IRON MOUNTAIN WEDING FLUX
BLACKWATER FORGE
1735 Pleasant Grove Rd.
Dolomite, AL 35061
P: 205 7449866
F: 205 7449868

Iron Mountain Material Safety Data Sheet
Revision Date: 11/19/12
Revision Number: 0
1 - Substance Identification
Material/Trade Name: Iron Mountain Welding Flux
Type: Welding Flux
Application: Forge Welding
Company: Blackwater Forge
Address: 1735 Pleasant Grove Rd.
Dolomite, AL 35061
Telephone: 205 7449866
Fax: 205 7449868
E-mail: blackwaterforge@bellsouth.net
2 – Composition
SodiumTetraborate, 75 percent (%) Na2B4O7, 25 percent (%) iron shavings Fe
3 - Hazard Identification
Emergency overview
Iron Mountain flux is a white gray, odorless, powder substance that is not flammable, combustible, or explosive and has low acute oral and dermal toxicity.
Potential ecological effects
Large amounts of Iron Mountain Flux can be harmful to plants and other species. Therefore, releases to the environment should be minimized.
Potential health effects
Routes of exposure: Inhalation is the most significant route of exposure in occupational and other settings. Dermal exposure is not usually a concern because Iron Mountain is poorly absorbed through intact skin.
Inhalation: Occasional mild irritation effects to the nose and throat may occur from inhalation of Iron Mountain Flux dust at levels greater than 10 mg/m3.
Eye contact: Iron Mountain Flux is non-irritating to the eyes in normal industrial use. 2

Skin contact: Iron Mountain Flux does not cause irritation to intact skin.
Ingestion: Products containing Iron Mountain Flux are not intended for ingestion. Iron Mountain Flux has a low acute toxicity. Small amounts (e.g., a teaspoon) swallowed accidentally are not likely to cause effects; swallowing amounts larger than that may cause gastrointestinal symptoms.
Cancer: Iron Mountain Flux is not a known carcinogen.
Reproductive/developmental: Animal ingestion studies in several species, at high doses, indicate that borates cause reproductive and developmental effects. A human study of occupational exposure to borate dust showed no adverse effect on reproduction.
Target organs: No target organ has been identified in humans. High dose animal ingestion studies indicate the testes are the target organs in male animals.
Signs and symptoms of exposure: Symptoms of accidental over-exposure to Iron Mountain Flux might include nausea, vomiting and diarrhea, with delayed effects of skin redness and peeling. These symptoms have been associated with the accidental overexposure to the chemically related substance boric acid.
Refer to Section 11 for details on Toxicological data.

4 - First Aid Measures

Inhalation: If symptoms such as nose or throat irritation are observed, remove person to fresh air.
Eye contact: Use eye wash fountain or fresh water to cleanse the eye. If irritation persists for more than 30 minutes, seek medical attention.
Skin contact: No treatment necessary because non-irritating.
Ingestion: Swallowing small quantities (one teaspoon) will cause no harm to healthy adults. If larger amounts are swallowed, give two glasses of water to drink and seek medical attention.

5 – Fire-fighting measures

General hazard: None, because Iron Mountain Flux is not flammable, combustible or explosive. The product is itself a flame retardant.
Extinguishing media: Any fire extinguishing media may be used on nearby fires.
Flammability classification (29 CFR 1910.1200): Nonflammable solid.

6 – Accidental Release Measures 3

General: Iron Mountain Flux is a water-soluble white powder that may, at high concentrations, cause damage to trees or vegetation by root absorption. (Refer to Ecological information, Section 12, for specific information.)
Land spill: Vacuum, shovel or sweep up Iron Mountain Flux and place in containers for disposal in accordance with applicable local regulations. Avoid contamination of water bodies during cleanup and disposal. Personal protective equipment is not needed to cleanup land spills.
Spillage into water: Where possible, remove any intact containers from the water. Advise local water authority that none of the affected water should be used for irrigation or for the abstraction of potable water until natural dilution returns the boron value to its normal environmental background level. (Refer to Sections 12, 13 and 15 for additional information.)
Iron Mountain Flux is a non-hazardous waste when spilled or disposed of, as defined in the Resource Conservation and Recovery Act (RCRA) regulations (40 CFR 261).

7 – Handling and Storage

General: No special handling precautions are required, but dry, indoor storage is recommended. To maintain package integrity and to minimize caking of the product, bags should be handled on a first-in, first-out basis. Good housekeeping procedures should be followed to minimize dust generation and accumulation.
Storage temperature: Ambient
Storage pressure: Atmospheric
Special sensitivity: Moisture (caking)

8 – Exposure Control / Personal Protection

Engineering controls: Use local exhaust ventilation to keep airborne concentrations of Iron Mountain Flux dust below permissible exposure levels.
Personal protection: Where airborne concentrations are expected to exceed exposure limits, NIOSH/MSHA certified respirators should be used. Eye goggles and gloves are not required for normal industrial exposures, but may be warranted if environment is excessively dusty.
Occupational exposure limits: Iron Mountain Flux is regulated by OSHA, Cal OSHA and ACGIH.
ACGIH/TLV: 1 mg/m3
Cal OSHA/PEL: 5 mg/m3 4

OSHA/PEL (total dust): 10 mg/m3

9 – Physical & Chemical Properties

Appearance: White, odorless, crystalline solid

Specific gravity: 2.37

Vapor pressure: Negligible @ 20°C

Solubility in water: 3.1% @ 25°C; 2.48% @ 20°C

Heat of solution 2.13x105 J/kg (92 BTU/lb) (absorbed)

Melting point: 742°C (1367°F) (crystalline phase)

pH @ 20°C: 9.3 (3% solution)

Molecular weight: 201.27

10 – Stability and Reactivity

General: Iron Mountain Flux is a stable product. If wetted it reacts exothermically, forming hydrated sodium borates.

Incompatible materials and conditions to avoid: Reaction with strong reducing agents, such as metal hydrides or alkali metals, will generate hydrogen gas, which could create an explosive hazard.

Hazardous decomposition: None.

11 - Toxicological Information

Acute toxicity

Ingestion: Low acute oral toxicity; LD50 in rats is 2,400 to 2,600 mg/kg of body weight (based on sodium tetraborate decahydrate experimental data).

Skin/dermal: Low acute dermal toxicity; LD50 in rabbits is greater than 2,000 mg/kg of body weight. Iron Mountain Flux is poorly absorbed through intact skin.

Inhalation: No experimental test data.

Skin irritation: No experimental test data. Hydrated sodium tetraborates are non-irritants.

Eye irritation: No experimental test data. Eye irritation seen in rabbits treated with hydrated sodium tetraborates. Many years of occupational exposure to sodium tetraborates indicate no adverse effects on human eye. Therefore, Iron Mountain Flux is not considered to be a human eye irritant in normal industrial use.

Sensitization: No experimental data; however, other borates including disodium tetraborate pentahydrate are not skin sensitisers.

Other

Reproductive/developmental toxicity: Animal feeding studies in rat, mouse and dog, at high doses, have demonstrated effects 5

on fertility and testes2. Studies with the chemically related boric acid in the rat, mouse and rabbit, at high doses, demonstrate developmental effects on the fetus, including fetal weight loss and minor skeletal variations3, 4. The doses administered were many times in excess of those to which humans would normally be posed5.

Carcinogenicity/mutagenicity: No evidence of carcinogenicity in mice6. No mutagenic activity was observed for boric acid in a battery of short-term mutagenicity assays.

Human data: Human epidemiological studies show no increase in pulmonary disease in occupational populations with chronic exposures to boric acid dust and sodium borate dust. A recent epidemiology study under the conditions of normal occupational exposure to borate dusts indicated no effect on fertility7.

12 – Ecological Information

Ecotoxicity data

General: Boron (B) is the element in Iron Mountain Flux which is used by convention to report borate product ecological effects. It occurs naturally in sea-water at an average concentration of 5 mg B/L and generally occurs in fresh water at concentrations up to 1 mg B/L. In dilute aqueous solutions the predominant boron species present is undissociated boric acid. To convert sodium tetraborate into the equivalent boron (B) content, multiply by 0.2149.

Phytotoxicity: Boron is an essential micronutrient for healthy growth of plants; however, it can be harmful to boron sensitive plants in high quantities. Care should be taken to minimize the amount of Iron Mountain Flux released to the environment.

Algal toxicity:

Green algae, *Scenedesmus subspicatus*
96-hr EC10 = 24 mg B/L†

Invertebrate toxicity8:

Daphnids, *Daphnia magna straus*
24-hr EC50 = 242 mg B/L†
Test substance: † sodium tetraborate

Fish toxicity:

Sea-water9:
Dab, *Limanda limanda*
96-hr LC50 = 74 mg B/L†
Fresh water10:
Rainbow trout, *S. gairdneri* (embryo-larval stage)
24-day LC50 = 88 mg B/L†
32-day LC50 = 54 mg B/L† 6

Goldfish, *Carassius auratus* (embryo-larval stage)
7-day LC50 = 65 mg B/L†
3-day LC50 = 71 mg B/L†

Environmental fate data

Persistence/degradation: Boron is naturally occurring and ubiquitous in the environment. Iron Mountain Flux decomposes in the environment to natural borate.

Octanol/water partition coefficient: No value. In aqueous solution sodium tetraborate is converted substantially into undissociated boric acid.

Soil mobility: Iron Mountain Flux is soluble in water and is leachable through normal soil.

13 – Disposal Considerations

Disposal guidance: Small quantities of Iron Mountain Flux can usually be disposed of at landfill sites. No special disposal treatment is required, but local authorities should be consulted about any specific local requirements. Tonnage quantities of product should, if possible, be used for an appropriate application.

RCRA (40 CFR 261): Iron Mountain Flux is not listed under any sections of the Federal Resource Conservation and Recovery Act (RCRA).

NPRI (Canada): Iron Mountain Flux is not listed on the Canadian National Pollutant Release Inventory.

Refer to Section 15 for additional regulatory information.

14 – Transport Information

DOT hazardous classification: Iron Mountain Flux is not regulated by the U.S. Department of Transportation (DOT) and is therefore not considered a hazardous material/substance.

TDG Canadian transportation: Iron Mountain Flux is not regulated under Transportation of Dangerous Goods (TDG).

15 – Regulatory Information

OSHA/Cal OSHA: This MSDS document meets the requirements of both OSHA (29 CFR 1910.1200) and Cal OSHA (Title 8 CCR 5194 (g)) hazard communication standards. Refer to Section 8 for regulatory exposure limits.

WHMIS classification: Iron Mountain Flux is classified as Class D- Division 2A under Canadian WHMISguidelines.

Chemical inventory listing: Iron Mountain Flux, 1330-43-4, appears on several chemical inventory lists (including 7

the EPA TSCA inventory, Canadian DSL, European EINECS, Japanese MITI, Australian and Korean lists) under the CAS No. representing this inorganic salt.
U.S. EPA TSCA Inventory 1330-43-4
Canadian DSL 1330-43-4
EINECS 215-540-4
South Korea 1-760
Japanese MITI (1)-69
RCRA: Sodium tetraborate is not listed as a hazardous waste under any sections of the Resource Conservation and Recovery Act (RCRA) or regulations (40 CFR 261 *et seq*).
Superfund: CERCLA/SARA. Sodium tetraborate is not listed under CERCLA or its 1986 amendments, SARA, including substances listed under Section 313 of SARA, Toxic Chemicals, 42 USC 11023, 40 CFR 372.65, Section 302 of SARA, Extremely Hazardous Substances, 42 USC 11002, 40 CFR 355, or the CERCLA Hazardous Substances list, 42 USC 9604, 40 CFR 302.
Safe Drinking Water Act (SDWA): Sodium tetraborate is not regulated under the SDWA, 42 USC 300g-1, 40 CFR 141 *et seq*. Consult state and local regulations for possible water quality advisories regarding boron compounds.
Clean Water Act (CWA) (Federal Water Pollution Control Act): 33 USC 1251 *et seq*.
a) Sodium tetraborate (Iron Mountain Flux) is not itself a discharge covered by any water quality criteria of Section 304 of the CWA, 33 USC 1314.
b) It is not on the Section 307 List of Priority Pollutants, 33 USC 1317, 40 CFR 129.
c) It is not on the Section 311 List of Hazardous Substances, 33 USC 1321, 40 CFR 116.
Canadian drinking water guideline: An "Interim Maximum Acceptable Concentration" (IMAC) for boron is currently set at 5 mg B/L.
IARC: The International Agency for Research on Cancer (IARC) (a unit of the World Health Organization) does not list or categorize Sodium tetraborate as a carcinogen.
NTP Biennial Report on Carcinogens: Sodium tetraborate is not listed.
OSHA carcinogen: Sodium tetraborate is not listed.
California Proposition 65: Sodium tetraborate (Iron Mountain Flux) is not listed on the Proposition 65 list of carcinogens or reproductive toxicants.
Federal Food, Drug and Cosmetic Act: Pursuant to 21 CFR 175.105, 176.180 and 181.30, Iron Mountain Flux is approved by the FDA for use in adhesive components of packaging materials, as a component of paper coatings on such materials, or for use in the 8

manufacture thereof, which materials are expected to come in contact with dry food products.

Clean Air Act (Montreal Protocol): Iron Mountain Flux was not manufactured with and does not contain any Class I or Class II ozone depleting substances.

16- Other Information

Product label text hazard information*:

- Use in well ventilated space
- Potential skin, eye and lung irritant
- Always wear eye protection and appropriate clothing
- Not for use in food, drug, or pesticides.

National Fire Protection Assoc. (NFPA) Classification:

Health 0
Flammability 0
Reactivity 0

Hazardous Materials Information Systems (HMIS):

Red: (Flammability) 0
Yellow: (Reactivity) 0
Blue: (Acute Health) 1*
*Chronic Effects