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WNTI

WORLD NUCLEAR TRANSPORT INSTITUTE

GOOD PRACTICE GUIDE

Transport of UN 3507 by Air

Dedicated to the safe, efficient and
reliable transport of radioactive materials

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Good Practice Guide for Transport of UN 3507 by Air

1. INTRODUCTION

From 1st January 2015, samples of uranium hexafluoride (UF₆) in excepted packages transported under the UN number UN 3507, are classified in Class 8, with a subsidiary risk of Class 7.

The scope of this good practice guide is to facilitate the understanding of the regulations associated with the transport of UF₆ under this new UN number and to harmonise the implementation of the new rules.

2. REGULATIONS FOR REFERENCE

This guide is based on the 56th Edition of the International Air Transport Association IATA Dangerous Goods Regulations (DGR) manual, applicable as from 1st January 2015. This document will be referred to as IATA DGR in this guide.

This good practice guide has been developed with the support of the IATA.

3. PACKING INSTRUCTIONS, MARKING AND LABELLING, LIMITATIONS

UF₆ samples shipped under UN 3507 shall be classified in conformance with 10.3.11.1.5, packed in accordance with packing instruction 877 and special provisions A139 and A194, including references contained within.

Important points of the regulations are listed in the appendix.

Many good practices of packaging and transporting UF₆ samples exist. Below is one example of a packaging process for P10 tubes and the related labelling process.

- 3.a.** Each P10 tube (primary inner receptacle) is to be wrapped individually or packed separately in a way so as to prevent contact to other P10 tubes. This is the case if multiple P10 tubes are placed in a secondary packaging (single canister).



- 3.b.** Place the wrapped P10 tubes into the secondary packaging (canister) in a way that under normal conditions of transport, they cannot break, be punctured or leak their contents into the secondary packaging (canister).



- 3.c.** If shipping to or within a European Union (EU) Member State, the GHS (Globally Harmonized System of Classification and Labelling of Chemicals) markings should be attached to the secondary packaging (canister) according to European Regulation (EC) No 1272/2008 (European Regulation (EC) No 1272/2008 on classification, labelling and packaging of substances and mixtures came into force on 20 January 2009 in all EU Member States, including the UK. It is known by its abbreviated form, 'the CLP Regulation' or just plain 'CLP').

3.d. The secondary packaging (canister) must be placed into the outer packaging (fibreboard box) with suitable cushioning material to prevent movement. If multiple primary receptacles are placed in a single secondary packaging, they must be either individually wrapped or separated so as to prevent contact between them.



3.e. Before sealing the outer packaging (fibreboard box) with tamper proof sealing place a "Radioactive" mark on top of the cushioning material or on the closure of the canister. The mark should be immediately visible on opening of the outer packaging (fibreboard box).



3.f. Please mark and label the outer packaging (fibreboard box) as described below:

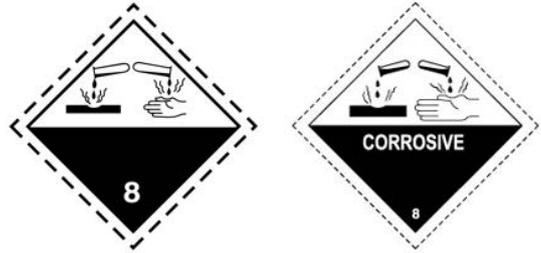
3.f.1. For the marking and labelling requirements associated with "UN3507 URANIUM HEXAFLUORIDE RADIOACTIVE MATERIAL EXCEPTED PACKAGE" the requirements for Class 8 apply according to Special Provision A194 (IATA DGR 4.4).

- Apply the markings: UN number, proper shipping name, name and address of shipper and consignee and net quantity;

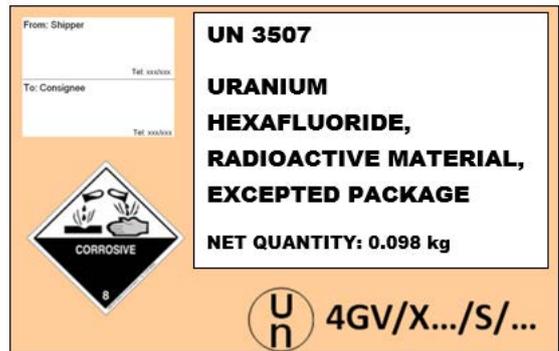
N.B.: Although the indication of net quantity is not mandatory in all cases, it is recommended to mark it on the package at all times.

- Hazard Label Specification – Class 8 –Corrosives, a Class 7 hazard label is not required, see Special Provision A194;
- Marking of UN specification outer packaging (fibreboard box) including the complete code of the package.

Examples of labels:



Example of marking and labelling:



N.B.: The label for Radioactive Material-Excepted Package (7.4.7) shall not be used as per in the note of 10.7.4.4.3 and section 7.2.4.6.

4. TRANSPORT DOCUMENTS

The requirements for the transport document are described in Section 8 of the IATA DGR. The shipment type shall be "NON-RADIOACTIVE" as per paragraph 8.1.6.8. Paragraph 10.8.8.3 exempts Class 7 excepted packages from the shipper's declaration, therefore the requirements for completion of the shipper's declaration are only those stated in Section 8 (as per 10.8.8.3.4).

Please see further an example of the shipper's declaration for dangerous goods.

SHIPPER'S DECLARATION FOR DANGEROUS GOODS						
Shipper UF6 producer Ltd New Town Countryland			Air Waybill No. Page 1 of 1 Pages Shipper's Reference Number <i>(optional)</i>			
Consignee Who-ever Ltd Youngville Stateland			<i>For optional use for Company logo name and address</i>			
<i>Two completed and signed copies of this Declaration must be handed to the operator.</i>			WARNING Failure to comply in all respects with the applicable Dangerous Goods Regulations may be in breach of the applicable law, subject to legal penalties.			
TRANSPORT DETAILS						
This shipment is within the limitations prescribed for: <i>(delete non-applicable)</i>			Airport of Departure:			
<input type="checkbox"/> PASSENGER AND CARGO AIRCRAFT		<input checked="" type="checkbox"/> OR <input checked="" type="checkbox"/> ONLY				
Airport of Destination:			Shipment type: <i>(delete non-applicable)</i> <input checked="" type="checkbox"/> NON-RADIOACTIVE <input checked="" type="checkbox"/> EXCEPTED			
NATURE AND QUANTITY OF DANGEROUS GOODS						
Dangerous Goods Identification						
UN or ID No.	Proper Shipping Name	Class (or Division (Subsidiary Risk)	Pack- ing Group	Quantity and type of packing	Packing Inst.	Authorization
UN3507	URANIUM HEXAFLUORIDE, RADIOACTIVE MATERIAL, EXCEPTED PACKAGE	8 (7)	I	1 fibreboard box x 98 gram	877	
Additional Handling Information 24-hour phone number +1 234 567 8901 Registered shipping name: UF6 Transporter Registration Nr. 12345						
I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labelled/placarded, and are in all respects in proper condition for transport according to applicable International and national governmental regulations. I declare that all of the applicable air transport requirements have been met.				Name/Title of Signatory Julie Jones, Compliance Specialist Place and Date New Town, 1 January 2015 Signature <i>(see warning above)</i> <i>Barbara Brown</i>		

N.B.: The same shipper's declaration can also be used for other modes of transport with additional information provided especially the Tunnel Restriction Code (D) (when the European Agreement concerning the International Carriage of Dangerous Goods by Road (ADR) applies).

5. INFORMATION FOR FORWARDERS AND OPERATORS (AIRLINES)

There is no specific limit on the number of packages or consignments per aircraft as the radioactive properties are classified as excepted package.

(exclusive use shipment is not required);

Checklist:

- An acceptance checklist (non-radioactive) must be performed prior to acceptance
- The per package net quantity limit is indicated in Packing Instruction 877
- The Class 7 hazard label is not required (SP A194);
- The radioactive material, excepted package label is not required (10.7.4.4.3.1, Note.)

6. STATE VARIATIONS

State variations need to be checked against both radioactive and corrosive properties.

APPENDIX

Special provision A139 shall read: "A139 (317) "Fissile-excepted" applies only to those packages complying with section 10.3.7.2." (instead of 10.6.2.8).

Mass of UF₆ shall be less than 100g per package (see 10.3.11.1.5 (a) and 10.3.11.5.2 (a),

Mass of U-235 shall not exceed (for enrichments in U-235 higher than 1%):

- 3,5 g per package and 45 g per consignment in case of uranium with a maximum enrichment of 5% by mass of U-235 (see 10.3.7.2.3);
- 2 g per package and 15 g per consignment in other cases (see 10.3.7.2.4).

UF₆ shall be contained in one or several metal or plastic primary inner receptacles that comply to 10.3.11.5.2.(b) and (c) (ullage of at least 5% at maximum temperature specified for the plant system, UF₆ in solid form and pressure not above atmospheric pressure when presented for transport) and which can be heated up to 55°C without loss of UF₆;

Evidence of the compatibility between material of the primary receptacle and UF₆ shall be made available to the competent authority on request (see 5.0.2.6).

The combination packaging used (outer packaging with secondary packagings) shall be of a type design as allowed in the packing instruction 877, successfully tested for solid or liquid Packing Group I dangerous goods, marked as required in 6.0.4;

The primary inner receptacle, the outer packaging, or the secondary packaging, shall be capable of withstanding a pressure differential of not less the maximum normal operating pressure (MNOP) + 95kPa without loss or dispersal of radioactive content taking account of the maximum ambient temperature of 55°C (see 10.6.1.3) (MNOP should at least correspond to the increase of inner pressure due to increase of temperature of the air contained in the inner volume of the inner packaging or of the outer packaging between temperature of the package at closing and 55°C; outer or inner packagings tested at 110 kPa will meet the provision ; when considering the primary inner receptacle, considering that only UF₆ is present in that primary inner receptacle and that the vapour pressure of uranium hexafluoride at 55°C is less than 1 atmosphere - the MNOP is of 0 kPa, the differential pressure to which the inner primary receptacle shall be able to withstand without escape of UF₆ is 95 kPa only) ;

The packer shall be in possession of the manufacturer information of the outer and inner packagings regarding procedures to be followed (see 6.0.1.4) and shall conform to them when preparing the consignment;

Primary (outer surface), secondary (outer and inner surfaces) and outer packaging (outer and inner surfaces) shall be free from non-fixed contamination (10.5.3.2);

The primary inner receptacles shall be packed in secondary packagings in a way that, under normal conditions of transport, they cannot break, be punctured or leak their content into secondary packagings (see PI 877);

The secondary packagings shall be properly secured in the outer packaging with suitable cushioning material (see PI 877);

Before closing the outer package, the marking "RADIOACTIVE" shall be placed in a manner that it will be visible at opening of the outer packaging (see 10.3.11.1.5 (d));

Radiation level at any point on the external surface of the package shall not exceed 5 µSv/h (see 10.3.11.1.2.).

UN number, proper shipping name, net quantity of UF₆ content and the label of Class 8, shall be placed next to each other on the same surface of the package;

"Radioactive Material – Excepted Package" label shall not be used for UN 3507;

Full name and address of the shipper and consignee, shall be placed on the same surface of UN number, proper shipping name if the package dimensions are adequate; Markings and labels added at the time of shipment shall not obliterate packaging marks required in 6.0.4.

Other irrelevant marking already on the package shall be removed or obliterated (see 7.1.1 (b))

Package marking character size and label design shall conform to 7.1.4.4 and 7.2.2.3 respectively.

Language for markings shall be English in addition to the language that may be required by the state of origin (see 7.1.3.3).

See Package Labelling Example in Figure 7.2.A of IATA DGR.

NB.

Whilst the WNTI will use all reasonable efforts to ensure that the information in this good practice guide is accurate, we cannot guarantee the accuracy of all information and we will accept no liability for any loss or damages incurred, howsoever caused, and cannot be held liable for any use or reliance you may make of or put on it. The WNTI also cannot be held liable for your use or inability to use the site or the information or services that it contains. Errors and Omissions Excepted.

The WNTI offers the use of this good practice guide freely to members and non-members of the transport community; the agents and authorities responsible for ensuring compliance of labelling and documentation of transports of radioactive materials presented for air shipments. Where any interpretation of the information has been made, it has been done so with the interests of the wider transport community. Although the good practice guide has been extensively reviewed by industry experts, if you have any issues in use or content, please contact the WNTI so we can rectify the issues and conflicts in systems etc.



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