



WORKING PAPER

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

The Hague, 3 to 7 November 2008

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

2.2: Part 2 — Classification

**IGNITION EXCITERS CONTAINING RADIOACTIVE SPARK GAPS IN LARGE AIRCRAFT
ENGINES**

(Presented by Gary Branscombe)

SUMMARY

This paper is to inform panel members of potential situations where a large aircraft engine, which has been purged of any fuel and has no battery, may still contain dangerous goods in the form of “radioactive material in excepted quantity”.

Action by the DGP-WG is in paragraph 2.

1. INTRODUCTION

1.1 When a large aircraft engine is shipped by air, it is classified as UN3166, **Engines, Internal Combustion, flammable liquid powered**, unless no dangerous goods are present.

1.2 In Table 3-1, Dangerous Goods List, under UN3166, **Engines, Internal Combustion, flammable liquid powered**, we find four entries for special provisions. These being A67, A70, A87 and A134. Of interest in this situation is Special Provision A70 which states:

Internal combustion engines being shipped either separately or incorporated into a machine or other apparatus, the fuel tank of which has never contained any fuel and the fuel system of which is completely empty of fuel, or that are powered by a fuel that does not meet the classification criteria for any class or division, and without batteries or other dangerous goods, are not subject to these Instructions. ...

1.3 When large aircraft engines are shipped after being rebuilt, they often contain mineral oil or other similar non-dangerous goods substances to protect some of the components such as the seals, and do not contain batteries. Consequently, in accordance with Special Provision A70, they have often been classified as “not regulated”.

1.4 Recently, during an investigation, it was discovered that one of the components present in large aircraft engines, the ignition exciters, contains spark gaps which are enclosed in a metal-glass sealed envelope within the ignition unit, and are used to control the energy level and discharge characteristics of the unit. This technology is based on the principle that by incorporating a very small quantity of radioactive material within these spark gaps, a uniform operation of the ignition units will result. Modern versions of these spark gaps contain small quantities of Krypton-85 gas. Other radioactive gases such as Cesium-137 were previously used. When these ignition exciters units are shipped, they are classified as UN2910, **Radioactive material, excepted package — limited quantity of material**.

1.5 Consequently, if an aircraft engine would be shipped with the fuel lines completely empty of fuel and without batteries but with an ignition exciter containing radioactive spark gaps, one of the conditions of A70 (...without... other dangerous goods...) would no longer be met. In this situation., the large aircraft engine would be classified as UN3166, **Engines, Internal Combustion, flammable liquid powered**. Sadly, this descriptive proper shipping name and associated class number does not relate to the real hazard while UN2910, **Radioactive material, excepted package — limited quantity of material** would be better suited.

2. ACTION BY THE DGP-WG

2.1 The DGP-WG is invited to discuss if the classification of UN2910, **Radioactive material, excepted package — limited quantity of material** would be acceptable in such a situation. Subsequent to the discussion, a working paper proposing changes to the Technical Instructions may be presented at a later meeting.

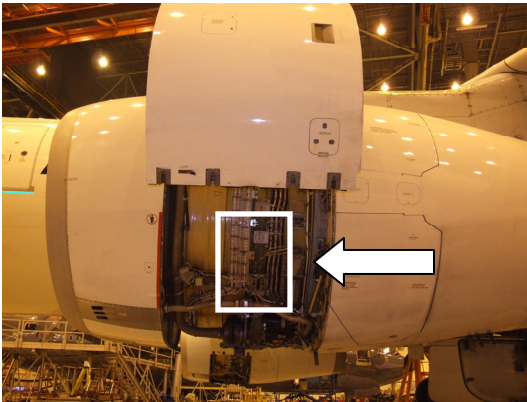


Figure 1 - Two ignition exciters mounted on an aircraft engine

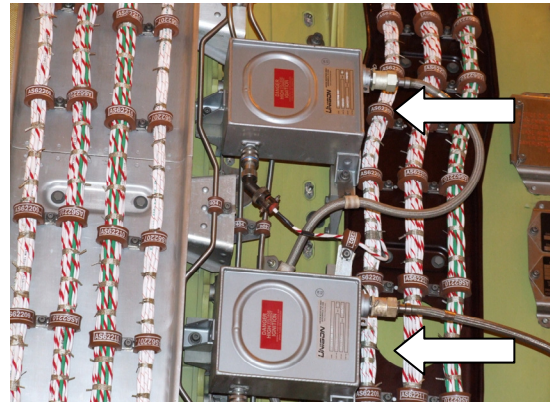


Figure 2 - Close up of two ignition exciters



Figure 3 - Aircraft engine on cradle, ready to be shipped



Figure 4 - Older version of spark gaps

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