

ISO

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION

ISO RECOMMENDATION R 1005/V

RAILWAY ROLLING STOCK MATERIAL
CAST WHEEL CENTRES IN NON-ALLOY STEEL
FOR TYRED WHEELS FOR TRAILER STOCK

1st EDITION

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BRIEF HISTORY

The ISO Recommendation R 1005/V, *Railway rolling stock material – Cast wheel centres in non-alloy steel for tired wheels for trailer stock*, was drawn up by Technical Committee ISO/TC 17, *Steel*, the Secretariat of which is held by the British Standards Institution (BSI).

Work on this question led, in 1967, to the adoption of a Draft ISO Recommendation based on a corresponding UIC* code.

In January 1968, this Draft ISO Recommendation (No. 1379) was circulated to all the ISO Member Bodies for enquiry. It was approved, subject to a few modifications of an editorial nature, by the following Member Bodies :

Austria
Belgium
Canada
Colombia
Czechoslovakia
Denmark
Finland
France
Germany

Hungary
India
Israel
Italy
Korea, Rep. of
Netherlands
New Zealand
Norway
Portugal

Romania
South Africa, Rep. of
Spain
Sweden
Switzerland
Turkey
U.A.R.
United Kingdom
Yugoslavia

Two Member Bodies opposed the approval of the Draft:

Japan
U.S.A.

The Draft ISO Recommendation was then submitted by correspondence to the ISO Council, which decided, in March 1969, to accept it as an ISO RECOMMENDATION.

* Union Internationale des Chemins de fer (International Union of Railways).

RAILWAY ROLLING STOCK MATERIAL

CAST WHEEL CENTRES IN NON-ALLOY STEEL

FOR TYRED WHEELS FOR TRAILER STOCK

1. SCOPE

This ISO Recommendation applies to the manufacture of cast spoked or solid web wheels, in non-alloy steel, rough-cast, rough-machined, half-finished or fully finished*, for trailer stock, and which are to be tyred.

2. CLASSIFICATION

This ISO Recommendation covers one class of cast wheel centres only, designated A 40 M 1.

3. CHEMICAL COMPOSITION

Wheel centres should be manufactured from non-alloy steel** of the following chemical purity :

phosphorus $\leq 0.06\%$

sulphur $\leq 0.05\%$

In the case of steel produced by the acid converter process, the following percentage may be accepted :

phosphorus $\leq 0.08\%$

* The terms are defined as follows :

- (a) *Rough-cast.* A wheel centre obtained by moulding and casting and which, having to be subsequently machined, has not yet undergone any machining whatsoever.
- (b) *Rough-machined.* A wheel centre having received no final machining, but having been rough-machined on all or certain portions which have to be machined.
- (c) *Half-finished.* A wheel centre having received final machining on certain portions which have to be machined.
- (d) *Fully finished.* A wheel in which all portions having to be machined have undergone their final machining.

** For this steel, the content of elements other than carbon should not exceed the following limits :

manganese	1.20 %	molybdenum	0.05 %
silicon	0.50 %	vanadium	0.05 %
nickel	0.30 %	copper	0.30 %
chromium	0.30 %		

4. MECHANICAL PROPERTIES

4.1 Tensile strength R_m

The tensile strength of the wheel centres should be between 40 and 50 kgf/mm².

4.2 Coefficient of quality C

The coefficient of quality (as defined in Table 1) of the wheel centres should be

$$C \geq 95$$

TABLE 1

L_0	C
$8.16 \sqrt{S_0}$	$R_m + 2.5 A$
$5.65 \sqrt{S_0}^*$	$R_m + 2.2 A$
$4 \sqrt{S_0}$	$R_m + 2 A$

* This formula should preferably be adopted.
The other formulae are retained provisionally.

where

L_0 is the gauge length used to measure the elongation after fracture, expressed in millimetres;

S_0 is the cross-sectional area of the gauge length of the test piece, expressed in square millimetres;

R_m is the tensile strength, expressed in kilogrammes-force per square millimetre;

A is the percentage elongation after fracture.

4.3 Resistance to impact

The wheel centres should be able to withstand consecutive blows which cause a permanent deflection of the machined surface of the boss equivalent to at least 10 % of the length of the spokes or of the radial length of the web without incurring flaws, cracking or breaking.

5. PHYSICAL CHARACTERISTICS

5.1 Soundness and appearance

The wheel centres should be entirely free of piping, blowholes, cracks, lack of metal, or any defect detrimental to their use.

The skin of the components should be free from pronounced roughness.

The finish of machined surfaces should comply with the indications shown on the drawings or comparison specimens.

5.2 Texture

The fractures of tested wheels and of test pieces should show a fine-grained homogeneous structure without trace of brilliant crystals, thereby proving the metal to be free from segregations and satisfactorily normalized.

During machining, no defect should be revealed either in wheel centres delivered as machined or in wheel centres intended for testing.

5.3 Static balance

(To be verified only on half-finished or fully finished wheel centres for which only the rough-machined bore remains to be brought to the final dimension).

The out-of balance of the wheel centre should be capable of correction by a balance weight attached to the wheel centre at a distance of 500 mm from the centre and having a maximum mass of 250 g.*

The radial position and value of the residual out-of-balance should be stamped on the rim as indicated in the standards or drawing.

* For certain vehicles, the work sheets can specify a balance weight for the wheel centres having a maximum mass less than that given above.