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Status: ADOPTED	Version: 01	Ref.: A 94-02-ZZ/1.2011	Original: EN	Date: 15.09.2011


APTU Uniform Rules (Appendix F to COTIF 1999)

**Uniform Technical Prescriptions (UTP) applicable to
Rolling Stock, subsystem**

FREIGHT WAGONS - (UTP WAG) - ANNEX ZZ

STRUCTURES AND MECHANICAL PARTS

PERMISSIBLE STRESS BASED ON ELONGATION CRITERIA

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Explanatory note:

The texts of this UTP which appear without columns are identical with corresponding texts of the European Community regulations. Texts which appear in two columns differ; left-hand column contains the UTP regulations, right-hand column shows the text in the corresponding EC regulations. The text in the right hand column is for information only and not part of the OTIF regulations.

OTIF UTP

| Corresponding text in EC regulations ¹

EC ref. ²

ZZ.1 STRUCTURAL STEELS

For structural steels, the margin of safety represented by factor S_2 in clause 3.4.3 of EN12663:2000 can be determined from the material elongation at failure. The table below gives a reduced value for S_2 and acceptable criteria using this approach that have been proven in service.

	Material Property		Permissible stress
		Factor S_2	
Parent Metal	$R < 0,8 R_m$	$S_2 \geq 1,25$	$\sigma_c \leq R$
	$R > 0,8 R_m; A > 10 \%$	$S_2 < 1,25$	$\sigma_c \leq R$
	$R > 0,8 R_m; A < 10 \%$	$S_2 \geq 1,25$	$\sigma_c \leq \frac{R_m}{1,25}$
Weld Metal	$R < 0,8 R_m$	$S_2 \geq 1,25$	$\sigma_c \leq \frac{R}{1,1}$
	$R > 0,8 R_m; A > 10 \%$	$S_2 < 1,25$	$\sigma_c \leq \frac{R}{1,1}$
	$R > 0,8 R_m; A < 10 \%$	$S_2 \geq 1,25$	$\sigma_c \leq \frac{R_m}{1,375}$

ZZ.2 OTHER STRUCTURAL MATERIALS

For other structural materials, the permissible stress shall be the lower value of the material yield (or proof stress) and the material ultimate stress divided by factor S_2 as defined in clause 3.4.3 of EN12663. S_2 shall be taken as 1.5 unless the criteria given in the Euronorm permit a lower value.

¹ TSI Freight Wagons – The Annex to the Commission Decision 2006/861/EC published in the EU Official Journal L344 on 08.12.2006 as amended by Commission Decision 2009/107/EC published in EU Official Journal L45 on 14.02.2009.

² If no EC reference is indicated, it means that the chapter/section number is the same as in the OTIF text.