International Civil Aviation Organization

DGP/22-WP/49
11/8/09

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 CARTRIDGES CARRIED IN CHECKED BAGGAGE

(Presented by USFCC)

SUMMARY

This paper asks the DGP to consider various changes to Part 8;1.1.2 r) of the *Technical Instructions for the Safe Transport of Dangerous Goods by Air* (Doc 9284) to allow spare fuel cell spare cartridges in checked baggage.

Action by the DGP: The panel is invited to agree to the proposal to amend Part 8;1.1.2 r) as presented in the appendix, which takes into account the discussion at DGP-WG09.

1. INTRODUCTION

1.1 At the DGP Working Group of the Whole Meeting in Auckland (DGP-WG09, 4 to 8 May 2009), the working group was reminded that the issue of fuel cell cartridges in passengers checked baggage's was first raised at DGP/21.The working group was updated on experience gained from transporting fuel cartridges since DGP/21. It was reported that more than 2 000 fuel cell cartridges had been successfully carried as carry-on baggage without trouble by passengers and fuel cell company personnel and more than 150 000 cartridges had been shipped without incident as cargo on both cargo and passenger aircraft since DGP/21. It was argued that the restriction against carrying fuel cell cartridges in checked baggage provided no additional safety improvement over carry-on baggage since fuel cell cartridges did not have the ability to be actuated or to short-circuit or to charge batteries on their own and that the experience gained was sufficient to support the proposed change.

1.2 It was reported that testing at the United States Federal Aviation Administration (FAA) Technical Center had also taken place but that the results were not yet available. As noted in DGP-WG09 Report (see DGP/22-WP/3), it was agreed that the final report would be distributed to panel members as soon it becomes available. Although members were mindful of the commitment given by States to protecting renewable resources and to promoting new technologies, some members were wary of making

changes until experience based on a longer timeframe could be demonstrated. One member recalled the lengthy discussions which had taken place regarding fuel cell cartridges in passenger baggage and was reluctant to approve such proposals without gaining experience in their State and region. The member noted that a passenger could confuse a fuel cell cartridge with a fuel cell system and noted the text referred to "closed" retail packaging — this would not guarantee that the cartridges were unused. Others commented that the fuel cell industry had shown due diligence in their approach and suggested that if the FAA test results were positive, then approval could be given. A number of editorial issues were also raised, for example the ordering of the paragraphs and the total number of cartridges permitted per passenger in both carry-on and checked baggage.

1.3 Part 8;1.1.2 allows passengers and crew to carry an equivalent flammable material as checked baggage up to 2 kg or 2 L (net quantity of each single article must not exceed 0.5 kg or 0.5 L) of medicinal or toilet articles, including aerosols such as hair sprays, perfumes, colognes and medicine containing alcohols and other flammable liquids. Butane and other flammable liquefied petroleum gases (LPG) are often used to pressurize aerosols that are permitted to be carried under these provisions. These passenger allowances have been effective for a long time without any notable difficulty.

1.4 Fuel cell cartridges are sophisticated articles that must conform to IEC PAS 62282-6-1 Ed.1 and must be marked with a manufacturer's certification that they conform to the IEC specification. The cartridge itself is a robust article, manufactured to stringent specifications, containing a specific fuel. As part of its testing, it must pass (amongst other tests) a 1.8 meter drop test without leakage. As was documented previously, at least one instance of confusion at a security checkpoint resulted in a fuel cell cartridge being placed in checked baggage at the direction of security personnel. This error was not caught immediately, and the fuel cell cartridge travelled safely to its destination without incident.

1.5 A fuel cell cartridge does not contain an ignition device or a battery and cannot produce electricity on its own. A fuel cell cartridge is an article that contains the fuel only and does not have the ability to be actuated or to short-circuit or to charge batteries on its own. For this reason, the restriction against carrying fuel cell cartridges in checked baggage provides no safety improvement over carry-on baggage. It seems that avoiding inadvertent actuation is the most important safety consideration, and since the cartridge cannot be actuated on its own, checked baggage is actually safer than carry-on.

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APPENDIX

AMENDMENT TO THE TECHNICAL INSTRUCTIONS

Part 8

PROVISIONS CONCERNING PASSENGERS AND CREW

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Chapter 1

PROVISIONS FOR DANGEROUS GOODS CARRIED BY PASSENGERS OR CREW

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):

. . .

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

1) 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 cell systems 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 in carry-on or checked baggage;

7) fuel cell 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 systems whose sole function is to charge a battery in the device are not permitted;

9) fuel cell 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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