



**WORKING PAPER**

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

**Auckland, New Zealand, 4 to 8 May 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**

**2.8: Part 8 — Provisions Concerning Passengers and Crew**

**UPDATE ON SPARE FUEL CELL CARTRIDGES CARRIED IN CHECKED BAGGAGE**

(Presented by USFCC)

**SUMMARY**

This paper proposes considering various changes to Part 8;1.1.2 r) 8) of the *Technical Instructions for the Safe Transport of Dangerous Goods by Air* (Doc 9284) to allow fuel cell spare cartridges in checked baggage. Filing this paper is a follow-up to DGP/21 when the industry was asked to come back to the DGP when additional experience was available. This paper provides a report on additional experience and an update on the status of fuel cell cartridges. The DGP-WG is asked to comment on the experience so far, and if it is sufficient for a decision we will bring back the issue at DGP/22

Action by the DGP-WG is in paragraph 2.

**1. INTRODUCTION**

1.1 DGP/21-WP/38 proposed that spare fuel cell cartridges be allowed to be carried on board as checked baggage. It was proposed at that time because the fuel cell cartridge does not pose a safety hazard beyond the amount of fuel carried, and many similar articles have been transported in that manner safely for many years.

1.2 As documented in paragraphs 2.9.1.4.1 and 2.9.1.4.2 of the meeting report from DGP/21, the Dangerous Goods Panel determined that “more experience was necessary before the panel could consider reviewing the issue”.

1.3 Subsequent to that decision, additional good experience has been gained and testing at the United States Federal Aviation Administration Technical Center has been accomplished.

## 2. DISCUSSION

2.1 Certain fuel cell systems containing fuel and fuel cell cartridges including spare cartridges are permitted in carry-on baggage (see Part 8;1.1.2) but are not permitted in checked baggage. This limitation was initially introduced to ensure that a fuel cell unit carried by a passenger is not operated in an unsupervised environment such as a baggage compartment.

2.2 Subsequent to DGP/21, more than 2,000 fuel cell cartridges have been successfully carried on board as carry-on baggage without untoward incidents by fuel cell company personnel. In addition, a significant, albeit undocumented, number of other passengers have carried them on board, including advisors to the DGP.

2.3 In addition to this good experience, 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 United States Transportation Security Administration (TSA) personnel. This error was not caught, and the fuel cell cartridge travelled safely to its destination without incident. We became aware of this occasion after speaking with TSA personnel at their headquarters. TSA subsequently worked to publish a reference document that will make it clear that fuel cell cartridges cannot be carried in checked baggage.

2.4 Subsequent to DGP/21, more than 150,000 fuel cell cartridges have been shipped as cargo on both cargo and passenger aircraft without any problems.

2.5 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.

2.6 As was documented previously in DGP/21-WP/38, 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 a 1.8 meter drop test without leakage.

2.7 The fuel cell cartridge does not contain an ignition device or a battery and cannot produce electricity on its own. The 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.

## 3. ACTION BY THE DGP-WG

3.1 The DGP-WG is invited to provide comments regarding the following proposed amendment to Part 8 1.1.2 r) 7) as indicated below:

- 7) ~~fuel cell systems containing fuel and fuel cell cartridges including spare cartridges are permitted in carry-on baggage only.~~ Spare cartridges are permitted in checked baggage provided they are new, unused, and in their original retail packaging.

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