**SODIUM HYDROXIDE SOLUTIONS, 1N TO 10N*
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MATERIAL SAFETY DATA SHEET

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SUBSTANCE IDENTIFICATION

CAS-NUMBER 1310-73-2

SUBSTANCE: **SODIUM HYDROXIDE SOLUTIONS, 1N TO 10N**

TRADE NAMES/SYNONYMS: CAUSTIC SODA SOLUTION; LYE SOLUTION; SODA LYE; SODIUM HYDROXIDE SOLUTION; SODIUM HYDROXIDE LIQUID; WHITE CAUSTIC SOLUTION; OHS40175

CERCLA RATINGS (SCALE 0-3): HEALTH=3 FIRE=0 REACTIVITY=1 PERSISTENCE=0

COMPONENTS AND CONTAMINANTS

PERCENT: 40.0-50.0 COMPONENT: SODIUM HYDROXIDE CAS# 1310-73-2

PERCENT: 50.0-60.0 COMPONENT: WATER

OTHER CONTAMINANTS: NONE

EXPOSURE LIMITS:
2 MG/M3 OSHA TWA;
2 MG/M3 ACGIH CEILING;
2 MG/M3/15 MINUTES NIOSH RECOMMENDED CEILING

PHYSICAL DATA

DESCRIPTION: CLEAR LIQUID BOILING POINT: 234 F (112 C)

MELTING POINT: 5 F (-15 C) SPECIFIC GRAVITY: 1.3 PH: ALKALINE

SOLUBILITY IN WATER: COMPLETE

FIRE AND EXPLOSION DATA

FIRE AND EXPLOSION HAZARD:
NEGLIGIBLE FIRE AND EXPLOSION HAZARD WHEN EXPOSED TO HEAT OR FLAME.

FLASH POINT: NON-COMBUSTIBLE

FIREFIGHTING MEDIA:
DRY CHEMICAL, CARBON DIOXIDE, WATER SPRAY OR FOAM
(1984 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.3).

FOR LARGER FIRES, USE WATER SPRAY, FOG OR ALCOHOL FOAM
(1984 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.3).

FIREFIGHTING:
MOVE CONTAINERS FROM FIRE AREA IF POSSIBLE. COOL CONTAINERS EXPOSED TO FLAMES WITH WATER FROM SIDE UNTIL WELL AFTER FIRE IS OUT (1984 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.3).

USE AGENT SUITABLE FOR TYPE OF FIRE; USE FLOODING QUANTITIES OF WATER AS FOG, APPLY FROM AS FAR A DISTANCE AS POSSIBLE. AVOID BREATHING CORROSIVE VAPORS, KEEP UPWIND (BUREAU OF EXPLOSIVES, EMERGENCY HANDLING OF HAZARDOUS MATERIALS IN SURFACE TRANSPORTATION, 1981).

TRANSPORTATION DATA

DEPARTMENT OF TRANSPORTATION HAZARD CLASSIFICATION 49CFR172.101:
CORROSIVE MATERIAL

DEPARTMENT OF TRANSPORTATION LABELING REQUIREMENTS 49CFR172.101 AND 172.402:
CORROSIVE

TOXICITY

40 MG/KG INTRAPERITONEAL-MOUSE LD50; MUTAGENIC DATA (RTEC); CARCINOGEN STATUS: NONE.
SODIUM HYDROXIDE SOLUTIONS ARE CORROSIVE TO THE EYES, SKIN, AND MUCOUS MEMBRANES.

HEALTH EFFECTS AND FIRST AID

INHALATION:
CORROSIVE. 200 MG/M3 IS IMMEDIATELY DANGEROUS TO LIFE AND HEALTH.
ACUTE EXPOSURE- THE EFFECTS MAY VARY FROM MILD IRRITATION OF THE NOSE AT ABOUT 2 MG/M3 TO SEVERE PNEUMONITIS, DEPENDING ON THE SEVERITY OF EXPOSURE. LOW CONCENTRATIONS MAY CAUSE SORE THROAT, COUGHING, AND LABORED BREATHING. INTENSE EXPOSURES MAY RESULT IN DELAYED PULMONARY EDEMA.

CHRONIC EXPOSURE- PROLONGED EXPOSURE MAY CAUSE BRONCHIAL IRRITATION, COUGHING, BRONCHIAL PNEUMONIA, AND GASTROINTESTINAL DISTURBANCES.

FIRST AID- REMOVE FROM EXPOSURE AREA TO FRESH AIR IMMEDIATELY. IF BREATHING HAS STOPPED, GIVE ARTIFICIAL RESPIRATION. KEEP AFFECTED PERSON WARM AND AT REST. GET MEDICAL ATTENTION AS SOON AS POSSIBLE.

SKIN CONTACT:
CORROSIVE.
ACUTE EXPOSURE- ON THE SKIN, SOLUTIONS OF 25 TO 50% MAY CAUSE THE SENSATION OF IRRITATION WITHIN ABOUT 3 MINUTES. IF NOT REMOVED FROM THE SKIN, SEVERE BURNS WITH DEEP ULCERATIONS MAY OCCUR. EXPOSURE TO MIST MAY CAUSE MULTIPLE SMALL BURNS AND TEMPORARY LOSS OF HAIR.

CHRONIC EXPOSURE- REPEATED EXPOSURE MAY RESULT IN DERMATITIS.

FIRST AID- REMOVE CONTAMINATED CLOTHING WHILE RUNNING STREAMS OF WATER UNDER CLOTHING. WASH AFFECTED AREA WITH SOAP OR MILD DETERGENT AND LARGE AMOUNTS OF WATER (APPROXIMATELY 15-20 MINUTES) UNTIL NO EVIDENCE OF CHEMICAL REMAINS. FOR CHEMICAL BURNS, APPLY STERILE BANDAGE SECURELY, BUT NOT TOO TIGHTLY. GET MEDICAL ATTENTION.

EYE CONTACT:
CORROSIVE.
ACUTE EXPOSURE- CONTACT MAY CAUSE DISINTEGRATION AND SLOUGHING OF CONJUNCTIVAL AND CORNEAL EPITHELIUM, CORNEAL OPACIFICATION, MARKED EDEMA AND ULCERATION; AFTER 7 TO 13 DAYS EITHER GRADUAL RECOVERY BEGINS OR THERE IS PROGRESSION OF ULCERATION AND CORNEAL OPACIFICATION. COMPLICATIONS OF SEVERE EYE BURNS ARE SYMBLEPHARON WITH OVERGROWTH OF THE CORNEA BY A VASCULARIZED MEMBRANE, PROGRESSIVE OR RECURRENT CORNEAL ULCERATION AND PERMANENT CORNEAL OPACIFICATION.

CHRONIC EXPOSURE- REPEATED OR PROLONGED VAPOR CONTACT AT LOW LEVELS OF EXPOSURE MAY CAUSE CONJUNCTIVITIS.

FIRST AID- WASH EYES IMMEDIATELY WITH LARGE AMOUNTS OF WATER, OCCASIONALLY LIFTING THE UPPER AND LOWER LIDS, UNTIL NO EVIDENCE OF CHEMICAL REMAINS (APPROXIMATELY 15-20 MINUTES). GET MEDICAL ATTENTION.

INGESTION:
CORROSIVE.
ACUTE EXPOSURE- MAY CAUSE SEVERE ABDOMINAL PAIN, CORROSION OF THE LIPS, MOUTH, TONGUE, AND PHARYNX, AND VOMITING OF LARGE PIECES OF MUCOSA. ASPHYXIA CAN OCCUR FROM SWELLING OF THE THROAT. PERFORATION OF THE ESOPHAGUS AND STOMACH MAY OCCUR. CASES OF SQUAMOUS CELL CARCINOMA OF THE ESOPHAGUS HAVE OCCURRED WITH LATENT PERIODS OF 12 TO 42 YEARS AFTER INGESTION. THESE CANCERS WERE BELIEVED TO BE SEQUELA OF TISSUE DESTRUCTION AND POSSIBLY SCAR FORMATION RATHER THAN THE RESULT OF DIRECT CARCINOGENIC ACTION OF SODIUM HYDROXIDE ITSELF.

CHRONIC EXPOSURE- HAS NOT BEEN REPORTED IN HUMANS.

FIRST AID- DO NOT USE GASTRIC LAVAGE OR EMESIS. DILUTE THE ALKALI BY GIVING WATER OR MILK TO DRINK IMMEDIATELY AND ALLOWING VOMITING TO OCCUR. AS SOON AS POSSIBLE, HAVE QUALIFIED MEDICAL PERSONNEL DO ESOPHAGOSCOPY AND IRRIGATE INJURED AREAS WITH 1% ACETIC ACID UNTIL ALKALI IS COMPLETELY NEUTRALIZED. (DREISBACH, HANDBOOK OF POISONING, 11TH EDITION).

ANTIDOTE:
NO SPECIFIC ANTIDOTE. TREAT SYMPTOMATICALLY AND SUPPORTIVELY.

REACTIVITY

REACTIVITY:
THE SUBSTANCE IS A STRONG BASE. IT REACTS EXOTHERMICALLY WITH WATER RELEASING CORROSIVE FUMES OF SODIUM HYDROXIDE.

INCOMPATIBILITIES:
SODIUM HYDROXIDE:
ACETALDEHYDE: RESULTS IN VIOLENT POLYMERIZATION OF ACETALDEHYDE.
ACETIC ACID: MIXING IN A CLOSED CONTAINER INCREASES TEMPERATURE AND PRESSURE.
ACETIC ANHYDRIDE: MIXING IN A CLOSED CONTAINER INCREASES TEMPERATURE AND PRESSURE.
ACROLEIN: RESULTS IN AN EXTREMELY VIOLENT POLYMERIZATION OF ACROLEIN.
ACRYLONITRILE: VIOLENT POLYMERIZATION TAKES PLACE IN THE PRESENCE OF NAOH.
ALLYL ALCOHOL: AS A BENZENE EXTRACT OF ALLYL BENZENESULFONATE WAS PREPARED FROM ALLYL ALCOHOL AND BENZENE SULFONYL CHLORIDE IN THE PRESENCE OF AQUEOUS SODIUM HYDROXIDE, UNDER VACUM DISTILLATION TWO FRACTIONS CAME OFF, THEN THE TEMPERATURE ROSE TO 135 C, WHEN THE RESIDUE DARKENED AND EXPLODED.
ALLYL CHLORIDE: IN CONTACT WITH DRY SODIUM HYDROXIDE, HYDROLYSIS MAY TAKE PLACE PRODUCING ALLYL ALCOHOL.
ALUMINUM: VIGOROUS REACTION WITH THE EVOLUTION OF FLAMMABLE HYDROGEN GAS.
CHLORINE TRIFLUORIDE: VIOLENT REACTION.
CHLOROFORM AND METHYL ALCOHOL: EXOTHERMIC REACTION.
CHLOROHYDRIN: MIXING IN A CLOSED CONTAINER CAUSES AN INCREASE IN TEMPERATURE AND PRESSURE.
CHLORONITROTOLUENES: POSSIBLE EXPLOSION.
CHLOROSULFONIC ACID: MIXING IN A CLOSED CONTAINER CAUSES AN INCREASE IN TEMPERATURE AND PRESSURE.
1,2-DICHLOROETHYLENE: MAY FORM SPONTANEOUSLY FLAMMABLE MONOCHLOROACETYLENE.
ETHYLENE CYANOHYDRIN: MIXING IN A CLOSED CONTAINER CAUSES AN INCREASE IN TEMPERATURE AND PRESSURE.
GLYOXAL: MIXING IN A CLOSED CONTAINER INCREASES TEMPERATURE AND PRESSURE.
HALOGENATED HYDROCARBONS: VIOLENT REACTION.
HYDROCHLORIC ACID: MIXING IN A CLOSED CONTAINER CAUSES AN INCREASE IN TEMPERATURE AND PRESSURE.
HYDROFLUORIC ACID: MIXING IN A CLOSED CONTAINER CAUSES AN INCREASE IN TEMPERATURE AND PRESSURE.
HYDROQUINONE: RAPID DECOMPOSITION OF HYDROQUINONE WITH EVOLUTION OF HEAT.
MALEIC ANHYDRIDE: EXPLOSIVE DECOMPOSITION.
METALS: CORRODES METALS, REACTING TO FORM FLAMMABLE HYDROGEN GAS.
NITRIC ACID: MIXING IN A CLOSED CONTAINER INCREASES TEMPERATURE AND PRESSURE.
NITROETHANE: FORMS AN EXPLOSIVE SALT.
NITROMETHANE: FORMS AN EXPLOSIVE SALT.
NITROPARAFFINS: THE NITROPARAFFINS, IN THE PRESENCE OF WATER, FORM DRY SALTS WITH ORGANIC BASES. THE DRY SALTS ARE EXPLOSIVE.
NITROPROPANE: FORMS AN EXPLOSIVE SALT.
OLEUM: MIXING IN A CLOSED CONTAINER CAUSES AN INCREASE IN TEMPERATURE AND PRESSURE.
PENTOL (3-METHYL-2-PENTEN-4-YN-1-OL): POSSIBLE EXPLOSION.
PHOSPHORUS: PHOSPHORUS BOILED WITH ALKALINE HYDROXIDES YIELDS MIXED PHOSPHINES WHICH MAY IGNITE SPONTANEOUSLY IN AIR.
PHOSPHORUS PENTOXIDE: EXTREMELY VIOLENT REACTION WHEN INITIATED BY LOCAL HEATING.
B-PROPIOLACTONE: MIXING IN A CLOSED CONTAINER CAUSES AN INCREASE IN TEMPERATURE AND PRESSURE.
SULFURIC ACID: MIXING IN A CLOSED CONTAINER CAUSES AN INCREASE IN TEMPERAURE

AND PRESSURE.
TETRACHLOROBENZENE AND METHYL ALCOHOL: POSSIBLE EXPLOSION.
TETRAHYDROFURAN: SERIOUS EXPLOSIONS CAN OCCUR.
TRICHLOROETHYLENE: FORMATION OF EXPLOSIVE MIXTURES OF DICHLOROACETYLENE.
WATER: SODIUM HYDROXIDE IN CONTACT WITH WATER MAY GENERATE ENOUGH HEAT TO IGNITE ADJACENT COMBUSTIBLES.

DECOMPOSITION:
MAY RELEASE TOXIC FUMES OF SODIUM OXIDE, WHICH CAN REACT WITH WATER OR STEAM TO PRODUCE HEAT AND FLAMMABLE HYDROGEN VAPORS.

POLYMERIZATION:
NOT KNOWN TO OCCUR.

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CONDITIONS TO AVOID

AVOID CONTACT WITH OR STORAGE WITH WATER, ACIDS, AND OTHER INCOMPATIBILITIES.
FLAMMABLE, POISONOUS GASES MAY ACCUMULATE IN TANKS AND HOPPER CARS.

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SPILL AND LEAK PROCEDURES

SOIL SPILL:
DIG HOLDING AREA SUCH AS LAGOON, POND OR PIT FOR CONTAINMENT.

USE PROTECTIVE COVER SUCH AS A PLASTIC SHEET TO PREVENT MATERIAL FROM DISSOLVING IN FIRE EXTINGUISHING WATER OR RAIN.

WATER SPILL:
ADD SUITABLE AGENT TO NEUTRALIZE SPILLED MATERIAL TO PH-7.

OCCUPATIONAL SPILL:
DO NOT TOUCH SPILLED MATERIAL. STOP LEAK IF YOU CAN DO IT WITHOUT RISK. FOR SMALL SPILLS, TAKE UP WITH SAND OR OTHER ABSORBENT MATERIAL AND PLACE INTO CONTAINERS FOR LATER DISPOSAL. FOR SMALL DRY SPILLS, WITH CLEAN SHOVEL PLACE MATERIAL INTO CLEAN, DRY CONTAINER AND COVER. MOVE CONTAINERS FROM SPILL AREA. FOR LARGER SPILLS, DIKE FAR AHEAD OF SPILL FOR LATER DISPOSAL. KEEP UNNECESSARY PEOPLE AWAY. ISOLATE HAZARD AREA AND DENY ENTRY.

PROTECTIVE EQUIPMENT

VENTILATION:
PROVIDE LOCAL EXHAUST VENTILATION SYSTEM TO MEET PERMISSIBLE EXPOSURE LIMITS.

RESPIRATOR:

100 MG/M3- HIGH-EFFICIENCY PARTICULATE RESPIRATOR WITH A FULL FACEPIECE.
SUPPLIED-AIR RESPIRATOR WITH A FULL FACEPIECE, HELMET, OR HOOD.
SELF-CONTAINED BREATHING APPARATUS WITH A FULL FACEPIECE.

200 MG/M3- POWERED AIR-PURIFYING RESPIRATOR WITH A HIGH-EFFICIENCY PARTICULATE FILTER AND A FULL FACEPIECE.
TYPE C SUPPLIED-AIR RESPIRATOR WITH A FULL FACEPIECE OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE OR WITH A FULL FACEPIECE, HELMET, OR HOOD OPERATED IN CONTINUOUS-FLOW MODE.

ESCAPE- DUST MASK, EXCEPT SINGLE-USE AND QUARTER-MASK RESPIRATORS. SELF-CONTAINED BREATHING APPARATUS.

FIREFIGHTING- SELF-CONTAINED BREATHING APPARATUS WITH A FULL FACEPIECE OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE.

CLOTHING:
EMPLOYEE MUST WEAR APPROPRIATE PROTECTIVE CLOTHING AND EQUIPMENT TO PREVENT ANY POSSIBILITY OF SKIN CONTACT WITH THIS SUBSTANCE.

GLOVES:
EMPLOYEE MUST WEAR APPROPRIATE PROTECTIVE GLOVES TO PREVENT CONTACT WITH THIS SUBSTANCE.

EYE PROTECTION:
EMPLOYEE MUST WEAR SPLASH-PROOF OR DUST-RESISTANT SAFETY GOGGLES AND A FACESHIELD TO PREVENT CONTACT WITH THIS SUBSTANCE.

WHERE THERE IS ANY POSSIBILITY THAT AN EMPLOYEE'S EYES MAY BE EXPOSED TO THIS SUBSTANCE, THE EMPLOYER SHALL PROVIDE AN EYE-WASH FOUNTAIN WITHIN THE IMMEDIATE WORK AREA FOR EMERGENCY USE.

AUTHORIZED - ALLIED FISHER SCIENTIFIC
CREATION DATE: 11/12/85 REVISION DATE: 11/14/85

-ADDITIONAL INFORMATION-