International Civil Aviation Organization

DGP/22-WP/54
12/8/09

WORKING PAPER

DANGEROUS GOODS PANEL (DGP)

TWENTY-SECOND MEETING

Montréal, 5 to 16 October 2009

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

FUEL CELL SYSTEMS USED TO POWER PORTABLE ELECTRONIC DEVICES

(Presented by D. Brennan)

SUMMARY

This working paper proposes some amendments to the provisions of Part 8 of the *Technical Instructions for the Safe Transport of Dangerous Goods by Air* (Doc 9284) with respect to the carriage of fuel cell cartridges in passenger/crew baggage.

Action by the DGP: The DGP is invited to amend Part 8;1.1.2 r) as presented in the appendix.

1. INTRODUCTION

1.1 This paper is presented jointly with the Japan Electrical Manufacturers' Association (JEMA) and the USFCC.

1.2 A paper was submitted at the DGP Working Group of the Whole in Auckland (DGP-WG09, 4 to 8 May 2009) inviting the working group to consider some amendments to Part 8;1.1.2 r) to clarify the requirements applicable to the carriage of fuel cell cartridges by passengers and crew (DGP/22-WP/3, paragraph 3.2.28). The paper noted that although definitions for "fuel cell" and "fuel cell cartridge" had been agreed for adoption into Part 1;3.1 of the Technical Instructions, Part 8;1.1.2 includes terms such as "fuel cell system" which are not defined.

1.3 The paper proposed to clarify that any prohibition on refuelling of fuel cell "systems" really only applied when on board an aircraft and that this should be clearly stated. In addition, it was proposed that there be a clarification with respect to fuel cells with integral reservoirs that are refuelled by use of a non-attached fuel cell cartridge. The requirement that fuel cartridges must not be refillable by the user appearing in the first sentence of 8;1.1.2 r) 2) may be interpreted as prohibiting the carriage of a micro fuel cell having an internal reservoir. Such fuel cells are refilled by means of a refill (cartridge) that is not

designed or intended to remain installed in the fuel cell. This interpretation appears at odds with the second sentence of current 8;1.1.2 r) 2), which recognizes such systems and specifies that the fuel cell **refills** are not permitted to be carried.

1.4 During the discussion on the proposals in the working paper at DGP-WG09 some questions were raised with respect to the design and test standards that apply to these external (non-attached) fuel cell cartridges. Concern was also expressed that introducing new terms into the provisions for passengers may only result in more confusion for both airline personnel and for the passengers.

1.5 Following DGP-WG09 the provisions of the IEC standard were reviewed to determine the criteria applicable to external fuel cell cartridges and to cartridges that are designed to remain attached to the fuel cell. This review identified that although the IEC specification requires that all cartridges (internal or external) must meet the same design and test criteria for leakproofness and shocks caused by drops, more rigorous test requirements apply to the valve for external fuel cell cartridges.

1.6 For the reason given above it is proposed to standardize the treatment of all types of fuel cell cartridges, both those designed to remain attached and those that are not designed to remain attached, by removing the prohibition in Part 8;1.1.2 r) 2).

1.7 Consideration was also given to the terms used in the passenger provisions. Here it is believed that the term “fuel cell” is adequate to describe the devices, which may have an integral fuel reservoir that requires the use of an external “fuel cell cartridge” to replenish the fuel, or the “fuel cell” which may be of a type where fuel cell cartridge must remain attached to supply fuel. Using these terms would remove the need for the use of “fuel cell system” or “fuel cell unit”. These changes will also align the terminology used in 8;1.1.2 r) with the terms defined in 1;3.1.

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APPENDIX

AMENDMENTS TO THE TECHNICAL INSTRUCTIONS

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Part 8

PROVISIONS CONCERNING PASSENGERS AND CREW

Chapter 1

PROVISIONS FOR DANGEROUS GOODS CARRIED BY PASSENGERS OR CREW

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1.1 DANGEROUS GOODS CARRIED BY PASSENGERS OR CREW

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1.1.2 Notwithstanding any additional restrictions which may be implemented by States in the interests of aviation security, except for the incident reporting provisions of 7;4.4, the provisions of these Instructions do not apply to the following when carried by passengers or crew members or in baggage that has been separated from its owner during transit (e.g. lost baggage or improperly routed baggage):

Medical necessities

. . .

r) fuel cells ~~systems~~ used to power portable electronic devices (for example cameras, cellular phones, laptop computers and camcorders) and spare fuel cell cartridges, under the following conditions:

1) fuel cells and fuel cell cartridges may only contain flammable liquids, corrosive substances, liquefied flammable gas, water reactive substances or hydrogen in metal hydride;

2) ~~fuel cell cartridges must not be refillable by the user.~~ Refuelling of fuel cells ~~systems~~ on board an aircraft is not permitted except that the installation of a spare cartridge is allowed. ~~Fuel cell cartridges which are used to refill fuel cell systems but which are not designed or intended to remain installed (fuel cell refills) are not permitted to be carried~~;

3) the maximum quantity of fuel in any fuel cell cartridge must not exceed:

a) for liquids 200 mL;

b) for solids 200 grams;

c) for liquefied gases, 120 mL for non-metallic fuel cell cartridges or 200 mL for metal fuel cell cartridges;

For hydrogen in metal hydride, the fuel cell cartridges must have a water capacity of 120 mL or less;

4) each fuel cell ~~system~~ and each fuel cell cartridge must conform to IEC PAS 62282-6-1 Ed. 1, and must be marked with a manufacturer's certification that it conforms to the specification. In addition, each fuel cell cartridge must be marked with the maximum quantity and type of fuel in the cartridge;

5) fuel cell cartridges containing hydrogen in metal hydride must comply with the requirements in Special Provision A162.

6) no more than two spare fuel cell cartridges may be carried by a passenger;

7) fuel cell~~s systems~~ containing fuel and fuel cell cartridges including spare cartridges are permitted in carry-on baggage only;

8) interaction between fuel cells and integrated batteries in a device must conform to IEC PAS 62282-6-1 Ed. 1. Fuel cell~~s systems~~ whose sole function is to charge a battery in the device are not permitted;

9) fuel cell~~s systems~~ must be of a type that will not charge batteries when the portable electronic device is not in use and must be durably marked by the manufacturer: "APPROVED FOR CARRIAGE IN AIRCRAFT CABIN ONLY" to so indicate; and

10) in addition to the languages which may be required by the State of Origin for the markings specified above, English should be used.

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