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

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

### FREIGHT WAGONS - (UTP WAG) - ANNEX D

#### VEHICLE TRACK INTERACTION AND GAUGING

### STATIC AXLE LOAD, DYNAMIC WHEEL LOAD AND LINEAR LOAD

#### Explanatory note:

The texts of this UTP which appear across two columns are identical to corresponding texts of the European Union regulations. Texts which appear in two columns differ; the left-hand column contains the UTP regulations, the right-hand column shows the text in the corresponding EU regulations. The text in the right-hand column is for information only and is not part of the OTIF regulations.

OTIF UTP

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

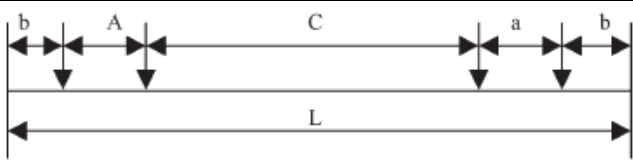
EU ref. <sup>2</sup>

### D.1 LOAD LIMITS FOR WAGONS ACCORDING TO THE CLASSIFICATION OF LINES.

#### Diagram of wagons to be considered for determining the line category


a = distance between bogie axles  
 b = distance from first axle to the end of the nearest buffer  
 c = distance between the two inside axles

}  
 } all distances in m  
 }

Line Category	Mass per axle	Mass per unit length					
			b	a	c and L	a	b
A	P=16 t	p=5,0 t/m	1,50	1,80	6,20 12,80	1,80	1,50
B1	P=18 t	p=5,0 t/m	1,50	1,80	7,80 14,40	1,80	1,50
B2	P=18 t	p=6,4 t/m	1,50	1,80	4,65 11,25	1,80	1,50
C2	P=20 t	p=6,4 t/m	1,50	1,80	5,90 12,50	1,80	1,50
C3	P=20 t	p=7,2 t/m	1,50	1,80	4,50 11,10	1,80	1,50

<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.

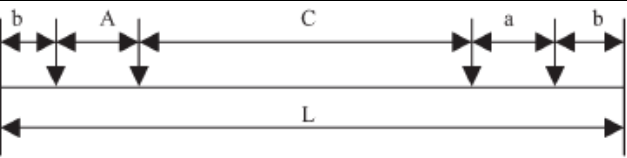
<sup>2</sup> If no EU reference is indicated, it means that the chapter/section number is the same as in the OTIF text.

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EU ref. <sup>2</sup>

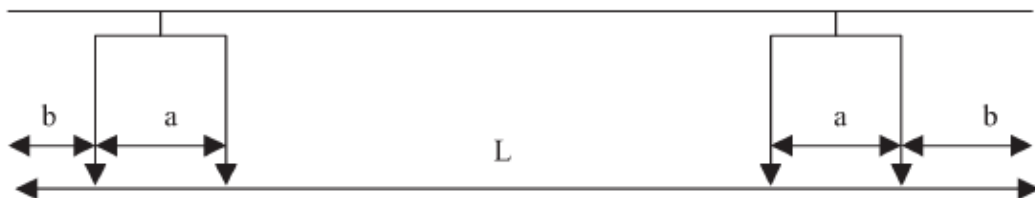
Line Category	Mass per axle	Mass per unit length					
C4	P=20 t	p=8,0 t/m	1,50	1,80	3,40 10,00	1,80	1,50
D2	P=22,5 t	p=6,4 t/m	1,50	1,80	7,45 14,05	1,80	1,50
D3	P=22,5 t	p=7,2 t/m	1,50	1,80	5,90 12,50	1,80	1,50
D4	P=22,5 t	p=8,0 t/m	1,50	1,80	4,65 11,25	1,80	1,50

Open for E, F and G lines and for categories 5 and 6


## D.2 LOAD LIMITS FOR WAGONS ACCORDING TO THE CLASSIFICATION OF LINES.

### WAGONS WITH TWO 2-AXLE BOGIES

Permissible maximum mass per  $P_r$  on the various line categories in relation to the dimensions a and b



Values of dimensions		Line categories			
a m	b m	D4 D3 D2 t	C4 C3 C2 t	B2 B1 t	A t
1,80	1,50	22,5	20	18	16
	1,40	21,5	19	17	15
	1,30	20,5	18,5	16,5	15
	1,20	20	18	16	14
1,70	1,50	22	19,5	17,5	15,5
	1,40	21	19	17	15
	1,30	20	18	16	14
	1,20	19,5	17,5	15,5	14
1,60	1,50	21	19	17	15
	1,40	20	18,5	16,5	14,5
	1,30	19	17,5	15,5	14
	1,20	18,5	17	15	13,5

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EU ref. <sup>2</sup>

Values of dimensions		Line categories			
a m	b m	D4 D3 D2 t	C4 C3 C2 t	B2 B1 t	A t
1,50	1,50	20	18,5	16,5	14,5
	1,40	19,5	18	16	14
	1,30	19	17,5	15,5	13,5
	1,20	18	17	14,5	13
1,40	1,50	19	17	15,5	13,5
	1,40	18	17	15,5	13,5
	1,30	18,5	16,5	15	13
	1,20	17,5	15,5	14	12
1,30	1,50	18,5	16,5	15	13
	1,40	18,5	16,5	15	13
	1,30	18	16,5	14,5	12,5
	1,20	17	15,5	13,5	11,5

**IMPORTANT NOTE:** The masse per axle shown in the above table are only valid if the wagon length L between buffers is such that the mass per unit length p falls within the line category under consideration. Otherwise the permissible mass per axle load is lower

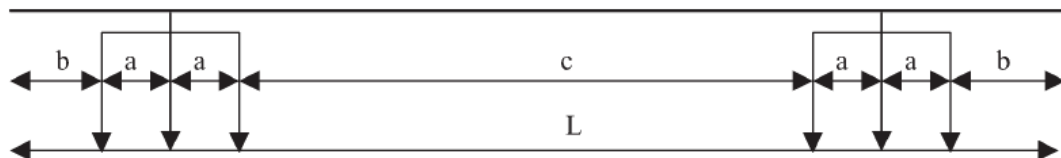
and shall be equal to  $\frac{pL}{4}$

Open for E, F and G lines and for categories 5 and 6


### D.3 LOAD LIMITS FOR WAGONS ACCORDING TO THE CLASSIFICATION OF LINES.

#### WAGONS WITH TWO 3-AXLE BOGIES

Permissible maximum mass per P<sub>r</sub> on the various line categories in relation to the dimensions a and b



Values of dimensions		Line categories								
a m	b m	D4 t	D3 t	D2 t	C4 t	C3 t	C2 t	B2 t	B1 t	A t
1,80	1,50	18	18	18	16,5	16,5	16,5	15	14,5	13
	1,40	18	18	17,5	16	16	16	14,5	14	12,5
	1,30	18	17,5	17	16	16	15,5	14,5	13,5	12
	1,20	18	17	16	16	16	15	14,5	13	12

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


EU ref. <sup>2</sup>

Values of dimensions		Line categories								
a m	b m	D4 t	D3 t	D2 t	C4 t	C3 t	C2 t	B2 t	B1 t	A t
1,70	1,50	17,5	17,5	17,5	16	16	16	14,5	14	12,5
	1,40	17,5	17,5	17	15,5	15,5	15,5	14	13,5	12
	1,30	17,5	17	16	15,5	15,5	15	14	13	12
	1,20	17,5	16,5	16	15,5	15,5	14,5	14	13	12
1,60	1,50	17	17	17	15,5	15,5	15,5	14	13,5	12
	1,40	17	17	16	15	15	15	13,5	13	12
	1,30	17	16,5	16	15	15	14,5	13,5	13	11,5
	1,20	17	16	15,5	15	15	14	13,5	12,5	11,5
1,50	1,50	16,5	16,5	16	15	15	15	13,5	13	12
	1,40	16,5	16,5	16	14,5	14,5	14,5	13	13	11,5
	1,30	16,5	16,5	15,5	14,5	14,5	14,5	13	12,5	11,5
	1,20	16,5	16	15,5	14,5	14,5	14	13	12,5	11,5
1,40	1,50	15,5	15,5	15,5	14	14	14	12,5	12,5	11,5
	1,40	15,5	15,5	15,5	14	14	14	12,5	12,5	11,5
	1,30	15,5	15,5	15,5	14	14	14	12,5	12,5	11,5
	1,20	15,5	15,5	15,5	14	14	14	12,5	12,5	11,5
1,30	1,50	15	15	15	13,5	13,5	13,5	12	12	11
	1,40	15	15	15	13,5	13,5	13,5	12	12	11
	1,30	15	15	15	13,5	13,5	13,5	12	12	11
	1,20	15	15	15	13,5	13,5	13,5	12	12	11

**IMPORTANT NOTE :** The masses per axle shown in the above table are only valid:

- 1) if the dimension c is > 2b. Otherwise the dimension b shall not be taken as the value of b, but the value  $\frac{c}{2}$  or the nearest value below shown in the table;
- 2) if the wagon length L between buffers is such that the mass per unit length p falls within the line category under consideration. Otherwise the permissible mass per axle is lower and shall be equal to  $\frac{pL}{6}$

Open for E, F and G lines and for categories 5 and 6

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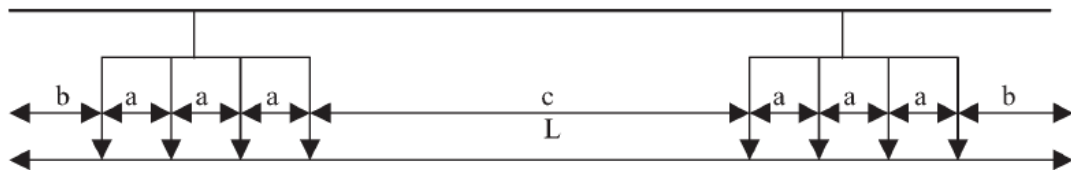
| Corresponding text in EU regulations <sup>1</sup>

EU ref. <sup>2</sup>

## D.4 LOAD LIMITS FOR WAGONS ACCORDING TO THE CLASSIFICATION OF LINES.

### WAGONS WITH TWO 4-AXLE BOGIES


Permissible maximum mass per  $P_r$  on the various line categories in relation to the dimensions a and b



Values of dimensions		Line categories								
a	b	D4	D3	D2	C4	C3	C2	B2	B1	A
m	m	t	t	t	t	t	t	t	t	t
1,80	1,50	17,5	16,5	15,5	16	16	15	14,5	13	11,5
	1,40	17	16,5	15	16	15,5	14,5	13,5	12,5	11
	1,30	17	16	15	16	15	14	13,5	12	10,5
	1,20	16,5	15	14,5	16	15	13,5	13	11,5	10,5
1,70	1,50	17,5	16	15	15,5	15,5	14,5	14	12,5	11
	1,40	17	16	15	15,5	15	14	13,5	12	10,5
	1,30	16,5	15	14,5	15,5	14,5	13,5	13	11,5	10,5
	1,20	15,5	15	14	15,5	14,5	13,5	12,5	11	10
1,60	1,50	16,5	15,5	15	15	15	14	13,5	12	10,5
	1,40	16	15	14,5	15	14,5	13,5	13	11,5	10
	1,30	15,5	14,5	14	14,5	14	13	12,5	11	10
	1,20	15	14,5	14	14,5	14	13	12	11	10
1,50	1,50	16	15	14,5	14,5	14,5	13,5	13	11,5	10,5
	1,40	15,5	14,5	14	14,5	14	13	12,5	11	10
	1,30	15	14	13	14	13,5	12,5	12	10,5	9,5
	1,20	15	14	13	14	13	12,5	12	10,5	9,5
1,40	1,50	15	14,5	13	13	13	13	12	10,5	10
	1,40	15	14	13	13	13	12,5	12	10,5	10
	1,30	15	13,5	12,5	13	13	12	12	10	9,5
	1,20	14,5	13	12,5	13	12,5	11,5	11,5	10	9,5
1,30	1,50	14,5	14	13	12,5	12,5	12,5	11,5	10,5	9,5
	1,40	14,5	13,5	13	12,5	12,5	12	11,5	10,5	9,5
	1,30	14,5	13	12,5	12,5	12,5	11,5	11,5	10	9
	1,20	14	13	12,5	12,5	12	11,5	11	10	9

**IMPORTANT NOTE :** The masses per axle shown in the above table are only valid:

- 1) if the dimension c is  $> 2b$ . Otherwise the dimension b shall not be taken as the value of b, but the value  $\frac{c}{2}$  or the nearest value below shown in the table; If  $\frac{c}{2} < 1,20$  m, a

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

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special study is required

- 2) if the wagon length  $L$  between buffers is such that the mass per unit length  $p$  falls within the line category under consideration. Otherwise the permissible mass per axle is lower and shall be equal to  $\frac{pL}{8}$ .

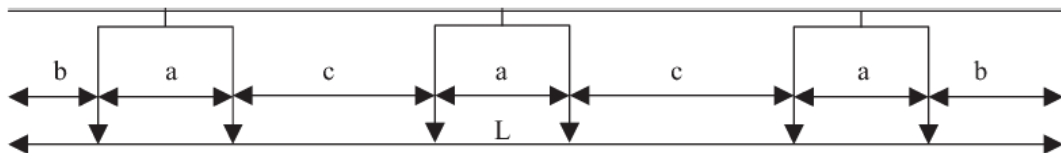
Open for E, F and G lines and for categories 5 and 6

## D.5 LOAD LIMITS FOR WAGONS ACCORDING TO THE CLASSIFICATION OF LINES.

### WAGONS WITH 3 OR 4 BOGIES, EACH WITH 2 AXLES

Permissible maximum mass per  $P_r$  on the various line categories in relation to the dimensions  $a$ ,  $b$  and  $c$

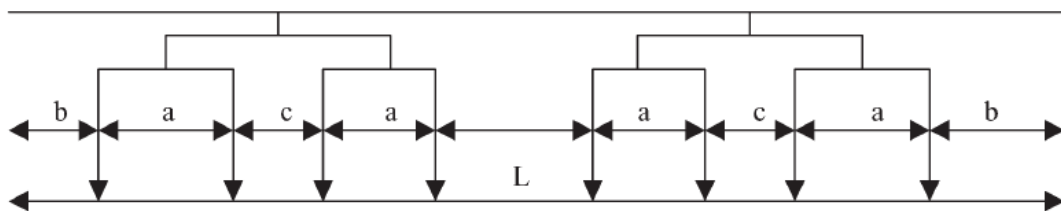
#### D.5.1 WAGONS WITH THREE 2-AXLE BOGIES



If  $c \geq 2b$ : the values given in D.2 shall be taken,  
If  $c < 2b$ : the values given in D.2 shall be taken and the dimension  $b$  shall not be taken as the value of  $b$ , but the value  $\frac{c}{2}$  or the nearest value below appearing in the table. If

$\frac{c}{2} < 1,20$  m, a special study is required

#### D.5.2 WAGONS WITH FOUR 2-AXLE BOGIES




If  $2,40 \leq c < 2b$ : the values given in D.2 shall be taken and the dimension  $b$  shall not be taken as the value of  $b$ , but the value  $\frac{c}{2}$  or the nearest value below appearing in D.2.

If  $c < 2,40$  m: the values given in D.4 shall be taken and the lesser of the dimensions  $a$  or  $c$  shall be taken as the value of  $a$ .

**IMPORTANT NOTE :** The masses per axle shown in the above table are only valid if the wagon length  $L$  between buffers is such that the mass per unit length  $p$  falls within the line category under consideration. Otherwise the permissible mass per axle is equal to:

$\frac{pL}{6}$  for wagons with three 2-axle bogies, and

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$\frac{pL}{8}$  for wagons with four 2-axle bogies.

Open for E, F and G lines and for categories 5 and 6

## D.6 LOAD LIMITS FOR WAGONS ACCORDING TO THE CLASSIFICATION OF LINES.

### LOAD LIMITS FOR TWO-AXLE WAGONS

The table below gives the results of the comparisons in relation to the length over buffers L for wagons in common use, i.e. for maximum axle loads P of 22,5, 20, 18 and 16 t.

However, when extra restrictions are required because of specific characteristics of the wagon or the load or as a result of fast forwarding conditions, the stricter values should be applied instead of those shown in the table below.

Load limits for two-axle wagons

Wagon characteristics		Line categories				
L (m)	P (t)	A	B1	B2	C	D
L > 7,20	22,5	32 t	36 t		40 t	45 t
	20	32 t	36 t		40 t	
	18	32 t	36 t			
	16	32 t				

Open for E, F and G lines and for categories 5 and 6

**Note:** Requirements for wagons with a length over buffers less than 7.2 m are not included because these wagons are not longer being built.


## D.7 LOAD LIMITS FOR WAGONS ACCORDING TO THE CLASSIFICATION OF LINES.

### LOAD LIMITS FOR WAGONS WITH TWO 2-AXLE BOGIES

The table below gives the results of the comparisons in relation to the length over buffers L for wagons in common use, i.e. for maximum axle loads P of 22,5, 20, 18 and 16 t.

However, when extra restrictions are required because of specific characteristics of the wagon or the load or as a result of fast forwarding conditions, the stricter values should be applied instead of those shown in the table below.

Load limits in tonnes for wagons with two 2-axle bogies

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Wagon characteristics		Line categories								
L m	P t	A	B1	B2	C2	C3	C4	D2	D3	D4
L>14,40	22,5	64	72		80			90		
	20	64	72		80					
	18	64	72							
	16	64								
14,06 <L<14,40	22,5	64	5 L		72			80		
	20	64	5 L		72					
	18	64	5 L	72						
	16	64								
12,80 <L<14,06	22,5	64	5 L	72	80			6,4 L	90	
	20	64	5 L	72	80					
	18	64	5 L	72						
	16	64								
12,50 <L<12,80	22,5	5 L	5 L	72	80			6,4 L	90	
	20	5 L	5 L	72	80					
	18	5 L	5 L	72						
	16	5 L	5 L	64						
11,25 <L<12,50	22,5	5 L	5 L	72	6,4 L	80		6,4 L	7,2 L	90
	20	5 L	5 L	72	6,4 L	80		6,4 L	80	
	18	5 L	5 L	72						
	16	5 L	5 L	64						
11,10 <L<11,25	22,5	5 L	5 L	6,4 L		80		6,4 L	7,2 L	8 L
	20	5 L	5 L	6,4 L		80		6,4 L	80	
	18	5 L	5 L	6,4 L		72		6,4 L	72	
	16	5 L	5 L	64						

Open for E and F lines and for categories 5 and 6

**NOTE:** Bogie wagons with a length over buffers of less than 10 m do not exist in practice and are therefore not taken into account.