



U.S. Department
of Transportation

**Pipeline and Hazardous
Materials Safety
Administration**

1200 New Jersey Avenue, SE
Washington, DC 20590

JUN 06 2017

John King
Chief, Rations & Equipment Branch
Defense Logistics Agency
700 Robbins Avenue
Philadelphia, PA 19111

Reference No. 17-0002

Dear Mr. King:

This letter is in response to your December 29, 2016, letter requesting clarification of the Hazardous Materials Regulations (HMR; 49 CFR Parts 171-180) applicable to the transportation of flameless ration heaters (FRH) as a component packaged into individual operational rations. In your letter and subsequent phone call, you describe and provide safety data sheets (SDS) for certain Individual Operational Rations, including, but not limited to Meal, Ready-to-Eat (MRE) that are packed with an FRH containing 8 grams of magnesium alloy.

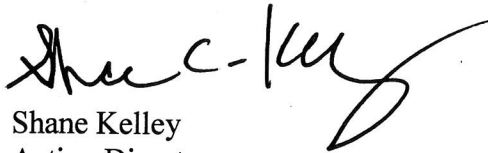
We have paraphrased and answered your questions as follows:

- Q1. You ask whether Individual Operational Rations packed with an FRH that contains 8 grams of magnesium alloy or less is subject to the HMR as a hazardous material.
- A1. PHMSA regulates the transportation in commerce of materials in an "amount and form [that] may pose an unreasonable risk to health and safety or property." 49 U.S.C 5103, as delegated to PHMSA in 49 C.F.R 1.53(b). This Office determined in Ref. No. 08-0046 that an MRE packed with an FRH containing 8 grams or less of magnesium alloy is not in a quantity and form that poses an unreasonable risk to health, safety, or property during transportation regardless of the number of MREs in a package. This interpretation remains valid. Therefore, Individual Operational Rations, such as MREs, are not subject to the HMR. Please note that this determination does not apply to FRH devices shipped separately from Individual Operational Rations that are not hermetically sealed or to FRH devices containing more than 8 grams of magnesium alloy, which must be shipped in conformance with the applicable requirements of the HMR.
- Q2. You ask if an SDS for the magnesium alloy needs to accompany shipments of MREs that contain an FRH.

A2. The HMR does not require an SDS to accompany a shipment of hazardous materials. In addition, based on the above determination, no other documentation or hazard communication requirements of the HMR apply.

I hope this information is helpful. Please contact us if we can be of further assistance.

Sincerely,

A handwritten signature in black ink, appearing to read "Shane Kelley", with a stylized flourish at the end.

Shane Kelley
Acting Director
Standards and Rulemaking Division

Dodd, Alice (PHMSA)

Ciccarone
§171.1
Applicability

17-0002

From: INFOCNTR (PHMSA)
Sent: Friday, December 30, 2016 9:41 AM
To: Hazmat Interps
Subject: FW: Request Letter of Interpretation
Attachments: FRH Hazard DOT 1992pdf.pdf; FRH Hazard DOT 1999.PDF; FRH Hazard DOT 2008.pdf; FRH-SDS-NY 161209.pdf; FRH Req letter of interpretation 161229.docx; FRH-MSDS-Inno-131127.pdf; FRH-MSDS-Inno-131127.pdf

Follow Up Flag: Follow up
Flag Status: Flagged

Hi Shante/Alice,

Please submit this as a letter of interpretation. It appears a colleague of Mr. King spoke with Jodi.

Please let me know if you have any questions.

Thanks,
Jordan

-----Original Message-----

From: King, John R CIV DLA TROOP SUPPORT (US) [mailto:John.King@dla.mil]
Sent: Thursday, December 29, 2016 11:16 AM
To: INFOCNTR (PHMSA) <INFOCNTR.INFOCNTR@dot.gov>
Cc: Lowry, Arthur B CIV DLA TROOP SUPPORT (US) <arthur.lowry@dla.mil>; Pritts, Keith A CIV DLA TROOP SUPPORT (US) <keith.pritts@dla.mil>; Garcia, Eugene J CW2 USARMY DLA TROOP SUPPORT (US) <Eugene.Garcia@dla.mil>
Subject: Request Letter of Interpretation

To whom it may concern,
Please review the attached information and provide interpretation & guidance.

V/r,
John

John R. King
Chief, Operational Rations and Equipment Technical Branch DLA Troop Support-FTSC
(P) 215.737.3822
(DSN)444.3822
(C) 267.234.8547
(F) 215.737.0379
John.King@dla.mil

Enclosure
Supporting Technical Data
USDOT letter dtd 7 July 1992
USDOT letter Ref. No. 98-0345
USDOT letter Ref. No. 08-0046
Luxfer Magtech MSDS dtd Nov 2103



DEFENSE LOGISTICS AGENCY
TROOP SUPPORT
700 ROBBINS AVENUE
PHILADELPHIA, PENNSYLVANIA 19111-5092

IN REPLY
REFER TO: FTRE

29 December, 2106

US Department of Transportation
Pipeline and Hazardous Materials Safety Administration
1200 New Jersey Avenue, SE
Washington, DC 20590

To whom it may concern,

DLA Troop Support requests a letter of interpretation for shipping flameless ration heaters (FRH) as a component packaged into individual operational rations.

On July 7, 1992, the DOT issued a competent authority approval (CAA) to the effect that, "Based on a technical review of a FRH single unit packed with a MRE, we have determined that this unit is not subject to the Department's Hazardous Materials Regulations (HMR). This determination is based on the small quantity of hazardous material (maximum quantity of 8 grams of magnesium powder per single unit) in relation to the total mass of each MRE package."

Attached are the original DOT Letter from 1992 and DOT letters from 1999 (Ref. No. 98-0345) and 2008 (Ref. No. 08-0046) reiterating the 1992 determination that "a single FRH device, containing eight grams of magnesium alloy or less packaged in a tough plastic envelope within an MRE, is in a quantity and form which does not pose a hazard in transportation and is not subject to the Hazardous Materials Regulations (HMR), regardless of the number of MREs in a package."

Please note that the letter from 2008 affirms that "the previously issued interpretations you cite in your inquiry remain valid. A flameless heater containing eight grams or less of MAGNESIUM-iron alloy (as magnesium powder) is in a quantity and form that does not pose a hazard in transportation and, thus, is not subject to the HMR", referring to the letters of 1992 and 1999.

It is understood that none of the above referenced determinations apply to FRH devices shipped separately from hermetically sealed individual rations, or to FRH devices containing more than eight grams of magnesium alloy, which must be shipped in conformance to the applicable requirements of the HMR. Water or liquid that may react with the water reactive substance shall not be included in the packaging.

1. REQUEST 1: Defense Logistics Agency requests that a Letter of Interpretation for FRHs contained in Individual Operational Rations be issued that recognizes the Individual Operational Rations including, but not limited to, "Meal, Ready-to-Eat, Individual", "Meal, Religious, Halal, Ready-to-Eat, Individual", and "Meal, Religious, Kosher, Ready-to-Eat, Individual" where the FRH is packaged within the individual ration meal bag as not being

subject to the HMR.

2. REQUEST 2: Defense Logistics Agency requests a determination by USDOT as to whether or not either an MSDS or an SDS is required to be either attached to a unitized loads of Individual Operational Rations, or to be included in the shipping papers accompanying deliveries of the same. Two SDS are attached, the May 2015 SDS being that in use at present, the transport information in Section 14 declaring the loads to be PG I. The second SDS, dated December 2016, was issued due to the presently occurring situation, i.e. military and civilian personnel involved in our transportation system, having read the SDS declaring the loads to be PG I are refusing to ship and/or store our rations. Non-HMR material that is identified as PG I material is interrupting the transportation and delivery of DLA rations, impeding our armed forces and emergency services ability to conduct operations world-wide.

Sincerely,

/s/

John R. King
Chief, Rations & Equipment Technical Branch

Enclosure
Supporting Technical Data
USDOT letter Ref. No. 98-0345
USDOT letter Ref. No. 08-0046
Luxfer Magtech SDS dtd May 2105
Luxfer Magtech SDS dtd Dec 2016



U.S. Department
of Transportation

Pipeline and Hazardous
Materials Safety
Administration

1200 New Jersey Avenue, SE
Washington, D.C. 20590

JUN 12 2008

Mr. Stanley Peterburgsky
530 West 186th Street
New York, New York 10033

Ref. No. 08-0046

Dear Mr. Peterburgsky:

This responds to your e-mail regarding the applicability of the Hazardous Materials Regulations (HMR; 49 CFR Parts 171-180) to flameless heaters used to warm packaged meals for human consumption. You ask whether previously issued *de minimus* interpretations (Ref. No. 98-0345 issued on March 3, 1999; Letter to Department of Defense issued on July 7, 1992) for certain flameless heaters are still valid and under what conditions. Additionally, you ask whether the meals may be warmed in-flight by a passenger if the heaters are not subject to the HMR.

The flameless heater you describe is manufactured by Innotech Products, Ltd. (Innotech) and contains a maximum of eight grams of a magnesium-iron alloy (as magnesium powder). Innotech's Material Safety Data Sheet indicates that the magnesium alloy contained in its flameless heaters meets the definition of a Division 4.3 (Dangerous When Wet) material. The salt water catalyst for the heater is securely packaged separately within the meal carton. Each meal carton contains one heater and one water packet.

The previously issued interpretations you cite in your inquiry remain valid. A flameless heater containing eight grams or less of a magnesium-iron alloy (as magnesium powder) is in a quantity and form that does not pose a hazard in transportation and, thus, is not subject to the HMR. This exception does not apply to a heater that is packaged separately from a meal or a heater that contains more than eight grams of magnesium powder within a meal carton.

The Transportation Security Administration (TSA) is the agency responsible for security in all modes of transportation, including civil aviation, and has the authority to restrict passengers from carrying materials perceived as security threats. We note that the Internet website belonging to the company that markets the meals you wish to consume in-flight

cautions its customers not to activate the flameless heater on an airplane. For information about items that may be prohibited by the TSA, you should contact the TSA's Contact Center directly by telephone at (866) 289-9673 or by e-mail at: TSA-ContactCenter@dhs.gov.

I trust this satisfies your inquiry. Please contact us if we can be of further assistance.

Sincerely,

A handwritten signature in black ink, appearing to read 'H. Mitchell', with a stylized flourish at the end.

Hattie L. Mitchell
Chief, Regulatory Review and Reinvention
Office of Hazardous Materials Standards



U.S. Department
of Transportation

**Research and
Special Programs
Administration**

400 Seventh Street, S.W.
Washington, D.C. 20590

MAR 18 1999

Neal Langerman, Ph.D.
8909 C Complex Drive
San Diego, CA 92123-1418

Ref. No. 98-0345

Dear Dr. Langerman:

This is in response to your letter and telephone conversations with a member of my staff regarding clarification of the requirements for shipping flameless ration heaters (FRH) in full pack (multiple) quantities or in single units as components of meals, ready-to-eat (MRE), and a previous letter dated July 7, 1992 to the Department of Defense (DOD) concerning classification of these items. I apologize for the delay in responding and hope it has not caused any inconvenience.

The FRH is a device packaged in a tough plastic envelope which, when water is added, generates heat to warm a field ration. It is used in military meals, ready-to-eat (MRE), and each MRE includes one FRH. You indicated that the magnesium alloy contained in the FRH meets the definition of Division 4.3 (Dangerous When Wet).

Based on the information you provided, it is our determination that a single FRH device, containing eight grams of magnesium alloy or less packaged in a tough plastic envelope within an MRE, is in a quantity and form which does not pose a hazard in transportation and is not subject to the Hazardous Materials Regulations (HMR), regardless of the number of MREs in a package. This determination does not apply to FRH devices shipped separately from MREs, or to FRH devices containing more than eight grams of magnesium alloy, which must be shipped in conformance to the applicable requirements of the HMR.

I hope this satisfies your inquiry. If we can be of further assistance, please contact us.

Sincerely,

Edward T. Mazzullo
Director, Office of Hazardous
Materials Standards

173.124

**FAX TRANSMITTAL FORM
ADVANCED CHEMICAL SAFETY**

8909 C Complex Drive
San Diego, CA 92123-1418

DATE: November 16, 1998

TO: HELEN INGRUM

COMPANY: U.S. DOT

FAX NUMBER: 202 366-3012

TELEPHONE NUMBER:

TOTAL PAGES, INCLUDING THIS ONE: 4

FROM: NEAL LANGERMAN

ACSAFETY File:

IF THERE ARE ANY PROBLEMS WITH THE CONDITION OF THESE PAGES CONTACT ME
AT THE FOLLOWING PHONE: 619/874-5577

OUR FAX PHONE: 619/874-8239

Helen:

I have attached the letter we discussed on Friday, November 13, 1998. At this point, I need a very clear statement (verbally or written) regarding shipping these items. The flameless ration heater (FRH) is a device packaged in a tough plastic envelop which, when water is added, generates heat to warm a field ration. It is used in military meals ready to eat (MREs). Each MRE includes one FRH. When activated with water, 8 grams of the magnesium alloy generates 9 liters of hydrogen.

Based on this, the alloy clearly meets the hazard class 4.3 definition as US2813.

Issue #1

Individually packaged, these FRH with or without a MRE, are exempt from regulation for shipment by highway, because of the exempt quantity (less than 30 grams). If 12 FRHs or FRH/MRE units are placed in a single outside package, the package is fully regulated as UN2813. Is this correct?

Issue #2

Is a shipment of pallet quantities of MREs (with FRHs included) regulated as UN2813? This is different from Issue #1, since that addresses a small shipment of one package and issue #2 addresses a full truck load.

98-0345

Consultant

Englum

\$ 173.124

I would like to find out if any follow-up to the July 7, 1992 letter occurred. At this point, it has become very important that this regulatory issue be fully and finally resolved. It is urgent that an answer is developed within the next seven to fourteen days.

Please call me after you review this FAX and we can discuss how to proceed. Thank you for your cooperation.

Neal Langerman, Ph.D.

Stevens
§ 173.124(b)(2)
Applicability
08-0046

Drakeford, Carolyn <PHMSA>

From: Stevens, Michael <PHMSA>
Sent: Thursday, February 21, 2008 3:01 PM
To: Drakeford, Carolyn <PHMSA>
Subject: Stevens interp

As you requested:

Requestor: Mr. Stanley Peterburgsky
530 West 186th Street
New York, New York 10033

Question: Are La Briute Meals containing a water-activated heating apparatus regulated under the HMR?

Section: § 173.124(b)(2)

Subject: Self-heating materials

Enclosure 1 – Supporting Technical Data

MRE Assembly Contract Requirements –

<http://www.dla.mil/Portals/104/Documents/TroopSupport/Subsistence/Rations/acrs/mre/m037.pdf>

Flameless Ration Heater Technical Requirements documents –

<http://www.dla.mil/TroopSupport/Subsistence/Operationalrations/mildtl/44398.aspx>

2. UNIT PRODUCT IDENTIFICATION

Ration Supplement, Flameless Heater (manufacturer designation)

Ration Supplement, Flameless Heater, for Meal, Ready-to-Eat (DoD designation)

Flameless Ration Heater, FRH (also frequently used)

National Stock Number (NSN) discrepancies can be found in existing DLA Technical Data:

The original FRH unit heater stock number was 8970-01-349-7049. The original FRH bulk-case of heaters stock number was 9870-01-321-9153. Currently 9870-01-321-9153 is the stock number for both the FRH unit heater and the bulk-case of heaters. DLA does not currently buy or store bulk cases of heaters.

Recommended designation for NSN 9870-01-321-9153:

Ration Supplement, Flameless Heater, for Meal, Individual Ration

CONTEXT: An individual eight gram FRH is hermetically sealed in a water-proof primary package (plastic bag), which is then hermetically sealed within a water-proof intermediate package (meal bag or accessory bag), which is then packed into a fiberboard shipping case, which is then palletized as a unitized load.

3. FRH MANUFACTURER (<http://luxfermagtech.com/>) maintains two production facilities:

Luxfer Magtech Inc.

Cincinnati Plant

2940 Highland Ave., Unit 210

Cincinnati, OH 45212

(800) 503-4483

Luxfer Magtech Inc.

Riverhead Plant

680 Elton St

River Head, NY 11901

4. FRH CHARACTERISTICS

Net weight: 8 grams (+ 2 grams), excluding plastic bag primary package

Substances are combined in product, except the wetting agent

CAS #

Magnesium – 5% Iron Alloy:

Magnesium

7439-95-4

Iron

7439-89-6

Silicon Dioxide

7631-86-9

Sodium Chloride

7647-14-5

Sodium Tripolyphosphate
Wetting Agent

7758-29-4
proprietary

5. INDIVIDUAL OPERATIONAL RATION PROGRAMS USING INDIVIDUALLY PACKAGED FRH AS A MEAL COMPONENT

8970-01-424-1998 , MEAL, RELIGIOUS, HALAL, Ready-to-Eat, Individual, at least 8 Meat and at most 4 Vegetarian menus, 12 menus per case. Unit of Issue: Case, Shelf-life 10 months at 80 °F

8970-01-424-1996 , MEAL, RELIGIOUS, KOSHER, Ready-to-Eat, Individual, at least 8 Meat and at most 4 Vegetarian menus, 12 menus per case. Unit of Issue: Case, Shelf-life 10 months at 80 °F

8970-00-149-1094, MEAL, READY-TO-EAT, INDIVIDUAL, Menus 1-12 (Case A); Menus 13-24 (Case B); 12 meals per shipping case, ACR-M-037, TPK-2 item, Shelf-life 36 months at 80 °F

6. DESTINATIONS RECEIVING INDIVIDUAL OPERATIONAL RATIONS CONTAINING INDIVIDUALLY PACKAGED FRHS AS A MEAL COMPONENT

- a. Direct vendor delivery to consumer organizations
- b. DLA inventory control points (defense distribution warehouse stock)
- c. Prepositioned stocks

Recommended storage conditions: -40 °F to 80 °F
Method of transportation,: rail, road, sea, air

7.a. FRH PACKAGING REQUIREMENTS FOR DVD AND DLA INVENTORY STOCK

Requires editing to match currently procured FRHs, see 3.2.3, 3.4.2, 3.4.3.

RATION SUPPLEMENT, FLAMELESS HEATER, FOR MEAL, READY-TO-EAT
MIL-R-44398B, 20 September 1993, W/CHANGE 03 1 MAY 2003

3. REQUIREMENTS

3.2.1 Supercorroding alloy. The supercorroding alloy shall be Mg-5atomic%Fe produced from magnesium metal powder and food grade electrolytic iron powder by solid state blending in a vibratory ball mill. The alloy shall be of such purity and uniformity that the performance of the finished ration heater will meet all requirements of this document.

3.2.2 Alloy additives. Fillers, binders, and additives, including electrolytes, wetting agents, and flow agents used in the heater construction shall be of such purity and uniformity that the performance of the finished ration heater will meet all requirements of this document.

3.2.3 Protective cover. The heater element shall be sealed within a

protective cover constructed of a gas and water permeable material. (Protective covering no longer used)

3.2.4 Plastic bag. The plastic bag shall be a clear, natural, high density polyethylene bag that will function as protective packaging for the heater and serve as a container to hold both the heater and the MRE entree pouch while the heating process takes place. The bag shall conform to the requirements shown on Drawing 6-1-8920.

3.3 Design of heater pad. The heater element shall consist of a supercorroding Mg-Fe alloy powder and an electrolyte toughener with flow and wetting agents. The magnesium and iron function as anode and cathode, respectively. The electrolyte is activated by the addition of water which initiates a rapid corrosion of the magnesium particles within the matrix. The products of the chemical reaction are heat, magnesium hydroxide, and gaseous hydrogen.

3.4 Heater construction.

3.4.1 Heater. The heater element materials shall be uniformly blended and fixed in a matrix that will assure conformity to the performance requirements.

3.4.2 Heater element protective covering. Heater elements shall be contained in a protective cover as specified in 3.2.3. Covers shall be heat sealable or sealed with hot melt adhesive. (Protective covering no longer used)

3.4.3 Insertion in bag. The heater paperboard with protective paperboard cover shall be sealed within the plastic bag specified in 3.2.4. The seals of the finished bag shall be of adequate strength and integrity to withstand the leakage test specified in 4.4.4 without leaking. (Protective paperboard cover no longer used)

Drawing 6-1-8920 - Bag, Ration Heater, revised 16 Aug 02: (specifications)

Material: HDPE clear side welded bag

Bag inside dimensions: 12-14 inches x 5 inches

Material thickness: 2.5 mil minimum

Procurement Specifications:

MIL-PRF-44398B, 20 SEP 93, w/change 03, 01 MAY 03

<http://www.dla.mil/TroopSupport/Subsistence/Operationalrations/mildtl/44398.aspx>

Drawing 6-1-8920, w/change 24 OCT 13

<http://www.dla.mil/TroopSupport/Subsistence/Operationalrations/mildtl/44398.aspx>

Packaging Requirements and Quality Assurance Provisions for MIL-R-44398, 16 NOV 00

<http://www.dla.mil/TroopSupport/Subsistence/Operationalrations/mildtl/44398.aspx>

7.b. FRH PACKAGING REQUIREMENTS FOR PREPOSITIONED STOCK

PACKAGING REQUIREMENTS AND QUALITY ASSURANCE PROVISIONS FOR MIL-R-44398, RATION SUPPLEMENT, FLAMELESS RATION HEATER FOR ASSEMBLY OF MEAL, READY-TO- EAT, INDIVIDUAL FOR PREPOSITIONED STOCK

PKGQA 44398, 16 NOVEMBER 2000

D-1 PACKAGING

A. Packaging. The packaging of the heaters and heater bags into the preformed pouches shall occur in the heater manufacturer's plant. Heaters and heater bags shall be packaged into the preformed pouches within 48 hours of production or shall be stored in a controlled environment(not to exceed 50 percent relative humidity)prior to packaging into preformed bags.

(1) Preformed pouches.

a. Pouch material. The preformed pouch shall be fabricated from 0.002 inch thick ionomer or polyethylene film laminated or extrusion coated to 0.00035 inch thick aluminum foil which is then laminated to 0.0005 inch thick polyester. The three plies shall be laminated with the polyester on the exterior of the pouch. All tolerances for thickness of pouch material shall be plus or minus 20 percent. The material shall show no evidence of delamination, degradation, or foreign odor when heat sealed or fabricated into pouches. The material shall be suitably formulated for food packaging and shall not impart an odor or flavor to the product. The complete exterior surface of the pouch shall be uniformly colored in the range of 20219, 30219, 30279, 30313, 30324, or 30450 of FED-STD-595.

b. Pouch construction. The pouch shall be a flat style preformed pouch having maximum inside dimensions of 5 inches wide by 7-1/4 inches long (\pm 1/8 inch in each dimension). The pouch shall be made by heat sealing three edges with minimum 1/8 wide seals. The heat seals shall be made in a manner that will assure hermetic seals. The side and bottom seals shall have an average seal strength of not less than 6 pounds per inch of width and no individual specimen shall have a seal strength of less than 5 pounds per inch of width when tested as specified in E-5, A,(4),a. Alternatively, the filled and sealed pouch shall exhibit no rupture or seal separation greater than 1/16 inch or seal separation that reduces the effective closure seal width to less than 1/16 inch when tested for internal pressure resistance as specified in E-5, A,(4),c. A tear nick or tear notch shall be provided on one outside edge or two opposite outside edges of the pouch to facilitate easy opening of the filled and sealed pouch. A 1/8 inch (+ 1/16 inch) wide lip may be incorporated at the open end of the pouch to facilitate opening and filling of the pouch.

c. Pouch filling and sealing. When specified, the FRH shall be inserted into the pouch and heat sealed. The closure seal shall be free of foldover wrinkles or entrapped matter that reduces the effective closure seal width to less than 1/16 inch. Seals shall be free of impression or design on the seal surface that would conceal or impair visual detection of seal defects. The average seal strength shall be not less than 6 pounds per inch of width and no individual specimen shall have a seal strength of less than 5 pounds per inch of width when tested as specified in E-5,A,(4),b. Alternatively, the filled and sealed pouch shall exhibit no rupture or seal separation greater than 1/16 inch or seal separation that reduces the effective closure seal width to less than 1/16 inch when tested for internal pressure resistance as specified in E-5,A,(4),c.

Procurement Specifications:

MIL-PRF-44398B, 20 SEP 93, w/change 03, 01 MAY 03 (see 7.a. above)

<http://www.dla.mil/TroopSupport/Subsistence/Operationalrations/mildtl/44398.aspx>

Drawing 6-1-8920, w/change 24 OCT 13 (see 7.a. above)

<http://www.dla.mil/TroopSupport/Subsistence/Operationalrations/mildtl/44398.aspx>

Packaging Requirements and Quality Assurance Provisions for MIL-R-44398, 16 NOV 00

<http://www.dla.mil/TroopSupport/Subsistence/Operationalrations/mildtl/44398.aspx>

DLA TECHNICAL DATA FOR THE FRH INDIVIDUALLY PACKAGED AND PACKED IN AN INDIVIDUAL OPERATIONAL RATION BY RATION PROGRAM

9.a. Assembly Requirements, Meal, Ready-to-Eat, Individual (MRE)

Part I –Technical Data for MRE Assembly

D-1. PACKAGING:

Packaging level is A. Requirements applicable to subassembly packet/accessory packets, time-temperature indicator (TTI) labels, meal bags, subassembly/accessory packet assembly, and meal assembly are specified in Section D-1 of the currently contractual Assembly Contract Requirements (ACR) document.

D-2. LABELING:

Labeling requirements applicable to subassembly/accessory packets and meal bags are specified in Section D-2 of the currently contractual Assembly Contract Requirements (ACR) document.

D-3. PACKING:

Packing level is A. Packing Requirements are specified in Section D-3 of the currently contractual Assembly Contract Requirements (ACR) document.

D-4. UNITIZATION:

A. Unitization requirements are specified in section D-4 of the currently contractual Assembly Contract Requirements (ACR) document.

D-5. MARKING:

A. ASSEMBLED RATION SHIPPING CONTAINERS:

6. To be in compliance with OSHA requirements, when the shipping container contains Flameless Ration Heater (FRHs) the following information must appear on a major flap of the shipping case closure immediately to the right of the marked end panel. The upper case letters shall not be more than ¼ inch high. The lower case letters shall not be less than 3/16 inch high.

Note: WATER ACTIVATED Flameless Ration Heater,
NSN 9870-01-321-9153, supplied in each menu bag.

B. ASSEMBLED RATION UNIT LOADS:

3. A Material Safety Data Sheet (MSDS) shall be placed on each unit load in accordance with MIL-R-44398. The MSDS shall be placed inside a clear or translucent plastic sleeve with "MSDS ENCLOSED" clearly printed in dark, contrasting ink. The plastic sleeve shall be securely attached to one side of the unit load with pressure-sensitive tape or adhesive.

4. One copy of the MSDS shall be included with the shipping papers and one copy shall also be included with the vehicle manifest.

D-1 PACKAGING

A. Componentents.

(3) Meal bag. The meal bag shall be made from food grade, low density polyethylene (LDPE) tubing or tubing made from a blend of food grade, low density polyethylene (LDPE) and linear low density polyethylene (LLDPE). Additives may be used in order to improve sealability, peelability, tear resistance or other attributes provided all additives are approved for food contact. Polyethylene shall have a minimum thickness of 0.010 inch. Inside dimensions of the bag shall not exceed 8-1/2 inches by 13-1/4 inches. One seal shall be a minimum 1/8 inch wide, continuous, peelable seal that forms a hermetic closure. Alternative bag construction, bag materials, and material thicknesses may be used provided that the alternative method can be demonstrated to meet or exceed the requirements of this document, military abuse testing and controlled pest testing.

B. Assembly

(2) Meal assembly. Each applicable component for each meal as described in table III shall be inserted in a meal bag. The bag shall be closed with a heat seal not less than 1/8 inch wide. The closure seal shall have an average seal strength of not less than 4 pounds per inch of width with no individual specimen test result less than 3 pounds per inch of width.

D-2 LABELING

B. Meal bag. Each meal bag shall be correctly and legibly labeled on at least one face with permanent ink or other dark contrasting color with the information contained in accordance with Figures 1, 2 or 3, as applicable.

Each Figure illustrating meal bag labeling includes, "FLAMELESS RATION HEATERS ARE PROHIBITED ON COMMERCIAL AIRLINES UNLESS SEALED IN ORIGINAL MEAL BAG".

D-3 PACKING

A. Packing. Twelve meals shall be packed in a fiberboard box. Case "A" shall contain meals 1 through 12, and case "B" shall contain meals 13 through 24. The fiberboard box shall conform to RSC-L of ASTM D5118/D5118M, Standard Practice for Fabrication of Fiberboard Shipping Boxes and grade V2s of ASTM D4727/D4727M, Standard

Specification for Corrugated and Solid Fiberboard Sheet Stock (Container Grade) and Cut Shapes, except the requirements for dry burst strength shall be minimum 425 psi, the requirement for wet burst strength shall be minimum 250 psi and the laminated board thickness shall be 0.069 inches. [US Army Research, Development and Engineering Command; Natick Soldier Research, Development, and Engineering Center found that solid fiberboard shipping container material consisting of two outer facings of 90 pound wet strength linerboard and an inner ply of 69 pound linerboard met the performance criteria

of this specification.] The box liner shall be a full inside width box liner fabricated from grade W5c fiberboard in accordance with ASTM D5118/D5118M, except the terminal ends of the liner shall overlap a minimum of 2 inches and no fastening of the overlap is required. The box shall be closed in accordance with closure method 2A1 of ASTM D1974/D1974M, Standard Practice for Methods of Closing, Sealing, and Reinforcing Fiberboard Boxes; except the gap between the outer flaps shall be not more than 3/4 inch wide. Each box shall be reinforced with two girthwise nonmetallic straps. The inside dimensions of the box shall be 15-5/8 inches in length, 9-1/8 inches in width and 9- 9/16 inches in depth.

D-4 UNITIZATION

A. Unit loads. Forty-eight boxes shall be arranged in unit loads in accordance with type I, class C of DLA Troop Support Form 3507, Loads, Unit: Preparation of Semiperishable Subsistence Items. Each load shall have 24 "A" cases and 24 "B" cases. At least two boxes in each tier shall be oriented to display the TTI label.

D-5 MARKING

B. Unit loads. Unit loads shall be marked in accordance with DLA Troop Support Form 3556. In addition, each unit load shall be provided with a Material Safety Data Sheet (MSDS), in accordance with MIL-R-44398. The MSDS shall be packaged and attached to one side of the unit load. A copy of the MSDS shall be included with the shipping papers and a copy shall also be placed in the vehicle manifest.

Procurement Specifications:

ACR-M-037, MEAL, READY-TO-EAT (MRE), ASSEMBLY REQUIREMENTS, 01-DEC-15, w/change 02, 02-JUN-16

<http://www.dla.mil/TroopSupport/Subsistence/Operationalrations/mre/mreacr.aspx>

9.b. Assembly Requirements, Meal, Religious, Ready-to-Eat, Halal

SALIENT CHARACTERISTICS: (p46)

The accessory packet shall include condiments/seasoning, dining kit (salt, pepper and sugar), spoon (7340-01-508-2742), matches, toilet tissue, moist towelette, napkin, and a Flameless Ration Heater (FRH) (8970-01-349-7049) for each meal. Each accessory pack shall either contain an insert card certifying that all components are halal , or the pack itself may be marked to attest to religious certification. (FRH NSN to be corrected to 8970-01-321-9153)

PACKAGING: (p51)

- Commercial packaging is acceptable, provided that such packaging will provide the required ten month shelf life.

Entrées shall be in thermostabilized pouches. Glass, plastic, or metal cans are not acceptable.

- Meals shall be packed either:

 - As twelve self-contained meal packages, similar to the MRE™ , or

The twelve entrées in one carton, plus twelve packs containing complementary items and Accessory

Packs in another carton, with both cartons packed together into one master shipper.

- If the Accessory Packs are packaged separate from the entrées, the Accessory Packs shall be packaged in a sealed bag. The bag shall be either marked to certify that all the components are kosher, in accordance with the certifying agency, or the bag shall contain an insert card certifying that all components are kosher, in accordance with the certifying agency.
- The meal bag and/or accessory pack, as applicable, shall be made of food - grade, low density polyethylene (LDPE) with a minimum thickness of 4 mil. The seal shall be a minimum of 1/8 inch wide, continuous and peelable, forming a hermetic closure.
- A tear nick, notch, or serrations shall be provided to facilitate opening of filled and sealed pouches that are not peelable.
- The sealed entrées and/or Accessory Packs shall not show any evidence of foreign odor.
- The Master shipper shall have the kosher symbol/name displayed with the appropriate certification checked off.
- Alternative meal packaging may be used provided that the alternative method can be demonstrated to meet or exceed the requirements of this document, military abuse testing, and controlled pest testing. Samples may be submitted to the Contracting Officer to be qualified on a case-by-case basis.

PACKING: (p52)

Shipping containers shall comply with the requirements of the National Motor Freight Classification or Uniform Freight Classification, as applicable.

UNITIZATION: (p52)

- Shipments destined for government inventory control points shall not have kosher and non-kosher shipping containers intermingled on the pallets. When shipments are destined for direct vendor delivery to consuming organizations and the shipment includes less than a full unit load, the shipping containers may be intermingled, provided that the unit load is clearly marked to indicate the quantities of each type of meal.
- Unit loads shall be unitized in accordance with Type III, Class G of DLA Troop Support Form 3507, Loads, Unit: Preparation of Semiperishable Subsistence Items.
- The unit load height shall be not greater than 54 inches.

MARKING: (p52)

A. Shipping Containers.

- To be in compliance with OSHA requirements, when the shipping container contains Flameless Ration Heater (FRHs), the following information must appear on a major flap of the shipping case closure immediately to the right of the marked end panel. The upper case letters shall not be more than ¼ inch high. The lower case letters shall not be less than 3/16 inch high.

Note: WATER ACTIVATED Flameless Ration Heater,
NSN 9870-01-321-9153, supplied in each menu bag.

B. Unit Loads.

- Unit loads shall be marked in accordance with DLA Troop Support Form 3556, Marking Instructions for Boxes, Sacks, and Unit Loads of Perishable and Semiperishable Subsistence.
- In addition, each unit load shall be provided with a Material Safety Data Sheet (MSDS), in accordance with MIL-R-44398, Ration Supplement, Flameless Heater, For Meal, Ready-to-Eat. The MSDS shall be placed inside a clear or translucent plastic sleeve clearly printed in dark, contrasting ink with "MSDS ENCLOSED" and attached to one side of the unit load with pressure -sensitive tape or adhesive.
- A copy of the MSDS must be included with the shipping papers and a copy shall also be placed in the vehicle manifest.

9.c. Assembly Requirements, Meal, Religious, Ready-to-Eat, Kosher

SALIENT CHARACTERISTICS: (p20)

The accessory packet shall include condiments/seasoning, dining kit (salt, pepper and sugar), spoon (7340-01-508-2742), matches, toilet tissue, moist towelette, napkin, and a Flameless Ration Heater (FRH) (8970-01-349-7049) for each meal. Each accessory pack shall either contain an insert card certifying that all components are kosher , or the pack itself may be marked to attest to religious certification.

PACKAGING: (p25)

- Commercial packaging is acceptable, provided that such packaging will provide the required ten month shelf life.
- Entrées shall be in thermostabilized pouches. Glass, plastic, or metal cans are not acceptable.
- Meals shall be packed either:
 - As twelve self -contained meal packages, similar to the MRE™ , or
 - The twelve entrées in one carton, plus twelve packs containing complementary items and Accessory
- Packs in another carton, with both cartons packed together into one master shipper.
- If the Accessory Packs are packaged separate from the entrées, the Accessory Packs shall be packaged in a sealed bag. The bag shall be either marked to certify that all the components are kosher, in accordance with the certifying agency, or the bag shall contain an insert card certifying that all components are kosher, in accordance with the certifying agency.
 - The meal bag and/or accessory pack, as applicable, shall be made of food - grade, low density polyethylene (LDPE) with a minimum thickness of 4 mil. The seal shall be a minimum of 1/8 inch wide, continuous and peelable, forming a hermetic closure.
 - A tear nick, notch, or serrations shall be provided to facilitate opening of filled and sealed pouches that are not peelable.
 - The sealed entrées and/or Accessory Packs shall not show any evidence of foreign odor.

- The Master shipper shall have the kosher symbol/name displayed with the appropriate certification checked off.
- Alternative meal packaging may be used provided that the alternative method can be demonstrated to meet or exceed the requirements of this document, military abuse testing, and controlled pest testing. Samples may be submitted to the Contracting Officer to be qualified on a case-by-case basis.

PACKING: (p26)

Shipping containers shall comply with the requirements of the National Motor Freight Classification or Uniform Freight Classification, as applicable.

UNITIZATION: (p26)

Shipments destined for government inventory control points shall not have kosher and non-kosher shipping containers intermingled on the pallets. When shipments are destined for direct vendor delivery to consuming organizations and the shipment includes less than a full unit load, the shipping containers may be intermingled, provided that the unit load is clearly marked to indicate the quantities of each type of meal.

Unit loads shall be unitized in accordance with Type III, Class G of DLA Troop Support Form 3507, Loads, Unit: Preparation of Semiperishable Subsistence Items.

The unit load height shall be not greater than 54 inches.

MARKING: (p26)

A. Shipping Containers.

To be in compliance with OSHA requirements, when the shipping container contains Flameless Ration Heater (FRHs), the following information must appear on a major flap of the shipping case closure immediately to the right of the marked end panel. The upper case letters shall not be more than ¼ inch high. The lower case letters shall not be less than 3/16 inch high.

Note: WATER ACTIVATED Flameless Ration Heater,
NSN 9870-01-321-9153, supplied in each menu bag.

B. Unit Loads.

- Unit loads shall be marked in accordance with DLA Troop Support Form 3556, Marking Instructions for Boxes, Sacks, and Unit Loads of Perishable and Semiperishable Subsistence.
- In addition, each unit load shall be provided with a Material Safety Data Sheet (MSDS), in accordance with MIL-R-44398, Ration Supplement, Flameless Heater, For Meal, Ready-to-Eat. The MSDS shall be placed inside a clear or translucent plastic sleeve clearly printed in dark, contrasting ink with "MSDS ENCLOSED" and attached to one side of the unit load with pressure -sensitive tape or adhesive. (THIS IS THE PROBLEM, interrupting transportation and operations)
- A copy of the MSDS must be included with the shipping papers and a copy shall also be placed in the vehicle manifest. (THIS IS THE PROBLEM, placing regulatory markings on a non-regulated item, thusly interrupting transportation and operations)

SAFETY DATA SHEET APPLIED TO DELIVERIES OF BULK CASED FRHs TO

INDIVIDUAL RATION ASSEMBLERS:

10. LUXFER SAFETY DATA SHEETS (SDS), dated December 9, 2016

May 28, 2015, see attachment

December 9, 2016, see attachment

11. ADDITIONAL SUPPORTING DOCUMENTS

DLA Troop Support Form 3507

<http://www.dla.mil/TroopSupport/Subsistence/Operationalrations/forms.aspx>

DLA Troop Support Form 3556

<http://www.dla.mil/TroopSupport/Subsistence/Operationalrations/forms.aspx>

AIR FORCE MANUAL 24-204, (INTERSERVICE) TM 38-250, NAVSUP PUB 505,
MCOP4030.19J, DLA 4145.3

<http://www.e-Publishing.af.mil>

Defense Transportation Regulation, DTR 4500.9-R, Part III

<http://www.ustranscom.mil/dtr/dtrp3.cfm>

Material Safety Data Sheet

Ration Supplement, Flameless Heater (FRH), For Meal, Ready-To-Eat

NSN 8970-01-321-9153

Section I – MANUFACTURER'S INFORMATION

Manufacturer's Name: Luxfer Magtech Inc.
Address: 2940 Highland Ave, Unit 210 Cincinnati, Ohio 45212
Telephone Number: (513)772-3066
Emergency Contact: CHEMTREC (800) 424-9300
Date Prepared: November 27, 2013

Section II – HAZARDOUS INGREDIENTS/IDENTITY INFORMATION

Ingredients (all are non-toxic materials)	Weight
Magnesium-Iron alloy (as magnesium metal)	8g max per FRH
Sodium Chloride, Silica, Wetting Agent	

Section III – PHYSICAL/CHEMICAL CHARACTERISTICS

Boiling Point (F)	N/A	Specific gravity	N/A
Vapor Pressure	N/A	Melting Point (F)	1202(Mg)
Vapor Density	N/A	Evaporation Rate	N/A
Solubility in Water	N/A	Percent Volatile by Weight	N/A

Appearance and Odor: The heater consists of a grayish metallic powder packaged within a porous plastic pouch. The pouch is sealed within a high density polyethylene (HDPE) bag.

Section IV – FIRE AND EXPLOSION HAZARD DATA

Flash Point: N/A **Flammability Limits:** N/A **LEL:** N/A **UEL:** N/A

Extinguishing Media:

Use class-D agents at any stage of the fire or other extinguishing agents specifically intended for Magnesium fires).

If detected before Mg starts to burn:

Use extinguishing agents intended for Type A, B, or C fires.

If Mg is burning (extremely intense fire with white sparks):

- (1) Flood the fire with large amounts of water with a fog nozzle (not a solid stream) or foam.
- (2) Move burning material outdoors if possible, allow to burn completely or spread material out to extinguish. Individual pads are self-extinguishing.

Special Fire Fighting Procedures:

Fire Fighters should use self Contained Breathing Apparatus due to hazardous off gassing from burning polyethylene.

Unusual Fire and Explosion Hazards:

If cases of FRHs are ignited, fiberboard and plastic will burn initially as a class A fire. Bulk packs will sustain initial fire due to fiberboard and plastic packing. Bulk packs will transition from initial class A fire to flammable solid fire (class D), if fire not brought under control in initial stages.

Section V – HEALTH HAZARD DATA

Acute Effects: (Requires exposure to FRH pad due to damaged or no packaging)
Causes eye irritation.
Causes skin irritation with prolonged contact.

Emergency First Aid Procedures:

In case of contact:

Eyes - Flush eyes with water for 15 minutes.

Broken skin - Wash skin with soap and water.

Carcinogenicity: Unknown

Signs and Symptoms of Exposure: Irritation of the eyes, nose or throat.
Dermatitis of the skin.

Medical Conditions Generally Aggravated by Exposure: Small cuts, abrasions

Other:

Manufacturer certifies that all FRH ingredients are non-toxic, and by-products of reacted FRHs are non-toxic and harmless. See Section VII for list of byproducts.

Individual FRHs are packaged with labels warning that "Heater and its By-Products are not indented for human consumption.

Section VI – REACTIVITY DATA

Stability: Water Activated

Incompatibilities: (Specifically Magnesium contained within FRH)
Acids, Acid Chlorides, Strong Oxidizing agents

Reacts Violently With: Halogens, Chlorinated Solvents, Ammonium Nitrate, Carbonates, Arsenic, Cupric Oxide, Cupric Sulfate, Mercuric Oxide, Inorganic Phosphates

Hazardous Decomposition or By-products: If packing is penetrated, saturation of one FRH by water slowly produces trace amounts of hydrogen (Max 9 liters).

Hazardous Polymerization: Will not occur

Section VII – SPILL OR LEAK PROCEDURES

Steps to be taken in Case Material is Released or Spilled:

- Collect spilled FRHs and inspect polyethylene bags:
- If bag is punctured, torn, or interior material is wetted, discard as waste as described below.
 - If bag is undamaged, repackage.

Waste Disposal Method

Used FRHs (i.e. heaters reacted with water), or unused FRHs, are approved for disposal as ordinary household waste.

Bulk Pack or multiple FRHs (not packed with MREs) must be managed as a RCRA hazardous waste when disposed or may be incinerated in a waste facility, ensuring that all material is burned thoroughly.

In all circumstances, FRHs must be disposed of in accordance with all applicable municipal, state and federal waste disposal regulations.

FRH byproducts (reacted with water):

Magnesium Hydroxide (Milk of Magnesia - common Antacid, FDA listed food additive)

Elemental Iron (food enrichment grade - FDA listed food additive)

Silicon Dioxide (FDA listed food additive)

Wetting agent (Trace amounts only - alcohol derivative, has been shown to cause diarrhea and hypoactivity)

Hydrogen

Section VIII – SPECIAL PROTECTION EQUIPMENT

Fire Fighters should use Self Contained Breathing Apparatus due to hazardous off-gassing from burning fiberboard and polyethylene.

Section IX – SPECIAL PRECAUTIONS

Precautions to be Taken in Handling and Storage

Warehouses where large quantities of FRHs are stored should provide:

- Protection against physical damage, especially the puncturing of cases during operation of fork lifts.
- Protection against water including leaks, snow, rain or flooding.
- Wrapping of FRH pallets to prevent water damage.
- Covering for small quantities of FRHs (i.e. tarps, polyethylene, etc.)
- Storage in a general purpose warehouse or dry goods storage area.
- End Bays reserved for the storage of FRHs where possible. Stacks of FRHs should be arranged for access to the stack's interior and/or for removal to the outdoor for fire fighting.
- Equipment for fighting Class-D and Class-A fires where FRHs are present.
- Quick response fire detection and fire fighting capabilities.
- Segregation from strong oxidizers; flammable or munitions.

Other Precautions:

This MSDS shall be made readily available to the local Fire Department of Emergency Response Crew in case of an emergency.

Section X – TRANSPORTATION

The U. S. Department of Transportation has determined that a single Flameless Ration Heater (FRH) device, containing a maximum of eight grams of magnesium powder, packaged in a tough plastic bag within a Meal, Ready-to-Eat (MRE), is in a quantity and form which does not pose a hazard in transportation and is not subject to the Hazardous Materials Regulation (HMR), regardless of the number of MREs in a package. This determination does not apply to FRH devices shipped separately from MRE's, or FRH devices containing more than eight grams of magnesium powder, which must be shipped in conformance with the applicable requirements of the HMR. (DOT letter of 7JUL92)

DISCLAIMER

The information, data, and recommendations contained herein are believed to be correct at the time of writing. All materials and mixtures may present unknown hazards and should be used with caution. When necessary or appropriate, independent opinions regarding the risk of handling or exposure should be obtained from trained professionals.

Material Safety Data Sheet

Ration Supplement, Flameless Heater (FRH), For Meal, Ready-To-Eat NSN 8970-01-321-9153

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Manufacturer's Name: Luxfer Magtech Inc.
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Telephone Number: (513)772-3066
Emergency Contact: CHEMTREC (800) 424-9300
Date Prepared: November 27, 2013

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Ingredients (all are non-toxic materials)	Weight
Magnesium-Iron alloy (as magnesium metal)	8g max per FRH
Sodium Chloride, Silica, Wetting Agent	

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Boiling Point (F)	N/A	Specific gravity	N/A
Vapor Pressure	N/A	Melting Point (F)	1202(Mg)
Vapor Density	N/A	Evaporation Rate	N/A
Solubility in Water	N/A	Percent Volatile by Weight	N/A

Appearance and Odor: The heater consists of a grayish metallic powder packaged within a porous plastic pouch. The pouch is sealed within a high density polyethylene (HDPE) bag.

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Flash Point: N/A **Flammability Limits:** N/A **LEL:** N/A **UEL:** N/A

Extinguishing Media:

Use class-D agents at any stage of the fire or other extinguishing agents specifically intended for Magnesium fires).

If detected before Mg starts to burn:

Use extinguishing agents intended for Type A, B, or C fires.

If Mg is burning (extremely intense fire with white sparks):

- (1) Flood the fire with large amounts of water with a fog nozzle (not a solid stream) or foam.
- (2) Move burning material outdoors if possible, allow to burn completely or spread material out to extinguish. Individual pads are self-extinguishing.

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Fire Fighters should use self Contained Breathing Apparatus due to hazardous off gassing from burning polyethylene.

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If cases of FRHs are ignited, fiberboard and plastic will burn initially as a class A fire. Bulk packs will sustain initial fire due to fiberboard and plastic packing. Bulk packs will transition from initial class A fire to flammable solid fire (class D), if fire not brought under control in initial stages.

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Causes skin irritation with prolonged contact.

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Broken skin - Wash skin with soap and water.

Carcinogenicity: Unknown

Signs and Symptoms of Exposure: Irritation of the eyes, nose or throat.
Dermatitis of the skin.

Medical Conditions Generally Aggravated by Exposure: Small cuts, abrasions

Other:

Manufacturer certifies that all FRH ingredients are non-toxic, and by-products of reacted FRHs are non-toxic and harmless. See Section VII for list of byproducts.

Individual FRHs are packaged with labels warning that "Heater and its By-Products are not indented for human consumption.

Section VI – REACTIVITY DATA

Stability: Water Activated

Incompatibilities: (Specifically Magnesium contained within FRH)

Acids, Acid Chlorides, Strong Oxidizing agents

Reacts Violently With: Halogens, Chlorinated Solvents, Ammonium Nitrate,

Carbonates, Arsenic, Cupric Oxide, Cupric Sulfate, Mercuric Oxide, Inorganic Phosphates

Hazardous Decomposition or By-products: If packing is penetrated, saturation of one FRH by water slowly produces trace amounts of hydrogen (Max 9 liters).

Hazardous Polymerization: Will not occur

Section VII – SPILL OR LEAK PROCEDURES

Steps to be taken in Case Material is Released or Spilled:

Collect spilled FRHs and inspect polyethylene bags:

- If bag is punctured, torn, or interior material is wetted, discard as waste as described below.
- If bag is undamaged, repackage.

Waste Disposal Method

Used FRHs (i.e. heaters reacted with water), or unused FRHs, are approved for disposal as ordinary household waste.

Bulk Pack or multiple FRHs (not packed with MREs) must be managed as a RCRA hazardous waste when disposed or may be incinerated in a waste facility, ensuring that all material is burned thoroughly.

In all circumstances, FRHs must be disposed of in accordance with all applicable municipal, state and federal waste disposal regulations.

FRH byproducts (reacted with water):

Magnesium Hydroxide (Milk of Magnesia - common Antacid, FDA listed food additive)

Elemental Iron (food enrichment grade - FDA listed food additive)

Silicon Dioxide (FDA listed food additive)

Wetting agent (Trace amounts only - alcohol derivative, has been shown to cause diarrhea and hypoactivity)

Hydrogen

Section VIII – SPECIAL PROTECTION EQUIPMENT

Fire Fighters should use Self Contained Breathing Apparatus due to hazardous off-gassing from burning fiberboard and polyethylene.

Section IX – SPECIAL PRECAUTIONS

Precautions to be Taken in Handling and Storage

Warehouses where large quantities of FRHs are stored should provide:

- Protection against physical damage, especially the puncturing of cases during operation of fork lifts.
- Protection against water including leaks, snow, rain or flooding.
- Wrapping of FRH pallets to prevent water damage.
- Covering for small quantities of FRHs (i.e. tarps, polyethylene, etc.)
- Storage in a general purpose warehouse or dry goods storage area.
- End Bays reserved for the storage of FRHs where possible. Stacks of FRHs should be arranged for access to the stack's interior and/or for removal to the outdoor for fire fighting.
- Equipment for fighting Class-D and Class-A fires where FRHs are present.
- Quick response fire detection and fire fighting capabilities.
- Segregation from strong oxidizers, flammable or munitions.

Other Precautions:

This MSDS shall be made readily available to the local Fire Department of Emergency Response Crew in case of an emergency.

Section X – TRANSPORTATION

The U. S. Department of Transportation has determined that a single Flameless Ration Heater (FRH) device, containing a maximum of eight grams of magnesium powder, packaged in a tough plastic bag within a Meal, Ready-to-Eat (MRE), is in a quantity and form which does not pose a hazard in transportation and is not subject to the Hazardous Materials Regulation (HMR), regardless of the number of MREs in a package. This determination does not apply to FRH devices shipped separately from MRE's, or FRH devices containing more than eight grams of magnesium powder, which must be shipped in conformance with the applicable requirements of the HMR. (DOT letter of 7JUL92)

DISCLAIMER

The information, data, and recommendations contained herein are believed to be correct at the time of writing. All materials and mixtures may present unknown hazards and should be used with caution. When necessary or appropriate, independent opinions regarding the risk of handling or exposure should be obtained from trained professionals.

REPLY TO
ATTENTION OF

Safety Division

DEPARTMENT OF THE ARMY
HEADQUARTERS, MILITARY TRAFFIC MANAGEMENT COMMAND
5611 COLUMBIA PIKE
FALLS CHURCH, VA 22041-5050
May 28, 1992



Chief, Exemptions and Approvals Division
Office of Hazardous Materials Transportation
Research and Special Programs Administration
U. S. Department of Transportation
400 Seventh St., S. W.
Washington, D. C. 20590

Dear Sir:

We hereby request on behalf of the Department of Defense (DOD) that you issue a competent authority approval in accordance with paragraph 5.1.4, Introduction to Class 4 Schedule, International Maritime Dangerous Goods Code (IMDG) and Packing Instruction 417, International Civil Aviation Organization (ICAO) Technical Instructions for the hazardous material indicated below.

Following is the DOD packaging recommended for approval in accordance with international regulations:

Product Nomenclature: Flameless Ration Heater (FRH) for the Meal, Ready-to-Eat (MRE)

49 CFR/UN Proper Shipping Name: Substances which in contact with water emit flammable solid, n.o.s.

49 CFR/UN Hazard Class: 4.3
UN No.: 2813

An emergency justification is enclosed with two requests for CAA for exemption from the hazardous marking and labeling of shipping cases containing FRHs. Each of the enclosed requests addresses a different method of packing FRHs.

The first CAA request addresses FRHs packed directly within military rations (i.e., inside MRE meal bags within MRE shipping cases), to ensure that heaters and rations are always issued together. The second CAA request addresses the packing of bulk quantities of FRHs, which will be used to supplement reserve stocks of MREs that do not contain FRHs.

The enclosed documents request two separate CAAs that address separate packaging requirements; however, MTMC requests, if feasible, that the provisions of each packaging method be incorporated in one CAA in order to reduce redundancy and paperwork.

The emergency justification (encl.) details specific rationale for this request. To summarize, the termination of the FRE program will not only result in serious financial loss to the government, (approx. 27 million dollars), but will greatly detract from ongoing efforts to support and sustain the soldier with the highest levels of technology available.

The Department of Defense requests relief from conforming with the hazardous materials provisions of the 49 CFR, for all modes of transportation, both international and domestic, for the MRE shipping case containing a FRH within each meal bag and for bulk pack shipping cases of FRHs. Specifically, request relief from the:

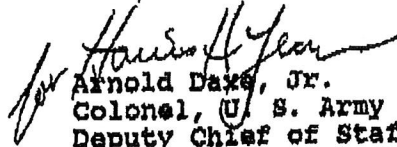
- a. Marking of MRE shipping cases containing FRHs and FRH bulk pack shipping cases with the proper shipping name (PSN) "Substances Which in Contact With Water Emit Flammable Gases, Solid, n.o.s." and United Nations (UN) identification number (49 CFR Part 172.301).
- b. Labeling of MRE shipping cases containing FRHs and FRH bulk pack shipping containers "Dangerous When Wet" (49 CFR part 172.400).
- c. Placarding of unitized vehicle loads of MRE shipping cases containing FRHs and vehicle loads of bulk pack shipping containers "Dangerous When Wet" (49 CFR Part 172.500).
- d. Shipping paper requirements for hazardous materials as required by 49 CFR (Parts 172.202 and 172.203). All other shipping paper requirements will be met.
- e. Packaging requirement for hermetically sealed metal cans packed within a fiberboard box, as specified under the IMDG Code, to allow use of the MRE shipping cases containing FRHs as an alternative package.
- f. Packaging requirement for hermetically sealed metal cans packed within a fiberboard box, as specified under the IMDG Code, to allow use of the bulk pack shipping case containing FRHs as an alternative package.

Our request for emergency issuance of a competent authority approval is based upon the rationale in the enclosed documents. Your expeditious handling of this matter would be appreciated. Shipment is required by June 1992.

Recommend you issue a competent authority approval to show acceptance of the DOD packaging for international transportation. Additional data is enclosed for your information.

If you have any questions or need additional information, please contact Mr. C.E. Radford, Safety Specialist, Headquarters, Military Traffic Management Command, telephone (703) 756-1951 or Mrs. L. Oleksyk, Physical Scientist, U.S. Army Natick Research Development and Engineering Center, (508) 651-4655.

Sincerely,

Arnold Dax, Jr.

Colonel, U. S. Army
Deputy Chief of Staff for Safety,
Security, and Intelligence

Enclosures

File: 064-92



DEPARTMENT OF THE ARMY
HEADQUARTERS, US ARMY TROOP SUPPORT COMMAND
4300 GOODFELLOW BOULEVARD, ST. LOUIS, MO. 63120-1798

REPLY TO
ATTENTION OF

14 MAY 1992

SIRNC-WTS

MEMORANDUM FOR Commander, Military Traffic Management Command (MTMC),
ATTN: MTSS-S (Mr. C.E. Radford), 5611 Columbia Pike,
Falls Church, VA 22041-5050

SUBJECT: Request for Competent Authority Approval (CAA) for the Flameless
Ration Heater (FRH) for the Meal, Ready-to-Eat (MRE)

1. An emergency justification is enclosed with two petitions for CAA for exemption from the hazardous marking and labeling of shipping cases containing FRHs (Encl). This Command requests that MTMC expeditiously review the subject petitions and submit them to the Department of Transportation (DOT) for CAA. It is requested that these petitions be given immediate consideration.
2. Each of the enclosed petitions addresses a different method of packing FRHs. The first CAA petition addresses FRHs packed directly within military rations (i.e., inside MRE meal bags within MRE shipping cases), to ensure that heaters and rations are always issued together. The second CAA petition addresses the packing of bulk quantities of FRHs, which will be used to supplement reserve stocks of MREs that do not contain FRHs.

-- The Soldiers' Command

Encl

Thomas L. Prather, Jr.
THOMAS L. PRATHER, JR.
Major General, USA
Commanding



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

29 2004

Mr. Raymond J. Fatz
Deputy Assistant Secretary of the Army
(Environmental, Safety and Occupational Health)
Installations and Environment
110 Army Pentagon
Washington DC 20310-0110

OFFICE OF
SOLID WASTE AND EMERGENCY
RESPONSE

Dear Mr. Fatz:

Thank you for your letter regarding proper management and disposal of waste unused flameless ration heaters (FRHs) at military installations. This letter responds to your request and to related correspondence from the Army on this topic.

The Army has requested EPA guidance regarding the appropriate waste classification and management under the Resource Conservation and Recovery Act (RCRA) for waste FRHs and the Meal, Ready-to-Eat (MRE), under several different situations. FRHs are packaged with MREs, and used to heat portions of the MRE. The attachment to this letter responds to each of the different situations for which the Army has requested clarification.

The EPA appreciates the Army's efforts to find an acceptable solution to the management of unused FRHs that is protective of the environment, and which also does not impede military operations or pose a safety concern to the soldier. Whenever possible, we encourage recycling of unused FRHs, either by returning them to the manufacturer or through consignment to surplus. When this is not possible, appropriate disposal, as described in the attachment, should be employed.

If you have any further questions regarding this matter, please feel free to contact me, or your staff may contact Gregory Helms at 703-308-8845, or helms.greg@epa.gov.

Sincerely,

A handwritten signature in black ink, appearing to read "Barry M. Breen", with a long horizontal line extending to the right.

Barry M. Breen
Principal Deputy Assistant Administrator

Attachments

Attachment
Classification and Disposal of Waste Flameless Ration Heaters¹

The following discussion reflects EPA's assessment of flameless ration heaters (FRHs) in relation to federal waste regulations. In general, states are authorized by EPA to implement the RCRA hazardous waste program within the state. An authorized state's hazardous waste regulations are applicable within the state in lieu of the Federal regulations, and states' regulations may be more stringent than the federal regulations. Therefore, commanders of Army facilities should check with the appropriate state agency to confirm the requirements applicable to FRH management activities.

1. Disposal of a single, unused FRH.

The Army's letter of July 31, 2001, describes two common circumstances in which a soldier might dispose of a single FRH. The first case is disposal of the FRH as normal trash at a military installation. The second example is where soldiers are on training exercises in the field and must dispose of the FRH.

EPA believes that disposal of FRHs that are discarded by individual soldiers issued Meals, Ready-to-Eat (MREs) is excluded from RCRA Subtitle C regulation, under the household waste exclusion in 40 CFR 261.4(b)(1). Wastes generated by households were not intended by Congress to be regulated under RCRA as Subtitle C hazardous wastes, and EPA therefore has excluded hazardous wastes generated by households from RCRA Subtitle C regulation, allowing such materials to be disposed as ordinary solid wastes². EPA believes that unused FRHs disposed of by individual soldiers in the field or at military installations are eligible for the household hazardous waste exclusion, under the circumstances outlined below.

¹ EPA's discussion of MRE/FRH waste status provided here is based on data and a number of representations about FRHs provided in correspondence with the Army. Therefore, any opinion or conclusion presented here by the Agency is only as reliable as are the test data and other information submitted in accurately and fully describing the chemical and physical properties of MREs and FRHs that could become waste.

²See Senate Report No. 94-988, 94th Cong., 2d Sess., at 16 (1976). Under 40 CFR Part 261.4(b)(1), exempt household waste is defined as a waste that has been "derived from households (including single and multiple residences, hotels and motels, bunkhouses, ranger station, crew quarters, campgrounds, picnic grounds and day-use recreation areas)." In promulgating these rules, EPA explained that for a waste to be excluded from RCRA as a household waste it must meet two criteria: 1) the household waste must be generated by individuals on the premises of a household (temporary or permanent); and 2) the waste must be composed primarily of materials found in the wastes generated by consumers in their homes. See 45 FR 33120, May 19, 1980, and 49 FR 44978 November 13, 1984.

Even though the FRH is a technology used by the military in training and operations, and sometimes in situations unique to the military, the FRH has also become a commercial product easily obtainable by the general public for use in the household or for camping, hunting, hiking or in other similar situations. Therefore, the potential exists for civilian campers, hunters, or hikers to obtain FRHs and to use them or dispose of them without activation. Civilian disposal of the unused FRH in these circumstances would not constitute a violation of RCRA Subtitle C because of the household waste exclusion. The use and/or disposal of FRHs by individual soldiers, whether at their barracks, camps, or in the field, is not unlike the civilian use of FRHs, and would constitute generation of a household waste 'on the premises' of a temporary or permanent household. Therefore, we believe that a soldier who either disposes of an unused FRH, or activates an FRH before disposal, would not be subject to RCRA hazardous waste regulation because of the household waste exclusion. This exclusion would also apply where FRHs are collected from a group of soldiers for disposal or reuse, as long the FRHs were initially issued to the soldiers for individual use in a permanent or temporary residential setting.

2. Disposal of multiple, unused MREs (that contain FRHs).

The Agency believes that intact MREs, which include FRHs, are a different waste from FRHs alone, and so warrant a separate hazardous waste determination. This is because the Agency evaluates waste based on its composition "as generated."

Assembled MREs containing FRHs (MRE/FRHs) could potentially become waste at various points in their storage and distribution for use, including at Army bases of various sizes, during shipment, or at central warehouse facilities. However, stockpiled waste MRE/FRHs are not eligible for the household hazardous waste exclusion, because the waste MRE/FRHs are not generated by individuals on the premises of a temporary or permanent residence.

The most likely hazardous waste criterion that could be triggered by disposal of MRE/FRHs in a MSW landfill would be reactivity under 40 CFR 261.23(a)(2) or (3)³. In considering whether a waste, including waste MRE/FRHs, is reactive, the Agency tries to identify actual or plausible handling and disposal practices for the waste, and from these practices, identify which are most likely to pose a hazard. The potential hazards of a waste under plausible worst-case management are then compared with the regulatory criteria at 40 CFR 261, to determine whether they meet the criteria for a hazardous classification.

³ In promulgating the reactivity characteristic, the Agency cited the goal of the proposed rules: "This definition was intended to identify wastes which, because of their extreme instability and tendency to react violently or explode, pose a problem at all stages of the waste management process." And, in relying on the narrative reactivity definition rather than quantifiable tests, the Agency described factors to consider in applying the definition, including the fact that "because the reactivity of a waste sample is a function not just of its intensive properties such as density and composition, but also of its extensive properties, such as mass and surface area, the reactivity of the sample as measured by a test will not necessarily reflect the reactivity of the whole waste. (45 FR 33109-33110; May 19, 1980).

Presumably, the greatest hazard potential for MRE/FRHs would occur in the event that large numbers are disposed together, and this seems most likely to occur if a central warehouse is periodically disposing of large numbers of expired or damaged MRE/FRHs. In evaluating MRE/FRH waste in a landfill, we believe it is not necessarily reasonable to rely on the protectiveness of packaging materials. Instead, the Agency believes it is plausible to assume that MRE/FRH packaging would be ruptured at the time of disposal, and that the FRHs packaged with the MREs will react on contact with water from any source (liquids in the MRE, rainfall, or other water in the landfill).

Based on information provided by the Army in various correspondence, the Agency believes that waste MRE/FRHs are unlikely to meet the reactivity regulatory definition – even when disposed of in large numbers and assuming damaged packaging, as discussed below.

In developing the reactivity characteristic, the EPA was concerned about the potential for injury to persons (usually workers) and damage to property that could result from mismanagement of reactive wastes: “By definition, reactive wastes are those which are capable of violently generating heat and pressure, reacting vigorously with the air or water, reacting with water to generate toxic fumes, etc. (Reactivity Characteristic Background Document, 1980, p.4)

In applying 40 CFR 261.23(a)(2) to MRE/FRHs, the waste MRE/FRHs must react violently with water to fail this aspect of the reactivity characteristic. Responding to public comments on this part of the reactivity definition, the Agency described its intent that “The definition of reactivity refers to wastes which undergo violent change in an uncontrolled manner, either by themselves or when mixed with water.” (Background Document, Characteristic of Reactivity, 1980, p. 23). According to materials provided by the Army, individual FRHs are designed to react with water in a controlled manner, and to release enough heat (187 BTU) to raise the temperature of the 8-ounce food entree by 100°F in 12 minutes. The final temperature of a heated entree would likely be 120°F-180°F (depending on initial temperature), and would be even lower if the whole MRE is being warmed (as in a landfill disposal situation). The temperature elevation that would be caused by MRE/FRHs reacting with water in a landfill is not great enough to cause a landfill fire or otherwise cause a significant hazard. We therefore believe the MRE is unlikely to fail the 40 CFR 261.23(a)(2) criteria.

Second, based on the results of Army tests of the hydrogen gas generated on reaction of the FRHs, we believe the rate of gas generation under plausible MRE/FRH waste management circumstances indicates that no potentially explosive mixtures would be generated (reactivity criteria at 40 CFR 261.23(a)(3)). Information submitted by the Army indicated that individual FRHs will generate H_2 at a rate of 1 liter/minute and generate a total of 8 liters of H_2 . In the Army's laboratory tests of individual FRHs, the circumstances under which enough H_2 accumulated to sustain combustion were if the packet was re-sealed with tape after wetting, and the H_2 was then vented out a small hole in the packaging. In considering plausible management of the waste, if all packages were ruptured on disposal, and the MRE/FRHs activated, the H_2 generated would escape as it is generated through the same holes where water entered. Given the

dispersal of FRHs in MREs, and the rate of gas generation and dispersal of H_2 in the atmosphere or landfill, it seems unlikely that H_2 could accumulate in the landfill to the point of being an explosive mixture. We therefore believe it is unlikely that MRE/FRHs would be RCRA hazardous waste when disposed.

3. Disposal of multiple, unused FRHs

As stated in Mr. Robert Tonetti's letter of May 20, 1999 to Mr. Peter Levigne, Headquarters U.S. Army Soldier Systems Command, EPA generally considers multiple unused FRHs (not packaged with MREs) that are discarded to be a D003 reactive waste which, therefore, must be managed as a RCRA hazardous waste when disposed. (Copy enclosed.) The Agency's view was based on its concerns about potential FRH hazards, particularly if large numbers of waste FRHs were managed together (and without being packaged with MREs, which will disperse heat and H_2 gas that might be generated). The Army's letter asked if the protective FRH packaging material could be considered as limiting potential reactivity of the heater. As discussed above, we believe that it is plausible to assume that packaging material will be ruptured for most FRHs during the disposal process, so it is inappropriate to assign some protectiveness to them. Therefore, we arrive at the same conclusion as our 1999 analysis on this basis. Note that this analysis addresses situations that are distinct from the circumstance posed in the first question above where the MREs have been distributed to soldiers for use.

May 20, 1999

Mr. Peter Levigne
Headquarters, U.S. Army Soldier Systems Command
Natick, MA 01760-5018

Dear Mr. Levigne:

Thank you for your memorandum requesting that the Environmental Protection Agency (EPA) review data regarding the classification and disposal of unused Flameless Ration Heaters (FRH) for the Army's Meals Ready to Eat (MRE) in the context of the Resource Conservation and Recovery Act (RCRA).

My staff has reviewed the Material Safety Data Sheet (MSDS) prepared by the manufacturer of the FRH, ZestoTherm, Inc., and the June 15, 1998 report prepared by ZestoTherm and Environmental Quality Management. Based on this information and the enclosures in your letter, EPA disagrees with your conclusion that the unused FRH is not a hazardous waste when disposed. Our reasons for this disagreement are as follows:

1. This material reacts violently with water. Thus, the material is a D003 reactive waste. (See 40 CFR 261.23(a)(2).)
2. This material can form potentially explosive mixtures with water. By producing hydrogen gas, particularly where the gas could accumulate, the FRH could be a D003 reactive waste. (See 40 CFR 261.23(a)(3).)

We recognize that an accident involving a single FRH is unlikely. However, like other reactive wastes, an accident such as a violent physical reaction or a fire could result from a number of FRHs being mishandled simultaneously.

Various information that you provided helped us arrive at these conclusions. For example:

1. The warning label on the FRH itself states that "vapors released by the activated heater contain hydrogen, a flammable gas."
2. As stated in the report, the major component of the FRH, magnesium metal, is classified by the Department of Transportation (DOT) as a hazardous material due to its reactive nature with water. FRH skids in excess of 220 pounds are considered hazardous material and shipped accordingly.
3. The report's executive summary states that unused FRH skids should be pretreated prior to disposal to eliminate the need for transport as a hazardous material and use of a DOT-

licensed hauler.

4. Of the 13 treatment, storage and disposal facilities listed in Appendix D of the report, Robert Maxey of my staff spoke with six in detail about the waste. Three landfills stated outright that they would not accept this material as nonhazardous. Two incinerators indicated that the contact had been made on the basis that the waste was nonhazardous. Only one facility indicated that the waste was likely to be nonhazardous.
5. The Occupational Safety and Health Administration defines magnesium as reactive.
6. The MSDS states that the FRH is incompatible with acids, acid chlorides, strong oxidizing agents and that it reacts violently with halogens, chlorinated solvents, ammonium nitrate, carbonates, arsenic, cupric oxide, cupric sulfate, mercuric oxide and inorganic phosphates. While such contact in a properly managed landfill is unlikely, its consequence would be most serious.

The Department of the Army has several options, acceptable to the EPA, for management of unused FRHs:

1. The best option would be the reuse of these materials, since the Army would have a continuing need for them, unless the new FRH (based on phosphorous and calcium chemistry) is adopted. Note that products that have not been used, and which are to be used for their original purpose are generally not wastes under the RCRA hazardous waste regulations. Similarly, if these materials were to be reclaimed, they would likely not be regulated as wastes under RCRA. (See 40 CFR 261.2(c)(3) concerning unused commercial chemical products that are reclaimed.)
2. The FRHs could be incinerated as discussed in the June 15, 1998 report prepared for the Army. This would have to be performed at a hazardous waste incinerator.
3. The MSDS also recommends that the FRHs be reacted with water in accordance with the instructions and then disposed as ordinary waste. Such activities would have to be conducted following all applicable Federal and state regulatory requirements. Under the Federal regulations, depending on the specifics of the situation, the generator may be able to conduct such activities under the generator requirements of 40 CFR Part 262 (particularly 40 CFR 262.34). Alternatively, such activities could be conducted by a third party, following the applicable generator, transportation, and treatment, storage, and disposal facility requirements of 40 CFR Parts 262, 263 and 264/265. Note that in general, states are authorized by EPA to implement the RCRA hazardous waste program. An authorized state's hazardous waste regulations are applicable within the state in lieu of the federal regulations, and states' regulations may be more stringent than the federal regulations. Thus, you should check with the appropriate state agency, or if the state is not authorized, the EPA regional office, to confirm the requirements applicable to your FRH management

activities. Per 40 CFR 268.40, these materials would have to meet the "DEACT" standard and meet the 268.48 Universal Treatment Standards prior to any land disposal.

Note that in general, states are authorized by EPA to implement the RCRA hazardous waste program. An authorized state's hazardous waste regulations are applicable within the state in lieu of the Federal regulations, and states' regulations may be more stringent than the Federal regulations. Thus, you should check with the appropriate state agency, or if the state is not authorized, the EPA regional office, to confirm the requirements applicable to your FRH management activities.

The disposal of spent FRH materials, following normal use to heat a MRE, is not disposal of a hazardous waste. The FRH is an excellent means of providing hot meals to soldiers in the field and we are sympathetic to the waste disposal problem associated with unused FRHs. It is also important that these materials be disposed in an environmentally sound manner. Please contact my office or call Robert Maxey of my staff at 703-308-7273 if you have additional questions.

Sincerely,

Robert Tonetti, Chief
International and Special Projects Branch
Office of Solid Waste



cc: Ollie Fordham, EMRAD
Robert Maxey, HWID

SAFETY DATA SHEET

Flameless Ration Heater (FRH)

NSN 8970-01-321-9153

Section 1. Identification of the substance/mixture and of the company/undertaking	
1.1 Product Identifier:	Ration Supplement, Flameless Heater
1.2 Relevant identified uses of the substance or mixture and uses advised against:	Heating Meals-Ready-To-Eat without use of a flame
1.3 Details on the supplier of the Safety Data Sheet:	Luxfer Magtech Inc., Riverhead Plant, 680 Elton Street, Riverhead, NY 11901 (631) 727-8600
1.4 Emergency telephone number:	(703) 527-3887

Section 2. Hazards Identification	
2.1 Classification of the substance or mixture:	 <p>GHS02 Flammable: Substance and mixtures which, in contact with water, emit flammable gas (Category 2).</p>
2.2 Label elements:	<p>(SEE NOTE UNDER SECTION 14.3)</p>  <p>Signal word: Danger</p> <p>Hazard statement: In contact with water releases flammable gas.</p> <p>Precautionary statements:</p> <p>Prevention: Keep away from any possible contact with water, because of violent reaction and possible flash fire. Protect from moisture. In case of exposure to enclosed powder, wear protective gloves, eye protection and dust mask.</p> <p>Response: In case of fire involving magnesium, use dry agents, such as melting flux, dry sand, dry talc, MET-L-X powder, <u>Purple-K powder</u> or other suitable extinguishing agents by gently covering burning material to smother fire. If dry agents are not available, flood with large amounts of water with fog nozzle (<u>not</u> a solid stream).</p> <p>Storage: Store in a dry place.</p> <p>Disposal: Dispose of contents/container in accordance with local/regional/national/international regulations.</p>
2.3 Other hazards:	In case of fire, water can act as an accelerant - resulting in flare-ups and spreading of the fire.

Section 3. Composition/information on ingredients	
3.1 Substances	CAS # (if known)
Magnesium-5% Iron Alloy:	
Magnesium	7439-95-4
Iron	7439-89-6
Silicon Dioxide	7631-86-9
Sodium Chloride	7647-14-5
Sodium Tripolyphosphate	7758-29-4
Wetting Agent	proprietary
3.2 Mixture	
Substances are combined in the product, except the wetting agent.	
Section 4. First aid measures	
4.1 Description of first aid measures	
<p>IF SWALLOWED: If conscious, rinse mouth with water and give large amounts of water. Consult physician to determine if vomiting should be induced.</p> <p>IF ON SKIN: Wash with soap and water to thoroughly remove any loose particles. Get medical attention if irritation develops, persists or worsens. Pad will become very hot when reacting with water – to prevent burns, <u>avoid contact while pad is reacting</u>.</p> <p>IF IN EYES: Flush with plenty of water for at least 15 minutes, lifting upper and lower lids. Get medical attention if irritation persists or worsens.</p> <p>IF INHALED (applies to dust creation): Move to fresh air. If breathing difficult, give oxygen. If not breathing, give artificial respiration. Consult a physician.</p>	
4.2 Most important symptoms and effects, both acute and delayed	
<p>No symptoms or effects under conditions of normal usage. Low toxicity and not considered to be a hazard to health.</p> <p>In cases of exposure, dermatitis of the skin, irritation of the eyes, nose or throat may be experienced.</p>	
4.3 Indication of any immediate medical attention and special treatment needed	
No specific treatment or antidote. Supportive care recommended. Treatment to be based on reactions of the patient.	
Section 5. Firefighting measures	
5.1 Extinguishing media	
<p>Smother burning magnesium alloy powder by gently covering with DRY agents such as melting flux, dry sand, dry talc, MET-L-X powder, <u>Purple-K powder</u> or other suitable extinguishing agents.</p> <p>If fire is detected before magnesium alloy powder starts to burn (that is, before any intense fire with white sparks), extinguishing agents intended for Type A, B or C fires may be used.</p> <p>If dry agents are not available, flood with large amounts of water using a fog nozzle (<u>not</u> a solid stream). The use of wet extinguishing agents could cause the release of hydrogen and could cause an explosion.</p>	
5.2 Special hazards arising from the substance or mixture	
<p>May produce toxic fumes of carbon oxides, iron oxides, hydrogen gas, magnesium oxide, sodium oxide.</p> <p>Magnesium alloy powder in air can auto-ignite at temperatures below its melting point. The presence of moisture increases this risk.</p> <p>Once ignited, magnesium alloy powder burns vigorously with an intense white flame, and can only be extinguished by smothering and allowing it to cool.</p>	

5.3. Advice for firefighters

If a case of Flameless Ration Heaters catches fire, fiberboard and plastic will burn initially as a Class A fire, but will transition to a Class D flammable solid fire if not brought under control in the initial stages.

If the fire becomes a Class D fire, move burning product outdoors (if achievable in a safe manner), then spread material out if possible before attempting to extinguish. Individual pads are self-extinguishing.

Wear self-contained breathing apparatus and protective clothing. Wear fire-fighting glasses (burning magnesium alloy powder produces a very bright white flame).

Section 6. Accidental release measures**6.1 Personal precautions, protective equipment and emergency procedures**

Wear suitable protective equipment.

Remove ignition sources.

6.2 Environmental precautions

Flameless Ration Heaters are not suspected of being highly harmful to the environment.

6.3 Methods and materials for containment and cleaning up

Collect dropped FRH product and inspect polyethylene bag and pad: if bag is punctured or torn, remove FRH pad and discard polyethylene bag as ordinary household waste. If not, repackage with the FRH pad inside. Inspect dropped FRH pad: if pad is wetted, discard as waste as described below under Waste Disposal Method. If not, check pad for leaks. If pad is leaking powder, sweep up spilled powder as described below under Waste Disposal Method, and cut open pad to reuse the remaining powder. If not, reinsert pad into a new polyethylene bag for repackaging.

Waste Disposal Method: Used FRH product (wetted pad, reacted with water) is approved for disposal as ordinary household waste. Unused FRH in bulk pack must be managed as a RCRA hazardous waste when disposed. Spilled FRH powder should be promptly swept up using natural fiber brushes or brooms and a non-sparking dust pan. If dry, it should be placed in a covered steel drum, and re-used if possible.

In all circumstances, FRH product must be disposed of in accordance with all applicable local, state and federal regulations.

6.4 Reference to other sections

See section 8 (Exposure controls/personal protection).

Section 7. Handling and storage**7.1 Precautions for safe handling**

Avoid getting FRH powder on skin or in eyes. Wash thoroughly after handling.

Warehouses where large quantities of Flameless Ration Heaters are stored should provide:

- Protection against physical damage, especially puncturing of cases during operation of forklifts.
- Protection against water including leaks, snow, rain or flooding.
- Wrapping of FRH pallets to prevent water damage.
- Coverings (i.e. tarps, polyethylene sheets, etc.)
- Storage in a general purpose warehouse dry goods storage area.
- End bays reserved for the storage of FRHs, where possible. Stacks of FRHs should be arranged for access to the stack's interior and/or removal to the outdoors for fire-fighting.
- Equipment for fighting Class-D and Class-A fires.
- Quick response fire detection and fire-fighting capabilities.
- Segregation from strong oxidizers, flammable materials or munitions.

7.2 Conditions for safe storage, including any incompatibilities

Water-activated. Keep from moisture and/or excessive heat. Keep away from sparks or flame.

Incompatibilities (specifically with respect to the magnesium inside the FRH pad): Acids, acid chlorides, strong oxidizing agents.

Reacts violently with halogens, chlorinated solvents, ammonium nitrate, carbonates, arsenic, cupric oxide, cupric sulfate, mercuric oxide, inorganic phosphates.

7.3 Specific end use(s)

Heating Meals-Ready-To-Eat without use of a flame.

Section 8. Exposure controls/personal protection**8.1 Control parameters**

Under conditions of normal usage, no special personal protection measures are necessary.

FRH ingredients and byproducts (after reaction with water) are non-toxic:

- Magnesium hydroxide (milk of magnesia) is a common antacid and FDA-listed food additive
- Iron (food enrichment grade) is an FDA-listed food additive
- Silicon dioxide is an FDA-listed food additive
- Sodium Tripolyphosphate is an FDA-listed food additive.
- Wetting agent present in trace amounts only, if ingested in significant amount may cause diarrhea
- Hydrogen

In the case of a punctured FRH pad spilling its contents, a dust mask, protective gloves and safety glasses/goggles are recommended. Eyewash fountain should be available.

8.2 Exposure controls

Magnesium-5% Iron Alloy:

Magnesium

Iron

Silicon Dioxide

Sodium Chloride

Sodium Tripolyphosphate

Wetting Agent

OSHA PEL

n/a

n/a

6 mg/m³

n/a

15mg/ m³

n/a

ACGIH TLV

n/a

n/a

10 mg/m³

n/a

10 mg/m³

n/a

Section 9. Physical and chemical properties**9.1 Information on basic physical and chemical properties**

n/a = not available, or not applicable.

Physical state: Solid. Appearance, Color, Odor: The heater consists of a grayish metallic powder sealed within a porous plastic enclosure (pad), which is in turn packaged in a green high density polyethylene bag. Odor threshold: n/a. pH: n/a. Relative evaporation rate, n-butyl acetate=1: n/a. Melting point/freezing point: 1202°F (magnesium). Boiling point: 2025°F (magnesium). Flash point: n/a. Auto-ignition temperature: n/a. Decomposition temperature: n/a. Flammability (solid, gas): n/a. Vapor pressure: n/a. Relative vapor density, air=1: n/a. Relative density: n/a. Solubility: n/a. Partition coefficient (Log P_{ow}): n/a. Viscosity (kinetic/dynamic): n/a. Upper/lower flammability or explosive limits: n/a.

9.2 Other information

Not applicable.

Section 10. Stability and reactivity
10.1 Reactivity Reacts with water producing heat and hydrogen gas, which is flammable and explosive. Reacts violently with halogens, chlorinated solvents, ammonium nitrate, carbonates, arsenic, cupric oxide, cupric sulfate, mercuric oxide, inorganic phosphates.
10.2 Chemical stability Stable under dry conditions.
10.3 Possibility of hazardous reactions Hazardous polymerization does not occur.
10.4 Conditions to avoid Exposure to moisture, sparks/ignition sources and open flame. Exposure to incompatible materials.
10.5 Incompatible materials Water, acids, acid chlorides, strong oxidizing agents.
10.6 Hazardous decomposition products Other than hydrogen gas (maximum 9 liters), none under normal usage and storage.

Section 11. Toxicological information
11.1 Information on toxicological effects Magnesium powder Acute toxicity: no data available Skin corrosion / irritation: no data available Eye damage / irritation: no data available Sensitization: no data available Germ cell mutagenicity: no data available Carcinogenicity: not listed by IARC, NTP or OSHA Reproductive toxicity: no data available Specific Target Organ Toxicity, single exposure: no data available Specific Target Organ Toxicity, repeated exposure: no data available Aspiration hazard: no data available Iron powder Acute toxicity: Oral LD50 (rat) 30000 mg/kg Skin corrosion / irritation: no data available Eye damage / irritation: no data available Sensitization: no data available Germ cell mutagenicity: no data available Carcinogenicity: Not listed by IARC, NTP or OSHA Reproductive toxicity: no data available Specific Target Organ Toxicity, single exposure: no data available Specific Target Organ Toxicity, repeated exposure: no data available Aspiration hazard: no data available

Silicon Dioxide

Acute toxicity: Oral LD50 (rat) > 10000 mg/kg, Dermal LD50 (rabbit) > 5000 mg/kg
 Skin corrosion / irritation: may cause irritation and drying of the skin.
 Eye damage / irritation: dust may cause irritation and discomfort
 Sensitization: not known to be sensitizing
 Germ cell mutagenicity: not reported to produce mutagenic effects in humans
 Carcinogenicity: IARC group 3 (unclassifiable for humans). Not listed by NTP or OSHA
 Reproductive toxicity: not reported to cause reproductive effects in humans
 Specific Target Organ Toxicity, single exposure: dust irritating to respiratory tract.
 Specific Target Organ Toxicity, repeated exposure: may cause skin dryness
 Aspiration hazard: no data available

Sodium Chloride

Acute toxicity: Oral LD50 (rat) 3 g/kg, Dermal LD50 (rabbit) >10 g/kg, Inhalation LC50 (rat, 1 hr) >42 g/m³
 Skin corrosion / irritation: contact may cause irritation
 Eye damage / irritation: causes irritation
 Sensitization: not a skin sensitizer
 Germ cell mutagenicity: no evidence
 Carcinogenicity: Not listed by IARC, NTP or OSHA
 Reproductive toxicity: no evidence
 Specific Target Organ Toxicity, single exposure: no data available
 Specific Target Organ Toxicity, repeated exposure: no data available
 Aspiration hazard: no data available

Sodium Tripolyphosphate

Acute toxicity: Oral LD50 (rat) 3120 mg/kg, Dermal LD50 (rabbit) >4640 mg/kg
 Skin corrosion / irritation: causes irritation
 Eye damage / irritation: causes eye irritation
 Sensitization: no data available
 Germ cell mutagenicity: no data available
 Carcinogenicity: Not listed by IARC, NTP or OSHA
 Reproductive toxicity: no data available
 Specific Target Organ Toxicity, single exposure: no data available
 Specific Target Organ Toxicity, repeated exposure: no data available
 Aspiration hazard: no data available

Section 12. Ecological information**12.1 Toxicity**

Magnesium powder: no data available.

Iron powder: no data available.

Silicon Dioxide: Fish – EC0 (*Oncorhynchus mykiss*) > 10000 mg/L (4 days static study), Aquatic invertebrates – EC0 (*Daphnia magna*) > 1000 mg/L (24 hours acute immobilization test).

Sodium Chloride: Fish – LC50 (*Lepomis macrochirus*) 12946 mg/L (96 hours static study), Aquatic invertebrates – EC50 (*Daphnia magna*) 1000 mg/L (48 hours).

Sodium Tripolyphosphate: Fish – LC0 (*Leuciscus idus*) 1600 mg/L (48 hours), Aquatic invertebrates – EC50 (*Daphnia magna*) 1150 mg/L (24 hours), Bacteria – EC50 (activated sludge) >1000 mg/L (3 hours).

12.2 Persistence and degradability

Magnesium powder: no data available.

Iron powder: no data available.

Silicon Dioxide: no data available.

Sodium Chloride: dissolves into water.

Sodium Tripolyphosphate: no data available.

12.3 Bioaccumulative potential

Magnesium powder: no data available.
 Iron powder: no data available.
 Silicon Dioxide: no data available.
 Sodium Chloride: not expected to occur.
 Sodium Tripolyphosphate: no data available.

12.4 Mobility in soil

Magnesium powder: No data available.
 Iron powder: no data available.
 Silicon Dioxide: no data available.
 Sodium Chloride: expected to have very high mobility in soil, it does not absorb on most soil types.
 Sodium Tripolyphosphate: no data available.

12.5 Results of PBT and vPvB assessment

For all substances: PBT/vPvB assessment not available as chemical safety assessment not required/not conducted.

12.6 Other adverse effects

Not applicable.

Section 13. Disposal considerations**13.1 Waste treatment methods**

Dispose in accordance with Federal, State, and Local regulations. See section 6.3.

Section 14. Transport information**14.1 UN Number**

UN2813

(SEE NOTE UNDER SECTION 14.3)

14.2 UN Proper shipping name

Water Reactive Solid, N.O.S. (Magnesium-Iron Mixture)

(SEE NOTE UNDER SECTION 14.3)

14.3 Transport hazard class(es)**4.3 Dangerous When Wet**

NOTE: The U. S. Department of Transportation has determined that a single Flameless Ration Heater (FRH) device, containing a maximum of eight grams of magnesium powder, packaged in a tough plastic bag within a Meal, Ready-to-Eat (MRE), is in a quantity and form which does not pose a hazard in transportation and is not subject to the Hazardous Materials Regulation (HMR), regardless of the number of MREs in a package. This determination does not apply to FRH devices shipped separately from MREs, or FRH devices containing more than eight grams of magnesium powder, which must be shipped in conformance with the applicable requirements of the HMR. (DOT letter of 7JUL92)

14.4 Packing group
PG I
(SEE NOTE UNDER SECTION 14.3)
14.5 Environmental hazards
None
14.6 Special precautions for user
Water activated. Note: In case of fire involving magnesium, use dry agents, such as melting flux, dry sand, dry talc, MET-L-X powder, <u>Purple-K powder</u> or other suitable extinguishing agents by gently covering burning material to smother fire. If dry agents are not available, flood with large amounts of water with fog nozzle (<u>not</u> a solid stream).
14.7 Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code
Not applicable.

Section 15. Regulatory information
15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture
Magnesium powder: US Federal Regulations SARA 302: no SARA 311/312: Acute Health Hazard no, Chronic Health Hazard no, Fire Hazard no, Sudden Release of Pressure Hazard no, Reactivity Hazard yes SARA 313: no
Iron powder: US Federal Regulations SARA 302: no SARA 311/312: Acute Health Hazard no, Chronic Health Hazard no, Fire Hazard yes, Sudden Release of Pressure Hazard no, Reactivity Hazard no SARA 313: no
Silicon Dioxide: US Federal Regulations SARA 302: no SARA 313: no CERCLA Reportable Quantity: no
Sodium Chloride: US Federal Regulations SARA 302: no SARA 313: no CERCLA Reportable Quantity: no
Sodium Tripolyphosphate: US Federal Regulations SARA 302: no SARA 313: no CERCLA Reportable Quantity: no
15.2 Chemical safety assessment
Has not been carried out.

Section 16. Other information
Indication of changes: Revision 2, dated December 9, 2016.
This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product. Although the information in this Safety Data Sheet was obtained from sources which we believe to be reliable, it cannot be guaranteed. In addition, this information may be used in a manner beyond our knowledge or control. The information is, therefore, provided without representation or warranty express or implied.