

# Safety Data Sheet

## Chemical Oxygen Demand (COD) Vials

OI Analytical  
 SDS Nos. **252120, 253110, 253112, 253122, 253132, G252130**  
 Version No. **4.3**  
 Safety Data Sheet according to OSHA HazCom Standard  
 (2012) requirements

Print Date: May 12, 2016  
 Initial date: May 11, 2014

### SECTION 1. SUBSTANCE IDENTITY AND COMPANY CONTACT INFORMATION

#### Product Identifier

<b>Product Name</b>	Chemical Oxygen Demand (COD) Vials Kit 25 – 150 ct., 0 – 15,000 mg/L
<b>Trade name</b>	Chemical Oxygen Demand (COD) Vials
<b>OI Analytical Product Part numbers</b>	252120, 253110, 253112, 253122, 253132, G252130
<b>Proper shipping name</b>	Sulfuric acid with more than 51 percent acid
<b>Chemical formula</b>	Not applicable
<b>Other means of identification</b>	Not applicable
<b>CAS number</b>	Not applicable

#### Company contact information

<b>Registered company name</b>	OI Analytics
<b>Address</b>	P.O. Box 9010, College Station, TX 77842-9010
<b>Telephone</b>	1-979-690-1711
<b>Fax</b>	1-979-690-0440
<b>Website</b>	<a href="http://www.oico.com/">http://www.oico.com/</a>
<b>E-mail</b>	OI-Mail@Xyleminc.com

#### Emergency telephone number

<b>Association / Organization</b>	ChemTel, Inc.
<b>Emergency telephone number</b>	<b>1-800-255-3924</b> <b>Use only in event of chemical emergencies involving spill, leaks, fire, exposure, or accidents involving chemicals.</b>

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

<b>Relevant identified uses</b>	Component of water analysis test kits 252120, 253110, 253112, 253122, 253132, G252130
<b>Uses advised against</b>	None

## SECTION 2. HAZARDS IDENTIFICATION

### Label elements



### Hazard statements

<b>GHS label elements</b>	Corrosive • Aquatic toxicity • Acute toxicity								
<b>Signal word</b>	DANGER								
<b>Hazard statements</b>	Toxic. Corrosive. Causes severe burns								
<b>Precautionary statements</b>	Causes severe burns, may cause abdominal pain, nausea, vomiting, rapid pulse								
<b>Target organ(s)</b>	Central nervous system, kidneys, teeth, lungs								
<b>Potential health effects</b>	<table border="0"> <tr> <td><b>Eye</b></td> <td>May cause irritation</td> </tr> <tr> <td><b>Skin</b></td> <td>May cause severe burns</td> </tr> <tr> <td><b>Ingestion</b></td> <td>May cause nausea, vomiting, burns</td> </tr> <tr> <td><b>Inhalation</b></td> <td>May cause tooth erosion and soreness in the mouth</td> </tr> </table>	<b>Eye</b>	May cause irritation	<b>Skin</b>	May cause severe burns	<b>Ingestion</b>	May cause nausea, vomiting, burns	<b>Inhalation</b>	May cause tooth erosion and soreness in the mouth
<b>Eye</b>	May cause irritation								
<b>Skin</b>	May cause severe burns								
<b>Ingestion</b>	May cause nausea, vomiting, burns								
<b>Inhalation</b>	May cause tooth erosion and soreness in the mouth								

<b>H272</b>	May intensify fire; oxidizer
<b>H290</b>	May be corrosive to metals
<b>H302</b>	Harmful if swallowed
<b>H311</b>	Toxic in contact with skin
<b>H314</b>	Causes severe skin burns and eye damage
<b>H318</b>	Causes serious eye damage
<b>H334</b>	May cause allergy or asthma symptoms or breathing difficulties if inhaled
<b>H335</b>	May cause respiratory irritation
<b>H340</b>	May cause genetic defects
<b>H350</b>	May cause cancer
<b>H360</b>	May damage fertility or unborn child
<b>H373</b>	May cause damage to organs through prolonged or repeated exposure
<b>H402</b>	Harmful to aquatic life
<b>H412</b>	Harmful to aquatic life with long-lasting effects

### Precautionary statements, Prevention

<b>P101</b>	If medical advice is needed, have product container or label at hand
<b>P102</b>	Keep out of reach of children
<b>P103</b>	Read label before use
<b>P201</b>	Obtain special instructions before use
<b>P210</b>	Keep away from heat, hot surfaces, sparks, open flames, and other ignition sources. No smoking.
<b>P221</b>	Take any precaution to avoid mixing with combustibles/organic matter
<b>P260</b>	Do not breathe dust/fume/gas/mist/vapors/spray
<b>P271</b>	Use only outdoors or in well-ventilated area

### Precautionary statements, Response

<b>P301+P330+P331</b>	IF SWALLOWED: Rinse mouth. Do NOT induce vomiting
<b>P303+P361+P353</b>	IF ON SKIN or hair: Immediately remove all contaminated clothing. Rinse skin with water/shower.
<b>P304+P340</b>	IF INHALED: Remove person to fresh air and keep comfortable for breathing
<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>P308+P313</b>	<b>IF EXPOSED OR CONCERNED:</b> get medical attention

**Precautionary statements, Storage**

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

**Precautionary statement, Disposal**

	Dispose of contents/container in authorized chemical landfill or, if organic, using high-temperature incineration.
<b>P501</b>	

**SECTION 3. COMPOSITION / INFORMATION ON INGREDIENTS**

**Substances**

See section below for composition of mixtures

**Mixtures**

CAS No.	%[weight]	Name
7664-93-9	65–87	sulfuric acid
7732-18-5	10–34	water
10294-26-5	<1	silver sulfate
7783-35-9	<1	mercuric sulfate
7778-50-9	<1	potassium dichromate

**SECTION 4. FIRST AID MEASURES**

**Description of first aid measures**

<b>Eye contact</b>	<ul style="list-style-type: none"> <li>◆ Immediately hold eyelids apart and flush the eye cautiously with running water.</li> <li>◆ Ensure complete irrigation of the eye by keeping eyelids apart and away from the eye and moving the eyelids by occasionally lifting the upper and lower lids.</li> <li>◆ Continue flushing until advised to stop by the Poison Control Center or a medical professional or for at least 15 minutes.</li> <li>◆ Transport to a hospital or to physician for treatment without delay.</li> <li>◆ Removal of contact lenses after an eye injury should be undertaken by skilled personnel.</li> </ul>
<b>Skin or hair contact</b>	<ul style="list-style-type: none"> <li>◆ Immediately flush body and clothes with large amounts of water, using safety shower, if available.</li> <li>◆ Quickly remove all contaminated clothing, including footwear.</li> <li>◆ Wash skin and hair with running water. Continue flushing with water until advised to stop by the Poison Control Center or a medical professional.</li> <li>◆ Transport to hospital or to physician for treatment without delay.</li> </ul>
<b>Inhalation</b>	<ul style="list-style-type: none"> <li>◆ If fumes or combustible products are inhaled, remove victim from contaminated area.</li> <li>◆ Lay patient down. Keep warm and quiet. Prostheses, such as dentures, which may block airway, should be removed, where possible, prior to initiating first aid procedures.</li> <li>◆ Start artificial respiration if needed, preferably with a demand valve resuscitator, bag-valve mask device, or pocket mask as trained. Perform CPR if necessary.</li> <li>◆ Transport to hospital, or doctor, without delay.</li> <li>◆ Inhalation of vapors or aerosols (mists, fumes) may cause lung edema.</li> <li>◆ Corrosive substances may cause lung damage (e.g., lung edema, fluid in the lungs).</li> <li>◆ As this reaction may be delayed up to 24 hours after exposure, affected individuals need complete rest (preferably in semi-recumbent posture) and must be kept</li> </ul>

	<p>under medical observation even if no symptoms are (yet) manifested.</p> <ul style="list-style-type: none"> <li>◆ Before any such manifestation, the administration of a spray containing a dexamethasone derivative or beclomethasone derivative may be considered, but must be determined and administered by a doctor or medical professional.</li> </ul>
<b>Ingestion</b>	<ul style="list-style-type: none"> <li>◆ For advice, contact Poison Control Center, hospital, or a physician.</li> <li>◆ Urgent hospital treatment is likely to be needed.</li> <li>◆ If swallowed do NOT induce vomiting.</li> <li>◆ If vomiting occurs, lean patient forward or place on left side (head-down, if possible) to maintain open airway and prevent aspiration.</li> <li>◆ Observe patient carefully.</li> <li>◆ Never give liquid to a person showing signs of being sleepy or with reduced awareness; i.e., becoming unconscious.</li> <li>◆ Give water to rinse out the mouth, then provide liquid slowly and as much as victim can comfortably drink.</li> <li>◆ Transport to hospital or physician without delay.</li> </ul>

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

#### 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 characterized by formation of a coagulum (eschar) as a result of the desiccating 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 neutralize 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 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 neutralizing agents or any other additives. Several liters of saline are required.
- ◆ Cycloplegic drops (1% cyclopentolate for short-term use or 5% homatropine for longer use) antibiotic drops, vasoconstrictive agents or artificial tears may be indicated dependent on the severity of injury.
- ◆ Steroid eye drops should only be administered with the approval of a consulting ophthalmologist.

Ref: Ellenhorn and Barceloux: *Medical Toxicology*, 1998

## SECTION 5. FIREFIGHTING MEASURES

### Extinguishing media

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

### Special hazards arising from the substrate or mixture

**Fire incompatibility** | None known

#### Advice for firefighters

<b>Fire Fighting</b>	<ul style="list-style-type: none"> <li>◆ Alert fire department or first responders to the location and nature of hazard</li> <li>◆ May be violently or explosively reactive</li> <li>◆ Wear full body protective clothing with breathing apparatus</li> <li>◆ Prevent, by an means available, spillage from entering drains or water courses</li> <li>◆ Consider evacuation (or protect in place)</li> </ul>
<b>Fire/Explosion Hazard</b>	<ul style="list-style-type: none"> <li>◆ Noncombustible</li> <li>◆ Not considered to be a significant fire risk</li> <li>◆ Acids may react with metals to product hydrogen, a highly flammable and explosive gas</li> <li>◆ Heating may cause expansion or decomposition, leading to violent rupture of containers</li> <li>◆ May emit corrosive, poisonous fumes</li> </ul>

## SECTION 6. ACCIDENTAL RELEASE MEASURES

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

<b>Minor spills</b>	<ul style="list-style-type: none"> <li>◆ Drains for storage or use areas should have retention basins for pH adjustments and dilution of spills before discharge or disposal of material</li> <li>◆ Check regularly for spills and leaks</li> <li>◆ Clean up all spills immediately</li> <li>◆ Avoid breathing vapors and contact with skin and eyes</li> <li>◆ Control personal contact with the substance by wearing protective equipment</li> </ul>
<b>Major spills</b>	<ul style="list-style-type: none"> <li>◆ Clear area of personnel and move personnel upwind of spill</li> <li>◆ Alert fire department to the location and nature of the hazard</li> <li>◆ May be violently or explosively reactive</li> <li>◆ Wear full body protective clothing with breathing apparatus</li> <li>◆ Prevent, by an means available, spillage from entering drains or water courses</li> </ul>
<b>PPE</b>	Personal protective equipment advice is contained in Section 8 of this SDS.

## SECTION 7. HANDLING AND STORAGE

### Precautions for safe handling

<b>Safe handling</b>	<ul style="list-style-type: none"> <li>◆ DO NOT allow clothing wet with material to stay in contact with skin</li> <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>◆ <b>WARNING:</b> To avoid violent reaction, ALWAYS add material to water and NEVER water to material</li> <li>◆ Avoid smoking, naked lights, or ignition sources</li> </ul> <p><b>Wear impact- and splash-resistant eyewear</b></p>
<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, well-ventilated area</li> <li>◆ Store away from incompatible materials and foodstuff containers</li> <li>◆ Protect containers from physical damage and check regularly for leaks</li> </ul> <p><b>For optimum analytical performance, store in the dark and at room</b></p>

**temperature**

**Conditions for safe storage, including any incompatibilities**

<b>Suitable container</b>	<ul style="list-style-type: none"> <li>◆ DO NOT use aluminum or galvanized containers</li> <li>◆ Check regularly for spills and leaks</li> <li>◆ Lined metal can, lined metal pail/can</li> <li>◆ Plastic bucket</li> <li>◆ Polyliner drum</li> <li>◆ Packing as recommended by manufacturer</li> <li>◆ Ensure that all containers are clearly labeled</li> <li>◆ Ensure that all containers are free from leaks</li> </ul>
<b>Storage incompatibility</b>	<ul style="list-style-type: none"> <li>◆ Inorganic acids are generally soluble in water with the release of hydrogen ions. The resulting solutions have pH's less than 7.0</li> <li>◆ Inorganic acids neutralize chemical bases (for example: amines and inorganic hydroxides) to form sales. Neutralization, though, can generate dangerously large amounts of heat in small spaces.</li> <li>◆ The dissolution of inorganic acids in water or the dilution of their concentrated solutions with additional water may generate significant heat</li> <li>◆ The addition of water to inorganic acids often generates sufficient heat in the small region of mixing to cause some of the water to boil explosively.</li> </ul>

**Package material incompatibilities:** Not available

**SECTION 8. EXPOSURE CONTROLS / PERSONAL PROTECTION**

**Control parameters**

Occupational exposure limits (OEL)

**INGREDIENT DATA**

Source	Ingredient	Material name	TWA	STEL	Peak	Notes
OSHA Permissible Exposure Levels (PELs), Table Z1	sulfuric acid	Sulfuric acid	1 mg/m <sup>3</sup>	Not available	Not available	
ACGIH Threshold Limit Values (TLV)	sulfuric acid	Sulfuric acid	0.2 mg/m <sup>3</sup>	Not available	Not available	TLV® Basis: Pulm. Func.
NIOSH Recommended Exposure Limits (RELs)	sulfuric acid	Battery acid, hydrogen sulfate, oil of vitriol, sulfuric acid (aqueous)	1 mg/m <sup>3</sup>	Not available	Not available	Not available
OSHA Permissible Exposure Levels (PELs) Table Z1	silver sulfate	Silver, metal and soluble compounds	0.01 mg/m <sup>3</sup>	Not available	Not available	(as Ag)
ACGIH Threshold Limit Values (TLV)	silver sulfate	Silver and compounds (metal, dust, and fumes)	0.1 mg/m <sup>3</sup>	Not available	Not available	TLV® Basis: Argyria
ACGIH Threshold Limit Values (TLV)	silver sulfate	Silver and compounds (soluble compounds, as Ag)	0.01 mg/m <sup>3</sup>	Not available	Not available	TLV® Basis: Argyria
OSHA Permissible Exposure Levels (PELs), Table Z1	mercuric sulfate	Mercury	Not available	Not available	Not available	See Table Z-2: (As Hg); (aryl and inorganic)

## Chemical Oxygen Demand (COD) Vials

ACGIH Threshold Limit Values (TLV)	mercuric sulfate	Mercury, all forms except alkyl, as Hg, elemental and inorganic forms	0.025 mg/m <sup>3</sup>	Not available	Not available	TLV® Basis: CNS impair; kidney dam; BEI
OSHA Permissible Exposure Levels (PELs), Table Z1	potassium dichromate	Chromium (VI) compounds	0.005 mg/m <sup>3</sup>	Not available	Not available	See 1910, 1026; see table Z-2 for the exposure limit for any operations or sector where the exposure limit in §1910.1026 is stayed or is otherwise not in effect
ACGIH Threshold Limit Values (TLV)	potassium dichromate	Chromium and inorganic compounds, as Cr and water-soluble CR VI compounds)	0.05 mg/m <sup>3</sup>	Not available	Not available	TLV® Basis: URT irr.; cancer, BEI

### EMERGENCY LIMITS

Ingredient	Material name	TEEL-1	TEEL-2	TEEL-3
sulfuric acid	Sulfuric acid	Not available	Not available	Not available
mercuric sulfate	Mercuric sulfate; (Mercury (II) sulfate)	0.037 mg/m <sup>3</sup>	0.15 mg/m <sup>3</sup>	41 mg/m <sup>3</sup>
potassium dichromate	Potassium dichromate	0.14 mg/m <sup>3</sup>	1.5 mg/m <sup>3</sup>	44 mg/m <sup>3</sup>

Ingredient	Original IDLH	Revised IDLH
sulfuric acid	80 mg/m <sup>3</sup>	15 mg/m <sup>3</sup>
water	Not available	Not available
silver sulfate	N.E. mg/m <sup>3</sup> / N.E. ppm	10 mg/m <sup>3</sup>
mercuric sulfate	28 mg/m <sup>3</sup>	10 mg/m <sup>3</sup>
potassium dichromate	Not available	Not available

### Exposure controls

#### Appropriate engineering controls

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 typically will be independent of worker interactions to provide a high level of protection.

The basic types of engineering controls are—

- Process controls which involve changing the way a job activity or process is done to reduce the risk.
- Enclosure and/or isolation of emission source which keeps a selected hazard “physically” away from the worker and ventilation and that strategically replaces air in the work environment. Ventilation can remove or dilute an air contaminant if designed properly.

## Chemical Oxygen Demand (COD) Vials

<p><b>Personal protection</b></p>	
<p><b>Eye and face protection</b></p>	<ul style="list-style-type: none"> <li>◆ Safety glasses with unperforated side shields may be used where continuous eye protection is desirable, as in laboratories; prescription-style glasses are not sufficient protection where complete eye protection is needed, such as when handling bulk quantities, where there is a danger of splashing, or if the material may be under pressure.</li> <li>◆ Chemical goggles, whenever there is a danger of the material coming in contact with the eyes. Goggles must be property fitted.</li> <li>◆ Full face shield (8-inch (20-cm) minimum) may be required for supplementary, but never primary, protection of the eyes. These afford face protection.</li> <li>◆ Alternatively, a gas mask may replace splash goggles and face shields</li> <li>◆ Contact lenses may post a special hazard; soft contact lenses may absorb and concentrate irritants.</li> </ul>
<p><b>Skin protection</b></p>	<p>See Hand Protection, below.</p>
<p><b>Hands/feet protection</b></p>	<ul style="list-style-type: none"> <li>◆ Elbow-length PVC gloves</li> <li>◆ When handling corrosive liquids, wear trousers or overalls outside of boots to avoid spills entering boots.</li> </ul> <p><b>NOTE:</b> The material may produce skin sensitization in predisposed individual. Care must be taken when removing gloves and other protective equipment to avoid all possible skin contact.</p> <p>Contaminated leather items, such as shoes, belts, and watch bands should be removed and destroyed.</p> <p>The selection of suitable depends not only on the material, but also on further marks of quality, which vary from manufacturer to manufacturer.</p>
<p><b>Body protection</b></p>	<p>See Other Protection, below.</p>
<p><b>Respiratory protection</b></p>	<p>Type E-P filter of sufficient capacity (ANSI Z88 or national equivalent). When the concentration of gas/particulates in the breathing zone approaches or exceeds the exposure standard (ES), respiratory protection is required. Degree of protection varies with both face-piece and class of filter; the nature of protection varies with type of filter.</p>
<p><b>Other protection</b></p>	<p>Employees working with confirmed human carcinogens should be provided with, and be required to wear, clean, full-body protective clothing (smocks, coveralls, or long-sleeved shirt and pants), shoe covers, and gloves, prior to entering the regulated area.</p> <p>Employees engaged in handling operations involving carcinogens should be provided with, and be required to wear and use, half-face filter-type respirators with filters for dust, mists, and fumes, or air-purifying canisters or cartridges. A respirator affording higher levels of protection may be substituted.</p> <p>Emergency deluge showers and eyewash fountains, supplied with potable water, should be located near, within sight of, and on the same level with locations where direct exposure is likely.</p> <p>Prior to exit from an area containing confirmed human carcinogens, employees should be required to remove and leave protective clothing and equipment at the point of exit. At the last exit of the day, to place used clothing and equipment in impervious containers at the point of exit for purposes of decontamination or disposal.</p>

**Thermal hazards**

Not available.

**Recommended materials**

**Glove selection index**

Material	CPI (Forsberg Clothing Performance Index)
Neoprene	A
Butyl	C
Natural rubber	C
Natural + Neoprene	C
Neoprene / Natural	C
Nitrile	C
Polyethylene (PE)	C
Polyvinyl alcohol (PVA)	C
Polyvinyl chloride (PVC)	C
Saranex-23	C
Viton	C

A: Best selection

B: Satisfactory; may degrade after 4 hours continuous immersion

C: Poor to dangerous choice for other than short-term immersion.

**SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES**

**Information on basic physical and chemical properties**

Appearance	Yellow, amber, orange with white precipitate	Relative density (water = 1)	>1
Physical state	Liquid	Partition coefficient n-octanol/ water	Not available
Odor	Characteristic	Auto-ignition temperature (°C)	Not available
Odor threshold	Not available	Decomposition temperature	Not available
pH (as supplied)	<1	Viscosity (cSt)	Not available
Melting point / freezing point (°C)	Not available	Molecular weight (g/mol)	Not available
Initial boiling point and boiling range (°C)	>100	Taste	Not available
Flash point(°C)	Not available	Explosive properties	Not available
Evaporation rate	Not available	Oxidizing properties	Not available
Flammability	Not available	Surface tension (dyn/cm or mH/m)	Not available
Upper explosive limit (%)	Not available	Volatile component (%vol)	Not available
Lower explosive limit (%)	Not available	Gas group	Not available
Vapor pressure (kPa)	Not available	pH as solution	Not available

## Chemical Oxygen Demand (COD) Vials

Solubility in water (g/L)	Miscible	VOC g/l	Not available
Vapor density (air =1)	Not available		

### SECTION 10. STABILITY AND REACTIVITY

<b>Reactivity</b>	See section 7
<b>Chemical stability</b>	Contact with alkaline materials liberates heat
<b>Possibility of hazardous reactions</b>	See section 7
<b>Conditions to avoid</b>	See section 7
<b>Incompatible materials</b>	See section 7
<b>Hazardous decomposition products</b>	See section 5

### SECTION 11. TOXICOLOGICAL INFORMATION

#### Information on toxicological effects

<b>Inhaled</b>	<p>Inhalation of vapors or aerosols (mists, fumes) generated by the material during the course of normal handling may product severely toxic, including fatal, effects.</p> <p>The materials can cause respiratory irritation in some persons. The body's response to such irritation can cause further lung damage.</p> <p>Corrosive acids can cause irritation of the respiratory tract, with coughing, choking, and mucous membrane damage. There may be dizziness, headache, nausea, and weakness.</p>
<b>Ingestion</b>	<p>Toxic effect may result from the accidental ingestion of the material; animal experiments indicate that ingestion of less than 40 grams may be fatal or may produce serious damage to the health of the individual.</p> <p>Ingestion of acidic corrosives may produce burns around and in the mouth, the throat, and esophagus, immediate pain and difficulties in swallowing and speaking may be evident.</p>
<b>Skin contact</b>	<p>Skin contact with the material may produce toxic effects; systemic effects may result after absorption.</p> <p>Skin contact with acidic corrosives may result in pain and burns; these may be deep with distinct edges and may heal slowly with the formation of scar tissue.</p> <p>Open cuts, abraded or irritated skin should not be exposed to material.</p> <p>Entry into the bloodstream 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.</p>
<b>Eye</b>	<p>If applied to the eyes, this material causes serious eye damage.</p> <p>Direct eye contact with acid corrosives may product pain, tears, sensitivity to light, and burns. Mild burns of the epithelia general recover rapidly and completely.</p>
<b>Chronic</b>	<p>Repeated or prolonged exposure to acids may result in erosion of the teeth, swelling and/or ulceration of the mouth lining, irritation of airways to lung with cough and inflammation of lung tissue, and cough.</p> <p>Substance accumulation in the human body is likely and may cause</p>

## Chemical Oxygen Demand (COD) Vials

some concern following repeated or long-term occupational exposure. Long-term exposure to respiratory irritants may result in disease of the airways involving breathing and related systemic problems.

Inhaling the product is more likely to cause a sensitization reaction in some persons.

<b>Sulfuric acid</b>	Occupational exposures to strong inorganic acid mists of sulfuric acid.
<b>Water</b>	No significant acute toxicological data identified in literature search.
<b>Potassium dichromate</b>	The following information refers to contact allergens as a group, and may not be specific to this product. Contact allergies quickly manifest themselves as a contact eczema, but more rarely as urticaria or Quincke's edema. The pathogenesis of contact eczema involves a cell-mediated (T lymphocyte) delayed immune reaction. Other allergic skin reactions, e.g., contact urticaria involving antibody-mediated immune reactions. The significance of the contact allergen is not simply determined by its sensitization potential: the distribution of the substance and the opportunities for contact with it are equally important.
<b>Sulfuric acid, Silver sulfate</b>	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 a 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 or hours of a documented exposure to the irritant. A reversible airflow pattern, or spirometry, with the presence of moderate to severe bronchial hyperreactivity on methacholine challenge testing and the lack of minimum 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.

Acute toxicity	✓	Carcinogenicity	✓
Skin irritation/corrosion	✓	Reproductivity	✓
Serious eye damage/irritation	✓	STOT – single exposure	✓
Respiratory or skin sensitization	✓	STOT – repeated exposure	✓
Mutagenicity	✓	Aspiration hazard	⊖

**Legend:** ✓ Data required to make classification available.  
⊖ Data not available to make classification.

## Chemical Oxygen Demand (COD) Vials

### CMR status

<b>CARCINOGEN</b>	sulfuric acid	Environmental Defense Scorecard Recognized carcinogen	P65
	mercuric sulfate	Environmental Defense Scorecard Suspected carcinogen	P65-MC
	potassium dichromate	Environmental Defense Scorecard Recognized carcinogen  Environmental Defense Scorecard Suspected carcinogen   Air Toxic Hot Spots TSD for Describing Available Cancer Potency Factors	P65-MC HAZMAP, P65-MC
<b>RESPIRATORY</b>	sulfuric acid	California OEHHA/ARB Acute Reference Exposure Levels and Target Organs (RELS); Respiratory; California OEHHA/ARB Chronic Reference Exposure Levels and Target Organs (CRELs) Respiratory	X
	mercuric sulfate	California OEHHA/ARB Acute Reference Exposure Levels and Target Organs (RELS) Respiratory	X
<b>SKIN</b>	mercuric sulfate	Hawaii Air Contaminant Limits – Skin designation; Michigan Exposure Limited for Air Contaminants – Skin; Alaska Limits for Air Contaminant – Skin designation; Tennessee Occupational Exposure Limits, Limits for air Contaminants – Skin; ADGIH Threshold Limit values (TLV – Skin; California Permissible Exposure Limits for Chemical Contaminants; Skin – North Carolina Permissible Exposure Limits for Air Contaminants; Skin Designation (NLV; Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants – Skin; Minnesota Permissible Exposure Limits (PELs) –Skin; Washington Permissible Exposure Limits of Air Contaminants - Skin	X Yes S

## SECTION 12. ECOLOGICAL INFORMATION

### Toxicity

Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment. 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.

### Ecotoxicity

The tolerance of water organisms toward pH margin and variation is diverse.

**Persistence and degradability**

Ingredient	Persistence: Water/Soil	Persistence: Air
Water	low	low
Potassium dichromate	high	high

**Bioaccumulative potential**

Ingredient	Bioaccumulation
Water	low (LogKow = -1.38)
Potassium dichromate	low (LogKow = 2.6724)

**Mobility in soil**

Ingredient	Mobility
Water	low (KOC = 14.3)
Potassium dichromate	low (KOC = 393.3)

**SECTION 13. DISPOSAL CONSIDERATIONS**

**Waste treatment methods**

Product/package disposal	Dispose of according to federal, state, and local regulations
--------------------------	---------------------------------------------------------------

**SECTION 14. TRANSPORT INFORMATION**

**Required labels**

Product/package disposal	
Marine pollutant	No

**Land transport (DOT)**

<b>UN number</b>	1830
<b>Packing group</b>	II
<b>UN proper shipping name</b>	Sulfuric acid with more than 51 percent acid
<b>Transport hazard class(uses)</b>	Class 8
<b>Special precautions for user</b>	Special provisions A3, A7, B3, B83, B84, IB2, N34, T8, TP2

**Air Transport (ICAO-IATA / DGR)**

<b>UN number</b>	1830	
<b>Packing group</b>	II	
<b>Environmental hazard</b>	No relevant data	
<b>UN proper shipping name</b>	Sulfuric acid with more than 51 percent acid	
<b>Transport hazard class(es)</b>	ICAO-IATA Class 8 ICAO-IATA subrisk: not applicable ERG Code 8L	
<b>Special precautions for user</b>	Special provisions	Not

Chemical Oxygen Demand (COD) Vials

	applicable
Cargo only packing instructions	855
Cargo only maximum qty/pack	30 L
Passenger and cargo packing instruction	851
Passenger and cargo maximum qty/pack	1 L
Passenger and cargo limited qty packing instruction	Y840
Passenger and cargo limited maximum qty/pack	0.5 L

**Sea transport**

<b>UN number</b>	1830	
<b>Packing group</b>	II	
<b>UN proper shipping name</b>	Sulfuric acid with more than 51 percent acid	
<b>Environmental hazard</b>	Not applicable	
<b>Transport hazard class(es)</b>	IMDG class	8
	IMDG subrisk	Not applicable
<b>Special precautions for user</b>	EMS number	F-A, S-B
	Special provisions	Not applicable
	Limited quantities	1 L

**Transport in bulk according to Annex II of MARPOL 73 / 78 and the IBC code**

Source	Ingredient	Pollution category
IMO MARPOL 73/78 (Annex II), List of Noxious Liquid Substances Carried in Bulk	sulfuric acid	Y

## SECTION 15. REGULATORY INFORMATION

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

<p><b>Sulfuric acid (7664-93-9) is found on the following regulatory lists</b></p>	<p>ACGIH Threshold Limit Values (TLV)                      ACGIH Threshold Limit Values (TLV) – Carcinogens                      Alaska Limits for Air Contaminants                      California OEHHA/ARB, Acute Reference Exposure Levels and Target Organs (RELS)                      California OEHHA/ARB, Chronic Reference Exposure Levels and Target Organs (CRELS)                      California Permissible Exposure Limits for Chemical Contaminants                      Chemical Substance Inventory                      Hawaii Air Contaminant Limits                      Idaho Limits for Air Contaminants                      International Agency for Research on Cancer (IARC), Agents Classified by the IARC Monographs                      International Air Transport Association (IATA) Dangerous Goods Regulations, Prohibited List Passenger and Cargo Aircraft                      Michigan Exposure Limits for Air Contaminants                      Minnesota Permissible Exposure Limits (PELs)                      National Toxicology Program (NTP) 13th Report Part A Known to be Human Carcinogens                      New Jersey Right to Know, Special Health Hazard Substance List (SHHSL): Carcinogens                      NIOSH Recommended Exposure Limits (RELs)                      Oregon Permissible Exposure Limits (Z-1)                      OSHA Permissible Exposure Levels (PELs), Table Z1                      Tennessee Occupational Exposure Limits, Limits For Air Contaminants                      Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants,                      Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants, Toxic Substances Control Act (TSCA)                      Washington Permissible exposure limits of air contaminants                      Washington Toxic air pollutants and their ASIL, SQER and de minimis emission values,                      Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants</p>
<p><b>Water (7732-18-5) is found on the following regulatory lists</b></p>	<p>Toxic Substances Control Act (TSCA), Chemical Substance Inventory</p>

Chemical Oxygen Demand (COD) Vials

<p><b>Silver sulfate (10294-26-5) is found on the following regulatory lists</b></p>	<p>ACGIH Threshold Limit Values (TLV)          California Permissible Exposure Limits for Chemical Contaminants          Hawaii Air Contaminant Limits          Idaho, Limits for Air Contaminants          Michigan Exposure Limits for Air Contaminants          Minnesota Permissible Exposure Limits (PELs)          OSHA Permissible Exposure Levels (PELs) – Table Z1          Tennessee Occupational Exposure Limits, Limits For Air Contaminants          Toxic Substances Control Act (TSCA), Chemical Substance Inventory          Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants          Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants          Washington Permissible exposure limits of air contaminants          Wyoming Toxic and Hazardous Substances Table Z1 for Limits for Air Contaminants</p>
<p><b>Mercuric sulfate (7783-35-9) is found on the following regulatory lists</b></p>	<p>ACGIH Threshold Limit Values (TLV)          Alaska Limits for Air Contaminants          California OEHHA/ARB Acute Reference Exposure Levels and Target Organs (RELs)          California OEHHA/ARB Chronic Reference Exposure Levels and Target Organs (CRELs)          California Permissible Exposure Limits for Chemical Contaminants          California Proposition 65, Reproductive Toxicity          Hawaii Air Contaminant Limits          Idaho, Limits for Air Contaminants          International Agency for Research on Cancer (IARC), Agents Classified by the IARC Monographs          Michigan Exposure Limits for Air Contaminants          Minnesota Permissible Exposure Limits (PELs)          OSHA Permissible Exposure Levels (PELs), Table Z1          Priority List for the Development of Proposition 65 Safe Harbor Levels No Significant Risk Levels (NSRLs) for Carcinogens and Maximum Allowable Dose Levels (MADLs) for Chemicals Causing Reproductive Toxicity          Tennessee Occupational Exposure Limits, Limits For Air Contaminants          Toxic Substances Control Act (TSCA) Chemical Substance Inventory          Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants          Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants          Washington Permissible exposure limits of air contaminants          Wyoming Toxic and Z-1-A Transitional Limits for Air Contaminants</p>

**Potassium dichromate (7778-50-9) is found on the following regulatory lists**

ACGIH Threshold Limit Values (TLV)  
ACGIH Threshold Limit Values (TLV) - Carcinogens  
ATSDR Minimal Risk Levels for Hazardous Substances (MRLs)  
California Permissible Exposure Limits for Chemical Contaminants, ACGIH Threshold Limit Values (TLV), Carcinogens  
California Proposition 65, Reproductive Toxicity  
California Proposition 65, Carcinogens  
International Agency for Research on Cancer (IARC), Agents Classified by the IARC Monographs  
Michigan Exposure Limits for Air Contaminants  
Minnesota Permissible, Exposure Limits (PELs)  
National Toxicology Program 13th Report Part A, Known to be Human Carcinogens  
New Jersey Right to Know, Special Health Hazard Substance List (SHHSL): Mutagens  
New Jersey Right to Know, Special Health Hazard Substance List (SHHSL): Carcinogens  
Oregon Permissible Exposure Limits (Z-1)  
OSHA Permissible Exposure Levels (PELs), Table Z1  
Toxic Substances Control Act (TSCA), Chemical Substance Inventory  
Washington Permissible exposure limits of air contaminants  
Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants

## SECTION 16. OTHER INFORMATION

### Other information

The SDS is a Hazard Communication tool and should be used to assist in 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 R&D use only. Not for drug, household, or other uses. Judgments as to the suitability of information herein for the purchaser's purpose are necessarily the purchaser's responsibility. Therefore, although reasonable care has been taken in the preparation of such information, OI Analytical extends no warranties, makes no representations, and assumes no responsibility as to the accuracy or suitability of such information for application to the purchaser's intended purpose for consequences of its use.

© 2015 OI Analytical. License granted to make unlimited paper copies for internal use only.

OI Analytical, WTW, Global Water, and SI Analytics are trademarks of Xylem Inc. or one of its subsidiaries.