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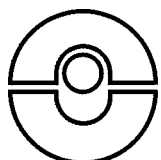
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3rd edition, June 2001

Translation

Technical specification for the supply of brake coupler heads

*Spécification technique pour la fourniture de têtes d'accouplement de frein
Technische Lieferbedingungen für Bremskupplungsköpfe*



*Union Internationale des Chemins de fer
Internationaler Eisenbahnverband
International Union of Railways*

UIC



Leaflet to be classified in Sections :

V - Transport stock

VIII - Technical specifications

Application :

With effect from 1 January 1992

All members of the International Union of Railways

Record of updates

2nd edition, January 1992

3rd edition, June 2001

Retyped in FrameMaker

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



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Printed by the International Union of Railways (UIC)

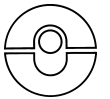
16, rue Jean Rey 75015 Paris - France, June 2001

Dépôt Légal June 2001

ISBN 2-7461-0301-X (French version)

ISBN 2-7461-0302-8 (German version)

ISBN 2-7461-0303-6 (English version)

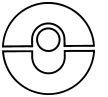


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Summary

This leaflet contains the technical specification for the supply of brake coupler heads mounted on brake half-couplers.



1 - Purpose

1.1 - Type of equipment

This leaflet governs the supply of coupler heads mounted on brake half-couplers.

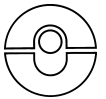
1.2 - Reference documents

Reference is made in this specification to the following documents: *Leaflet 541-1*, *ISO Standards 630, 1083, 5922, 6506, 6892, 7438* (see - [Bibliography - page 14](#)).

1.3 - Details contained in orders

The order or its appended documents must contain all information necessary for proper execution of the contract, in particular:

- intended use of the coupler heads: main brake pipes or train pipes;
- the existence or otherwise of a brass ring, in accordance with the purchasing Railway's requirements;
- details required for application of points [2.1.1 - page 3](#), [2.2.2 - page 4](#), [2.2.3 - page 4](#), [2.2.6 - page 5](#) and [5.1 - page 12](#).



2 - Characteristics

2.1 - Component parts

Coupler heads shall comprise

- the coupler-head proper;
- an optional ring, in accordance with the purchasing Railway's requirements;
- a stop.

2.1.1 - Coupler heads

The present specification stipulates the following grades of cast-iron:

- whiteheart malleable cast iron, type W 40-05,
- blackheart malleable cast-iron, type B 35-10,
- spheroidal graphite cast iron, type 400-15.

2.1.2 - Rings

Rings shall preferably be made from drawn-brass or, failing this, from threaded-brass bars or cast brass tubes, in accordance with the purchasing Railway's requirements.

2.1.3 - Stops

Stops shall be manufactured from rolled steel.

2.2 - Characteristics of component parts

2.2.1 - Physical characteristics

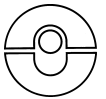
2.2.1.1 - Appearance

2.2.1.1.1 - Coupler heads

Coupler heads must be properly deburred and fettled and must not contain any defects which render them unfit for use.

2.2.1.1.2 - Rings

Rings must be free of porosity, oxide inclusions, blow-holes or other defects which render them unfit for use.



2.2.1.1.3 - Stops

Stops must not contain any cracks, faults, lines, laps or other defects which render them unfit for use.

2.2.1.2 - Texture (applies only to coupler heads)

Coupler heads in whiteheart malleable cast iron

After treatment, the cast iron must be completely white, although a light greyish tinged central area is allowed.

Coupler heads in blackheart malleable cast iron

The fracture must be completely black or bordered by a fine edge of a different appearance resulting from surface decarbonisation; the black part must have a silky appearance.

2.2.2 - Geometric characteristics

The component parts of the coupler heads must be of the form and dimensions and fall within the tolerances set out in the specifications.

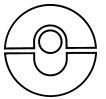
2.2.3 - Chemical characteristics of the rings

These rings shall have the following nominal chemical contents:

- Cu % = 59 to 62,
- Zn % = 38 to 41.

Impurities:

- Fe % \leq 0,2,
- Pb % \leq 0,3.



2.2.4 - Mechanical characteristics of coupler heads and stops

2.2.4.1 - Characteristics of heads

Coupler heads shall comply with the characteristics given in the table below:

Standard	Cast-grades	Sample diameter in mm d	Minimum tensile strength in MPa Rm	Minimum conventional yield strength at 0,2% in N/mm ² Rp 0,2	Minimum percentage elongation after break A %	HBS Brinell hardness 10/3000
ISO 1083	400-15	14	400	250	15	130 to 180
ISO 5922	B 35-10	12	350	200	10	≤ 150
		15				
	W 40-05	9	360	200	8	≤ 220
12	400	220	5			
	15	420	230	4		

2.2.4.2 - Characteristics of stops

Stops shall be manufactured from Fe 360 A steel as defined in point 5.2 of ISO Standard 630 (see - Bibliography - page 14), and shall be required to withstand, under the test conditions set out in point 6.5.2, a bending force with the two sides forming an angle of 120° as specified in ISO Standard 7438 (see - Bibliography - page 14)

2.2.5 - Other characteristics (only concerns coupler heads)

2.2.5.1 - Malleability

The deformability characteristics of the cast-iron used must be such that no breaks, fissures or cracks occur following 10% crushing of the coupler heads under the test conditions specified in point 4.3.4.2 - page 10.

2.2.5.2 - Air-tightness

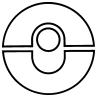
Non-coated coupler heads shall be tight to compressed air up to a pressure of 13 bars under the test conditions stipulated in point 4.3.4.5 - page 10.

2.2.6 - Marks

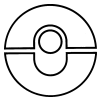
Each coupler head shall carry the marks indicated in the order or its appended documents.

Unless otherwise specified, the following markings shall be either stamped or embossed at foundry:

- the foundry mark;
- the year of manufacture;



and, for coupler heads to be used in the train pipe, an embossed cross in accordance with Appendix 5 to *UIC Leaflet 541-1* (see - Bibliography - page 14).



3 - Manufacture

Coupler heads may be manufactured only by suppliers approved beforehand for the purpose by the purchasing Railway.

3.1 - Coupler heads

Metalworking methods, chemical composition, annealing (if required) and casting processes shall be left to the supplier's discretion, subject to compliance with the characteristics specified in point 2.2 - page 3 of this leaflet.

3.2 - Rings

Metalworking methods and manufacturing processes shall be left to supplier's discretion, subject to compliance with the characteristics specified in point 2.2 of this leaflet.

3.3 - Minor alterations

3.3.1 - Minor alterations authorised

Following agreement with a representative of the purchasing Railway, the supplier may remove minor defects on condition that the parts concerned remain within the dimensional tolerances set out in point 2.2.2 - page 4 and that they retain their structural characteristics and the mechanical characteristics laid down in point 2.2.4 - page 5.

Alterations of this kind shall be carried out on the parts when cold, by soft grinding or machining.

If necessary, coupler heads may be cold straightened. Hot straightening may not be carried out without prior agreement from the purchasing Railway, which shall stipulate the number of additional parts to be texture-tested.

3.3.2 - Minor alterations prohibited

Any minor alterations designed to conceal a defect are strictly prohibited and shall result in rejection of the entire batch.



4 - Inspection

4.1 - Manufacturing inspection

It shall be possible for the purchasing Railway's representative to carry out any inspections necessary to ensure compliance with the conditions contained in this leaflet and relating to the manufacture of coupler heads and components parts.

The manufacturer must carry out the air-tightness test on each part before submission.

4.2 - Inspection of manufacturing materials

The materials used in the manufacture of rings and stops shall, in principle, be acceptance tested on the manufacturer's premises.

4.3 - Checks into the characteristics of parts

4.3.1 - Submission

4.3.1.1 - Condition of parts submitted

Complete coupler heads or their component parts shall be submitted for acceptance as ready for delivery, but before painting, to the purchasing Railway's representative.

4.3.1.2 - Grouping into batches

4.3.1.2.1 - Coupler heads

Batches shall be composed of parts made from the same grade of cast iron, originating from the same cast and having been heat-treated at the same time in the same furnace.

4.3.1.2.2 - Rings and stops

Rings and stops shall be selected for sampling in accordance with the purchasing Railway's wishes.

4.3.1.3 - Notification of submission for acceptance

The purchasing Railway's representative shall be advised in writing of the date of submission for acceptance in a letter signed by the manager of the manufacturing firm or his authorised representative. Mention shall be made in this letter of the number of coupler heads submitted, together with reference details of the order concerned.

When the submission is made, the purchasing Railway's representative shall be provided with a certificate stating the results of tests and analyses carried out on the coupler heads and their component parts.



4.3.2 - Type and proportions of inspections and tests

Type of inspections and tests	Number of parts to be checked or tested for batches including				
	≤ 100	101 to 500	501 to 1 000	1 001 to 2 000	2 001 to 3 000
Coupler heads					
Tensile testing	1	1	1	2	3
Malleability	2	3	4	4	4
Texture ^a	2	3	4	4	4
HB hardness	on 5% of the coupler heads				
Air-tightness	3	6	9	12	12
Appearance	At the discretion of the purchasing Railway's representative				
Dimensions	At the discretion of the purchasing Railway's representative				
Rings					
Chemical analysis	At the discretion of the purchasing Railway's representative				
Appearance and dimensions	At the discretion of the purchasing Railway's representative				
Stops					
Bending	At the discretion of the purchasing Railway's representative				
Appearance and dimensions	At the discretion of the purchasing Railway's representative				

a. These proportions do not apply to hot straightening - see point 3.3.1.

4.3.3 - Selection and preparation of test pieces

4.3.3.1 - Selection of samples

The purchasing Railway's representative shall select random samples for testing from each batch submitted, and shall mark these indelibly.

Samples and test-pieces must retain the marks affixed by the purchasing Railway's representative.

4.3.3.2 - Preparation of test pieces

4.3.3.2.1 - Tensile testing

Test-pieces for tensile testing shall be cast separately in a sand mould similar to that used for casting the coupler heads, with the metal used for casting the parts and under the same temperature conditions.

In the case of heads made from spheroidal-graphite cast iron, the sample bars shall be cast after the last parts of the casting.

The samples shall undergo the same heat treatment (if any) as the parts, simultaneously and in the same oven. They shall not be machined and their dimensions shall be as specified in the table of point [2.2.4.1 - page 5](#) and in ISO Standards 1083 and 5922 (see - [Bibliography - page 14](#)).



4.3.3.2.2 - Malleability - Texture - HB Hardness

The test piece shall consist of the coupler head.

4.3.3.2.3 - Air-tightness

The test piece shall consist of the machine-finished coupler head.

4.3.3.2.4 - Chemical analysis

Chemical analysis shall be carried out on a test piece of at least 50 g in weight.

4.3.3.2.5 - Bending test

The test piece shall consist of the stop itself.

4.3.4 - Checking and testing procedures

4.3.4.1 - Tensile test

Tensile tests shall be carried out in accordance with the conditions set out in ISO Standard 6892 (see - Bibliography - page 14).

4.3.4.2 - Malleability

The test shall consist of using hammering or pressure to reduce any one dimension of the body by 10%, following the centre-line between the coupler recess of the head and that of another head.

Choice of the device required for carrying out this test shall be made at supplier's discretion.

4.3.4.3 - Texture

The malleability test shall be continued until the head breaks. The texture shall be examined either with the naked eye or using a magnifying glass of maximum x3 strength.

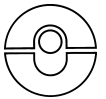
4.3.4.4 - Hardness

The test shall be carried out in accordance with ISO Standard 6506 (see - Bibliography - page 14); the test shall be carried out on a flat surface after local grinding if it is not machined.

4.3.4.5 - Air-tightness

Following pressure testing, the coupler head shall be connected to a compressed air supply at 13 bars and coupled to a device fitted with a pressure gauge. Pressure shall be maintained for one minute.

The absence of leakage shall be tested by immersion in water.



4.3.4.6 - Chemical analysis

Chemical analysis shall be carried out in accordance with the relevant ISO Standards or Recommendations or (apart from cases where litigation arises) by any other method acceptable to the purchasing Railway.

4.3.4.7 - Bending

The stop shall be held between the jaws of a vice in such a way as to protrude by at least a length equal to its diameter. Bending shall be obtained using a hammer.

4.3.4.8 - Appearance and dimensions

Appearance shall be gauged either with the naked eye or using a magnifying glass of maximum x3 strength.

Dimensions shall be checked using the customary measuring instruments or gauges supplied by the manufacturer and approved by the purchasing Railway.

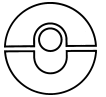
Clearance shall be checked using 20 mm steel balls, and coupling efficiency using a test head.

4.4 - Conclusion of checks

Any defects in appearance or dimension shall cause the coupler head concerned to be rejected.

Any tensile, malleability, texture, analysis, HB hardness, air-tightness, chemical or bending characteristics which do not conform with specifications shall cause the batch in question to be rejected.

New tests, with or without corrective treatment, may only be carried out if a request has been made in writing by the manufacturer and prior agreement reached with the purchasing Railway.



5 - Delivery

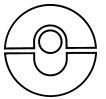
5.1 - Anti-corrosion treatment

After shot blasting or cleaning, rough parts of coupler heads shall be treated with the protective coatings stipulated by the purchasing Railway.

Machined parts shall be given a protective coating approved by the purchasing Railway.

5.2 - Protection against damage from impact

Coupler heads must be protected against any damage liable to occur during transport.



6 - Guarantee

Coupler heads shall be guaranteed against all manufacturing defects for a period of 2 (two) years.

If the coupler heads are to be fitted on new stock, the delivery date of the vehicles on which they are maintained shall be deemed to be the date on which the guarantee commences.

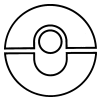
Coupler heads which, during the guarantee period, are found to contain defects which make them unfit for use or are likely to reduce their service life, shall be rejected.

However, before being rejected definitively, defective coupler heads may be subjected to a check examination on behalf of both the purchasing Railway and the supplier, if the latter so requests.

If the check examination confirms that defects have indeed arisen during the manufacturing process, the defective coupler heads shall be rejected definitively.

If the check examination fails to result in agreement between the purchasing Railway and the supplier, experts approved by both parties shall be called upon to arbitrate. In this event, costs shall be borne by the party held responsible for the defects.

Rejected coupler heads shall be made available to the supplier for the purpose of replacement or reimbursement at their value as new when withdrawn.



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ISO 5922

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"Metallic materials - Tensile tests at ambient temperature", 1998

ISO 7438

"Metallic materials - Bend test", 1985