ATTN: SAFETY DIRECTOR
MARY PINTERN/ CREDIT CARD ORD
UNIVERSITY OF WISCONSIN WHITewater
P O BOX 296
WHITEWATER WI 53190

EMERGENCY PHONE 1-414-273-3850
DATE 06/01/99
CUST#: 523216
PO#: CC/2444G REQ

M A T E R I A L  S A F E T Y  D A T A  S H E E T  P A G E  1

SECTION 1. - - - - - - - CHEMICAL IDENTIFICATION - - - - - - -

CATALOG #: 21346-2
NAME: SODIUM BOROHYDRIDE, 99%

SECTION 2. - - - - COMPOSITION/INFORMATION ON INGREDIENTS - - - - -

CAS #: 16940-66-2
MF: H3BNA
EC NO: 241-004-4

SYNONYMS
BOROHYDRURE DE SODIUM (FRENCH) * BOROL * HICKITEX DF * SODIUM
BOROHYDRATE * SODIUM HYDROBORATE * SODIUM TETRAHYDROIDOBORATE(1-) *
SODIUM TETRAHYDROBORATE(1-) *

SECTION 3. - - - - HAZARDS IDENTIFICATION - - - - - -

LABEL PRECAUTIONARY STATEMENTS
FLAMMABLE (USA)
HIGHLY FLAMMABLE (EU)
TOXIC
CONTACT WITH WATER LIBERATES EXTREMELY FLAMMABLE GASES.
TOXIC BY INHALATION, IN CONTACT WITH SKIN AND IF SWALLOWED.
CAUSES BURNS.
IN CASE OF FIRE, USE DRY POWDER. NEVER USE WATER.
KEEP CONTAINER TIGHTLY CLOSED AND DRY.
IN CASE OF ACCIDENT OR IF YOU FEEL UNWELL, SEEK MEDICAL ADVICE
IMMEDIATELY (SHOW THE LABEL WHERE POSSIBLE).
WEAR SUITABLE PROTECTIVE CLOTHING, GLOVES AND EYE/FACE
PROTECTION.
MOISTURE SENSITIVE

SECTION 4. - - - - - - - FIRST-AID MEASURES - - - - - - -

IN CASE OF CONTACT, IMMEDIATELY FLUSH EYES OR SKIN WITH COPIOUS
AMOUNTS OF WATER FOR AT LEAST 15 MINUTES WHILE REMOVING CONTAMINATED
CLOTHING AND SHOES.
IF INHALED, REMOVE TO FRESH AIR. IF NOT BREATHING GIVE ARTIFICIAL
RESPIRATION. IF BREATHING IS DIFFICULT, GIVE OXYGEN.
IF SWALLOWED, WASH OUT MOUTH WITH WATER PROVIDED PERSON IS CONSCIOUS.
CALL A PHYSICIAN.
DISCARD CONTAMINATED CLOTHING AND SHOES.

SECTION 5. - - - - - - - FIRE FIGHTING MEASURES - - - - - - -

EXTINGUISHING MEDIA
DO NOT USE:
WET CHEMICAL
WATER

CONTINUED ON NEXT PAGE
CATALOG #: 21346-2
NAME: SODIUM BOROHYDRIDE, 99%

CARBON DIOXIDE. HALOCARBONS
USE:
DRY CHEMICAL POWDER.
SODA ASH
DOLOMITE
DRY SAND

SPECIAL FIREFIGHTING PROCEDURES
WEAR SELF-CONTAINED BREATHING APPARATUS AND PROTECTIVE CLOTHING TO
PREVENT CONTACT WITH SKIN AND EYES.
FLAMMABLE SOLID.

UNUSUAL FIRE AND EXPLOSIONS HAZARDS
EMITS TOXIC FUMES UNDER FIRE CONDITIONS.
MATERIAL READILY REACTS WITH WATER GENERATING FLAMMABLE AND/OR
EXPLOSIVE HYDROGEN GAS.
REACTS WITH WATER TO LIBERATE FLAMMABLE AND/OR EXPLOSIVE GAS.

SECTION 6. - - - - - - ACCIDENTAL RELEASE MEASURES- - - - - - - - -
EVACUATE AREA.
WEAR SELF-CONTAINED BREATHING APPARATUS, RUBBER BOOTS AND HEAVY
RUBBER GLOVES.
Sweep up, place in a bag and hold for waste disposal.
Avoid raising dust.
Ventilate area and wash spill site after material pickup is complete.

SECTION 7. - - - - - - HANDLING AND STORAGE- - - - - - - - -
REFER TO SECTION 8.

ADDITIONAL INFORMATION
SODIUM BOROHYDRIDE IN DIMETHYLFORMAMIDE (DMF) WILL UNDERGO RUNAWAY
THERMAL REACTIONS RESULTING IN VIOLENT DECOMPOSITIONS. AN INDUCTION
PERIOD IS INVOLVED AND IT IS TEMPERATURE DEPENDENT. E.G., 45 HOURS AT
62°C AND 45 MINUTES AT 90°C. THE TEMPERATURE CAN REACH THE
AUTOIGNITION TEMPERATURE (190°C) OF TRIMETHYLLAMINE, THE REACTION BY-
PRODUCT. THE ADDITION OF SUPPORTED NOBLE METAL CATALYSTS TO SOLUTIONS
OF SODIUM BOROHYDRIDE CAN RESULT IN IGNITION OF LIBERATED HYDROGEN
GAS. THE REDUCTION OF RUTHENIUM SALTS SOLUTIONS WITH BOROHYDRIDE
SOLUTIONS TO GIVE THE METAL OR AN ALLOY GAVE SOLID PRODUCTS WHICH
WERE DRIED AND SUBSEQUENTLY EXPLODED WHEN DISTURBED BY A SPATULA OR
ON CONTACT WITH WATER.

MIXING SOLID SODIUM BOROHYDRIDE WITH CHARCOAL (ACTIVATED CARBON) IN
AIR PROMOTES THE OXIDATION OF THE SODIUM BOROHYDRIDE, PRODUCING A SELF-
HEATING REACTION THAT MAY RESULT IN THE IGNITION OF THE CHARCOAL AND
IN PRODUCTION OF HYDROGEN THROUGH THERMAL DECOMPOSITION OF SODIUM
BOROHYDRIDE. THE SPONTANEOUS COMBUSTION IN AIR OCCURS AT 90-100°C. THE
PRESENCE OF MOISTURE IN THE AIR CAUSES THE IGNITION TO OCCUR MORE
READILY.

SECTION 8. - - - - - EXPOSURE CONTROLS/PERSONAL PROTECTION- - - - -
CONTINUED ON NEXT PAGE
CATALOG #: 21346-2
NAME: SODIUM BOROHYDRIDE, 99%

WEAR APPROPRIATE NIOSH/MSHA-APPROVED RESPIRATOR, CHEMICAL-RESISTANT GLOVES, SAFETY GOGGLES, OTHER PROTECTIVE CLOTHING.
USE ONLY IN A CHEMICAL FUME HOOD.
SAFETY SHOWER AND EYE BATH
FACESHIELD (8-INCH MINIMUM).
DO NOT BREATHE DUST.
DO NOT GET IN EYES, ON SKIN, ON CLOTHING.
WASH THOROUGHLY AFTER HANDLING.
KEEP TIGHTLY CLOSED.
KEEP AWAY FROM HEAT, SPARKS, AND OPEN FLAME.
STORE IN A COOL, DRY PLACE.

SECTION 9. - - - - - - PHYSICAL AND CHEMICAL PROPERTIES - - - - - -

APPEARANCE AND ODOR
WHITE POWDER

PHYSICAL PROPERTIES
MELTING POINT: 400°C (DEC)
EXPLOSION LIMITS IN AIR:
LOWER:
SPECIFIC GRAVITY: 1.074
3.02%

SECTION 10. - - - - - - STABILITY AND REACTIVITY - - - - - -

STABILITY
STABLE.

INCOMPATIBILITIES
OXIDIZING AGENTS
ACIDS
MAY DECOMPOSE ON EXPOSURE TO MOIST AIR OR WATER.
CHEMICALLY ACTIVE METALS

HAZARDOUS COMBUSTION OR DECOMPOSITION PRODUCTS
BORANE/BORON OXIDES
SODIUM OXIDE

HAZARDOUS POLYMERIZATION
WILL NOT OCCUR.

SECTION 11. - - - - - - TOXICOLOGICAL INFORMATION - - - - - -

ACUTE EFFECTS
TOXIC BY INHALATION, INGESTION OR SKIN ABSORPTION.
MATERIAL IS EXTREMELY Destructive TO TISSUE OF THE MUCOUS MEMBRANES
AND UPPER RESPIRATORY TRACT, EYES AND SKIN.
INHALATION MAY RESULT IN SPASM, INFLAMMATION AND EDEMA OF THE LARYNX AND BRONCHI, CHEMICAL PNEUMONITIS AND PULMONARY EDEMA.
SYMPTOMS OF EXPOSURE MAY INCLUDE BURNING SENSATION, COUGHING,
WHEEZING, LARYNGITIS, SHORTNESS OF BREATH, HEADACHE, NAUSEA AND

CONTINUED ON NEXT PAGE
CATALOG #: 21346-2
NAME: SODIUM BOROHYDRIDE, 99%

VOMITING.
TO THE BEST OF OUR KNOWLEDGE, THE CHEMICAL, PHYSICAL, AND
TOXICOLOGICAL PROPERTIES HAVE NOT BEEN THOROUGHLY INVESTIGATED.

RTECS #: ED3325000
BORATE(1-), TETRAHYDRO-, SODIUM

TOXICITY DATA
IPR-RAT LD50: 18 MG/KG AMHAB 17.124.1958
ONLY SELECTED REGISTRY OF TOXIC EFFECTS OF CHEMICAL SUBSTANCES
(RTECS) DATA IS PRESENTED HERE. SEE ACTUAL ENTRY IN RTECS FOR
COMPLETE INFORMATION.

SECTION 12. ECOCLOGICAL INFORMATION
DATA NOT AVAILABLE.

SECTION 13. DISPOSAL CONSIDERATIONS
CONTACT A LICENSED PROFESSIONAL WASTE DISPOSAL SERVICE TO DISPOSE OF
THIS MATERIAL.

SECTION 14. TRANSPORT INFORMATION
CONTACT ALDRICH CHEMICAL COMPANY FOR TRANSPORTATION INFORMATION.

SECTION 15. REGULATORY INFORMATION
EUROPEAN INFORMATION
HIGHLY FLAMMABLE
TOXIC
R 15
CONTACT WITH WATER LIBERATES EXTREMELY FLAMMABLE GASES.
R 23/24/25
TOXIC BY INHALATION, IN CONTACT WITH SKIN AND IF SWALLOWED.
R 34
CAUSES BURNS.
HIGHLY FLAMMABLE
S 43
IN CASE OF FIRE, USE DRY POWDER. NEVER USE WATER.
S 7/8
KEEP CONTAINER TIGHTLY CLOSED AND DRY.
S 45
IN CASE OF ACCIDENT OR IF YOU FEEL UNWELL, SEEK MEDICAL ADVICE
IMMEDIATELY (SHOW THE LABEL WHERE POSSIBLE).
S 36/37/39
WEAR SUITABLE PROTECTIVE CLOTHING, GLOVES AND EYE/FACE
PROTECTION.

REVIEWS, STANDARDS, AND REGULATIONS
OEL=MAK

CONTINUED ON NEXT PAGE
CATALOG #: 21346-2
NAME: SODIUM BOROHYDRIDE, 99%

NOHS 1974: HZD 83757; NIS 5; TNF 162; NOS 4; TNE 977
NOES 1983: HZD 83757; NIS 5; TNF 274; NOS 11; TNE 14408; TFE 2344
EPA TS C A SECTION 8(B) CHEMICAL INVENTORY
EPA TS C A TEST SUBMISSION (TSCATS) DATA BASE, MARCH 1999

SECTION 16. OTHER INFORMATION - - - - - - - - - -

THE ABOVE INFORMATION IS BELIEVED TO BE CORRECT BUT DOES NOT PURPORT TO
BE ALL INCLUSIVE AND SHALL BE USED ONLY AS A GUIDE. ALDRICH SHALL NOT BE
HELD LIABLE FOR ANY DAMAGE RESULTING FROM HANDLING OR FROM CONTACT WITH
THE ABOVE PRODUCT. SEE REVERSE SIDE OF INVOICE OR PACKING SLIP FOR
ADDITIONAL TERMS AND CONDITIONS OF SALE.

COPYRIGHT 1998 SIGMA-ALDRICH CO.
LICENSE GRANTED TO MAKE UNLIMITED PAPER COPIES FOR INTERNAL USE ONLY.