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## APTU Uniform Rules (Appendix F to COTIF 1999)

### Uniform Technical Prescriptions (UTP) relating to the Subsystem Rolling Stock

#### FREIGHT WAGONS - ANNEX N

#### STRUCTURE AND MECHANICAL PARTS -

#### PERMISSIBLE STRESSES FOR STATIC TEST METHODS

##### Explanatory note:

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

OTIF UTP

| Corresponding text in EU regulations <sup>1</sup>

EU ref. <sup>2</sup>

## N.1 STATIC TEST METHODS

### N.1.1 LIMITS VALUES FOR STATIC TESTS TO VERIFY FATIGUE STRENGTH

#### Definition of the notch cases


The limit stresses to be used for wagon body tests are indicated, for three steels with a minimum tensile resistance of 370, 420 and 570 MPa, and for five notch cases defined in a general way as follows:

- Case A: Parent metal,
- Case B: Butt weld,
- Case C: Butt weld with inertia change,
- Case D: Fillet weld,
- Case E: Projection weld.

These five notch cases do not cover the full range of structures and, in practice, it is necessary to choose the most suitable notch case for each welded zone tested. To facilitate and standardize these choices figures in TableNx gives practical examples of welded joints which occur frequently in vehicle body structures and in bogies frames.

<sup>1</sup> 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.

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





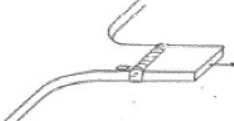
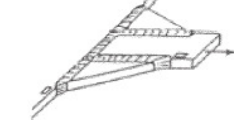
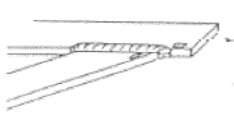
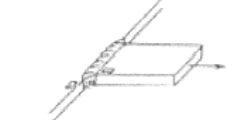
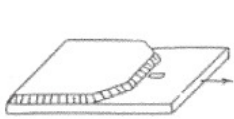
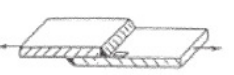
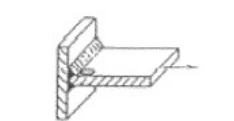
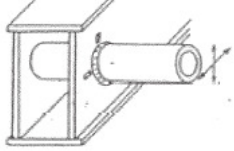

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Fig. N.1

Case	Sketch	Description	Comments
A		Away from weld	Away from weld
		Machined butt weld	Machined butt weld
B		Butt weld	Butt weld
		Butt weld with bevelling	
B		Machined and welded joint	
C		Corner joint with gusset plates	Butt weld between pieces at an angle to each other
C		Inclined joint	
D		Corner joint	Butt weld at 90°
D		Reinforced plate	Lap joint
D		Butt welded lap joint	
D		Corner joint	Fillet welds
D		Joint between tube and straight piece	
D		Joint between plate and tube	

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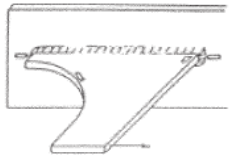
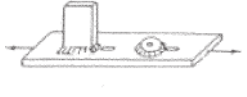
D		Joint between plate and web	
E		Welded securing lug Welded securing stud	

Table N.1

		$2\sigma_{Alim}$ [N/mm <sup>2</sup> ]			$\Sigma_{mlim}$ [N/mm <sup>2</sup> ]			$\sigma_{maxlim}$ [N/mm <sup>2</sup> ]		
Steel <sup>(1)</sup>					K=0.3			K=0.3		
		370	420	520	370	420	520	370	420	520
Notch case	A	110	118	166	183	197	277	238	258	360
	B	90	90	90	150	150	150	195	195	195
	C	80	80	80	133	133	133	173	173	173
	D	66	66	66	110	110	110	143	143	143
	E	54	54	54	90	90	90	117	117	117
<sup>(1)</sup> Characteristic tensile strength $R_m$ according to material standard. <sup>(2)</sup> Stress is determined by the elastic limit $R_p$ or $R_{p'}$ .										