# DANGEROUS GOODS PANEL (DGP)

## TWENTY-FOURTH MEETING

**Montréal, 28 October to 8 November 2013**

**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 2015-2016 Edition**

## PROVISIONS FOR FUEL CELLS USED TO POWER PORTABLE ELECTRONIC DEVICES CARRIED BY PASSENGERS OR CREW

(Presented by the Fuel Cell and Hydrogen Energy Association)

**SUMMARY**

This information paper invites the panel to discuss revisions to the requirements in Part 8, Table 8-1, item 20) concerning fuel cells charging batteries. Based on the discussion, a proposed amendment will be developed during the next biennium.

Subject for consideration by the DGP is in Paragraph 3.

## 1. INTRODUCTION

1.1 The Fuel Cell and Hydrogen Energy Association, which provides representation for the global fuel cell industry, invites further consideration by the DGP of the following provisions currently appearing in Part 8 of the Technical Instructions:

a) Part 8, Table 8-1, item 20) of the Technical Instructions provides requirements for the carriage of fuel cells used to power portable electronic devices carried by passengers and crew.

b) Part 8, Table 8-1, item 20) indicates in subparagraph h) ". . . Fuel cells whose sole function is to charge a battery in the device are not permitted;"

c) Part 8, Table 8-1, item 20) indicates in subparagraph i) "fuel cells must be of a type that will not charge batteries when the portable electronic device is not in use . . ."

## 2. DISCUSSION

2.1 Part 8, Table 8-1, item 20) requirements h) and i) concerning fuel cells and batteries were developed at the Twentieth Meeting of the DGP in 2005 when provisions for fuel cell technologies were first considered. At that time there were significant uncertainties about the types of fuel cell products that would be commercialized, the status of the relevant international safety standard and the nature of interaction between fuel cells and batteries in terms of safety.

2.2 By 2013 at least three fuel cell products to power personal electronics devices are commercially available from major retail providers, providing real world examples of products and commercial experience with them. These products offered for commercial sale are external power and charging devices that are to be connected to power portable electronic devices. Thousands of fuel cell-battery hybrid systems are being deployed annually around the world in a range of applications in light-duty passenger vehicles, transit buses and heavy duty trucks, telecommunications backup systems, materials handling units including fork lifts and portable power/charging devices. These systems have been proven and tested in the real world, using a mix of fuel cell and battery technology to safely generate clean, reliable power.

2.3 The safety standard that fuel cells are required to conform to is now more advanced since 2005 when IEC 62282-6-1 Publically Available Specification (PAS) was required by DGP/20. It was replaced by International Standard IEC 62282-6-100 Ed. 1 by DGP/23 and now includes Amendment 1 to IEC 62282-6-100 Ed. 1, adopted by Addendum No. 3 to the 2013-2014 Technical Instructions.

2.4 Part 8, Table 8-1, subparagraph h) requires that "interaction between fuel cells and integrated batteries in a device must conform to IEC 62282-6-100 Ed. 1, including Amendment 1", to provide assurance and requirement of safe fuel cell/battery interaction. Fuel cells that meet the robust IEC safety standard, which includes requirements governing the interactions between the fuel cell system and the consumer electronic device, offer an enhanced level of safety over and above what is currently permitted as to a multitude of battery-powered power sources permitted on board aircraft today.

2.5 Part 8, Table 8-1, subparagraph h) prohibiting fuel cell types whose sole function is to charge a battery in the device, singles out fuel cell technologies compared to other sources of electrical power currently allowed to charge batteries, such as power from batteries, aircraft electrical outlet, or other means. If sole charging of batteries by passengers or crew remains a significant concern to ICAO, it is suggested that the proper scope of ICAO governance should be to prohibit all sole–purpose charging of batteries by any means whatsoever. A requirement along these lines might be: "Usage of dedicated battery chargers intended solely to charge a battery independent of a consumer electronic device is prohibited on board aircraft."

2.6 Prohibiting fuel cell types that charge batteries in a device when the device is not in use, as required by Part 8, Table 8-1, subparagraph i), has been found to be confusing and subject to varying interpretations by dangerous goods air safety regulatory authorities and by the fuel cell industry. The clause as written is ambiguous as to when a device is "not in use", given that common consumer electronic phones, tablets and laptop computers continue to function and use electricity even when not in use. This continues to become evident as devices become more sophisticated and are designed to draw

power for a variety of functions even in standby mode, in terms of features such as tracking device location, processing electrical power and maintaining proper battery power status and device readiness.

## 3. CONSDERATION BY THE DGP

3.1 The DGP is invited to discuss and provide feedback on removal of the requirement in subparagraph h) and its replacement with a general prohibition against use by passengers or crew of any device whose sole function is to charge batteries, regardless of by power from fuel cells, battery, aircraft power outlet or any other means. (A requirement along these lines might be: "Usage of dedicated battery chargers intended solely to charge a battery independent of a consumer electronic device is prohibited on board aircraft."). The DGP is also invited to discuss removal of subparagraph i). If it is deemed appropriate, a suitable working paper on this topic will be submitted for consideration by the Dangerous Goods Panel Working Group of the Whole in 2014.

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