

# UIC CODE

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*Translation*

# O R

## **Brake parts - Interchangeability**

*Bremsteile - Austauschbarkeit*

*Pièces de frein - Interchangeabilité*



UNION INTERNATIONALE DES CHEMINS DE FER  
INTERNATIONALER EISENBAHNVERBAND  
INTERNATIONAL UNION OF RAILWAYS

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All members of the International Union of Railways

**Record of updates**

<b>1st edition, January 1953</b>	First issue and 3 amendments
<b>2nd edition, January 1965</b>	and 3 amendments
<b>3rd edition, July 1973</b>	and 4 amendments
<b>4th edition, January 1995</b>	and 4 amendments
<b>5th edition, September 2010</b>	Overhaul of Leaflet to align it with the corresponding TSI & EN documents

*The person responsible for this leaflet is named in the UIC Code*

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## Summary

This Leaflet sets out the fundamental characteristics necessary to ensure the interchangeability of brake block holders, brake-rigging adjusters and cast iron brake blocks in international traffic.

## 1 - Brake block holder

The dimensions for interchangeability of brake block holders with a single brake block and holders with non-articulated two-piece brake blocks are defined in Appendix A - page 5 and Appendix B - page 6.

To prevent the brake blocks from protruding beyond their holders it is recommended that holders and brake triangles be replaced and repaired when any of the limit dimensions shown in Appendix C - page 7 is reached. The dimensions shown in the figure concern all brake block holders.

## 2 - Envelope and characteristics of brake-rigging adjusters

The envelope and characteristics of brake-rigging adjusters are defined in Appendix **D - page 8** for forces of up to 75kN in the brake rigging and in Appendix **E - page 9** for forces exceeding 75kN. These particulars must be observed when new wagons are being manufactured.

Brake-rigging adjusters built into the wagon underframe must comply with the envelope and other minimum requirements laid down.

The serial number 1, 2 or 3 (see Appendices **D** and **E**) to be allocated to the corresponding wagon shall be chosen in relation to the vehicle design and the braking devices and shall be defined when the vehicle is designed.

When designing wagons, allowance must be made for the fact that the position of the brake-rigging adjuster built into the underframe can change due to wear (brake blocks, brake rigging, wheel diameters) and to the passage of bogie wagons through curves and over humps. The adjuster may therefore require more space. Consequently, under all operating conditions a 15 mm gap must be allowed between the envelope of the brake-rigging adjuster and the fixed elements of the underframe.

Clearance for the adjuster ends and the brake-rigging connections must be observed on the vehicles. Pin diameters are given in Appendix **F - page 10**.

Due to insufficient space no special envelope is planned for the brake-rigging adjuster in the bogie. However, also in this case the design must ensure that a gap of 15 mm is allowed between the brake-rigging adjuster and the fixed elements for all operating situations.

### 3 - Cast iron brake blocks

The shape of cast iron brake blocks shall comply with Appendix G - page 11.

The instructions given in point 3 of *UIC Leaflet 541-1* shall also apply to the contact surface between the block, the block holder and the cotter.

The crosswise profile of the friction surface of the block shall be adapted to the wheel profile laid down in *UIC Leaflet 510-2* and there should be a 1/40 slope ratio on the surface opposite the flange.

As an alternative to this profile, a curved crosswise profile is also acceptable.

No radii shall be specified for the lengthwise profile of the friction surface of the block. Those in common use on the railways for the different ranges of wheel diameter shall be permitted.

## Appendix A - Brake block holder (single)

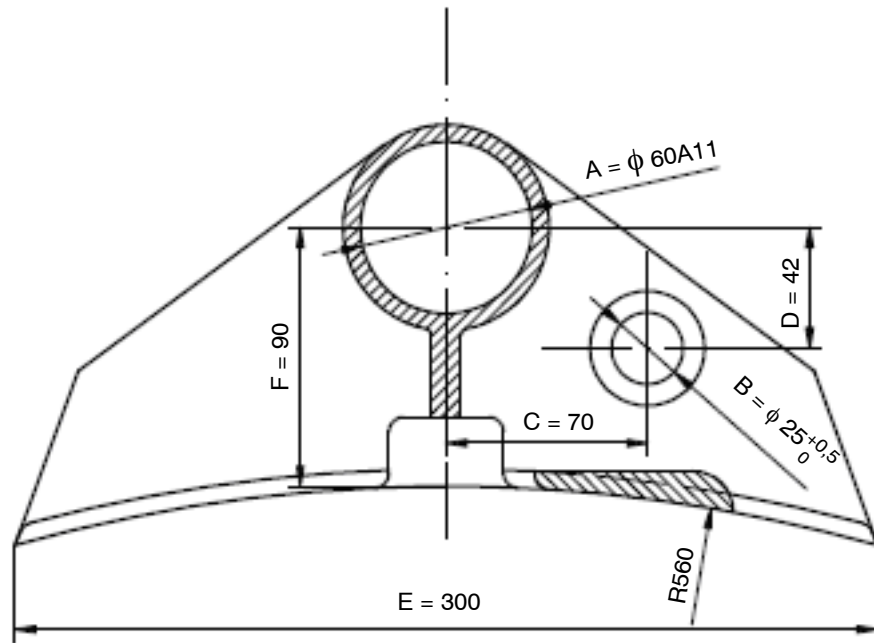


Fig. 1 - Brake block holder

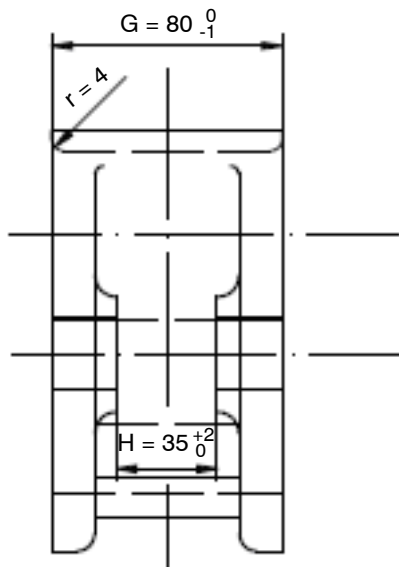


Fig. 2 - Cast design

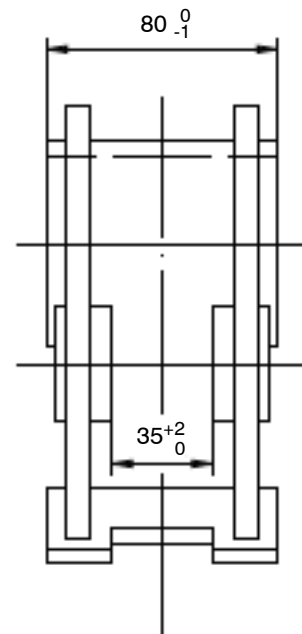


Fig. 3 - Alternative welded design



## Appendix B - Brake block holder (double)

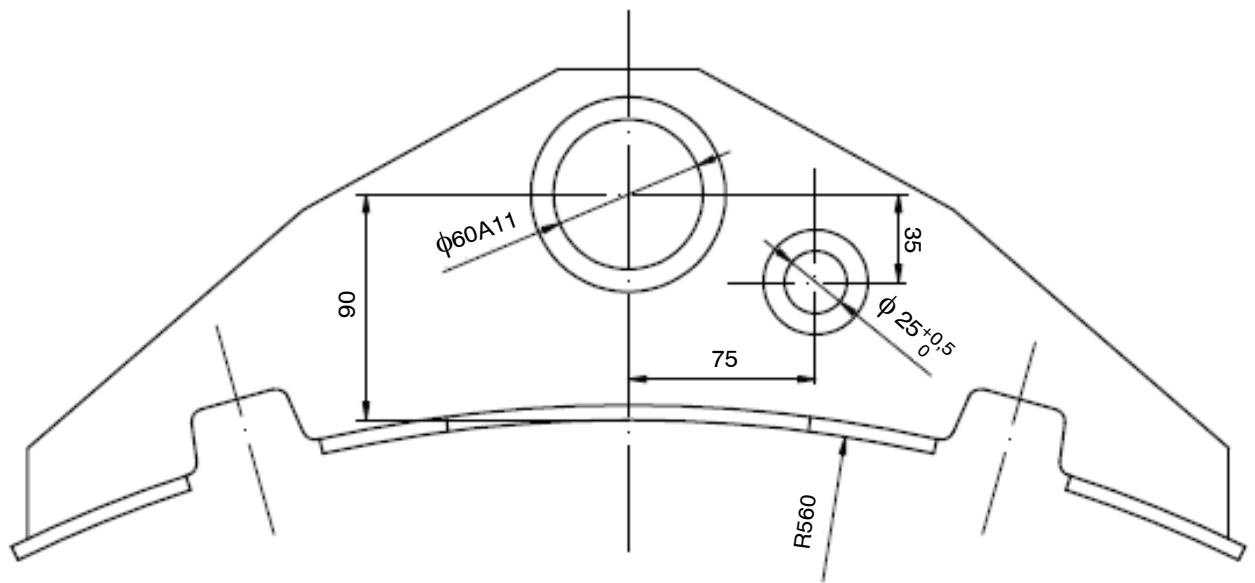


Fig. 4 - Brake block holder

## Appendix C - Limit dimensions of brake block holder

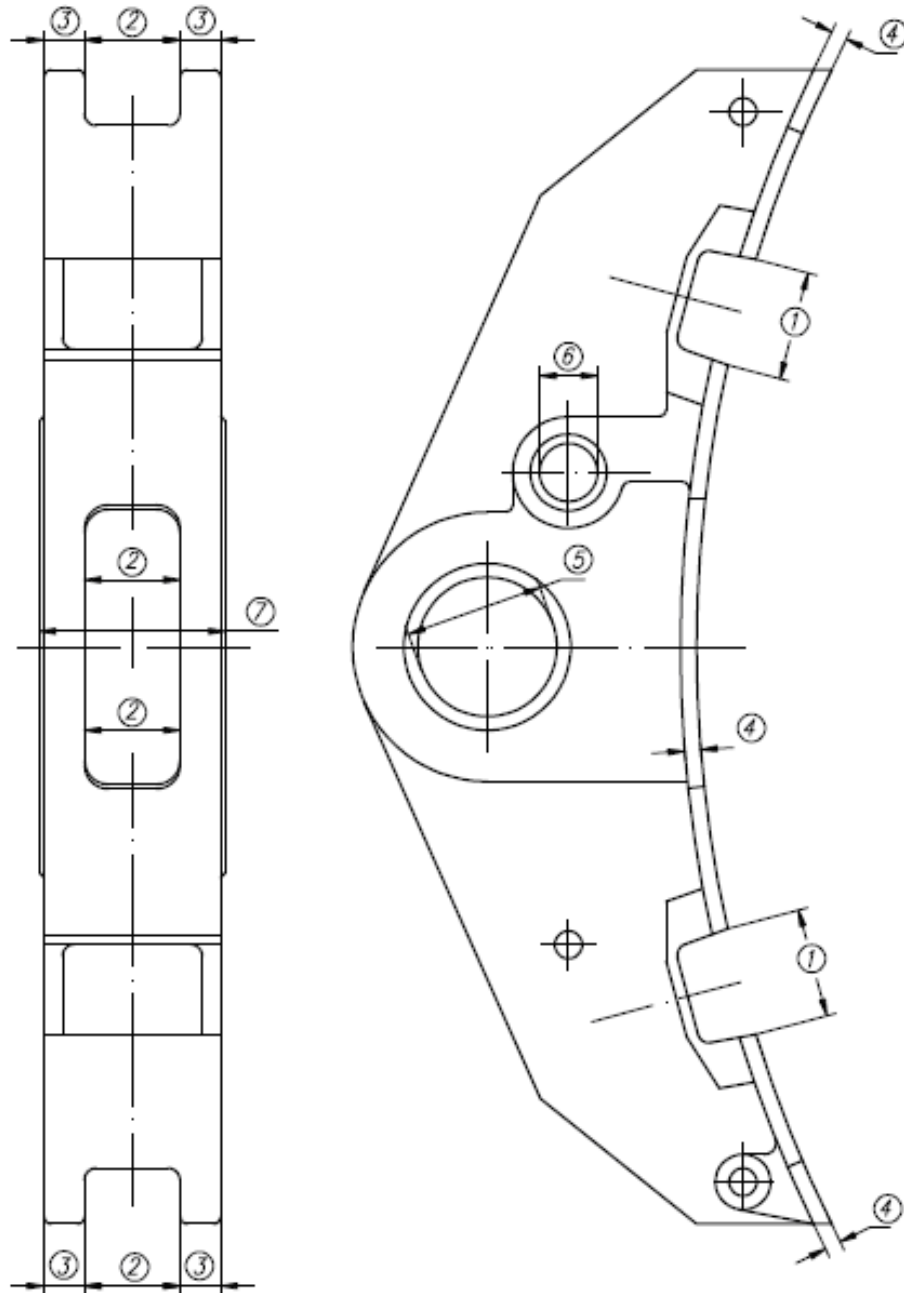


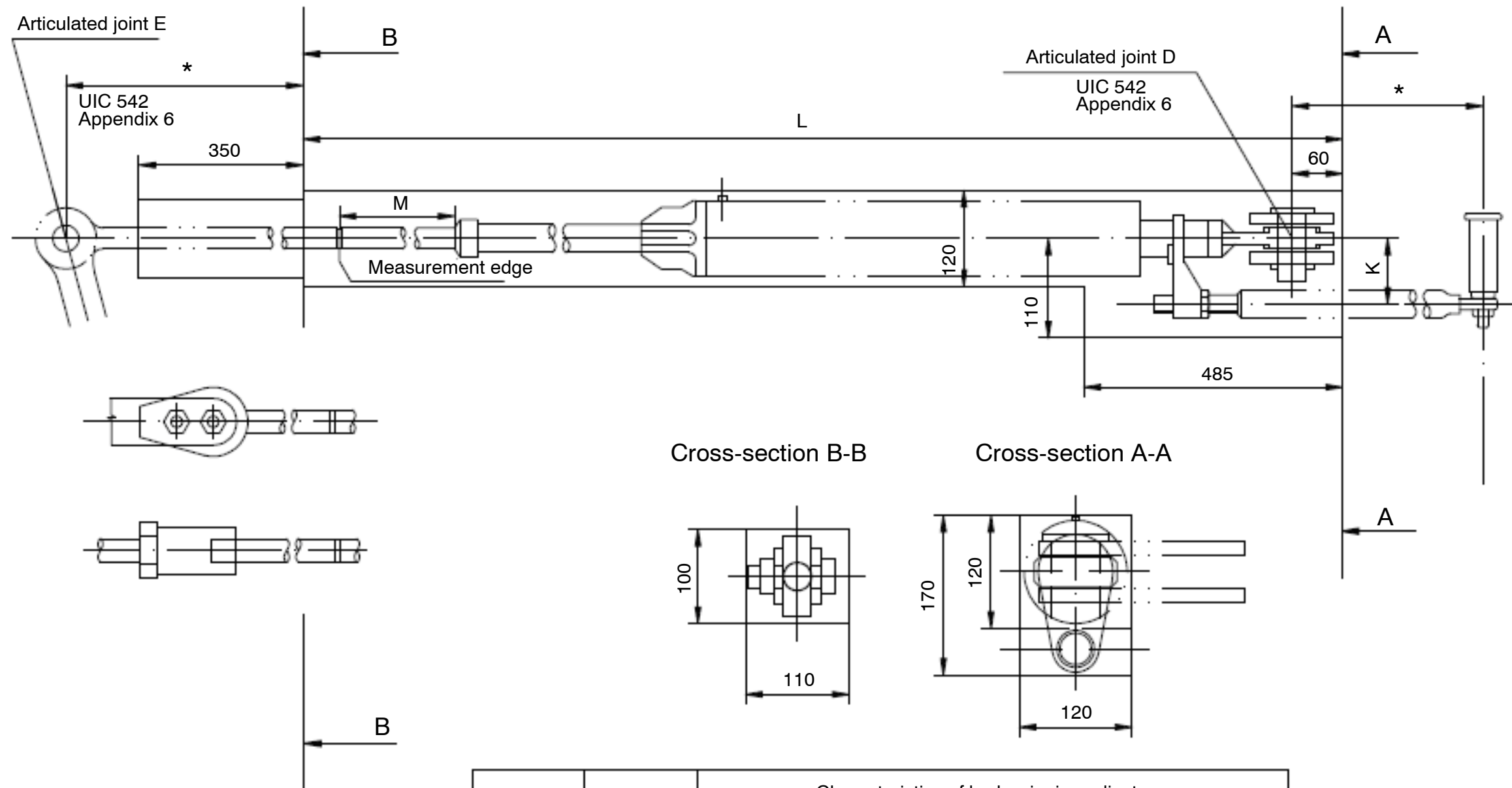
Fig. 5 - Limit dimensions for manufacture of brake block holders

Limit dimensions for manufacture of brake block holders								a
Measuring point	1	2	3	4	5	6	7	8
Nominal dimension	47,0	41,0	17,5	7,0	60A11	25,0	80,0	60a11
Maximum tolerance	48,0	43,0	17,5	7,0	60,53	25,5	80,0	59,66
Minimum tolerance	47,0	41,0	15,5	6,0	60,34	25,0	79,0	59,47
Limit dimensions for manufacture	50,0	45,0	15,0	5,0	61,5	25,7	77,0	58,5

a. Measuring point 8 relates to the brake triangle pins

### Appendix D - Envelope of brake-rigging adjusters (up to 75 kN)

Envelope and characteristics of brake-rigging adjusters (for forces up to 75 kN in the brake-rigging)



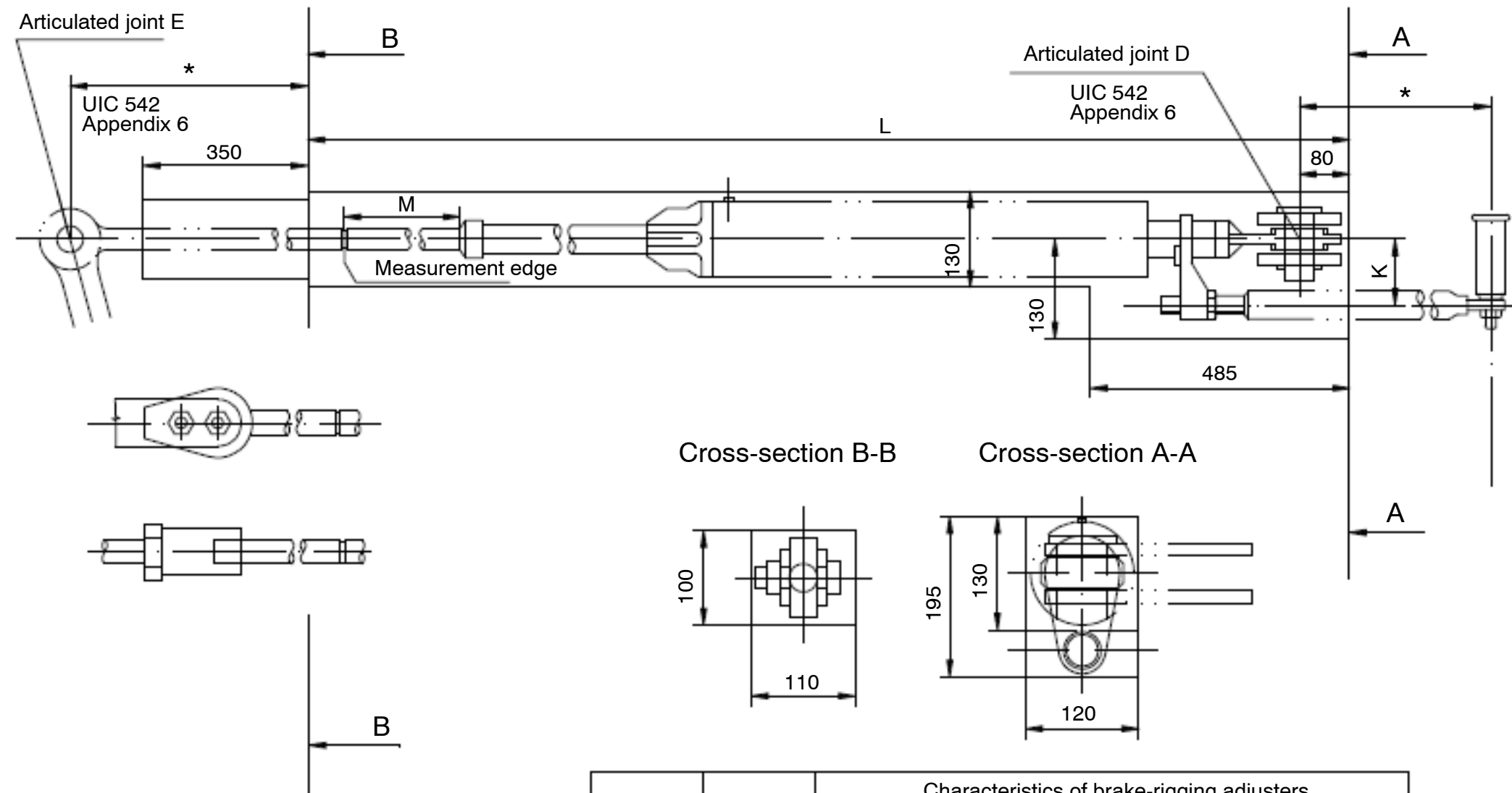
\* Adapted to the wagon  
 \*\* Recommended for new wagon designs

Serial no.	Length	Characteristics of brake-rigging adjusters			
		Minimum adjustment length	Force	Opposing force	Distance
	L	M			K
1	2 325	580	75 kN	2 kN	83 **
2	1 875	440			

Fig. 6 - Envelope of brake-rigging adjusters (up to 75 kN)

## Appendix E - Envelope of brake-rigging adjusters (over 75 kN)

Envelope and characteristics of brake-rigging adjusters (for forces exceeding 75kN in the brake-rigging)



\* Adapted to the wagon  
 \*\* Recommended for new wagon designs  
 \*\*\* 120 kN are valid for wagons with 20 t axle load

Serial no.	Length	Characteristics of brake-rigging adjusters			
		Minimum adjustment length	Force	Opposing force	Distance
1	2 390	M	*** 85 - 130 kN	2 kN	83 **
2	1 940	440			
3	1 640	280			

Fig. 7 - Envelope of brake-rigging adjusters (over 75 kN)

## Appendix F - Pin diameters of articulated joints

2-Axle and bogie wagons suitable for ordinary, S and SS (20 t per axle) running conditions  
 standardisation of the dimensions of the brake rigging articulated joints

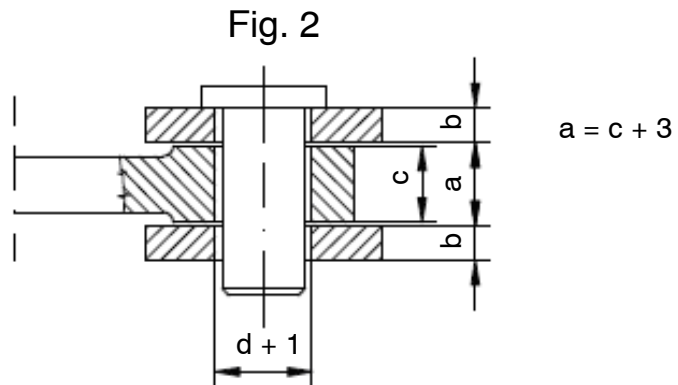
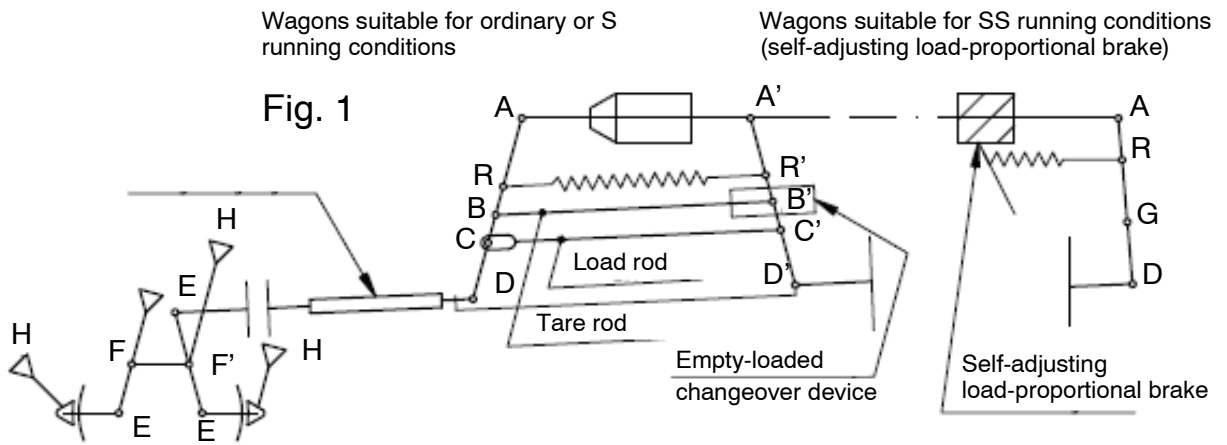


Fig. 8 -

		Pin diameter "d" <sup>a</sup>									b	c
		Articulated joints										
		A	B	C	D	E	F	G	H	R <sup>b</sup>		
Ordinary and S running conditions	Horizontal lever <sup>c</sup> Vertical lever <sup>d</sup>	30	36	50	36	-	-	-	-	30	15	30 or 40 <sup>e</sup>
		-	-	-	-	36	50	-	24	-	20	40
SS running conditons	Horizontal lever <sup>c</sup> Vertical lever <sup>d</sup>	36	-	-	40	-	-	60	-	30	20	40
		-	-	-	-	40	60	-	24	-	20 <sup>f</sup>	40

a. Steel Rm ≥ 370 N/mm<sup>2</sup> subjected to a suitable superficial hardening treatment

b. In the case of an external return spring

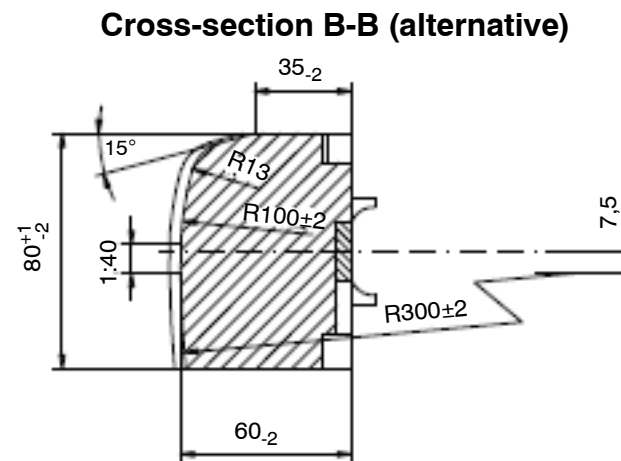
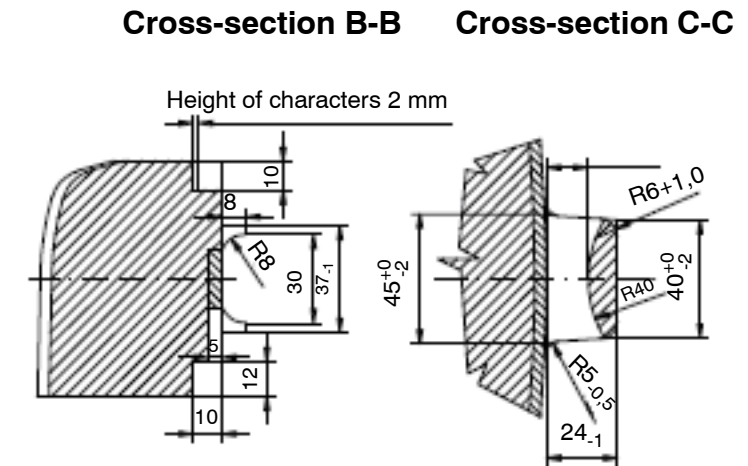
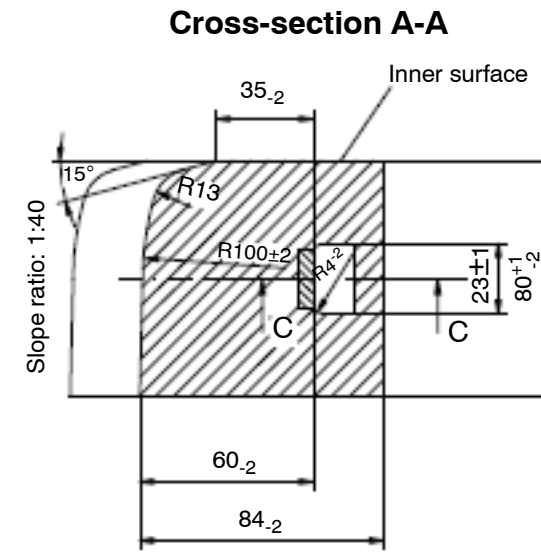
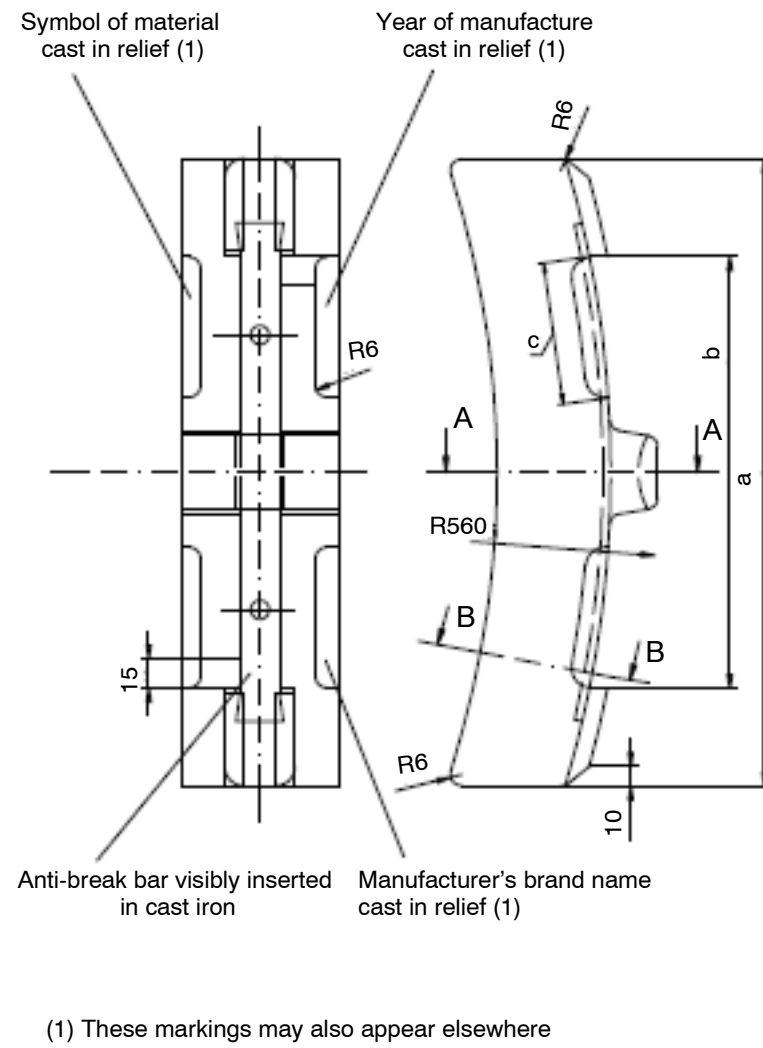
c. Steel Rm ≥ 370 N/mm<sup>2</sup>

d. Seel Rm ≥ 520 N/mm<sup>2</sup>

e. 30 mm for 2-axle wagons (12" cylinder) - 40 mm for bogie wagons (16" cylinder)

f. Thickness increased to 30 mm in the centre part

## Appendix G - Cast iron brake blocks



No.	Brake block	Dimensions		
		a	b	c
I	560x320	320±2	220±2	30-65
II	560x250	250±2	182±2	30-65

Fig. 9 - Cast iron brake blocks

## Bibliography

### 1. UIC leaflets

#### **International Union of Railways (UIC)**

*UIC Leaflet n° 510-2: Trailing stock: wheels and wheelsets. Conditions concerning the use of wheels of various diameters, 4th edition, May 2004*

*UIC Leaflet n° 541-1: Brakes - Regulations concerning the design of brake components, 7th edition, September 2010*

### 2. Miscellaneous

#### **International Union of Railways (UIC)**

##### *Conclusions*

- *alignment of the Leaflet with the corresponding TSI and EN documents*
- *aspects concerning composite brake blocks, inter alia, were to be removed from the draft of Leaflet 542 to avoid parallel regulations, (SET 7 "Braking": Paris, January 2008)*

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