



Material Safety Data Sheet

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SECTION 1 PRODUCT AND COMPANY INFORMATION

Trade Name: 10X 2,4-Dinitrophenylhydrazine Solution
Catalogue Number(s): 90448 A component of OxyBlot™ Protein Oxidation Detection Kit, S7150
Chemical Name: Aqueous solution containing hydrogen chloride, and 2,4-Dinitrophenylhydrazine
Other trade names and synonyms: None
Manufacturer/Distributor: Millipore Corporation (Corporate Headquarters) Millipore S.A.S. (European Headquarters)
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SECTION 2 COMPOSITION / INFORMATION ON INGREDIENTS

Component	EINECS or ELINCS No.	CAS No.	Content (weight percent)	Symbol letters*	R Phrases**
Hydrogen chloride	231-595-7	7647-01-0	< 10 %	C Xi	R34 R37
2,4-Dinitrophenylhydrazine	204-309-3	119-26-6	< 0.8 - 1.2 %	Xn F	R1 R11 R20/21/22

* Symbol letters and categories of danger: **T+** = Very toxic, **T** = Toxic, **C** = Corrosive, **Xn** = Harmful, **Xi** = Irritant, **E** = Explosive, **F+** = Extremely flammable, **F** = Very flammable, **N** = Dangerous for the environment, **O** = Oxidising.

** The full text of each phrase is listed in Section 16.

This product contains water that is not a dangerous substance or hazardous chemical as defined in European Community Directives 67/548/EEC or 1999/45/EC, and Hazard Communication Standard 29 CFR 1910.1200.

SECTION 3 HAZARD IDENTIFICATION / EMERGENCY OVERVIEW

Classification: This product is a Corrosive according to Directive 1999/45/EC.

Adverse human health effects

- Contact with Eyes:** Vapors are irritating and may cause damage to the eyes. Contact may cause severe burns and permanent eye damage.
- Ingestion:** Swallowing hydrochloric acid can cause immediate pain and burns of the mouth, throat, esophagus and gastrointestinal tract. May cause nausea, vomiting, and diarrhea. Swallowing may be fatal.
- Inhalation (Short Term):** Acute exposure to hydrogen chloride vapor or aerosol produces inflammation and may cause ulceration of the nose, throat, and larynx; laryngeal spasm or pulmonary edema may occur on rare occasions.
- Inhalation (Long Term):** Dental discoloration and erosion of exposed incisors may occur on prolonged exposure to low concentrations of hydrogen chloride
- Skin Contact:** Chronic exposure by skin contact with aqueous solutions may result in dermatitis and photosensitization
- Target Organs:** Eyes, skin, respiratory system
- Medical conditions aggravated by exposure:** Persons with pre-existing skin disorders or eye disease may be more susceptible to the effects of this substance. Persons with pre-existing respiratory conditions, such as asthma or emphysema, may be especially sensitive to irritation by hydrogen chloride vapors.
- Adverse environmental effects:** This material is expected to be toxic to aquatic life.
- Adverse physiochemical effects:** Hydrochloric acid is corrosive to unprotected acid metals, such as aluminum, zinc, and steel. Contact with active metals may generate a sufficient volume of hydrogen to pose a fire or explosion hazard

SECTION 4 FIRST AID MEASURES

- Contact with Eyes:** In case of contact with eyes seek immediate medical assistance. Flush with copious amounts of water for at least 15 minutes. Assure adequate flushing by separating the eyelids with fingers. Symptoms include severe eye irritation and damage.
- Ingestion:** Do not induce vomiting. Seek immediate medical assistance. If person is conscious, give cupfuls of water or milk. Symptoms include sore throat, vomiting, diarrhea, and .burns of the mouth, throat and stomach.
- Inhalation:** Immediately remove from exposure, move to fresh air and summon medical attention. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Do NOT use mouth-to-mouth resuscitation. If breathing has ceased apply artificial respiration using oxygen and a suitable mechanical device such as a bag and a mask. Symptoms may include burning sensation, coughing, wheezing, laryngitis, shortness of breath, headache, nausea and vomiting.
- Skin Contact:** In case of contact, immediately summon medical attention and flush skin with copious amounts of water. Launder clothing before reuse. Symptoms include severe irritation and skin destruction.

SECTION 5 FIRE FIGHTING MEASURES

Flash Ignition Temperature:	Not applicable
Autoignition Temperature (ASTM D1929):	Not applicable
Suitable extinguishing media:	Water spray, carbon dioxide, dry chemical powder or foam. Hydrochloric acid solutions are not flammable; select extinguishing media best suited to extinguish the surrounding fire.
Unsuitable extinguishing media:	Foams may react with hydrochloric acid and release toxic and corrosive gases.
Special protective equipment for firefighters:	Hydrochloric acid vapors and aerosols are irritating and corrosive; use self-contained breathing apparatus in pressure-demand mode and full protective gear.
Special exposure hazards:	If released during a fire, large quantities of hydrochloric acid may react with active metals and generate significant volumes of hydrogen, which will add to the intensity of the fire. Behavior in fire: Pressurized container may explode and release toxic, irritating vapors.

SECTION 6 ACCIDENTAL RELEASE

Personal precautions:	Clear area of all unnecessary personnel and move upwind. Wear chemically resistant boots, clothing and gloves (nitrile, neoprene) to prevent skin contact, since hydrochloric acid is irritating and may be corrosive to the skin.
Small spills:	Clean up spills immediately. Wear appropriate protective clothing and if necessary breathing apparatus. Contain spill and absorb with sand, earth, inert material or vermiculite. Collect residues and place in labeled plastic containers. Avoid breathing vapors and contact with skin and eyes.
Large spills:	In addition to small spill precautions, clear area of all unnecessary personnel and move upwind, if aerosol formation is possible. Evacuate the area and summon personnel trained in hazardous materials spill response. If possible to do so safely, lay down booms or other spill barriers as the areas are evacuated.
Environmental precautions:	Hydrochloric acid runoff will adversely affect aquatic life. Prevent discharge to sewers and bodies of water.
Clean up measures:	Contain spill and absorb with sand, earth, or vermiculite. Commercial acid spill products may be used to neutralized and absorb the spill. Collect residues and place in labeled plastic containers. Larger spill may be absorbed in sand, sawdust or vermiculite, and stored in closed containers pending final disposition (See section 13). Wash spill area with detergent and water to remove residual contamination.

SECTION 7 HANDLING AND STORAGE

Handling:	Avoid contact with eyes and skin. Wear gloves. Do not inhale aerosols or vapors. May be harmful if swallowed. Use personal protective equipment outlined in section 8. Wash thoroughly after handling. Use with adequate ventilation.
Storage:	Store in cool, dry, well-ventilated location. Separate from oxidizing materials, organic materials, and alkalis.

SECTION 8 EXPOSURE CONTROL AND PERSONAL PROTECTION

	Normal Handling Conditions	Emergency Response Conditions
Respiratory protection:	Not normally required for normal use.	If aerosols are present - air purifying respirator with organic cartridges
Ventilation:	General room ventilation	If aerosols are present, provide exhaust ventilation
Eye protection:	Safety glasses with side shields	Chemical splash goggles.
Skin protection:	Nitrile gloves and laboratory coat.	Chemically resistant jacket, pants, gloves, boots and head covering

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Appearance:	Clear pink to red liquid
Odor:	Pungent, irritating odor
Odor Threshold:	0.77 ppm
pH:	<1
Melting Point:	20 to -25 °C
Boiling Point:	105 to 110 °C
Flash Ignition Point:	Not Applicable
Explosive Properties:	Reacts violently with many metals, with the generation of highly flammable hydrogen gas, which may explode.
Oxidizing Properties:	Not considered to have oxidizing properties.
Vapor pressure:	0.2 mm Hg
Solubility:	Infinite in water with slight evolution of heat.
Specific Gravity (Water = 1.0):	1.09
Vapor Density, 20 °C:	1.26
Viscosity, centipoise:	1.3
Partition coefficient (n-octanol/water):	1.8

SECTION 10 STABILITY AND REACTIVITY

Chemical Stability:	Stable under normal temperatures and pressures.
Incompatible With:	Reacts violently with bases, oxidizers forming toxic chlorine gas. Reacts, often violently, with acetic anhydride, active metals, aliphatic amines, alkanolamines, alkylene oxides, aromatic amines, amides, 2-aminoethanol, ammonia, ammonium hydroxide, calcium phosphide, chlorosulfonic acid, ethylene diamine, ethyleneimine, epichlorohydrin, isocyanates, metal acetylides, oleum, organic anhydrides, perchloric acid, 3-propiolactone, uranium phosphide, sulfuric acid, vinyl acetate, vinylidene fluoride. Highly corrosive to most metals, forming flammable hydrogen gas. Attacks some plastics, rubber, and coatings.

- Hazardous Decomposition Products:** Carbon monoxide, carbon dioxide, hydrogen fluoride vapors, and small quantities of nitrogen oxides. Reaction with oxidizers such as permanganates, chlorates, chlorites, and hypochlorites may produce chlorine or bromine gas.
- Conditions to Avoid:** Light, exposure to moist air or water, heat. Incompatible materials
- Hazardous Polymerization:** Aldehydes and epoxides in the presence of hydrochloric acid cause violent polymerization.

SECTION 11 TOXICOLOGICAL INFORMATION

- Inhalation:** May cause severe respiratory tract irritation. Symptoms may include sore throat, coughing, shortness of breath, and delayed pulmonary edema. Vapor and liquid may cause tooth and mucous membrane corrosion.
- Ingestion:** Will cause gastrointestinal irritation. Ingestion may cause corrosive of the esophagus and digestive tract. Ingestion of large quantities may result in vomiting, abdominal pain and possible death.
- Skin Contact:** May cause skin corrosion, accompanied by burns and ulceration. May be absorbed through the skin in harmful amounts.
- Eye Contact:** Will cause eye irritation and possible burns and irreversible eye damage. May cause painful sensitization to light.
- Carcinogenicity:** None of the components of these products are listed as carcinogenic by ACGIH, IARC, NTP, OSHA or California proposition 65.
- Chronic Toxicity:** Long term exposure to hydrogen chloride vapors may cause cell changes (hyperplasia) of nasal mucosa, larynx, and trachea and lesions in the nasal cavity, based upon animal studies.
- Toxicology Data:** Compound: Hydrogen chloride (100%) RTECS#: MW4025000
LD50, oral, rabbit: 900 mg/kg
LC50, inhalation, rat: 7,004 mg/m³/30M
LC50, inhalation, rat 45,000 mg/m³/5M
LC50, inhalation, mouse 1,108 mg/m³/5M
Hydrogen chloride has been shown to cause reproductive and mutagenic effect in laboratory animals.

SECTION 12 ECOLOGICAL INFORMATION

- Ecotoxicity:** This material is expected to be toxic to aquatic life.
LC50, Bluegill/Sunfish 3.6 mg/L product/liter test water (96 Hr; pH 3.0-3.5)

Environmental Fate: Environmental Fate:

Terrestrial Fate: If released to soil, hydrogen chloride will evaporate from dry soil surfaces and dissociate into chloride and hydronium ions in moist soil(1).

[(1) ATSDR; ToxFAQs for Hydrogen Chloride, April 2002, available at:

<http://www.atsdr.cdc.gov/tfacts173.html> as of July 20, 2007.]

Aquatic Fate: If released to water, hydrogen chloride dissociates readily in water to chloride and hydronium ions, decreasing the pH of the water(1). A Henry's law constant of 2.04×10^{-6} mol/L atm (4.90×10^{-10} cu m atm/mol) has been reported for hydrochloric acid(2). This Henry's Law constant indicates that hydrochloric acid is expected to be essentially nonvolatile from water surfaces(3).

[(1) ATSDR; ToxFAQs for Hydrogen Chloride, April 2002, available at:

<http://www.atsdr.cdc.gov/tfacts173.html> as of July 20, 2007. (2) Brimblecombe P, Clegg SL; J Atmos Chem 8: 95 (1989) (3) Lyman WJ et al; Handbook of Chemical Property Estimation Methods. Washington, DC: Amer Chem Soc pp. 15-1 to 15-29 (1990)]

Atmospheric Fate: Hydrogen chloride is removed from air by wet deposition as chloride salts with an atmospheric lifetime of 1-5 days(1).

[(1) Kao AS; J Air Waste Manage Assoc 44: 683-96 (1994)]

SECTION 13 DISPOSAL INFORMATION

European Union: When disposal is required, this product be considered according to the European Waste catalogue (European commission decision of 03/05/01 modifying directives 94/3/CE and 75/442/CE) as part of the following category:

06 01 02* hydrochloric acid

United States: **RCRA Requirements:** D002; A solid waste containing hydrochloric acid may become characterized as a hazardous waste when subjected to testing for corrosivity as stipulated in 40 CFR 261.21, and if so characterized, must be managed as a hazardous waste.

[40 CFR 261.22; U.S. National Archives and Records Administration's Electronic Code of Federal Regulations.]

SECTION 14 TRANSPORTATION INFORMATION

Proper Shipping Name: Hydrochloric Acid Solution

UN Identification Number: UN1789

Hazard Class: 8

Packing Group: II

Net Weight /Volume: 0.4 milliliters

SECTION 15 REGULATORY INFORMATION

Australia

Hazchem Code: 2R

Poisons Schedule Number: None Allocated

California

No Significant Risk Level: listed.

Canada		WHMIS: These products have WHMIS classifications of E, D2A.
European Union		Symbols: C Category of danger: None Risk phrases: R1: Explosive when dry. R11: Highly flammable. R22: Harmful if swallowed. R23: Toxic by inhalation. R34: Causes burns. R35: Causes severe burns. R36/37/38: Irritating to eyes, respiratory system and skin. R40: Possible risk of cancer. Safety phrases: S1/2: Keep locked up and out of the reach of children. S9: Keep container in a well-ventilated place. S26: In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. S36/37/39: Wear suitable protective clothing, gloves and eye/face protection. S45: In case of accident or if you feel unwell, seek medical advice immediately WEEE/RoHS: Not applicable
Japan	Poisonous and Deleterious Substances Control Law:	Hydrogen chloride is listed as a Deleterious Substance under the Poisonous and Deleterious Substances Control Law
United Kingdom	Control of Substances Hazardous to Health Regulations 2002 (COSHH) Rating:	Unknown
United States	Toxic Substances Control Act (TSCA):	All of the components of this product are listed on the EPA Toxic Substances Control Act (TSCA) Inventory.
Clean Water Act:	Hydrochloric acid is designated as a hazardous substance under section 311(b)(2)(A) of the Federal Water Pollution Control Act and further regulated by the Clean Water Act Amendments of 1977 and 1978. These regulations apply to discharges of this substance. This designation includes any isomers and hydrates, as well as any solutions and mixtures containing this substance. [40 CFR 116.4; U.S. National Archives and Records Administration's Electronic Code of Federal Regulations.]	

Atmospheric Standards: Listed as a hazardous air pollutant (HAP) generally known or suspected to cause serious health problems. The Clean Air Act, as amended in 1990, directs EPA to set standards requiring major sources to sharply reduce routine emissions of toxic pollutants. EPA is required to establish and phase in specific performance based standards for all air emission sources that emit one or more of the listed pollutants. Hydrochloric acid is included on this list.
[Clean Air Act as amended in 1990, Sect. 112 (b) (1) Public Law 101-549 Nov. 15, 1990]

CERCLA reportable Quantities: Persons in charge of vessels or facilities are required to notify the National Response Center (NRC) immediately, when there is a release of this designated hazardous substance, in an amount equal to or greater than its reportable quantity of 5000 lb or 2270 kg. The toll free number of the NRC is (800) 424-8802. The rule for determining when notification is required is stated in 40 CFR 302.4 (section IV. D.3.b).
[40 CFR 302.4; U.S. National Archives and Records Administration's Electronic Code of Federal Regulations.]

Occupational Exposure Limits

Component	Occupational Exposure Limits, ppm	
Hydrogen chloride (100%)	ACGIH Ceiling:	0.2
	United Kingdom WEL	1
	Japan OEL Ceiling	5
	US OSHA Ceiling	5
	European Union IOELV TWA	5
	STEL	10
	NIOSH IDLH	50

SECTION 16 ADDITIONAL INFORMATION

Abbreviations Used	
ACGIH	American Conference of Government Industrial Hygienists
ADR	European agreement on the international carriage of dangerous goods on road
CAS	Chemical Abstract Service
EINECS	European Inventory of Existing Commercial Chemical Substances
ELINCS	European List of Notified Chemical Substances
EPA	United States Environmental Protection Agency
IARC	International Agency for Research in Cancer.
IATA	International Air Transport Association
ICAO	International Civil Aviation Organization
IMDG	Regulations regarding the transportation of dangerous goods on ocean-going vessels issued by the International Maritime Organization.
LC ₅₀	Lethal Concentration 50% is the concentration of a chemical which kills 50% of a sample population
LD ₅₀	Lethal Dose 50% is the dose of a chemical which kills 50% of a sample population.
LDLo	Lowest observed lethal dose
MSFU	Manufacture, Formulation, Supply and Use (Section 13)

NIOSH National Institute of Occupational Safety and Health (US)
NTP National Toxicology Program (US)
OSHA United States Occupational Safety and Health Administration
RID International regulations concerning the international carriage of dangerous goods by rail.
RTECS Registry of Toxic Effects of Chemical Substances (US)
WHMIS Workplace Hazardous Materials Information System (Canada)

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