

**ECONOMIC COMMISSION FOR EUROPE**

## INLAND TRANSPORT COMMITTEE

Working Party on the Transport of Dangerous Goods

Joint Meeting of the RID Committee of Experts and  
the Working Party on the Transport of Dangerous Goods

Geneva, 11-21 September 2007

Item 2: Tanks

**6.8.2.1.19****Transmitted by the Government of Germany****SUMMARY**

**Executive summary:** Amendment of the current text of 6.8.2.1.19 by a provision regarding certain stainless ferritic-austenitic (duplex) steels.

**Action to be taken:** Amendment of the current text of 6.8.2.1.19 of RID/ADR.

**Related documents:** None.

**Introduction**

In Chapter 6.8 of RID/ADR, the minimum wall thicknesses  $e$  and  $e_1$  of shells are determined in 6.8.2.1.17 and 6.8.2.1.18.

To the extent that tanks provide for protection against damage, the above minimum wall thickness – except for tank-wagons – can be reduced, with the minimum values of the table in 6.8.2.1.19 to be observed as bottom-line wall thickness limits.

In the table, however, only 4 material groups are listed:

- stainless austenitic steels
- other steels
- aluminium alloys
- pure aluminium of 99.8%,

so that duplex steels have to be treated as "other steels", i.e., as ferritic steels.

**Proposal**

It is proposed to amend the table in 6.8.2.1.19 by having a separate line for duplex steels. The working group is invited to determine the right value for this type of material.

	Diameter of shell	≤ 1.80 m	> 1.80 m
Minimum thickness of shells	Stainless austenitic steels	2.5 mm	3 mm
	<b>Stainless ferritic austenitic steels with a minimum elongation at rupture of at least 30 %</b>	<b>[x mm]</b>	<b>[y mm]</b>
	Other steels	3 mm	4 mm
	Aluminium alloys	4 mm	5 mm
	Pure Aluminium of 99.80 %	6 mm	8 mm

**Justification**

Before RID/ADR 2001, the equivalent thicknesses of the shells were determined in accordance with the old third root formula in connection with the specifications in 6.8.2.1.19.

With the restructured RID/ADR, the minimum wall thickness formula was changed and introduced as binding in 2001 respectively 2003. The consequence of this was that the calculated minimum wall thickness for stainless steel could result in values below 3 mm.

In order to maintain the hitherto accepted safety level, absolute bottom-line limit values were determined with the table introduced in 6.8.2.1.19.

In doing so, duplex steels were not taken into account separately. These steels have been used successfully in tank construction for many years. Just like the austenitic steels, the required calculated minimum wall thickness of the duplex steels according to the formula in 6.8.2.1.18 for shells with diameters >1.8 m are below the table's limit values of 3.0 mm.

The required calculated minimum wall thicknesses of the duplex steels are equivalent to those of the austenitic steels and/or are just a little higher, however, distinctly lower than those of ferritic steels.

Due to the excellent ductility of the duplex steels with an elongation at rupture of at least 30%, it can be determined that these duplex steels up to an operating temperature of -40° C are comparable more to the austenitic than to the ferritic steels.

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