



**DANGEROUS GOODS PANEL (DGP)  
WORKING GROUP MEETING (DGP-WG/18)**

**Montréal, 1 to 5 October 2018**

**Agenda Item 2: Managing air-specific safety risks and identifying anomalies**

**2.2: Develop proposals, if necessary, for amendments to the *Technical Instructions for the Safe Transport of Dangerous Goods by Air (Doc 9284)* for incorporation in the 2021-2022 Edition**

**REVISIONS TO PACKING INSTRUCTIONS 378 AND 972**

(Presented by D. Brennan)

**REVISED**

**SUMMARY**

This working paper proposes revisions to Packing Instructions 378 and 972 to incorporate provisions for machinery that apply to vehicles in Packing Instruction 950

**Action by the DGP-WG:** The DGP-WG is invited to consider the proposed revisions to Packing Instructions 378 and 972 as shown in the appendix to this working paper.

**1. INTRODUCTION**

1.1 Prior to the 2017-2018 Edition of the Technical Instructions, UN 3166 was assigned to engines, flammable liquid-powered and vehicles flammable liquid powered to which Packing Instruction 950 applied.

1.2 Based on changes arising from the 19<sup>th</sup> revised edition of the UN Model Regulations, engines were removed from UN 3166 with **Engine, flammable liquid-powered** and **Engine, fuel cell, flammable liquid-powered** being assigned to UN 3528 in Class 3 and Packing Instruction 378. At the same time new proper shipping names **Machinery, flammable liquid-powered** and **Machinery, fuel cell, flammable liquid-powered** were added to UN 3528. Further a new entry, UN 3530, **Engines, internal combustion** and **Machinery, internal combustion** was assigned to Class 9 and Packing Instruction 972.

1.3 For the most part the contents of the new Packing Instructions 378 and 972 aligned to the existing provisions of Packing Instruction 950. However, there were some provisions that were not carried across as these provisions applied only to vehicles. The provisions in question are those related to the allowance for the fuel tank on a vehicle to have some residual fuel and the exception for vehicles powered by a diesel engine to not have the fuel tank drained.

1.4 Since the adoption of the new entry for machinery, it has become apparent that there are large machines that are being transported that can only be transported upright and it is believed that the allowances for vehicles should reasonably be available for machinery. One example of this machinery is a large container that is fitted with a diesel engine, see below:



1.5 To facilitate the acceptance and carriage of this type of machinery it is proposed to include into Packing Instructions 378 and 972 the provisions for vehicles from Packing Instruction 950. For Packing Instruction 972 it is questioned as to whether there is any need to drain the fuel tank as the fuel must be non-flammable.

## 2. ACTION BY THE DGP-WG

2.1 The DGP-WG is invited to consider the revisions to Packing Instructions 378 and 972 as shown in the appendix to this working paper. For Packing Instruction 972 two options have been offered. One that aligns with the proposal shown in Packing Instruction 378 aligned to Packing Instruction 950 that allows for up to a quarter of a tank of fuel to remain. The second is to not require the fuel tank to be drained at all, i.e. aligned to the provision for diesel fuel in Packing Instruction 950.

## APPENDIX

### PROPOSED AMENDMENT TO PART 4 OF THE TECHNICAL INSTRUCTIONS

## Part 4

### PACKING INSTRUCTIONS

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## Chapter 5

### CLASS 3 — FLAMMABLE LIQUIDS

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#### Packing Instruction 378

Passenger and cargo aircraft for UN 3528 only  
(See Packing Instruction 220 for flammable gas-powered engines or machinery, Packing Instruction 950 for flammable liquid-powered vehicles, Packing Instruction 951 for flammable gas-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

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##### *Flammable liquid fuel tanks*

Except as otherwise provided for in this packing instruction, fuel tanks must be drained of fuel and tank caps fitted securely. Special precautions are necessary to ensure complete drainage of the fuel system of machines or equipment incorporating internal combustion engines, such as lawn mowers and outboard motors, where such machines or equipment could possibly be handled in other than an upright position. When it is not possible to handle in other than an upright position, machinery, except those with diesel engines, must be drained of fuel as far as practicable, and if any fuel remains, it must not exceed one-quarter of the tank capacity.

##### *Diesel engines*

Machinery equipped with diesel engines are excepted from the requirement to drain the fuel tanks, provided that a sufficient ullage space has been left inside the tank to allow fuel expansion without leakage, and the tank caps are tightly closed. A careful check must be made to ensure there are no fuel leakages.

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## Chapter 11

### CLASS 9 — MISCELLANEOUS DANGEROUS GOODS

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#### 11.1 PACKING INSTRUCTIONS

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##### Packing Instruction 972

Passenger or cargo aircraft for UN 3530 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 951 for flammable gas-powered vehicles or Packing Instruction 952 for battery-powered equipment and vehicles)

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##### ADDITIONAL PACKING REQUIREMENTS

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##### *Liquid fuel tanks*

Except as otherwise provided for in this packing instruction, fuel tanks must be drained of fuel and tank caps fitted securely. Special precautions are necessary to ensure complete drainage of the fuel system of machines or equipment incorporating internal combustion engines, such as lawn mowers and outboard motors, where such machines or equipment could possibly be handled in other than an upright position. [When it is not possible to handle in other than an upright position, machinery, must be drained of fuel as far as practicable, and if any fuel remains, it must not exceed one-quarter of the tank capacity.] . [When it is not possible to handle in other than an upright position, there is no requirement to drain the fuel tanks on machinery, provided that a sufficient ullage space has been left inside the tank to allow fuel expansion without leakage, and the tank caps are tightly closed. A careful check must be made to ensure there are no fuel leakages.]

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