



UIC CODE

Leaflet to be classified in Volumes:

- V - TRANSPORT STOCK
- VI - TRACTION
- VIII - TECHNICAL SPECIFICATIONS

829-2

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**TECHNICAL SPECIFICATION
FOR THE SUPPLY OF CASTINGS
IN GRAY IRON, MALLEABLE CAST IRON
OR SPHEROIDAL GRAPHITE CAST IRON
FOR THE UIC TYPE AUTOMATIC COUPLER
WITH A CENTRE BUFFER FOR TRACTIVE AND
TRAILING STOCK**

**NUMERISATION DANS
L'ETAT DU DOCUMENT**

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Article 1

PURPOSE

1.1 - This specification governs the supply of castings made of gray iron, malleable cast iron, or spheroidal graphite cast iron for the UIC type automatic coupler with centre buffer for tractive and trailing stock.

All necessary instructions for the carrying out of the contract, especially those concerning the application of the following paragraphs of this specification :

- 2.216, 2.22, 2.23,

- 3.21, 3.23, 3.24,

- 4.12, 4.132, 4.133, 4.147, 4.232, 4.233, 4.247,

must be shown in the order and its appended documents.

1.2. - List of documents referred to

Reference is made, in this technical specification, to the following documents:

- UIC leaflet No. 840-2

- Draft international standard ISO/DIS 82

- Recommendations ISO/R 79A 1, ISO/R 80, ISO/R 81
ISO/R 185, ISO/R 404, ISO/R 942, ISO/R 943,
ISO/R 944 and ISO/R 1083.

Article 2

CHARACTERISTICS

2.1. - Construction Materials

- 2.11. - non-alloy gray cast iron
- white heart malleable cast iron
- black heart malleable cast iron
- malleable perlitic cast iron
- spheroidal graphite cast iron

2.12. - Mechanical properties

The minimum mechanical properties to be complied with are as follows :

Types of cast iron	Diameter of the test piece (mm)	Elastic limit at 0.2% Proof Stress (N/mm ²)	Tensile strength (N/mm ²)	Elongation after fracture %	Brinell hardness (HB)
Non-alloy gray cast iron	20	-	245	-	
White heart malleable cast iron	15	225	410	8	
Black heart malleable cast iron	15	185	340	12	
Malleable perlitic cast iron	15	A 490	690	2	240 to 285
B 380		640	3	210 to 250	
C 320		540	4	190 to 240	
D 290		490	5	170 to 230	
E 260		440	7	150 to 200	
Spheroidal graphite cast iron	14	42-12 275	410	12	
50-7 345		490	7		
60-2 390		590	2		

2.2. - Parts

2.21. - Physical properties

2.211. - Appearance

The parts must be carefully trimmed, cleaned, rid of all loose oxide and free from gates, risers and feeder heads. All these operations must be conducted to guarantee the satisfactory appearance of the parts and not interfere with their functioning.

2.212. - Soundness

The parts must reveal no defect which can be detrimental to their use.

2.213. - Suitability to distortion by impact

The parts of white heart and black heart malleable cast iron must be able to withstand, before appearance of cracks or before fracture, permanent distortion to the extent indicated below:

- bending to an angle of 30° for parts of appreciably prismatic shape,
- reduction of 20% of the internal diameter or of the distance between two sides, for parts with a mainly hollow body.

2.214. - Texture

- Non-alloy gray iron : the texture of the fracture surface must be absolutely gray.
- White heart malleable cast iron: the texture must be white, and the central area of the cross section may show a slightly gray hue.

- Black heart malleable cast iron: the texture may be entirely black or surrounded by a slight edging of different appearance, resulting from superficial decarburisation, but the black part must have a silky appearance.
- Malleable perlitic cast iron: the texture may be entirely gray or surrounded by a slight edging of a different colour, resulting from superficial decarburisation.

2.215. - Micro-structure (spheroidal graphite cast iron)

Examination of the micro-structure must confirm that the graphite exists in the spheroidal form.

2.216. - Pressure tightness

The parts required to retain liquid or gas pressure must withstand, without leaking or seeping, the test conditions prescribed in the order or its appended documents.

2.22. - Geometrical properties

The form, dimensions and tolerances on the dimensions must conform to those laid down in the order or its appended documents; failing indication on these documents, the tolerances to be respected are those shown in UIC Leaflet No. 840-2.

2.23. - Marks

Each part must bear, on leaving the foundry, in the position and to the dimensions indicated in the order or its appended documents, the following manufacturing marks :

- the mark of the supplier,
- the identification mark,
- the date of manufacture (month and last two figures of the year of manufacture).

Article 3.

MANUFACTURE

3.1. - Preparation of the cast iron

The supplier is free to choose the method of melting of the metal, the chemical composition and the subsequent treatments, according to its own practices.

3.2. - Manufacture of the parts

The manufacture of the parts may only be entrusted to suppliers who have received the prior approval of the purchasing Railway.

3.21. Moulding and casting

Failing indications to the contrary in the order or its appended documents, the supplier may choose the moulding and casting methods.

Each batch of parts in gray iron is to be represented by at least two bars allowing preparation of the type B tensile test piece defined in Article 2 of ISO/R Recommendation 185.

Each batch of parts in malleable cast iron is to be represented by at least two rough cast tensile test pieces of 15 mm in diameter, defined in Article 6 of ISO/R Recommendation 942 for malleable white heart cast iron, or in ISO/R Recommendation 943 for malleable black heart cast iron, or ISO/R Recommendation 944 for malleable perlitic cast iron.

Each batch of parts in spheroidal graphite cast iron is represented by at least two sample blocks of type IIa defined in Article 5 of ISO/R Recommendation 1083 permitting preparation of the tensile test piece.

These sample blocks and test pieces of metal are marked and cast separately in the moulds in the same way as those of the parts, with the metal from one of the ladles used for the pouring of the castings, under the same casting conditions and at the same temperature. They shall undergo the same heat treatment as the parts which they characterise, and at the same time.

3.22. Straightening

Any straightening of the malleable cast iron castings must be carried out in the cold condition.

3.23. Heat treatment

Superficial hardening of malleable perlitic cast iron parts, when it is prescribed, must be conducted in such a way as to obtain the hardness characteristics stipulated in the order and its appended documents.

3.24. Machining

Machining shall be carried out in accordance with the indications in the order or its appended documents.

3.25. Retouching

No retouching may be carried out without the prior authorisation of the representative of the purchasing Railway and his agreement on the method of repair.

Any retouching intended to hide a defect is strictly forbidden and will result in rejection of the whole batch.

Article 4

INSPECTION

The inspection of the parts shall be carried out by the representative appointed by the purchasing Railway.

However, if the order and its appended documents so stipulate, delivery of the parts may merely be accompanied by an inspection certificate for the products, issued by the factory, as defined in § 4.13 of ISO/R Recommendation 404.

4.1. *Inspection of the manufacture*

The representative of the purchasing Railway must be able to carry out all necessary checks in order to ascertain that the conditions laid down in the order and its appended documents for the manufacture of parts have been strictly complied with, in particular those concerning the casting of parts, test-bars and sample-blocks, also those relating to the carrying out of heat treatments.

4.2. *Inspection of the parts*

4.21. Presentation

4.211. Condition of the parts on presentation

The parts shall be presented in delivery condition.

4.212. Grouping into batches

The castings shall be presented grouped into batches. Each batch of castings of gray iron shall consist of parts cast on the same day with cast iron prepared from charges of identical constitution; a batch shall not weigh more than 3 tons.

Each batch of castings in malleable cast iron shall be formed of castings which have undergone the same heat treatment simultaneously in the same furnace or the same treatment of superficial hardening whether or not emanating from the same cast; a batch shall not weigh more than 2 tons.

Each batch of parts in spheroidal graphite cast iron shall consist of parts cast with cast iron emanating from the same processing ladle and having been subjected, where applicable, to the same heat treatment; a batch shall not weigh more than 2 tons.

4.213. Advice of presentation

The date of presentation must be advised to the representative of the purchasing Railway in a written note signed by the director of the producing factory or his authorised representative. This note must indicate the number of parts presented in each batch, also the reference of the order by which they are covered.

At the time of presentation, a certificate attesting that the manufacturing conditions prescribed have been complied with and that the individual sealing test has been effected when this is stipulated, shall be handed to the representative of the purchasing Railway.

4.22. Nature and proportion of the checks and tests:

The parts shall be subjected to the following checks and tests:

<i>Nature of the checks and tests</i>	<i>Number of checks or tests per batch</i>
- Tensile test	1
- Brinell hardness test (malleable perlitic cast iron parts)	2%
- Rockwell or Vickers hardness test (parts subjected to superficial hardening)	2%
- Deflection test under impact (parts of white heart and black heart malleable cast iron)	1%
- Examination of the structure (parts of spheroidal graphite cast iron)	1
- Pressure tightness test (1)	2%
- Check on appearance and dimensions.	as required by the purchasing Railway

(1) Before presentation, all parts must have undergone the pressure tightness test under the responsibility of the supplier, when this is prescribed in the order or its appended documents.

4.23. Selection and preparation of the samples and test pieces.

The representative of the purchasing Railway shall select, at random, from each batch presented, the tensile test pieces and the sample parts intended for the tests, and mark them indelibly.

The test pieces and sample parts must retain the stamps of the representative of the purchasing Railway; any transfer may only be carried out by him,

4.231. Tensile strength

The test piece of gray iron shall be prepared in accordance with the indications of Article 2 of ISO/R Recommendation 185 (type B test piece).

The test piece of malleable cast iron, 15 mm in diameter, shall be prepared in accordance with the indications of Article 6 of ISO/R Recommendation 942 for white heart malleable cast iron, or ISO/R Recommendation 943 for black heart malleable cast iron, or ISO/R Recommendation 944 for malleable perlitic cast iron.

The test piece of spheroidal graphite cast iron shall be prepared in accordance with the indications of Article 4 of ISO/R Recommendation 1083.

4.232. Hardness

The hardness test shall be carried out on the parts in the position indicated in the order and its appended documents, or, failing this, by the representative of the purchasing Railway.

4.233. Deflection under impact

The bend test by impact shall be carried out on the castings themselves (white heart and black heart malleable cast iron) or in accordance with the indications in the order and its appended documents.

4.234. Structure

The sample for examination of the structure of the parts in spheroidal graphite cast iron shall be taken from the castings or from their appendages.

4.24. Carrying out of the checks and tests

4.241. Tensile test

The tensile test must be conducted in accordance with the regulations of the draft international standard DIS 82.

4.242. Brinell hardness test

The Brinell hardness test must be conducted in accordance with the ISO/R Recommendation 79 A1.

4.243. Rockwell or Vickers hardness test.

The hardness tests must be conducted in accordance with ISO/R Recommendations 80 or 81.

4.244. Test for distortion by impact.

The test shall be carried out by bending over a former of no more than 3 mm radius, by holding one end of the part in a vice and striking the other.

In the case of hollow parts, this test shall be carried out by reducing the distance between the sides. The test is then continued until fracture of the part occurs, for examination of the texture.

4.245. Texture test

The texture of the parts in gray cast iron and in perlitic malleable cast iron shall be inspected on the tensile test piece after fracture of the latter.

The texture of the parts of white heart and black heart malleable cast iron shall be inspected on the broken parts at the time of the deflection by impact test.

4.246. Examination of the structure

The micrographic examination of the structure of the parts of spheroidal graphite cast iron shall be carried out at 100 magnification.

4.247. Sealing test

The sealing test shall be carried out in accordance with the indications in the order and its appended documents, which should state the nature of the test fluid, the duration and the test pressure.

4.248. Checking of the dimensions

The checking of the dimensions shall be carried out by any suitable means and particularly by using gauges supplied by the manufacturer.

4.3. Conclusion of the Inspections

Any defect in appearance or dimensions shall result in rejection of the part.

Any test result regarding tensility, hardness, distortion by impact, texture, structure or sealing, not in accordance with the requirements, shall result in rejection of the corresponding batch.

Fresh tests may only be carried out, at the request of the manufacturer, with or without improvement treatment, with the prior agreement of the purchasing Railway.

Article 5

DELIVERY

5.1. Protection Against Oxidation

After inspection and stamping by the representative of the purchasing Railway, the parts shall be given a coating approved by the latter Railway, before storing or despatch.

5.2. Guarantee

The parts shall be guaranteed for a period of two years against any defect imputable to manufacture. This period shall count with effect from the end of the month indicated on the parts.

If the parts are fitted to new stock, the date of delivery of the vehicles to which they are fitted, shall be considered as the beginning of the guarantee.

If the parts are fitted to stock in service on reconversion to automatic coupling, the date of fitting, which shall be advised to the supplier, shall be considered as the beginning of the guarantee.

Those parts which, during the guarantee period, reveal defects rendering them unsuitable for use or which decrease their service life, shall be rejected.

Before being finally rejected, the defective parts can, however, be submitted to a check examination between the purchasing Railway and the supplier, if this latter so requests.

When the check examination confirms that the defects are definitely imputable to manufacture, the defective parts shall be finally rejected.

If the results of the check test do not enable an agreement to be reached between the purchasing Railway and the supplier, recourse shall be had to experts approved by both parties to settle the dispute. The costs shall then be borne by the party upon whom the responsibility finally devolves.

When more than 5% of parts emanating from the same batch show defects resulting in rejection, the purchasing Railway may reject the whole of the batch.

Rejected parts shall be placed at the disposal of the supplier with a view to their replacement or reimbursement at their value, in new condition at the time of withdrawal.

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APPLICATION

All Railways in the Union.

RECORD REFERENCES

Headings under which the question has been dealt with :

- Preparation of specifications for the supply of automatic couplers.
(Traction and Rolling Stock Committee : Graz, June 1972).
- Specifications for the supply of Automatic Couplers.
(Traction and Rolling Stock Committee : Trier, June 1974).