International Civil Aviation Organization

DGP-WG/14-WP/10
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WORKING PAPER

DANGEROUS GOODS PANEL (DGP)
MEETING OF THE WORKING GROUP OF THE WHOLE

Rio de Janeiro, Brazil, 20 to 24 October 2014

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 2017-2018 Edition

2.1: Part 5 — Shipper's Responsibilities

DETERMINATION OF TRANSPORT INDEX

(Presented by D. Mirko)

SUMMARY

This paper proposes to introduce a change to Part 5;1.2.3.1.1 a) of the Technical Instructions concerning requirements for the determination of the transport index.

Action by the DGP-WG: The DGP is invited to consider revising Part 5;1.2.3.1.1 a) of the Technical Instructions as shown in Appendix A to this working paper.

1. INTRODUCTION

1.1 The majority of radioactive packages that are transported worldwide by air have gamma emitting radionuclides. The transport index for such packages may be measured with commonly-used Geiger-Mueller detectors.

1.2 Some radioactive packages permitted for transport have gamma and neutron emitting radionuclides (for example Cf-252 or Am-241/Be). The transport index for such packages may be measured only with the joint use of Geiger-Mueller detectors and neutron measuring detectors. If shippers use one Geiger-Mueller detector only, the transport index will be measured incorrectly (see Appendix B).

1.3 Section 523.1 (b) of the International Atomic Energy Agency's (IAEA) Advisory Material for the IAEA Regulations for the Safe Transport of Radioactive Material (2012 Edition) (No. SSG-26) states: " If the measured dose rate comprises more than one type of radiation, then the TI should be based on the sum of all the dose rates from each type of radiation" (see Attachment C).

1.4 The current text in the Technical Instructions does not have such a provision and therefore Part 5;1.2.3.1.1 a) needs to be modified.

2. ACTION BY THE DGP-WG

2.1 The DGP is invited to consider revising Part 5;1.2.3.1.1 a) of the Technical Instructions as shown in Appendix A to this working paper.

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APPENDIX A

PROPOSED AMENDMENT TO PART 5 OF THE TECHNICAL INSTRUCTIONS

Part 5

SHIPPER'S RESPONSIBILITIES

Chapter 1

GENERAL

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Note.— It is the shipper's responsibility to ensure that all of the applicable air transport requirements are met. The items indicated below are provided as examples and do not include a complete list of all the applicable requirements for air transport.

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1.2 GENERAL PROVISIONS FOR CLASS 7

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1.2.3 Determination of transport index (TI) and criticality safety index (CSI)

1.2.3.1 Determination of transport index

1.2.3.1.1 The transport index (TI) for a package, overpack or freight container, must be the number derived in accordance with the following procedure:

a) Determine the maximum radiation level in units of millisieverts per hour (mSv/h) at a distance of 1 m from the external surfaces of the package, overpack, or freight container. The value determined must be multiplied by 100 and the resulting number is the transport index. If the measured dose rate comprises more than one type of radiation, then the TI should be based on the sum of all the dose rates from each type of radiation. For uranium and thorium ores and their concentrates, the maximum radiation level at any point 1 m from the external surface of the load may be taken as:

0.4 mSv/h for ores and physical concentrates of uranium and thorium;

0.3 mSv/h for chemical concentrates of thorium;

0.02 mSv/h for chemical concentrates of uranium, other than uranium hexafluoride;

b) For freight containers, the value determined in step a) above must be multiplied by the appropriate factor from Table 5-1;

c) The value obtained in steps a) and b) above must be rounded up to the first decimal place (e.g. 1.13 becomes 1.2), except that a value of 0.05 or less may be considered as zero.

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APPENDIX B

TRANSPORT INDEX CALCULATION

UN 3332 RADIOACTIVE MATERIAL, TYPE A PACKAGE, SPECIAL FORM
Am-241/ Be, 1 Type A Package x 592 GBq
Dims 43x43x52 cm.
III Yellow

	
Gamma (**γ**) radiation (mSv/h)	Neutron (**n**) radiation (mSv/h)
Top=0,00488	Top=0.035551
Side1=0,0112	Side1=0.05164
Side2=0,01095	Side2=0.04981
Side3=0,01134	Side3=0.05163
Side4=0,01147	Side4=0.05332
Bottom =0,00567	Bottom =0.04015
Transport Index , based on Gamma radiation only = 0,01147 x 100 = Rounded **1.2**	Transport Index, based on Gamma and Neutron radiations = (0,01147+0.05332)x100=Rounded 6.5
TI=1.2	**TI=6.5**

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APPENDIX C

EXTRACT FROM THE INTERNATIONAL ATOMIC ENERGY AGENCY'S (IAEA) ADVISORY MATERIAL FOR THE IAEA REGULATIONS FOR THE SAFE TRANSPORT OF RADIOACTIVE MATERIAL (2012 EDITION) (NO SSG-26)

Advisory Material for the
REGULATIONS FOR THE SAFE TRANSPORT OF RADIOACTIVE MATERIAL

Specific Safety Guide
SSG-26

DETERMINATION OF TRANSPORT INDEX

523.1. The TI is an indicator of the radiation level in the vicinity of a package, overpack, tank, freight container, conveyance, unpackaged LSA-I material or unpackaged SCO-I and it is used in the provision of radiation protection measures during transport. The value obtained for the TI in accordance with the following guidelines is required to be rounded up (see para. 523(c)) to the first decimal place (e.g. 1.13 becomes 1.2), except that a value of 0.05 or less may be considered as zero:

(a) The TI for a package is the maximum radiation level at 1 m from the external surface of the package, expressed in mSv/h and multiplied by 100.

(b) If the measured dose rate comprises more than one type of radiation, then the TI should be based on the sum of all the dose rates from each type of radiation.

(c) The TI for a rigid overpack, freight container or conveyance is either the maximum radiation level at 1 m from the external surface of the overpack or conveyance, expressed in mSv/h and multiplied by 100, or the sum of the TIs of all the packages contained in the overpack or conveyance.

(d) The TI for a freight container, tank, unpackaged LSA-I material or unpackaged SCO-I is the maximum radiation level at 1 m from the external surface of the load, expressed in mSv/h and multiplied by 100 and then further multiplied by an additional factor which depends on the largest cross-sectional area of the load. This additional multiplication factor, as specified in Table 7 of the Transport Regulations, ranges from 1 up to 10. It is equal to 1 if the largest cross-sectional area of the load is 1 m2 or less. It is 10 if the largest cross-sectional area is more than 20 m2. However, as noted previously, the TI for a freight container may be established alternatively as the sum of the TIs of all the packages in the freight container.

(e) The TI for a non-rigid overpack shall be determined only as the sum of the TIs of all the packages in the non-rigid overpack.

(f) The TI for loads of uranium or thorium ores and their concentrates can be determined without measuring the radiation levels. Instead, the maximum radiation level at any point 1 m from the external surface of such loads may be taken as the level specified in para. 523(a). The multiplication factor of 100 and the additional multiplication factor for the largest cross-sectional area of the load are still required, when applicable, as indicated above, for determining the TI of such loads.

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