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Translation

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Technical specification for the supply of brake triangles

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Technische Lieferbedingungen für Bremsdreiecke



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- Standards withdrawn and replaced by ISO:

ISO/R85:1959, withdrawn on 1.7.1985,
replaced by ISO 7438:1985

ISO/R286:1962, withdrawn on 1.9.1988,
replaced by ISO 286-1:1988

- Standards withdrawn and replacement documents suggested by SC03 of CTR:

ISO/R79:1968, withdrawn on 1.9.1981 -

Suggested replacement document ISO 6506-1:1999

ISO/R80:1968, withdrawn on 1.11.1986 -

Suggested replacement document ISO 6508-1:1999

ISO 468:1982, withdrawn on 10.4.1998 -

Suggested replacement document ISO 4287:1997

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

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Summary

This specification governs the acceptance and supply of brake triangles used for rolling stock. A brake triangle is understood to be the structural part which uniformly transmits the braking force to the brake-shoes.

1 - Purpose

1.1 - Type of parts

This specification governs the acceptance and supply of brake triangles used for rolling stock. It concerns solid parts obtained by cutting or forging, as well as those consisting of components assembled by welding, threading and press fit.

A brake triangle is understood to be the structural part which uniformly transmits the braking force to the brake-shoes.

1.2 - Classification

Brake triangles are classified in one of the following categories:

- brake triangles suitable for a nominal load (F_n) of 60 kN,
- brake triangles suitable for a nominal load (F_n) of 120 kN.

1.3 - Reference documents

In this specification, reference is made to the following documents:

ISO Standards: *ISO 286-1*, *ISO 377*, *ISO 630*, *ISO 683-1*, *ISO 683-11*, *ISO 1052*, *ISO 4287*, *ISO 6506-1*, *6508-1* and *ISO 7438* (see Bibliography - page 21).

2 - Characteristics

2.1 - Construction materials and components

List of materials

2.1.1 - Rolled steel products

2.1.1.1 - Definition

Failing any indication to the contrary in the order or its appended documents, the brake triangles shall be manufactured from carbon steels.

Failing any indication to the contrary in the order or its appended documents, the steels used for the manufacture of brake triangles shall, bearing in mind the conditions of use to which they are to be subjected, conform to the provisions of the following documents:

Standards:	<i>ISO 630</i>	:	Structural steels - Plates, wide flats, bars, sections and profiles
	<i>ISO 683-1</i>	:	Direct-hardening unalloyed and low-alloyed wrought steel in form of different black products
	<i>ISO 683-11</i>	:	Wrought case-hardening steels
	<i>ISO 1052</i>	:	Steels for general engineering purposes

2.1.1.2 - Characteristics

The physical, geometrical, chemical and mechanical characteristics of the rolled steels used shall be, in every way, as prescribed by the ISO Standards governing their supply (or Euronorms, should there be no ISO standards in existence, and particularly Euronorm 30.69: semi-finished products for forging made of general construction steel).

2.1.2 - Forged or drop-forged components

2.1.2.1 - Physical characteristics

The parts shall have smooth surfaces completely free of scale. They shall be sound throughout and reveal no defect on any of their parts, such as cracks, flaws, folds, or lack of material, detrimental to their use.

2.1.2.2 - Mechanical characteristics

1. Brinell hardness

The Brinell hardness of forged or drop-forged components shall be within the following limits in relation to the tensile strength of the steel of which they are made.

Tensile strength between:	Brinell hardness between:
360 and 440 N/mm ²	100 and 130 HB
410 and 490 N/mm ²	115 and 140 HB
490 and 590 N/mm ²	140 and 165 HB
510 and 610 N/mm ²	145 and 175 HB

2. Capacity for cold deformation

Under the test conditions shown in point [4.3.4.2 - page 13](#), it shall be possible to deform the forged or drop-forged parts without causing fracture or incipient cracking.

2.2 - Brake triangles

2.2.1 - Physical characteristics

2.2.1.1 - Appearance

Parts remaining in the as-forged condition must be suitably trimmed and have smooth surfaces completely free from scale.

The machined parts shall have a surface finish in accordance with that indicated in the drawings or demonstrated by the specimens previously approved by the purchasing Railway.

Failing any indication on the drawings, the roughness of machined surfaces, measured as the arithmetical average variation Ra defined by *ISO Standard 4287*, shall be within the following limits:

Nature of the parts	Average variation Ra
Trunnions	3,2 µm
Parts fitted with a bush (bores or trunnions)	0,8 µm
Bores without bushes	3,2 µm

Where weld seams exist, these shall comply with the conditions of *UIC Leaflet 897-13* (see [Bibliography - page 21](#)) for the quality class requested by the purchasing Railway.

2.2.1.2 - Soundness

The brake triangles shall be sound throughout, including any welded areas, which must not contain any lack of fusion or reveal any defect such as lack of penetration, blowholes or inclusions. The welding operations must not have altered the characteristics of the base metal.

2.2.2 - Geometrical characteristics

The shape and dimensions of brake triangles shall conform throughout with those prescribed in the order or its appended documents; they must be interchangeable and comply with the provisions of *UIC Leaflet 542* (see *Bibliography - page 21*) in this respect.

Failing any specific indications, the following tolerances shall be observed for rough parts:

- as-forged parts: j_s 16 or J_s 16 according to the provisions of *ISO Standard 286-1*,
- parts consisting of rolled sections used in that form: tolerances prescribed by the ISO Standards governing the supply of the sections concerned.

In addition, failing specification in the order and its appended documents, the relative positions of the functional parts: trunnions, traction head, holes for the traction pin, shall comply with the following conditions (see *Figure 1 - page 6*).

Table 1 : Triangles

Alignment of the pins of the trunnions:

At no point must the actual centre line of each of the trunnions vary by more than 0,5 mm from the theoretical common centre line of both trunnions.

Triangles	Permissible variation
- Parallelism of the actual centre lines of the trunnions and of the bore of the traction head (xy and mn)	$\leq 5 \text{ ‰}$
- Parallelism of the actual centre line of the hole in the traction head and of the median plane containing the actual centre line of the trunnions (tu and rs)	$\leq 10 \text{ ‰}$
- Perpendicularity of the longitudinal centre line of the traction head in relation to the actual centre line of the bore (op and xy)	$\leq 3 \text{ ‰}$
- Symmetry of the surfaces of the shoulders of the trunnions in relation to the plane containing the longitudinal centre line of the traction head, measurements a	$\frac{b}{2} - a \leq 2 \text{ mm}$