Feedback on Freight Container Issues raised by ICAO
Questions from ICAO

• **Question 1:** In case the freight container is used as a packaging e.g. IP-2 does Table 5-1 apply or not?

• **Question 2:** In case the freight container is used as packaging do these requirements apply or are the labelling requirements for packagings sufficient?

• **Question 3:** In case the freight container is used as packaging is the TI limited to 10?

• **Question 4:** If a shipment must be transported under exclusive use, only in the case the surface radiation level of a package or overpack exceeds 2mSv/h the shipment must in addition also be transported under special arrangement. Why did IAEA impose this requirement (special arrangement) only in case the surface radiation level exceeds 2mSv/h.
629. *Freight containers* with the characteristics of a permanent enclosure may also be used as *Type IP-2* or *Type IP-3*, provided that:

(a) The *radioactive contents* are restricted to solid materials.

(b) They satisfy the requirements for *Type IP-1* specified in para. 623.

(c) They are designed to conform to the International Organization for Standardization document ISO 1496/1: Series 1 Freight Containers — Specifications and Testing — Part 1: General Cargo Containers for General Purposes [11] excluding dimensions and ratings. They shall be designed such that if subjected to the tests prescribed in that document and to the accelerations occurring during routine conditions of transport they would prevent:

(i) Loss or dispersal of the *radioactive contents*;

(ii) More than a 20% increase in the maximum *radiation level* at any external surface of the *freight containers*. 
Which means;

Freight container  
(serves as equipment to retain packages)

Package  
(which provides containment to its radioactive contents)

Freight container used as packaging  
(serves as containment to radioactive contents)

Radioactive contents
Examples;

Freight container

Uranium ore concentrate package

20’ ISO Freight Container

(from WNTI Good Practice Guide GPG3)

Freight container used as packaging

200L drum containing low level radioactive waste

Type LLW-1 packaging
In case the freight container is used as a packaging (e.g. IP-2), does Table 5-1 apply or not?

Para 523 (b) of SSR-6 applies for tanks, freight containers or unpackaged LSA-I material and SCO-I only. Freight containers used as packaging with radioactive contents are treated as a packages. Therefore, para 523 (b) does not apply in this case.

<table>
<thead>
<tr>
<th>Size of load *</th>
<th>Multiplication factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size of load $\leq$ 1 m$^2$</td>
<td>1</td>
</tr>
<tr>
<td>1 m$^2$ $&lt;$ size of load $\leq$ 5 m$^2$</td>
<td>2</td>
</tr>
<tr>
<td>5 m$^2$ $&lt;$ size of load $\leq$ 20 m$^2$</td>
<td>3</td>
</tr>
<tr>
<td>20 m$^2$ $&lt;$ size of load</td>
<td>10</td>
</tr>
</tbody>
</table>

* Largest cross-sectional area of the load being measured.
**Question 2**

*In case the freight container is used as packaging do these requirements (IAEA para. 543) apply or are the labelling requirements for packagings sufficient?*

IAEA Para 543 here is unambiguous. The requirements in para 543 apply only for large freight containers carrying packages other than excepted packages, and tanks. They do not apply to freight containers used as packagings.
In case the freight container is used as packaging is the TI limited to 10?

The TI limit for a freight container used as packaging not under exclusive use is 10 as stated in footnote b of Table 8. When the freight container is used as handling equipment the TI limit is 50 as stated in Table 10 of SSR-6.

<table>
<thead>
<tr>
<th>Conditions</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>TI</td>
<td>Maximum radiation level at any point on external surface</td>
</tr>
<tr>
<td>More than 10</td>
<td>More than 2 mSv/h but not more than 10 mSv/h</td>
</tr>
</tbody>
</table>

b Shall also be transported under exclusive use except for freight containers (see Table 10)
If yes, this would mean that if the TI exceeds 10 the package (freight container) must be shipped under exclusive use and with special arrangement. As a consequence of exclusive use no other cargo can be loaded on the aircraft.

If the TI exceeds 10 the package (freight container used as packaging) must be shipped under exclusive use, but not always with special arrangement. Special arrangement is required if maximum dose rate at external surface of package (or freight container used as packaging) exceeds 2 mSv/h (IAEA Para. 579).
If a shipment must be transported under exclusive use, only in the case the surface radiation level of a package or overpack exceeds 2mSv/h the shipment must in addition also be transported under special arrangement.

Why did IAEA impose this requirement (special arrangement) only in case the surface radiation level exceeds 2mSv/h.

We have no answer to that question.
Question 4 – see SSG-26

579.1. Owing to the higher radiation levels than those normally allowed, greater care is necessary in loading and handling. The requirement for such consignments to be transported by special arrangement ensures the involvement of the competent authority and allows special handling precautions to be specified, either during loading, in flight or at any intermediate transfer point.

579.2. The special arrangement authorization should include consideration of handling, loading and in-flight arrangements in order to control the radiation doses to flight crew, ground support personnel and incidentally exposed persons. This may necessitate special instructions for crew members, notification to appropriate persons such as terminal staff at the destination and at intermediate points and special consideration of transfer to other transport modes.
Give your feedback, please!
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Corresponding Group on Freight Containers