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COMMITTEE OF EXPERTS ON THE TRANSPORT OF DANGEROUS GOODS

Sub-Committee of Experts on the Transport of Dangerous Goods
(Thirteenth session,
Geneva, 7-17 July 1997,
agenda item (3 (c))

DRAFT AMENDMENTS TO THE MODEL REGULATIONS ON THE TRANSPORT OF DANGEROUS GOODS

Other packaging and IBC matters

Minimum Thickness Requirements for Metal IBCs

Transmitted by the Expert from the United States of America

1. In this proposal the expert from the United States of America is proposing to amend the minimum thickness requirements for metal intermediate bulk packagings (IBCs) to establish a more linear relationship between minimum thickness and capacity. In addition, it is proposed that when calculating the equivalent thickness for IBCs constructed of metals other than the reference steel, provision should be made to allow actual values to be used in addition to the guaranteed minimum values according to material standards.

2. Paragraph 6.5.3.1.6 of the Recommendations currently specifies minimum wall thicknesses for metal IBCs on the basis of the following table:

Capacity in m^3	Wall thickness in mm			
	Types 11A, 11B, 11N		Types 21A, 21B, 21N, 31A, 31B, 31N	
	Unprotected	Protected	Unprotected	Protected
≤ 1.0	2.0	1.5	2.5	2.0
> 1.0 - 2.0	2.5	2.0	3.0	2.5
> 2.0 - 3.0	3.0	2.5	4.0	3.0

With this stepped approach, an IBC slightly under the limiting capacity is required to have a minimum thickness significantly less than an IBC with a capacity slightly higher than the limiting capacity. For example, an unprotected 11A IBC of 2.0 m^3 capacity must have a minimum wall thickness of 2.5mm while the same type IBC with a capacity of 2.001 m^3 must have a thickness of 3.0mm. The expert from the United States of America proposes that the relationship between capacity and minimum thickness be amended to establish a more linear relationship. A linear relationship between capacity and minimum thickness provides a more logical means of assigning minimum thicknesses.

3. In this proposal the expert from the United States is also proposing to amend the provisions for calculating minimum thicknesses for metal IBCs when materials other than reference steel is used. A precedent for the concept exists in the corresponding minimum thickness requirements for portable tanks (see 6.6.2.3.3.1). Unlike portable tanks metal IBCs are not exposed to high internal operating pressures and are subject to rigorous performance tests. On this basis, it is considered appropriate that actual values of tensile strength be allowed to be used for all metal materials of construction (subject to a maximum increase of 15% greater than the guaranteed minimum specified in the relevant material standard).

Proposal

4. It is proposed that the table in paragraph 6.5.3.1.6(a) for establishing minimum thicknesses be replaced by the following table:

Capacity (C) in litres	Wall thickness (T) in mm			
	Types 11A, 11B, 11N		Types 21A, 21B, 21N, 31A, 31B, 31N	
	Unprotected	Protected	Unprotected	Protected
≤ 1000	2.0	1.5	2.5	2.0
> 1000 ≤ 2000	T=C/2000 + 1.5	T=C/2000 + 1.0	T=C/2000 + 2.0	T=C/2000 + 1.5
> 2000 ≤ 3000	T=C/2000 + 1.5	T=C/2000 + 1.0	T=C/1000 + 1.0	T=C/2000 + 1.5

A graphical presentation of the proposed capacity/minimum thickness relationship for unprotected IBCs of types 21A, 21B, 21N, 31A, 31B and 31N is provided as an annex to this paper to illustrate the proposed linear relationships.

5. With regard to the proposal to incorporate a provision to allow use of actual values in the calculation of equivalent thickness the following amendments to paragraph 6.5.3.1.6 are proposed:

(a) At the end of the definition of the variable Rm_1 in (b) add "(see (c))"; and
(b) Add a new paragraph (c), as follows:

> (c) For purposes of the calculation described in (b), the guaranteed minimum tensile strength of the metal to be used (Rm_1) shall be the minimum value according to national or international material standards. However, the specified minimum value for Rm according to the material standards may be increased by up to 15% when a greater value is attested in the material inspection certificate. When no material standard exists for the material in question, the value of Rm shall be the minimum value attested in the material inspection certificate.

6. The Sub-Committee is requested to review the proposal and consider adoption of the proposed amendments to the Recommendations.

ANNEX

The following graph illustrates the proposed capacity/minimum thickness relationship for unprotected IBCs of types 21A, 21B, 21N, 31A, 31B and 31N.

PROPOSED LINEAR RELATIONSHIPS FOR METAL IBC THICKNESSES