



**WORKING PAPER**

**DANGEROUS GOODS PANEL (DGP)**

**TWENTY-SIXTH MEETING**

**Montréal, 16 to 27 October 2017**

**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 2019-2020 Edition**

**VEHICLES POWERED BY FLAMMABLE GAS AND FLAMMABLE LIQUID**

(Presented by D. Brennan)

**SUMMARY**

This working paper proposes revisions to Special Provision A214 and to Packing Instruction 951 to reinforce to shippers of vehicles powered by both a flammable gas and a flammable liquid that the provisions of Packing Instruction 950 with respect to the quantity of flammable liquid fuel in the vehicle must also be applied.

**Action by the DGP-WG:** The DGP is invited to consider revising Special Provision A214 and Packing Instruction 950 as shown in the appendix to this working paper.

**1. INTRODUCTION**

1.1 Special Provision A203, which was adopted into the 2017-2018 Edition of the Technical Instructions, requires that vehicles that are powered by a flammable liquid and a flammable gas must be assigned to UN 3166, **Vehicle, flammable gas powered**. Special Provision A203 will be deleted from the 2019-2020 Technical Instructions, but the requirement in A203 will be incorporated into a new Special Provision A214 (see DGP/26-WP/13).

1.2 While the wording included in Special Provision A214 clearly identifies the correct classification for vehicles that are powered by both a flammable liquid and a flammable gas, what is not apparent is for the shipper, and the operator at acceptance, to comply with the parts of Packing Instruction 950 that relate to the quantity of flammable liquid in the fuel tank in addition to all of the applicable parts of Packing Instruction 951.

1.3 To ensure that shippers and operators are made aware of the need to comply with the relevant parts of both packing instructions it is proposed to add some text into Special Provision A214 to draw attention to the need to also follow part of Packing Instruction 950 and to include a reference to Packing Instruction 950 into Packing Instruction 951.

## 2. ACTION BY THE DGP

2.1 The DGP-WG is invited to consider the amendments to Special Provision A214 and to Packing Instruction 951 as shown in the appendix to this working paper.

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APPENDIX

PROPOSED AMENDMENT TO PART 3 OF THE TECHNICAL INSTRUCTIONS

Part 3

DANGEROUS GOODS LIST,  
SPECIAL PROVISIONS AND  
LIMITED AND EXCEPTED QUANTITIES

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Chapter 3

SPECIAL PROVISIONS

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Table 3-2. Special provisions

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A214 (388) UN No. 3166 entries apply to vehicles powered by flammable liquid or flammable gas internal combustion engines or fuel cells.

Vehicles powered by a fuel cell engine must be assigned to UN 3166 **Vehicle, fuel cell, flammable gas powered** or UN 3166 **Vehicle, fuel cell, flammable liquid powered**, as appropriate. These entries include hybrid electric vehicles powered by both a fuel cell and an internal combustion engine with wet batteries, sodium batteries, lithium metal batteries or lithium ion batteries, transported with the battery(ies) installed.

Other vehicles which contain an internal combustion engine must be assigned to UN 3166 **Vehicle, flammable gas powered** or UN 3166 **Vehicle, flammable liquid powered**, as appropriate. These entries include hybrid electric vehicles powered by both an internal combustion engine and wet batteries, sodium batteries, lithium metal batteries or lithium ion batteries, transported with the battery(ies) installed.

If a vehicle is powered by a flammable liquid and a flammable gas internal combustion engine, it must be assigned to UN 3166 **Vehicle, flammable gas powered**. **The requirements of Packing Instruction 950 with respect to flammable liquid fuel tanks must also be met.**

Entry UN 3171 only applies to vehicles powered by wet batteries, sodium batteries, lithium metal batteries or lithium ion batteries and equipment powered by wet batteries or sodium batteries transported with these batteries installed.

For the purpose of this special provision, vehicles are self-propelled apparatus designed to carry one or more persons or goods. Examples of such vehicles are cars, motorcycles, scooters, three- and four-wheeled vehicles or motorcycles, trucks, locomotives, bicycles (pedal cycles with a motor) and other vehicles of this type (e.g. self-balancing vehicles or vehicles not equipped with at least one seating position), wheelchairs, lawn tractors, self-propelled farming and construction equipment, boats and aircraft. This includes vehicles transported in a packaging. In this case some parts of the vehicle may be detached from its frame to fit into the packaging.

Examples of equipment are lawnmowers, cleaning machines or model boats and model aircraft. Equipment powered by lithium metal batteries or lithium ion batteries must be assigned to UN 3091 **Lithium metal batteries contained in equipment** or UN 3091 **Lithium metal batteries packed with equipment** or UN 3481 **Lithium ion batteries contained in equipment** or UN 3481 **Lithium ion batteries packed with equipment**, as appropriate.

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## Part 4

# PACKING INSTRUCTIONS

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## Chapter 11

### CLASS 9 — MISCELLANEOUS DANGEROUS GOODS

*Parts of this Chapter are affected by State Variation US 2; see Table A-1*

#### 11.1 PACKING INSTRUCTIONS

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#### Packing Instruction 951

Cargo aircraft only for UN 3166 only

(See Packing Instruction 220 for flammable gas-powered engines and machinery, Packing Instruction 378 for flammable liquid-powered engines and machinery, Packing Instruction 950 for flammable liquid-powered vehicles, Packing Instruction 952 for battery-powered equipment and vehicles or Packing Instruction 972 for engines or machinery containing only environmentally hazardous fuels)

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#### ADDITIONAL PACKING REQUIREMENTS

##### *Flammable gas vessels*

- 1) for flammable gas-powered vehicles, pressurized vessels containing the flammable gas must be completely emptied of flammable gas. Lines from vessels to gas regulators, and gas regulators themselves, must also be drained of all trace of flammable gas. To ensure that these conditions are met, gas shut-off valves must be left open and connections of lines to gas regulators must be left disconnected upon delivery of the vehicle to the operator. Shut-off valves must be closed and lines reconnected at gas regulators before loading the vehicle aboard the aircraft;

or alternatively,

- 2) flammable gas-powered vehicles that have pressure receptacles (fuel tanks) equipped with electrically operated valves that close automatically in case the power is disconnected, or with manual shut-off valves, may be transported under the following conditions:
  - i) the tank shut-off valves must be in the closed position and in the case of electrically operated valves, power to those valves must be disconnected;
  - ii) after closing the tank shut-off valves, the vehicle must be operated until it stops from lack of fuel before being loaded aboard the aircraft;
  - iii) in no part of the closed system must the remaining pressure of compressed gases exceed 5 per cent of the maximum allowable working pressure of the pressure receptacle (fuel tank) system, or more than 2 000 kPa (20 bar), whichever is the lower.

##### *Flammable liquid fuel tanks*

If a vehicle is powered by a flammable liquid and a flammable gas internal combustion engine, the requirements set out in Packing Instruction 950 for flammable liquid fuel tanks must also be met.

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