

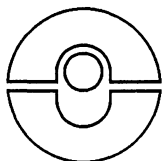
UIC Code

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**Technical specification
for the supply of
rolled or forged steel wheel centres
for tractive and trailing stock
Quality requirements**



International Union of Railways

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Leaflet to be classified in Volumes:

- V - Transport stock
- VIII - Technical specifications

Amendments

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This leaflet carries *obligatory* status except for chemical compositions which are *recommendatory*.

Note

This leaflet forms part of a set which also includes the following leaflets in particular:

- | | |
|-----------------|---|
| Leaflet 510-1 : | Wagon running gear - Normalisation |
| Leaflet 515 : | Coaches - Running gear |
| Leaflet 530-2 : | Wagons - Running safety |
| Leaflet 541-3 : | Brakes - Disc brakes and disc brake linings |
| Leaflet 571-1 : | Standard wagons - Ordinary two-axle wagons - Characteristics |
| Leaflet 571-2 : | Standard wagons - Ordinary bogie wagons - Characteristics |
| Leaflet 571-3 : | Standard wagons - Wagons adapted for certain types of traffic - Characteristics |
| Leaflet 571-4 : | Standard wagons - Wagons for combined transport - Characteristics |
| Leaflet 579-1 : | Wagons - Periodical overhaul - Method for establishing its frequency and nature |
| Leaflet 853-1 : | Technical specification for the supply of tyres for ordinary use on tractive stock. |

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Table 1 - Steel grade, chemical composition, heat treatment in delivery condition and mechanical characteristics

Table 2 - Nature and number of tests with wheel centres

Table 3 - Permitted variations (reductions) in cast analysis from composition limits specified in Table 1 for product analysis

1 - Purpose and scope

This technical specification applies to the manufacture of rolled or forged steel wheel centres for tractive and trailing stock.

Its contents are broadly in line with ISO Standard 1005/4 "Rolled or forged wheel centres for tyred wheels for tractive and trailing stock - Quality requirements".

2 - References

This technical specification contains references to the following documents:

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|-------------------|---|--|
| ISO/6892 | - | Metallic materials - Tensile test |
| ISO/83 | - | Steel - Charpy resilience testing (U-notch) |
| ISO/R 377 | - | Selection and preparation of samples and test pieces for shear steel |
| UIC Leaflet 510-2 | - | Trailing stock. Wheels and wheelsets. Conditions concerning the use of wheels of various diameters |
| UIC Leaflet 842-3 | - | Surface preparation of metallic and non-metallic materials used in the construction of railway vehicles and containers |
| UIC Leaflet 842-5 | - | Protection against corrosion and painting of coaches and tractive units. |

O R**3 - Particulars to be supplied by the Purchasing Railway**

The following particulars shall be supplied by the Purchasing Railway when inviting tenders and when placing the purchase order:

- a) the number of this technical specification,
- b) the steel grade (see 4.1 and table 1) and, where relevant, additional details concerning its chemical composition,
- c) the metallurgical condition at time of delivery (see 4.2),
- d) any stipulations for checking the chemical composition based on cast analysis (see 5.1),
- e) the degree of finish of the different parts (see 4.3) and the surface condition of machined parts (see 5.3),
- f) the limiting value of residual out-of-balance (see 5.2.4),
- g) the dimensions of the wheel centre (see 5.3),
- h) possible stipulation of a special marking (see 5.4),
- i) possible stipulation of vacuum degassing (see 6.1),
- k) machining and balancing conditions (see 6.2.5),
- l) the type of checks to be performed (see 7.1),
- m) the type of sample and test-piece preparation when it differs from the provisions of paragraphs 7.7.2 and 7.7.3,
- n) the surfaces (if any) to be protected against oxidation (see 8.1),
- o) possible stipulation of macroscopic and macroflux tests (see points 5.2.2.1, 5.2.2.2 and Table 2).

4 - Classification

Wheel centres shall be identified by the steel grade used and by the metallurgical condition at delivery.

4.1 - Steel grade

This technical specification stipulates the following steel grades (C1, C2, C3 and C4) according to the mechanical properties outlined in Table 1.

4.2 - Metallurgical condition on delivery

Wheel centres shall be delivered:

- a) in non-treated condition (no symbol)
- b) in normalised condition (Symbol N)
The "N" condition means that the wheel centre is heated from an initial temperature not exceeding 540° C to one that exceeds by about 25°C the temperature for transforming the steel grade concerned and is kept at this temperature for a sufficient lapse of time and then left to cool in still air.
- c) in hardened and annealed condition (symbol E)
The "E" condition means that the wheel centre is heated, from an initial temperature not exceeding 540°C, to one that exceeds by about 25°C the temperature for transforming the steel grade concerned, is kept at this temperature for a sufficient lapse of time, then left to cool immersed in a suitable liquid. Immersion is followed by annealing at a minimum temperature of 500°C. The wheel centre is then left to cool in still air.

The immersion process (wheel centres E) shall be performed in such a way as to avoid cold cracks.

O R**4.3 - Degree of finish**

The degree of finish of the different parts of a wheel centre at delivery may be as follows:

- a) rough cast, when the wheel centre, in the as-rolled or as-cast state, has not undergone any machining except for the machining that the manufacturer must perform to ensure the wheel centre complies with the provisions of the present specification;
- b) rough-machined, when machining is required;
- c) finished, when machining is definitive (inapplicable for borings and bearings);
- d) ready for mounting, this being the condition for a boring that has been definitively machined before mounting.

Unless otherwise specified in the order or its appended documents, the following degrees of finishing shall be applicable:

- hub and webs: rough
- hub surfaces: finished,
- rim and borings: rough-machined.

5 - Characteristics**5.1 - Chemical composition**

Unless otherwise stipulated in the order or its appended documents, the maximum contents of the different elements are as given in Table 1. These values shall apply for product analysis.

Subject to agreement when placing the order, the Purchasing railway can accept checking of the chemical composition by cast analysis in preference to the product-analysis method. Cast analysis shall be performed on the basis of the values in Table 1, less the permissible variations specified in table 3.

5.2 - Physical and mechanical characteristics

5.2.1 - Appearance

Parts kept rough must be perfectly trimmed and blend in smoothly with machined parts.

The surfaces of wheel centres shall not present any marking outside the areas assigned for this purpose in the order or its appended documents.

5.2.2 - Structure

In the case of structural examination, the structure shall after micrographic testing comply with the stipulations in the order or its appended documents.

5.2.2.1 - Macroscopic examination

After polishing, the surface examined shall not reveal any breaks in continuity whatsoever.

5.2.2.2 - Macroflux examination (Baumann method)

After etching the picture obtained shall not reveal any defects that are more pronounced than those given in the album appended to UIC Leaflet 812-3.