



THE TRANSPORT OF RADIOACTIVE MATERIAL WITH SUBSIDIARY RISKS

Example: C-14 marked flammable liquid, toxic

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Sending of Samples

1. No radioactive material of class 7

If activity concentration or activity do not exceed 1×10^4 Bq/g or 1×10^7 Bq (2.2.7.7.2.1 IMDG-Code/ADR/RID or 10.4.A IATA-DGR columns 3 or 4), the conditions for exempt material or exempt consignment are given. Dependent on flashpoint and toxic properties the material has to be classified for instance as a flammable liquid of class 3, toxic.

2. Material of Class 7, Limited Quantities, Excepted Packages

For a liquid, no special form, C-14 activities up to $A \leq 10^{-4} A_2 = 3 \times 10^{-4}$ TBq (2.2.7.7.1.2.1 IMDG-Code/ADR/RID or 10.5.9 IATA-DGR) are the condition for a radioactive material in limited quantities. Following special regulation 290 of 3.3 IMDG or 10.5.9.3 IATA-DGR the other hazard takes precedence.

Description in Shipper's Declaration for Defined Material or Sample (to define toxic properties) would be:

Case 1: Flammable liquid, toxic, n.o.s. (technical name/sample), 3 (6.1), UN 1992, I

Case 2: Flammable liquid, toxic, n.o.s. (technical name/sample), Radioactive material, excepted package, limited quantity of material, 3 (6.1), UN 1992, I

In case 1 sending of a sample is clearly allowed as there is no radioactive property in sense of class 7. In case 2 it is not quite clear, if sending as a sample concerning toxic properties is allowed or not allowed (see below under 3.).

3. Material of Class 7, Type A-Package

C-14 activities $A > 10^{-4} A_2 = 3 \times 10^{-4}$ TBq (2.2.7.7.1.2.1 ADR or 10.5.9 IATA-DGR) make it impossible to send radioactive material in limited quantities. The radioactive hazard takes precedence. Depending on the properties of the material several classifications are possible. Type A-package is chosen here.

Description in Shipper's Declaration for Defined Material or Sample (to define toxic properties) would be for instance:

UN 2915 Radioactive material type A package, 7 (3, 6.1), C-14, flammable liquid, toxic (sample), PG I, 1,1 TBq, II-YELLOW, TI=0,5

The same question as in case 2 occurs: Is sending of a sample concerning toxic properties allowed or not allowed?

2.1.4.2 IMDG-Code/ADR/RID or 4.1.2.2 IATA-DGR prescribe under b): "...the substance is not considered ... to be ... a radioactive material; ..."

In cases 2 and 3 the radioactive properties of the materials are defined and can be recognised in the shipper's declaration and on the labels and markings on the packages. Sending of a sample in order to find out radioactive properties is not necessary and also not intended. On the other hand it could be of interest to send a sample to find out toxic properties.

It is suggested, that it should be possible to transport a radioactive material as a sample with regard to its subsidiary risk. If there are no reasons against this idea, the regulation could be modified:

"The substance must not be transported for testing radioactive properties, but a radioactive material may be transported for testing subsidiary risks."

Regulations for Design of Package

10.5.3.9 IATA-DGR or 6.4.2.11. IMDG-Code/ADR/RID prescribe: "For radioactive material having other dangerous properties, the package design must take into account these properties."

IMDG-Code/ADR/RID contain an additional regulation 4.1.9.1.5: "Radioactive material with a subsidiary risk must be transported in packages, IBC or tanks which fully comply with the applicable chapter of part 6 and the regulations of chapters 4.1 and 4.2 which are applicable for this subsidiary risk."

These Regulations take into account that package design regulations may be more restrictive either for the radioactive hazard or for the other hazard (see examples in table 1). In the interest of a safe transport all restrictions have to be considered.

	Package for subsidiary risk UN 4G/X20/04/S/D/XY1234	Type A for liquid
Approval by competent authority	Required	Not required
Stacking Test 24 h	Weight x numbers of packages in a stack of 3 m	5 x weight of package or 13 kPa x vertically projected area of the package
Penetration test	Not required	A bar of 6 kg, 32 mm diameter, height of drop 1 m
Free Drop Test	1,80 m (X) or 1,20 (Y)	9,00 m

Table 1: Comparison of selected tests and requirements for a package according 6.1 IMDG-Code and Type A-package

But is it really necessary to perform all tests of chapter 6.1 if they are still included in the tests of chapter 6.4? Is it especially necessary to perform tests for an UN-package under approval by a competent authority while the more restrictive test for a type A-package are only performed under the responsibility of the package designer?

Therefore an addition to 4.1.9.1.5 is suggested:

“Approval by competent authority according to 6.1.1.3 and markings of 6.1.2 are not required, if package design regulations for the radioactive hazard are more restrictive in all points than the regulations for the other hazard.”