



WORKING PAPER

DANGEROUS GOODS PANEL (DGP)

TWENTY-FIRST MEETING

Montréal, 5 to 16 November 2007

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 2009-2010 Edition

PACKING INSTRUCTIONS FOR NEW ENTRIES FOR FUEL CELL CARTRIDGES

(Presented by the US Fuel Cell Council (USFCC))

SUMMARY

WG07 agreed to four new entries in Table 3-1 to cover fuel cell cartridges containing fuels in Divisions 2.1, 4.3, and Class 8 along with corresponding packing instructions and special provisions. This paper proposes minor clarifications and improvements to the packing instructions previously agreed for each type of fuel cell cartridge.

Action by the DGP is in paragraph 3.

1. INTRODUCTION

1.1 The development of packing instructions (PI) for fuel cell cartridges containing fuels in classes or division 2.1, 4.3 and 8 was discussed at WG07 (see DGP-WG/07-WP/75, paragraph 5.13.7). It was agreed that standard terminology referring to PG II standard would be used. The fuel cell industry is pleased to submit to DGP/21 detailed provisions for applicable packing instructions.

2. DISCUSSION

2.1 The four new entries as well as the existing Class 3 entry for fuel cell cartridges agreed to at WG07 reflect the proper shipping names (PSN) adopted by the UNCOE for UN 3473, UN 3476, UN 3477, UN 3478 and UN 3479. Unlike some other articles appearing in the Technical Instructions, each of these individual adopted proper shipping names covers three different possibilities:

- a) fuel cell cartridges (packed on their own);
- b) fuel cell cartridges contained in equipment; and

- c) fuel cell cartridges packed with equipment.

2.2 The proposed packing instructions that follow clearly address all three of the above possibilities while retaining simplicity in the provisions.

3. ACTION BY THE DGP

Editorial Note.— Proposed modifications to the text agreed to at DGP-WG07 in the revised packing instructions presented in 3.1 and 3.2 are highlighted.

3.1 The DGP is invited to *amend* Packing Instruction 313 as follows:

313	PACKING INSTRUCTION 313	313
<p>This instruction applies to UN 3473 on passenger and cargo aircraft.</p> <p>The requirements of 4.1.1.1, 4.1.1.2, 4.1.1.3.1, 4.1.1.7 and 4.2 must be met, as appropriate. The following packagings are authorized:</p> <p>1a) For fuel cell cartridges containing flammable liquids must be packed:</p> <p>1) in accordance with the packing requirements of [4.1.1.1 to 1.1.3 and 4.1.1.7];</p> <p>2) containing flammable liquid must be packed in accordance with the general packing requirements of 4.1 and be in in wooden boxes (4C1, 4C2), plywood boxes (4D), fibreboard boxes (4G) or reconstituted wood boxes (4F) boxes; plywood drums (1D), fibre drums (1G), plastic drums (1H2), plastic jerricans (3H2) or solid plastic boxes (4H2) of of Packagings must meet Packing Group II performance standards. The fuel cells must be incapable of short-circuiting and be securely cushioned in the packagings; and</p> <p>3) so that the fuel cell cartridges are securely cushioned in the packagings.</p> <p>If fuel cell cartridges are shipped as an integral component of assembled equipment, they must be securely installed and protected against contact with other articles so as to prevent short circuits.</p> <p>2b) For fuel cell cartridges contained in, or packed with, equipment or packed with equipment:</p> <p>1) must be packed in strong outer packagings that meet the packing requirements of [4.1.1.1 and 4.1.1.7];</p> <p>2) fuel cell cartridges that are installed in equipment must be protected against short circuit and the entire system must be protected against inadvertent operation;</p> <p>3) When fuel cell cartridges are packed with equipment, they must be packed in inner packagings or placed in the outer packaging with cushioning material or divider(s) so that the fuel cell cartridges are protected against damage that may be caused by the movement or placement of the equipment and the cartridges equipment and the cartridges contents within the outer packaging. Fuel cell cartridges which are installed in equipment must be protected against short circuit and the entire system must be protected against inadvertent operation.</p> <p>c) each package containing fuel cell cartridges must not contain more than:</p> <p>1) 5 kg of fuel cell cartridges when transported on passenger aircraft; and</p> <p>2) 60 kg of fuel cell cartridges when transported on cargo aircraft.</p>		

3.2 The DGP is invited to *amend* the three new packing instructions adopted at WG07 as indicated below:

<u>215</u>	<u>PACKING INSTRUCTION 215</u>	<u>215</u>
<p><u>This instruction applies to UN 3478 and UN 3479 on passenger and cargo aircraft.</u></p>		
<p><u>a) Fuel cell cartridges containing flammable gas must be packed:</u></p>		
<p><u>1) in accordance with the packing requirements of [4;1.1.1, 4;1.1.2, to 1.1.3 and 4;1.1.3.1, 4;1.1.7] and 4;2 must be met, as appropriate. The following packagings are authorized:-</u></p>		
<p><u>The following packagings are authorized:</u></p>		
<p><u>1) For fuel cell cartridges, in wooden boxes (4C1, 4C2), plywood boxes (4D), fibreboard boxes (4G), or reconstituted wood boxes (4F) boxes; plywood drums (1D), fibre drums (1G), plastic drums (1H2), plastic jerricans (3H2) or solid plastic boxes (4H2). Packagings must meet of Packing Group II performance standards; and</u></p>		
<p><u>2) so that the fuel cell cartridges are securely cushioned in the packagings.</u></p>		
<p><u>2b) For fuel cell cartridges contained in equipment, or packed with equipment:-</u></p>		
<p><u>1) must be packed in strong outer packagings that meet the packing requirements of [4;1.1.1 and 4;1.1.7];</u></p>		
<p><u>2) fuel cell cartridges that are installed in equipment must be protected against short circuit and the entire system must be protected against inadvertent operation;</u></p>		
<p><u>3) When fuel cell cartridges are packed with equipment, they must be packed in inner packagings or placed in the outer packaging with cushioning material or divider(s) so that the fuel cell cartridges are protected against damage that may be caused by the movement or placement of the equipment and the cartridges contents within the outer packaging. Fuel cell cartridges which are installed in equipment must be protected against short circuit and the entire system must be protected against inadvertent operation.</u></p>		
<p><u>c) each package containing fuel cell cartridges must not contain more than:</u></p>		
<p><u>1) 1 kg of fuel cell cartridges when transported on passenger aircraft; and</u></p>		
<p><u>2) 15 kg of fuel cell cartridges when transported on cargo aircraft.</u></p>		

436**PACKING INSTRUCTION 436****436**

This instruction applies to UN 3476 on passenger and cargo aircraft.

The requirements of 4:1.1.1, 4:1.1.2, 4:1.1.3.1, 4:1.1.7 and 4:2 must be met, as appropriate. The following packagings are authorized:

The mass of each cartridge must not exceed 1 kg.

The following packagings are authorized:

a) Fuel cell cartridges containing substances dangerous when wet must be packed:

1) in accordance with the packing requirements of [4:1.1.1 to 1.1.3 and 4:1.1.7];

2) For fuel cell cartridges, in wooden boxes (4C1, 4C2), plywood boxes (4D), fibreboard boxes (4G), or reconstituted wood boxes (4F) boxes, plywood drums (1D), fibre drums (1G), plastic drums (1H2), plastic jerricans (3H2) or solid plastic boxes (4H2). Packagings must meet of Packing Group II performance standards; and

3) so that the fuel cell cartridges are securely cushioned in the packagings.

2b) For fuel cell cartridges contained in, or packed with, equipment; or packed with equipment,

1) must be packed in strong outer packagings that meet the packing requirements of [4:1.1.1 and 4:1.1.7];

2) fuel cell cartridges that are installed in equipment must be protected against short circuit and the entire system must be protected against inadvertent operation;

3) When fuel cell cartridges are packed with equipment, they must be packed in inner packagings or placed in the outer packaging with cushioning material or divider(s) so that the fuel cell cartridges are protected against damage that may be caused by the movement or placement of the equipment and the cartridges contents within the outer packaging. Fuel cell cartridges which are installed in equipment must be protected against short circuit and the entire system must be protected against inadvertent operation.

c) Each package containing fuel cell cartridges must not contain more than:

1) [5 kg] of fuel cell cartridges when transported on passenger aircraft; and

2) 50 kg of fuel cell cartridges when transported on cargo aircraft;

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PACKING INSTRUCTION 827

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This instruction applies to UN 3477 on passenger and cargo aircraft.

The requirements of 4:1.1.1, 4:1.1.2, 4:1.1.3.1, 4:1.1.7 and 4:2 must be met, as appropriate. The following packagings are authorized:

The mass of each cartridge must not exceed 1 kg.

The following packagings are authorized:

a) Fuel cell cartridges containing corrosive substances must be packed:

1) in accordance with the packing requirements of 4:1.1.1 to 1.1.3 and 4:1.1.7;

2) For fuel cell cartridges, in wooden boxes (4C1, 4C2), plywood boxes (4D), fibreboard boxes (4G), or reconstituted wood boxes (4F) boxes, plywood drums (1D), fibre drums (1G), plastic drums (1H2), plastic jerricans (3H2) or solid plastic boxes (4H2). Packagings must meet of Packing Group II performance standards; and

3) so that the fuel cell cartridges are securely cushioned in the packagings.

2b) For fuel cell cartridges contained in, or packed with, equipment or packed with equipment:

1) must be packed in strong outer packagings that meet the packing requirements of 4:1.1.1 and 4:1.1.7;

2) fuel cell cartridges that are installed in equipment must be protected against short circuit and the entire system must be protected against inadvertent operation;

3) When fuel cell cartridges are packed with equipment, they must be packed in inner packagings or placed in the outer packaging with cushioning material or divider(s) so that the fuel cell cartridges are protected against damage that may be caused by the movement or placement of the equipment and the cartridges contents within the outer packaging. Fuel cell cartridges which are installed in equipment must be protected against short circuit and the entire system must be protected against inadvertent operation.

c) Each package containing fuel cell cartridges must not contain more than:

1) [5 kg] of fuel cell cartridges when transported on passenger aircraft; and

2) 50 kg of fuel cell cartridges when transported on cargo aircraft;