



DANGEROUS GOODS PANEL (DGP)

TWENTY-SECOND MEETING

Montréal, 5 to 16 October 2009

Agenda Item 6: Other business

GUIDANCE MATERIAL FOR FUEL CELLS

(Presented by USFCC)

SUMMARY

This paper offers to the Dangerous Goods Panel “Guidance material on fuel cells” which could be posted on the ICAO dangerous goods website.

Action by the DGP: The DGP is invited to agree that the proposed guidance material on fuel cells, as presented in the appendix, be posted to the ICAO dangerous goods website.

1. INTRODUCTION

1.1 At a meeting of the European Dangerous Goods Liaison Group (DELG) held in Geneva in June 2009, a demonstration of commercially-available portable micro fuel cells was held. Attendees welcomed the demonstration which they found informative and invited the fuel cell industry to propose to organizations such as ICAO, IATA, etc. educational material on fuel cells which could be posted on their respective website. The objective of such guidance material is to help passengers, crew and the general public better understand and comply with the provisions of the air regulations concerning fuel cells, thus enhancing safety.

APPENDIX

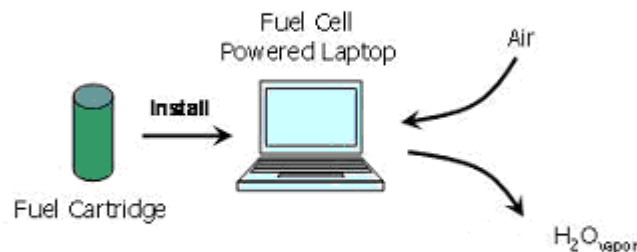
WHAT IS A FUEL CELL?

Growing demand for more powerful portable electronic devices, such as mobile phones, MP3 players, laptop computers, PDA, DVD players, etc., is pushing battery storage well beyond their capabilities. Fuel cell technology has emerged as a strong candidate to replace and supplement batteries in these portable applications, offering numerous benefits over the most advanced battery chemistries, including longer runtimes, more consistent higher quality power output and better lifecycle performance. All fuel cells operate on the same basic electrochemical principles although they can be powered with different fuels, each with distinct attributes.

Developers of micro fuel cells have worked closely with International and National Organizations such as the International Civil Aviation Organization (ICAO), the International Air Transport Organization (IATA), the United Nations, the International Electro-technical Commission (IEC), the US Department of Transport (DOT) and other National Organizations to develop standards of safety for these devices, no matter what fuel is used. The industry objective is to ensure fuel cells deliver enhanced functionality while maintaining the highest standard of safety.

Power in the form of electricity is produced in a fuel cell by the reaction, without combustion, of a fuel with an oxidant (usually oxygen supplied from the ambient air) through a membrane. Efficiencies of fuel cells are high, even in small sizes, while emissions are low.

How Fuel Cells Work



Examples of commercially available fuel cells thru the internet:



BestBuy.com

BestBuy.com



NewEgg.com



Amazon.com



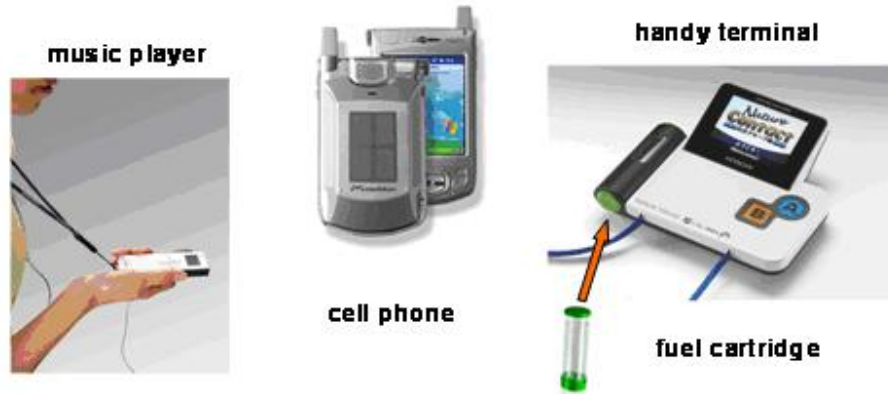
Fuel Cell Store



DataVision

Portable electronic devices are used today in many diverse environments, including the passenger cabin of an aircraft. The ICAO Technical Instructions and the IATA Dangerous Goods Regulations permit the carriage and use of certain fuel cells and fuel cell cartridges by passengers and crew. The only fuel cells and cartridges permitted in an aircraft cabin are those designed and built to meet stringent safety standards to ensure the products are safe for consumers to use and transport. Technical experts from across the fuel cell industry have developed a comprehensive micro fuel cell safety standard (IEC PAS 62282-6-1 Ed. 1) that these products and their cartridges must meet prior to carriage and/or use in an aircraft cabin. This standard, which is referenced in the ICAO and IATA provisions, complements existing standards and regulatory requirements for consumer electronic products, which also apply to micro fuel cell systems.

Fuel Cell Powered Small Devices



In an aircraft, fuel cells and cartridges are permitted to be carried by passengers and crew under specific conditions summarized below:

(Note: key words appear in **bold**)

- they may only contain **flammable liquids, corrosive substances, liquefied flammable gas, water reactive substances or hydrogen in metal hydrides.**;
- Refueling of fuel cells board an aircraft is not permitted except that the **installation of a spare cartridge is allowed.**
- fuel cell and cartridges must comply with IEC PAS 62282-6-1 Ed.1;
- the maximum quantity of fuel in any fuel cell cartridge must not exceed:
 - for **liquids 200 ml**;
 - for **solids 200 g**;
 - for **liquefied gases 120 ml** for nonmetallic fuel cell cartridges **or 200 ml** for metal fuel cell cartridges;
 - for **hydrogen in metal hydride** the fuel cell cartridge must have a water capacity of **120 ml** or less.
- each fuel cell and cartridge must be marked with a manufacturer's certification that it **conforms to IEC PAS 62282-6-1 Ed. 1**, and with the **maximum quantity and type of fuel** in the cartridge;
- no more than **two spare** fuel cell cartridges may be carried by a passenger;
- fuel cell systems containing fuel and fuel cell cartridges including spare cartridges are **permitted in carry-on baggage only.**

— END —