...

PHENOL REAGENT

GHS Safety Data Sheet

Version No:5

Page 9 of 21

Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

concentrations encountered in the workplace.

At this time no TLV has been established, even though this material may produce adverse health effects (as evidenced in animal experiments or clinical experience). Airborne concentrations must be maintained as low as is practically possible and occupational exposure must be kept to a minimum.

NOTE: The ACGIH occupational exposure standard for Particles Not Otherwise Specified (P.N.O.S) does NOT apply.

PHOSPHORIC ACID:

The saturated vapour concentration of phosphoric acid exceeds the TLV.

The TLV-TWA is based by analogy from comparable experience and data for sulfuric acid. Exposure at or below this limit is thought to prevent throat irritation amongst unacclimatised workers.

Fumes of phosphorus pentoxide at concentrations between 0.8 and 5.4 mg/m³ were reported to be noticeable but not uncomfortable whilst concentrations between 3.6 and 11.3 mg/m³ produced coughing in unacclimatised workers but were tolerable. Concentrations of 100 mg/m³ were unbearable except in inured workers.

HYDROCHLORIC ACID:

Odour Threshold Value: 0.262 ppm (detection), 10.06 ppm (recognition)

NOTE: Detector tubes for hydrochloric acid, measuring in excess of 1 ppm, are available commercially.

Hydrogen chloride is a strong irritant to the eyes, mucous membranes and skin. Chronic exposure produces a corrosive action on the teeth. Reports of respiratory irritation following short-term exposure at 5 ppm have lead to the recommended TLV-C. There is no indication that skin contact with hydrogen chloride elicits systemic poisoning and a skin designation has not been applied.

Exposure of humans to hydrogen chloride at 50 to 100 ppm for 1 hour is reported to be barely tolerable; 35 ppm caused irritation of the throat on short exposure and 10 ppm was the maximal concentration for prolonged exposure. It has been stated that hydrogen chloride at concentrations of 5 ppm is immediately irritating.

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Toxic effects of hydrochloric acid

Concentration	Clinical effects
0.067 - 0.267 ppm	Reported range of odour thresholds and
changes in respiratory pattern	
5 ppm	No organic damage
10 ppm	Irritation; work undisturbed
10-50 ppm	Work difficult but possible
35 ppm	Short exposure irritation of the throat
50-100 ppm	Exposure for 1 h barely tolerable
1000-2000 ppm	Brief exposure dangerous; laryngospasm
1300-2000 ppm	Lethal after a few minutes

BROMINE:

Odour Threshold Value: 0.046 ppm (recognition)

Toxic effects of bromine are concentration dependent, viz:

0.2-0.5 ppm: Eye irritation and lachrymation

10.0 ppm: Intolerable, severe irritation of the upper respiratory tract.

40-60 ppm: Brief exposure dangerous to life.

1000 ppm: Choking, glottal and pulmonary oedema, rapid death.

Physiological response to various levels suggests the following:

continued...

PHENOL REAGENT

GHS Safety Data Sheet

Version No:5

Page 10 of 21

Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

0.1-0.15 ppm: maximal concentration allowable for prolonged exposure.

4.0 ppm: maximal concentration allowable for short exposure (0.5-1hr)

40-60 ppm: dangerous for short exposures

1000 ppm: rapidly fatal for short exposure

Exposure at the TLV-TWA and STEL is thought to prevent injury of the respiratory passages and injury to the lung.

HYDROGEN PEROXIDE:

NOTE: Detector tubes for hydrogen peroxide, measuring in excess of 0.1 ppm, are available commercially.

Exposure at or below the TLV-TWA is thought to minimise irritation and bleaching of hair.

WATER:

No exposure limits set by NOHSC or ACGIH.

PERSONAL PROTECTION



EYE

- Chemical goggles.
- Full face shield may be required for supplementary but never for primary protection of eyes
- Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants. A written policy document, describing the wearing of lens 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].

HANDS/FEET

Wear chemical protective gloves, eg. PVC.

Wear safety footwear or safety gumboots, eg. Rubber.

When handling corrosive liquids, wear trousers or overalls outside of boots, to avoid spills entering boots.

OTHER

- Overalls.
- PVC Apron.
- PVC protective suit may be required if exposure severe.
- Eyewash unit.
- Ensure there is ready access to a safety shower.

RESPIRATOR

Selection of the Class and Type of respirator will depend upon the level of breathing zone contaminant and the chemical nature of the contaminant. Protection Factors (defined as the ratio of contaminant outside and inside the mask) may also be important.

continued...

PHENOL REAGENT

GHS Safety Data Sheet

Version No:5

Page 11 of 21

Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

Breathing Zone Level ppm (volume)	Maximum Protection Factor	Half- face Respirator	Full- Face Respirator
1000	10	B- AUS P	-
1000	50	-	B- AUS P
5000	50	Airline *	-
5000	100	-	B- 2 P
10000	100	-	B- 3 P
	100+		Airline**

* - Continuous Flow

** - Continuous-flow or positive pressure demand.

The local concentration of material, quantity and conditions of use determine the type of personal protective equipment required.

For further information consult your Occupational Health and Safety Advisor.

ENGINEERING CONTROLS

Local exhaust ventilation usually required. If risk of overexposure exists, wear approved respirator. Correct fit is essential to obtain adequate protection. Supplied-air type respirator may be required in special circumstances. Correct fit is essential to ensure adequate protection.

An approved self contained breathing apparatus (SCBA) may be required in some situations. Provide adequate ventilation in warehouse or closed storage area. Air contaminants generated in the workplace possess varying "escape" velocities which, in turn, determine the "capture velocities" of fresh circulating air required to effectively remove the contaminant.

Type of Contaminant:

solvent, vapours, degreasing etc., evaporating from tank (in still air).

aerosols, fumes from pouring operations, intermittent container filling, low speed conveyer transfers, welding, spray drift, plating acid fumes, pickling (released at low velocity into zone of active generation) direct spray, spray painting in shallow booths, drum filling, conveyer loading, crusher dusts, gas discharge (active generation into zone of rapid air motion)

grinding, abrasive blasting, tumbling, high speed wheel generated dusts (released at high initial velocity into zone of very high rapid air motion).

Air Speed:

0.25- 0.5 m/s (50- 100 f/min.)

0.5- 1 m/s (100- 200 f/min.)

1- 2.5 m/s (200- 500 f/min.)

2.5- 10 m/s (500- 2000 f/min.)

Within each range the appropriate value depends on:

Lower end of the range

1: Room air currents minimal or favourable to capture

2: Contaminants of low toxicity or of nuisance value only.

3: Intermittent, low production.

4: Large hood or large air mass in motion

Upper end of the range

1: Disturbing room air currents

2: Contaminants of high toxicity

3: High production, heavy use

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

continued...

PHENOL REAGENT

GHS Safety Data Sheet

Version No:5

Page 12 of 21

Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

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 1-2 m/s (200-400 f/min) for extraction of solvents generated in a tank 2 meters 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.

Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE

Yellow highly acidic liquid with a slight pungent odour; mixes with water.
Discolours if contaminated with dust or organic matter.

PHYSICAL PROPERTIES

Liquid.
Mixes with water.
Corrosive.
Acid.

Molecular Weight: Not Applicable
Melting Range (°C): Not Available
Solubility in water (g/L): Miscible
pH (1% solution): Not Available
Volatile Component (%vol): Not Available
Relative Vapour Density (air=1): Not Available
Lower Explosive Limit (%): Not Applicable
Autoignition Temp (°C): Not Applicable
State: Liquid

Boiling Range (°C): Not Available
Specific Gravity (water=1): 1.24
pH (as supplied): <0.5
Vapour Pressure (kPa): Not Available
Evaporation Rate: Not Available
Flash Point (°C): Not Applicable
Upper Explosive Limit (%): Not Applicable
Decomposition Temp (°C): Not Available
Viscosity: Not Available

log Kow: -1.36

Section 10 - CHEMICAL STABILITY AND REACTIVITY INFORMATION

CONDITIONS CONTRIBUTING TO INSTABILITY

Contact with alkaline material liberates heat.

Section 11 - TOXICOLOGICAL INFORMATION

POTENTIAL HEALTH EFFECTS

ACUTE HEALTH EFFECTS

SWALLOWED

The material can produce chemical burns within the oral cavity and gastrointestinal tract following ingestion.

The material is not thought to produce adverse health effects following ingestion (as classified by EC Directives using animal models). Nevertheless, adverse systemic effects have been produced following exposure of animals by at least one other route and good hygiene practice requires that exposure be kept to a minimum.

EYE

Evidence exists, or practical experience predicts, that the material may cause eye irritation in a substantial number of individuals and/or may produce significant ocular

continued...

PHENOL REAGENT

GHS Safety Data Sheet

Version No:5

Page 13 of 21

Section 11 - TOXICOLOGICAL INFORMATION

lesions which are present twenty-four hours or more after instillation into the eye(s) of experimental animals.

Repeated or prolonged eye contact may cause inflammation characterised by temporary redness (similar to windburn) of the conjunctiva (conjunctivitis); temporary impairment of vision and/or other transient eye damage/ulceration may occur.

The material can produce chemical burns to the eye following direct contact. Vapours or mists may be extremely irritating.

The material may be irritating to the eye, with prolonged contact causing inflammation.

Repeated or prolonged exposure to irritants may produce conjunctivitis.

SKIN

Evidence exists, or practical experience predicts, that the material either produces inflammation of the skin in a substantial number of individuals following direct contact, and/or produces significant inflammation when applied to the healthy intact skin of animals, for up to four hours, such inflammation being present twenty-four hours or more after the end of the exposure period. Skin irritation may also be present after prolonged or repeated exposure; this may result in a form of contact dermatitis (nonallergic). The dermatitis is often characterised by skin redness (erythema) and swelling (oedema) which may progress to blistering (vesiculation), scaling and thickening of the epidermis. At the microscopic level there may be intercellular oedema of the spongy layer of the skin (spongiosis) and intracellular oedema of the epidermis.

The material can produce chemical burns following direct contact with the skin.

Skin contact is not thought to produce harmful health effects (as classified under EC Directives using animal models). Systemic harm, however, has been identified following exposure of animals by at least one other route and the material may still produce health damage following entry through wounds, lesions or abrasions. Good hygiene practice requires that exposure be kept to a minimum and that suitable gloves be used in an occupational setting.

Entry into the blood-stream, through, for example, cuts, abrasions or lesions, may produce systemic injury with harmful effects. Examine the skin prior to the use of the material and ensure that any external damage is suitably protected.

The material may cause skin irritation after prolonged or repeated exposure and may produce a contact dermatitis (nonallergic). This form of dermatitis is often characterised by skin redness (erythema) and swelling epidermis. Histologically there may be intercellular oedema of the spongy layer (spongiosis) and intracellular oedema of the epidermis.

INHALED

Not normally a hazard due to non-volatile nature of product.

Limited evidence exists that exposure to the material may produce irreversible damage (other than carcinogenesis, mutagenesis and teratogenesis) following a single exposure by inhalation.

Evidence shows, or practical experience predicts, that the material produces irritation of the respiratory system, in a substantial number of individuals, following inhalation.

In contrast to most organs, the lung is able to respond to a chemical insult by first removing or neutralising the irritant and then repairing the damage. The repair process, which initially evolved to protect mammalian lungs from foreign matter and antigens, may however, produce further lung damage resulting in the impairment of gas exchange, the primary function of the lungs. Respiratory tract irritation often results in an inflammatory response involving the recruitment and activation of many cell types, mainly derived from the vascular system.

Acidic corrosives produce respiratory tract irritation with coughing, choking and mucous membrane damage. Symptoms of exposure may include dizziness, headache, nausea and weakness. In more severe exposures, pulmonary oedema may be evident either immediately or after a latent period of 5-72 hours. Symptoms of pulmonary oedema include a tightness in the chest, dyspnoea, frothy sputum and cyanosis. Examination may reveal hypotension, a weak and rapid pulse and moist rates. Death, due to anoxia, may occur several hours after onset of the pulmonary oedema.

Inhalation of quantities of liquid mist may be extremely hazardous, even lethal due to

continued...

PHENOL REAGENT

Section 11 - TOXICOLOGICAL INFORMATION

spasm, extreme irritation of larynx and bronchi, chemical pneumonitis and pulmonary oedema.

Exposure to high concentrations causes bronchitis and is characterised by the onset of haemorrhagic pulmonary oedema.

CHRONIC HEALTH EFFECTS

Repeated or prolonged exposure to acids may result in the erosion of teeth, inflammatory and ulcerative changes in the mouth and necrosis (rarely) of the jaw. Bronchial irritation, with cough, and frequent attacks of bronchial pneumonia may ensue. Gastrointestinal disturbances may also occur. Chronic exposures may result in dermatitis and/or conjunctivitis.

Repeated or long-term occupational exposure is likely to produce cumulative health effects involving organs or biochemical systems.

Asthma-like symptoms may continue for months or even years after exposure to the material ceases. This may be due to a non-allergenic condition known as reactive airways dysfunction syndrome (RADS) which can occur following exposure to high levels of highly irritating compound. Key criteria for the diagnosis of RADS include the absence of preceding respiratory disease, in a non-atopic individual, with abrupt onset of persistent asthma-like symptoms within minutes to hours of a documented exposure to the irritant. A reversible airflow pattern, on spirometry, with the presence of moderate to severe bronchial hyperreactivity on methacholine challenge testing and the lack of minimal lymphocytic inflammation, without eosinophilia, have also been included in the criteria for diagnosis of RADS. RADS (or asthma) following an irritating inhalation is an infrequent disorder with rates related to the concentration of and duration of exposure to the irritating substance. Industrial bronchitis, on the other hand, is a disorder that occurs as result of exposure due to high concentrations of irritating substance (often particulate in nature) and is completely reversible after exposure ceases. The disorder is characterised by dyspnea, cough and mucus production.

On the basis, primarily, of animal experiments, concern has been expressed by at least one classification body that the material may produce carcinogenic or mutagenic effects; in respect of the available information, however, there presently exists inadequate data for making a satisfactory assessment.

Cattle, rabbits, and chicks on high dietary levels of molybdenum exhibited deformities of joints of the extremities. Chronic exposure of workers in Russian molybdenum-copper plant resulted in a fall in the albumin/globulin ratio owing to a rise in globulins (particularly alpha-globulins) which is interpreted as evidence of liver dysfunction with hyperbilirubinaemia. Hepatotoxic effects are also found in animals given molybdenum salts with a rise in alpha-globulin levels, hypoalbuminaemia and increased serum bilirubin reported. Other reported biochemical effects include an early depletive effect on tissue nicotinamide nucleotides, hyperaminoaciduria, reduction in red blood cell life-span and hyper-thyroidism. Industrial exposure to some insoluble molybdenum compounds is thought to have resulted in an increased incidence of weakness, fatigue, anorexia, headache and joint and muscular pain. Animals exposed to certain insoluble molybdenum compounds show anorexia, diarrhoea, weight loss, listlessness, and liver and kidney damage. Molybdenum disturbs bone metabolism, giving rise to lameness, bone joint abnormalities, osteoporosis and high serum phosphatase levels. Low molybdenum intake has been attributed to the high incidence of oesophageal cancer in South Africa among the Bantu of Transkei, in China and in Russia. Under the conditions of a 2-year inhalation study* there was equivocal evidence of carcinogenic activity of molybdenum trioxide in male rats, male mice and female mice based on a marginally significant positive trend of alveolar/bronchiolar adenoma or carcinoma. There was no evidence of carcinogenic activity in female rats exposed to 10, 30 and 100 mg/m³. Exposure of male and female rats to molybdenum trioxide by inhalation resulted in increased incidences of chronic alveolar inflammation, hyaline degeneration of the olfactory epithelium (females), hyaline degeneration of the respiratory epithelium and squamous metaplasia of the epiglottis. Exposure of female and male mice to molybdenum trioxide resulted in an increased incidence of metaplasia of the alveolar epithelium, histiocyte cellular inflammation (males), hyaline degeneration of the respiratory epithelium, hyaline degeneration of the olfactory epithelium (females), squamous metaplasia of the epiglottis, and hyperplasia of the larynx. Molybdenum trioxide

continued...

PHENOL REAGENT

GHS Safety Data Sheet

Version No:5

Page 15 of 21

Section 11 - TOXICOLOGICAL INFORMATION

was not mutagenic in any of five strains of *Salmonella typhimurium* and did not induce sister chromatid exchanges or chromosomal aberrations in cultured Chinese hamster ovary cells in vitro. All tests were conducted with or without S9 metabolic activation enzymes.

National Toxicology Program: Technical Report Series 462, April 1997.

The material may accumulate in the human body and progressively cause tissue damage.

TOXICITY AND IRRITATION

Not available. Refer to individual constituents.

LITHIUM SULFATE:

unless otherwise specified data extracted from RTECS - Register of Toxic Effects of Chemical Substances.

TOXICITY

Oral (mouse) LD50: 1190 mg/kg

Subcutaneous (mouse) LD50: 560 mg/kg

Intramuscular (mouse) LD50: 560 mg/kg

Oral (Human) TDLo: 6 mg/kg

Oral (Rat) LD50: 613 mg/kg

Subcutaneous (Mouse) LD50: 953 mg/kg

IRRITATION

Nil Reported

Asthma-like symptoms may continue for months or even years after exposure to the material ceases. This may be due to a non-allergenic condition known as reactive airways dysfunction syndrome (RADS) which can occur following exposure to high levels of highly irritating compound. Key criteria for the diagnosis of RADS include the absence of preceding respiratory disease, in a non-atopic individual, with abrupt onset of persistent asthma-like symptoms within minutes to hours of a documented exposure to the irritant. A reversible airflow pattern, on spirometry, with the presence of moderate to severe bronchial hyperreactivity on methacholine challenge testing and the lack of minimal lymphocytic inflammation, without eosinophilia, have also been included in the criteria for diagnosis of RADS. RADS (or asthma) following an irritating inhalation is an infrequent disorder with rates related to the concentration of and duration of exposure to the irritating substance. Industrial bronchitis, on the other hand, is a disorder that occurs as result of exposure due to high concentrations of irritating substance (often particulate in nature) and is completely reversible after exposure ceases. The disorder is characterised by dyspnea, cough and mucus production.

SODIUM TUNGSTATE:

unless otherwise specified data extracted from RTECS - Register of Toxic Effects of Chemical Substances.

TOXICITY

Oral (rat) LD50: 1190 mg/kg

Intraperitoneal (rat) LD50: 204 mg/kg

Intraperitoneal (mouse) LD50: 145 mg/kg

Oral (rat): 223- 225 mg *

* 66-day-old animals after 24 hours
starvation - Gosselin

IRRITATION

Nil Reported

PHOSPHORIC ACID:

unless otherwise specified data extracted from RTECS - Register of Toxic Effects of Chemical Substances.

TOXICITY

Unreported (human) LDLo: 220 mg/kg

Oral (rat) LD50: 1530 mg/kg

Oral (rat) LD50: 3500 mg/kg* [Monsanto]*

Dermal (rabbit) LD50: >1260 mg/kg*

IRRITATION

Skin (rabbit):595 mg/24h - SEVERE

Eye (rabbit): 119 mg - SEVERE

The material may produce severe irritation to the eye causing pronounced inflammation.

Repeated or prolonged exposure to irritants may produce conjunctivitis.

The material may produce severe skin irritation after prolonged or repeated exposure, and may produce a contact dermatitis (nonallergic). This form of dermatitis is often characterised by skin redness (erythema) thickening of the epidermis.

Histologically there may be intercellular oedema of the spongy layer (spongiosis) and intracellular oedema of the epidermis. Prolonged contact is unlikely, given the severity

continued...

PHENOL REAGENT

GHS Safety Data Sheet

Version No:5

Page 16 of 21

Section 11 - TOXICOLOGICAL INFORMATION

of response, but repeated exposures may produce severe ulceration.

Asthma-like symptoms may continue for months or even years after exposure to the material ceases. This may be due to a non-allergenic condition known as reactive airways dysfunction syndrome (RADS) which can occur following exposure to high levels of highly irritating compound. Key criteria for the diagnosis of RADS include the absence of preceding respiratory disease, in a non-atopic individual, with abrupt onset of persistent asthma-like symptoms within minutes to hours of a documented exposure to the irritant. A reversible airflow pattern, on spirometry, with the presence of moderate to severe bronchial hyperreactivity on methacholine challenge testing and the lack of minimal lymphocytic inflammation, without eosinophilia, have also been included in the criteria for diagnosis of RADS. RADS (or asthma) following an irritating inhalation is an infrequent disorder with rates related to the concentration of and duration of exposure to the irritating substance. Industrial bronchitis, on the other hand, is a disorder that occurs as result of exposure due to high concentrations of irritating substance (often particulate in nature) and is completely reversible after exposure ceases. The disorder is characterised by dyspnea, cough and mucus production.

phosphoric acid (85%)

HYDROCHLORIC ACID:

unless otherwise specified data extracted from RTECS - Register of Toxic Effects of Chemical Substances.

TOXICITY

Unreported (man) LDLo: 81 mg/kg

Inhalation (human) LCLo: 1300 ppm/30 min

Inhalation (human) LCLo: 3000 ppm/5 min

Inhalation (rat) LC50: 3124 ppm/1h

Oral (rat) LD50: 900 mg/kg

The substance is classified by IARC as Group 3:

NOT classifiable as to its carcinogenicity to humans.

Evidence of carcinogenicity may be inadequate or limited in animal testing.

IRRITATION

Eye (rabbit): 5mg/30s - Mild

SODIUM MOLYBDATE:

Not available. Refer to individual constituents.

BROMINE:

unless otherwise specified data extracted from RTECS - Register of Toxic Effects of Chemical Substances.

TOXICITY

Oral (human) LDLo: 14 mg/kg.

Inhalation (human) LCLo: 1000 ppm.

Oral (Human) LD: 14 mg/kg

Inhalation (Human) LC: 1000 ppm/4h

Oral (Rat) LD50: 2600 mg/kg

Inhalation (Rat) LC50: 2700 mg/m³/4h

Oral (Mouse) LD50: 3100 mg/kg

Oral (Rabbit) LD50: 4160 mg/kg

Oral (Guinea pig) LD50: 5500 mg/kg

None (None) None: None None

IRRITATION

Nil Reported

The material may produce severe irritation to the eye causing pronounced inflammation.

Repeated or prolonged exposure to irritants may produce conjunctivitis.

The material may produce severe skin irritation after prolonged or repeated exposure, and may produce a contact dermatitis (nonallergic). This form of dermatitis is often characterised by skin redness (erythema) thickening of the epidermis.

Histologically there may be intercellular oedema of the spongy layer (spongiosis) and intracellular oedema of the epidermis. Prolonged contact is unlikely, given the severity of response, but repeated exposures may produce severe ulceration.

Asthma-like symptoms may continue for months or even years after exposure to the material ceases. This may be due to a non-allergenic condition known as reactive airways dysfunction syndrome (RADS) which can occur following exposure to high levels of highly irritating compound. Key criteria for the diagnosis of RADS include the absence of

continued...

PHENOL REAGENT

GHS Safety Data Sheet

Version No:5

Page 17 of 21

Section 11 - TOXICOLOGICAL INFORMATION

preceding respiratory disease, in a non-atopic individual, with abrupt onset of persistent asthma-like symptoms within minutes to hours of a documented exposure to the irritant. A reversible airflow pattern, on spirometry, with the presence of moderate to severe bronchial hyperreactivity on methacholine challenge testing and the lack of minimal lymphocytic inflammation, without eosinophilia, have also been included in the criteria for diagnosis of RADS. RADS (or asthma) following an irritating inhalation is an infrequent disorder with rates related to the concentration of and duration of exposure to the irritating substance. Industrial bronchitis, on the other hand, is a disorder that occurs as result of exposure due to high concentrations of irritating substance (often particulate in nature) and is completely reversible after exposure ceases. The disorder is characterised by dyspnea, cough and mucus production.

HYDROGEN PEROXIDE:

unless otherwise specified data extracted from RTECS - Register of Toxic Effects of Chemical Substances.

TOXICITY

Dermal (rabbit) LD50: 4060 mg/kg

Dermal (rabbit) LDLo: 500 mg/kg

Inhalation (mouse) LC50: 2000 mg/kg/4h

IRRITATION

Nil Reported

Asthma-like symptoms may continue for months or even years after exposure to the material ceases. This may be due to a non-allergenic condition known as reactive airways dysfunction syndrome (RADS) which can occur following exposure to high levels of highly irritating compound. Key criteria for the diagnosis of RADS include the absence of preceding respiratory disease, in a non-atopic individual, with abrupt onset of persistent asthma-like symptoms within minutes to hours of a documented exposure to the irritant. A reversible airflow pattern, on spirometry, with the presence of moderate to severe bronchial hyperreactivity on methacholine challenge testing and the lack of minimal lymphocytic inflammation, without eosinophilia, have also been included in the criteria for diagnosis of RADS. RADS (or asthma) following an irritating inhalation is an infrequent disorder with rates related to the concentration of and duration of exposure to the irritating substance. Industrial bronchitis, on the other hand, is a disorder that occurs as result of exposure due to high concentrations of irritating substance (often particulate in nature) and is completely reversible after exposure ceases. The disorder is characterised by dyspnea, cough and mucus production.

The substance is classified by IARC as Group 3:

NOT classifiable as to its carcinogenicity to humans.

Evidence of carcinogenicity may be inadequate or limited in animal testing.

WATER:

unless otherwise specified data extracted from RTECS - Register of Toxic Effects of Chemical Substances.

No significant acute toxicological data identified in literature search.

PHOSPHOMOLYBDIC ACID:

No significant acute toxicological data identified in literature search.

PHOSPHOTUNGSTIC ACID:

unless otherwise specified data extracted from RTECS - Register of Toxic Effects of Chemical Substances.

TOXICITY

Oral (rat) LD50: 3300 mg/kg

IRRITATION

Nil Reported

Section 12 - ECOLOGICAL INFORMATION

Marine Pollutant: Not Determined

Prevent, by any means available, spillage from entering drains or water courses.

DO NOT discharge into sewer or waterways.

Refer to data for ingredients, which follows:

LITHIUM SULFATE:

continued...

PHENOL REAGENT

GHS Safety Data Sheet

Version No:5

Page 18 of 21

Section 12 - ECOLOGICAL INFORMATION

DO NOT discharge into sewer or waterways.

PHOSPHORIC ACID:

Fish LC50 (96hr.) (mg/l): 138

The principal problems of phosphate contamination of the environment relates to eutrophication processes in lakes and ponds. Phosphorus is an essential plant nutrient and is usually the limiting nutrient for blue-green algae. A lake undergoing eutrophication shows a rapid growth of algae in surface waters. Planktonic algae cause turbidity and flotation films. Shore algae cause ugly muddying, films and damage to reeds. Decay of these algae causes oxygen depletion in the deep water and shallow water near the shore. The process is self-perpetuating because anoxic conditions at the sediment/water interface causes the release of more adsorbed phosphates from the sediment. The growth of algae produces undesirable effects on the treatment of water for drinking purposes, on fisheries, and on the use of lakes for recreational purposes. On the basis of available evidence concerning either toxicity, persistence, potential to accumulate and or observed environmental fate and behaviour, the material may present a danger, immediate or long-term and /or delayed, to the structure and/ or functioning of natural ecosystems.

Prevent, by any means available, spillage from entering drains or water courses.

Do NOT allow product to come in contact with surface waters or to intertidal areas below the mean high water mark. Do not contaminate water when cleaning equipment or disposing of equipment wash-waters.

Wastes resulting from use of the product must be disposed of on site or at approved waste sites.

DO NOT discharge into sewer or waterways.

HYDROCHLORIC ACID:

Hazardous Air Pollutant: Yes

Fish LC50 (96hr.) (mg/l): 0.282

Prevent, by any means available, spillage from entering drains or water courses.

DO NOT discharge into sewer or waterways.

Ecotoxicity

Fish LC100 (24 h): trout 10 mg/l

TLm (96 h): mosquito fish 282 ppm (fresh water)

LC50: goldfish 178 mg/l

Shrimp LC50 (48 h): 100 - 330 ppm (salt water)

Starfish LC50 (48 h): 100 - 330 mg/l

Cockle LC50 (48 h): 330 - 1000 mg/l

[Hach]

Hydrogen chloride in water dissociates almost completely, releasing hydrogen and chloride ions; the hydrogen ions are captured by water to produce hydronium ions.

Hydrochloric acid infiltrates soil, the rate dependent on moisture content. During soil transport, hydrochloric acid dissolves soil components.

Drinking water standard:

chloride: 400 mg/l (UK max.)

250 mg/l (WHO guideline)

BROMINE:

Prevent, by any means available, spillage from entering drains or water courses.

Do NOT allow product to come in contact with surface waters or to intertidal areas below the mean high water mark. Do not contaminate water when cleaning equipment or disposing of equipment wash-waters.

continued...

PHENOL REAGENT

GHS Safety Data Sheet

Version No:5

Page 19 of 21

Section 12 - ECOLOGICAL INFORMATION

Wastes resulting from use of the product must be disposed of on site or at approved waste sites.

DO NOT discharge into sewer or waterways.

Following release of ozone-depleting substances into the atmosphere, they eventually enter the troposphere where they persist undegraded. Subsequently they diffuse into the stratosphere and degrade slowly. In the stratosphere, these substances react slowly with oxygen free radicals and release halogen atoms which catalytically destroy ozone, producing irreversible damage. Use of these substances has been restricted by the Montreal Protocol on Substances that Deplete the Ozone Layer (1988) and also by US EPA Regulation 3093/94. Ozone depleters do not degrade readily in the ambient atmosphere; some have a half-life of more than 100 years for the photochemical reaction producing hydroxy radicals.

In the atmosphere, bromine destroys ozone, catalytically; the bromine cycle is thought to be more efficient in ozone destruction than the chlorine cycle.

In water, bromine is slowly reduced to bromide by natural oxidisable materials.

Bromine is harmful to aquatic life at low concentrations.

No standards available for drinking water, soils or air.

HYDROGEN PEROXIDE:

DO NOT discharge into sewer or waterways.

log Kow: -1.36

Fish LC50 (96 h): catfish 37.4 mg/l

Section 13 - DISPOSAL CONSIDERATIONS

- Recycle wherever possible.
 - 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.
 - Treat and neutralise at an approved treatment plant. Treatment should involve:
: Neutralisation with soda-ash or soda-lime followed by: Burial in a licenced land-fill or Incineration in a licenced apparatus (after admixture with suitable combustible material).
 - Decontaminate empty containers with 5% aqueous sodium hydroxide or soda ash, followed by water. Observe all label safeguards until containers are cleaned and destroyed.
 - Containers may still present a chemical hazard/ danger when empty.
 - Return to supplier for reuse/ recycling if possible.
- Otherwise:
- 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.
 - Where possible retain label warnings and MSDS and observe all notices pertaining to the product.

Section 14 - TRANSPORTATION INFORMATION



continued...

PHENOL REAGENT

GHS Safety Data Sheet

Version No:5

Page 20 of 21

Section 14 - TRANSPORTATION INFORMATION

Labels Required: CORROSIVE
HAZCHEM: 2X

UNDG:

Dangerous Goods Class:	8	Subrisk:	None
UN Number:	3264	Packing Group:	III
Shipping Name: CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S. (contains hydrochloric and phosphoric acids)			

Air Transport IATA:

ICAO/IATA Class:	8	ICAO/IATA Subrisk:	None
UN/ID Number:	3264	Packing Group:	III
Special provisions:	A3		
Shipping Name: CORROSIVE LIQUID, ACIDIC, INORGANIC N.O.S.			

Maritime Transport IMDG:

IMDG Class:	8	IMDG Subrisk:	None
UN Number:	3264	Packing Group:	III
EMS Number:	F- A, S- B	Special provisions:	223 274 944
Marine Pollutant:	Not Determined		
Shipping Name: CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S.			

Section 15 - REGULATORY INFORMATION

REGULATIONS

Merck Folin & Ciocalteu's Phenol Reagent (CAS: None):
No regulations applicable

phosphoric acid (CAS: 7664-38-2) is found on the following regulatory lists;
IMO MARPOL 73/78 (Annex II) - List of Noxious Liquid Substances Carried in Bulk
International Council of Chemical Associations (ICCA) - High Production Volume List
OECD Representative List of High Production Volume (HPV) Chemicals

hydrochloric acid (CAS: 7647-01-0) is found on the following regulatory lists;
CODEX General Standard for Food Additives (GSFA) - Additives Permitted for Use in Food in General, Unless Otherwise Specified, in Accordance with GMP
IMO MARPOL 73/78 (Annex II) - List of Noxious Liquid Substances Carried in Bulk
International Agency for Research on Cancer (IARC) Carcinogens
International Council of Chemical Associations (ICCA) - High Production Volume List
International Maritime Dangerous Goods Requirements (IMDG Code) - Goods Forbidden for Transport
OECD Representative List of High Production Volume (HPV) Chemicals
United Nations Convention Against Illicit Traffic in Narcotic Drugs and Psychotropic Substances - Table II
United Nations List of Precursors and Chemicals Frequently used in the Illicit Manufacture of Narcotic Drugs and Psychotropic Substances Under International Control - Table II
WHO Guidelines for Drinking-water Quality - Chemicals for which guideline values have not been established

sodium molybdate (CAS: 7631-95-0) is found on the following regulatory lists;
OECD Representative List of High Production Volume (HPV) Chemicals
sodium molybdate (CAS: 10102-40-6) is found on the following regulatory lists;
OECD Representative List of High Production Volume (HPV) Chemicals

bromine (CAS: 7726-95-6) is found on the following regulatory lists;
OECD Representative List of High Production Volume (HPV) Chemicals

hydrogen peroxide (CAS: 7722-84-1) is found on the following regulatory lists;
IMO MARPOL 73/78 (Annex II) - List of Noxious Liquid Substances Carried in Bulk
International Agency for Research on Cancer (IARC) Carcinogens
International Air Transport Association (IATA) Dangerous Goods Regulations
OECD Representative List of High Production Volume (HPV) Chemicals

water (CAS: 7732-18-5) is found on the following regulatory lists;
OECD Representative List of High Production Volume (HPV) Chemicals

No data available for lithium sulfate as CAS: 10377-48-7, CAS: 10102-25-7.
No data available for sodium tungstate as CAS: 13472-45-2, CAS: 10213-10-2, CAS: 53125-86-3.
No data available for phosphomolybdic acid as CAS: 11104-88-4, CAS: 51429-74-4, CAS: 12026-57-2.
No data available for phosphotungstic acid as CAS: 12067-99-1, CAS: 12501-23-4.

continued...

PHENOL REAGENT

GHS Safety Data Sheet

Version No:5

Page 21 of 21

Section 16 - OTHER INFORMATION

INGREDIENTS WITH MULTIPLE CAS NUMBERS

Ingredient Name	CAS
lithium sulfate	10377- 48- 7, 10102- 25- 7
sodium tungstate	13472- 45- 2, 10213- 10- 2, 53125- 86- 3
sodium molybdate	7631- 95- 0, 10102- 40- 6
phosphomolybdic acid	11104- 88- 4, 51429- 74- 4, 12026- 57- 2
phosphotungstic acid	12067- 99- 1, 12501- 23- 4

EXPOSURE STANDARD FOR MIXTURES

"Worst Case" computer-aided prediction of spray/ mist or fume/ dust components and concentration:

Composite Exposure Standard for Mixture (TWA) :100 mg/m³.

MSDS SECTION CHANGES

The following table displays the version number of and date on which each section was last changed.

Section Name	Version	Date	Section Name	Version	Date	Section Name	Version	Date
Appearance	4	22- Aug- 2003	Physical Properties	4	22- Aug- 2003	Acute Health (inhaled)	4	22- Aug- 2003

The above information is believed to be accurate and represent the best information currently available to us, but does not represent any warranty expressed or implied of the properties of the product. User should make their own investigation to determine the suitability of the information for their particular purpose.

Issue date: 16-June 2018