DANGEROUS GOODS PANEL (DGP)
MEETING OF THE WORKING GROUP OF THE WHOLE

The Hague, 3 to 7 November 2008

Agenda Item 2: Development of recommendations for amendments to the *Technical Instructions for the Safe Transport of Dangerous Goods by Air* (Doc 9284) for incorporation in the 2011/2012 Edition

2.7: Part 7 — Operator’s Responsibilities

**FLAMELESS RATION HEATER (FRH) AND SELF-HEATING BEVERAGE**

(Presented by Gary Branscombe)

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**SUMMARY**

This paper proposes the addition of Meals Ready to Eat (MRE), which could be containing Flameless Ration Heater (FRH) or self-heating beverage, to the list of provisions to aid recognition of undeclared dangerous goods.

Action by the DGP-WG is in paragraph 2.

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1. **INTRODUCTION**

1.1 Part 7, Chapter 6 of the Technical Instructions contains a list of general descriptions that are often used for items in cargo or in passengers’ baggage which may contain dangerous goods.

1.2 Following research in Canada, a notice, attached in the appendix to this working paper was issued on the hazards present with transporting Meals Ready to Eat (MRE) which can contain Flameless Ration Heater (FRH) and self-heating beverages. The notice indicates that in some cases, these may contain regulated dangerous goods such as water-reactive solid, n.o.s. (magnesium), UN 2813 and Calcium oxide, UN 1910 Packing Group III.

2. **ACTION BY THE DGP-WG**

2.1 The DGP-WG is invited to consider the addition of the following entry in the list of general descriptions that are often used for items in cargo or in passengers’ baggage which may contain dangerous goods

*Meals Ready to Eat (MRE) — may contain Flameless Ration Heater (FRH) or self-heating beverage*
APPENDIX

NOTICE FROM TRANSPORT CANADA ON THE HAZARD PRESENT WITH TRANSPORTING MEALS READY TO EAT (MRE)

<table>
<thead>
<tr>
<th>Standards Branch</th>
<th>Direction des normes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dangerous Goods Standards</td>
<td>Normes relatives aux marchandises dangereuses</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Notice</th>
<th>Avis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Individual Meal Packages, Flameless Ration Heater, and Self-Heating Beverages</td>
<td>Emballages de repas individuel, réchauffeur de ration sans flamme, et boissons auto-chauffantes</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Notice Summary</th>
<th>Résumé de l’avis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Issue</td>
<td>Enjeu</td>
</tr>
<tr>
<td>Individual Meal Packages (IMP), Flameless Ration Heater (FRH) and Self-heating beverages.</td>
<td>Emballage de repas individuel (ERI), réchauffeur de ration sans flamme (RRSF) et boissons auto-chauffantes.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Position</th>
<th>Position</th>
</tr>
</thead>
<tbody>
<tr>
<td>IMP is a totally self-contained combat ration package, consisting of a full meal. The complete package contains a FRH packed in a flexible bag that is readily available commercially to the public at large, or thru online buying. The ready availability of the IMPs commercially represents an increased hazard to aviation safety. The IMP and FRH may also be purchased separately. FRH could also be used in self-heating beverages.</td>
<td>Un ERI est un emballage indépendant de ration de combat qui consiste en un repas complet. L’emballage complet contenant un RRSF emballé dans un sac flexible est accessible au public en général sur le marché ou par achat en ligne, ce qui représente un risque accru pour la sécurité de l’aviation. On peut aussi se procurer séparément un ERI et un RRSF. Certaines boissons auto-chauffantes peuvent utiliser un RRSF.</td>
</tr>
</tbody>
</table>

| Other technologies may be available and requires the manufacturer, based on the TDGR requirements, to indicate if the technology used meets criteria for inclusion in one of the nine classes of dangerous goods. | Les ERI contenant un RRSF ainsi que le RRSF seul présenté dans cet avis, sont interdit dans les bagages à main ou enregistrés. On doit en demander le transport en conformité avec les exigences du Reglement sur le transport des marchandises dangereuses (RTMD). |

<table>
<thead>
<tr>
<th>Scope</th>
<th>Portée</th>
</tr>
</thead>
<tbody>
<tr>
<td>This notice is of importance to air operators, Transport Canada Aviation Security, the Canadian Air Transport Security Authority, Department of National Defence, Canada Post, wilderness travellers, and anyone involved in emergency preparedness.</td>
<td>Cet avis est important pour les exploitants aériens, la sûreté aérienne de Transports Canada, l’Administration canadienne de la sûreté du transport aérien, le ministère de la Défense nationale, Postes Canada, les excursionnistes d’expérience et toute personne concernée par les mesures d’urgence.</td>
</tr>
</tbody>
</table>
Transportation of Dangerous Goods Regulations

The transportation of dangerous goods by air to, from and within Canada is subject to the Transportation of Dangerous Goods Regulations (TDGR) Part 12 – Air, and the International Civil Aviation Organisation Technical Instructions for the Safe Transport of Dangerous Goods by Air (ICAO TIs).

Classification of Dangerous Goods

In Canada, the consignor (shipper) is responsible for determining the classification of dangerous goods before handling, offering for transport or transporting them. This activity is normally done by, or in consultation with, a person who understands the nature of the dangerous goods such as a manufacturer, a person who formulates, blends or otherwise prepares mixtures or solutions of goods.

A substance or article is a dangerous goods when it is listed by name in Schedule 1 to the TDGR, in Table 3-1 of the ICAO TIs, or if not listed by name it meets the criteria for inclusion in at least one of the nine classes of dangerous goods found in Part 2 – Classification of the TDGR.

Background

1. Individual Meal Packages

Individual Meal Packages (IMP) is a ration system designed to sustain individuals engaged in heavy physical activity such as military exercises or actual combat operations when normal food services are not available. The IMP is a totally self-contained operational ration package consisting of a full meal packed in a flexible bag. The full bag is lightweight and fits easily into military or military style clothing pockets.

The Military transport IMPs on military vehicles or aircraft IMP, with the emergence of commercial marketing of the product and subsequent easy accessibility by the public at large introduction of this product by passengers to civil aviation may increase hazards to aviation safety.
IMP containing the Flameless Ration Heater (FRH) are shipped fully regulated, or under the Consumer Commodity provisions (or under the ORM-D exemption in the US). It is forbidden in passenger carry-on or checked baggage.

IMP are available without the FRH included and are not regulated as dangerous goods. However, the FRH sold separately is fully regulated as dangerous goods, and is required to heat the IMP.

IMP terminology varies depending on the country, the purpose and format and additional information may be found on the following website:
http://www.ureinfo.com/imps.html

2. Flameless Ration Heaters (FRH)

FRH is a device used for the flameless re-heating of IMP. While originally being designed for the military, it soon became part of the travel kit for campers, hunters or anyone involved in emergency preparedness.

Different FRH technologies are available, such as:

Mixture of magnesium metal, iron powder

This technology is based on a combination of food grade iron and magnesium. When salt water is added to the iron-magnesium combination it results in an exothermic reaction with the emission of hydrogen gas.

The FRH meet the classification criteria for a Division 4.3, Packing Group 1 dangerous goods, with a Proper Shipping Name being:

Water-reactive solid, n.o.s. (magnesium), UN2813.

The US Department of Transportation, Federal Aviation Administration (US DOT, FAA) tested this type of FRH and MRE, and published a report (DOT/FAA/AR-TN06/18) that may be consulted on the following website:


In summary, the test indicates that once the FRH is activated, it generates sufficient hydrogen gas to be ignited.

Les ERI contenant un réchauffeur de ration sans flamme (RRSF) sont réglementées intégralement ou sont soumises aux dispositions relatives aux biens de consommation (ou font l'objet d'une expédition de type ORM-D). Ils sont interdits dans les bagages à main ou les bagages enregistrés des passagers.

Les emballages ERI sont aussi disponibles sans le RRSF et ne sont pas réglementés à titre de marchandises dangereuses. Toutefois, le RRSF, vendu séparément est entièrement réglementé à titre de marchandises dangereuses et est également requis pour réchauffer le ERI.

La terminologie utilisée pour les ERI varie selon le pays, le besoin ou le format. Veuillez consulter le site suivant pour en savoir davantage :
http://www.ureinfo.com/imps.html

2. Réchauffeur de ration sans flamme (RRSF)

Le RRSF est un dispositif utilisé pour réchauffer sans flamme des ERI. Bien qu' à l'origine il ait été conçu pour des fins militaires, ce dispositif a rapidement été intégré à la trousse de voyage des campers et des chasseurs et de toute personne concernée par les mesures d'urgence.

Différentes technologies de RRSF sont disponibles, tel que:

Mélange de magnésium métal, poudre de fer

Cette technologie est basée sur la combinaison de fer et de magnésium de qualité alimentaire. Lorsque de l'eau salée est ajoutée à la combinaison fer-magnésium, il y a réaction exothermique et libération d'hydrogène gazeux.

Le RRSF répond aux critères de classification des marchandises dangereuses du groupe d’emballage 1 de la classe 4.3, dont l’appellation réglementaire spécifique est :

Solide hydroréactif, n.s.a. (magnésium), ONU2813.

La Federal Aviation Administration (US DOT, FAA) du U. S. Department of Transportation, a testé ces types de RRSF et de MRE et a publié un rapport (DOT/FAA/AR-TN06/18) qui peut être consulté sur le site Vb suivant :


Bref, les essais indiquent que lorsque le RRSF est activé, il génère suffisamment d'hydrogène pour être allumé.
Potassium permanganate – glycerine

The FRH consists of two pouches with a total of 29.9 grams of potassium permanganate – KMnO₄ (approx. 15 grams in each pouch). The KMnO₄ is covered with an inert coating and meets the criteria for inclusion in Division 5.1 (Oxidizer) and Packing Group II. The fuel pouch contains a glycerine-water solution. The water dissolves the coating to allow the glycerine to react with the oxidizer.

Once the FRH is activated, it generates oxygen and contributes to the combustion of other material.

In 2002, the US DOT, FAA indicated that this type of FRH is fully regulated, or may qualify for the limited quantity or consumer commodity exceptions. It is forbidden in passenger carry-on or checked baggage.

Please consult the following:

MRE #2.pdf

3. Self-Heating Beverages

The United Kingdom indicated that Calcium oxide (CaO) used in the self-heating beverage technology meets the criteria for Calcium oxide, UN1910 Packing Group III dangerous goods. The regulations pertaining to Calcium oxide, UN1910 Packing Group III apply if classification criteria are met.

FRH may also be used to heat self-heating beverages.

The manufacturer must provide specifications of the test conducted on the self-heating beverage technology.

4. Action

Passenger check-in staff must be trained in recognizing IMP and Self-Heating beverages, and to inform passengers that IMP and Self-Heating beverages containing FRH is not allowed in carry-on or checked baggage.

Permanganate de potassium – glycérine

Le RRSF consiste en deux pochettes contenant au total 29,9 grammes de permanganate de potassium – KMnO₄ (env. 15 grammes chacune). Le KMnO₄ est recouvert d’un revêtement intérieur inerte et répond aux critères pour être compris dans la classe 5.1 (Matière comburante), Groupe d’emballage II. Les pochettes de combustible renferment une solution eau-glycérol. L’eau dissout le revêtement pour permettre à la glycérol de réagir avec la matière comburante.

Lorsque le RRSF est activé, il génére de l’oxygène et contribue à la combustion de matériau combustible.

En 2002, le US DOT et la FAA ont indiqué que ce type de RRSF est réglementé intégralement, ou qu’il peut se qualifier pour une quantité limitée ou une exception relative aux biens de consommation. Ils sont interdits dans les bagages à main ou les bagages enregistrés des passagers.

Veuillez consulter ce qui suit :

MRE #2.pdf

3. Boissons auto-chauffantes

Le Royaume-Uni a indiqué que l’oxyde de calcium (CaO) utilisé dans la technologie des boissons auto-chauffantes répond aux critères relatifs à l’oxyde de calcium, numéro UN1910, Groupe d’emballage III des marchandises dangereuses. Si les critères de classification sont rencontrés pour l’Oxyde de calcium, ONU1910, Groupe d’emballage III, la réglementation s’applique.

Un RRSF peut être utilisé pour réchauffer une boisson auto-chauffante.

Le fabricant doit fournir des spécifications des tests menés sur la technologie de boissons auto-chauffantes.

4. Mesures

Le personnel chargé de l’enregistrement des passagers doit avoir une formation suffisante pour détecter les ERI et les boissons auto-chauffantes et informer les passagers que les ERI et les boissons auto-chauffantes contenant un RRSF sont interdit dans les bagages à main ou les bagages enregistrés.
Passenger Check-in staff should seek confirmation from a passenger about the content of any baggage where there are suspicions that it may contain IMP or Self-heating beverages.

Security Screening officers, part of their screening procedures, must intercept IMP and Self-heating beverages found in carry-on or checked baggage, and dispose of them in compliance with Canadian Laws. They must also report it to the air operator when found in checked baggage.

Canada Post should ensure that the dangerous goods screening process includes provisions for intercepting IMP and Self-heating beverages entering the Air Mail system.

Le personnel chargé de l'enregistrement des passagers devraient chercher à faire vérifier par le passager sur le contenu de tout bagage dont il soupçonne contenir un ERI ou une boisson auto-chauffante.

Selon les procédures de filtrage en place, les agents chargés du filtrage de sûreté doivent intercepter les ERI et les boissons auto-chauffantes trouvés dans les bagages à main ou les bagages enregistrés et les mettre au rebut en conformité avec les lois canadiennes. Un rapport doit également être fait à l’exploitant aérien lorsqu’il s’agit des bagages enregistrés.

Gary Branscombe
A/Chief – Chef intermédiaire
Dangerous Goods Standards
Normes relatives aux marchandises dangereuses
Standards Branch
Direction des normes

For additional information please call/Pour de plus amples renseignements, veuillez composer l’un des numéros suivants:

Atlantic/Atlantique: 506-851-7247
Quebec/Québec: 418-877-8868
Ontario: 416-952-0000
Prairie and Northern/Prairies et Nord: 780-495-4022
Pacific/Pacifique: 604-666-5655
Airline Inspection/Inspection des entreprises de transport aérien: 514-633-3116

www.tc.gc.ca/civilaviation/commerce/dangerousgoods
www.tc.gc.ca/aviationcivile/commerce/marchandises dangereuses
This responds to your letter requesting clarification of the requirements for shipping your product, a new individual food heater inside of a meals, ready-to-eat (MRE) ration package. Specifically, you asked whether the individual food heater, containing a Division 5.1 (oxidizer), in Packing Group IIA, and glycerin-water solution, would be excepted from the Hazardous Materials Regulations (HMR; 49 CFR Parts 171-180). A facsimile of several photographs of the individual food heater, MRE ration package, and accompanying test report were enclosed. You provided information, as follows:

The individual food heater consists of two pouches with a total of 29.9 grams of potassium permanganate. Each of the hermetically sealed, vacuum packed pouches contains approximately 15 grams of potassium permanganate. The potassium permanganate is covered with an inert coating and meets the definition of Division 5.1 (Oxidizer) in Packing Group IIA, tested in accordance with the UN Manual of Tests and Criteria, 34.1, Test 0.1, as specified in § 173.127(a)(1). The amount of oxidizer in the combined two-pouch heater is less than the reportable quantity (RQ) of potassium permanganate (RQ, 100 lbs.) per package, and each pouch weighs 22.6 grams. The fuel is a glycerin-water solution. When the fuel pouch is ruptured, the fuel spreads throughout the oxidizer; the water slowly dissolves the coating of the permanganate crystals, which then react with the glycerin.

Based on the information you provided, it is our determination that the individual food heater described above when shipped as components of a MRE ration package is subject to the requirements of the HMR. This determination also applies to the individual food heater devices when shipped separately from MRES. The MRE ration package, containing an individual food heater, may qualify for the limited quantity or consumer commodity packaging exceptions specified in § 173.152(b) and (c), respectively, for Division 5.1 (oxidizers), or the small quantity packaging exceptions in § 173.4.

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

Sincerely,

[Signature]

Delmer F. Billings
Chief, Standards Development
Office of Hazardous Materials Standards
Date: 12/03/01

To: Suzanne Hedgepedith, Director
Office of Hazardous Materials Exemptions and Approvals
Fax: 202-366-3308

Subject: Request for Letter of Opinion

Dear Ms. Hedgepedith,

Our company is requesting a letter of opinion for a new individual food heater for shipment without special labeling. The requested letter is required by the U.S. Army in order to qualify our product for replacement of the existing magnesium/aluminum heater in military ration applications. When I called today, I was informed that faxing this document was probably the most effective method of delivering this document to you. If you should want a hard copy or an electronic copy of this document, you can e-mail me at Msabin@tempratech.com. If you should have any questions regarding any of this material, please don’t hesitate to call me at 1-800-867-9189. Your prompt reply to this matter would be greatly appreciated.

Sincerely,

Martin Sabin
Tempra Technology, Inc.

7 page document enclosed