UIC CODE 812-2

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Translation

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Solid wheels for tractive and trailing stock - Tolerances

Roues monoblocs pour matériel roulant moteur et remorque - Tolérances
Vollräder für Triebfahrzeuge und Wagen - Toleranzen

UNION INTERNATIONALE DES CHEMINS DE FER
INTERNATIONALER EISENBAHNVERBAND
INTERNATIONAL UNION OF RAILWAYS

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V - Rolling stock

VIII - Technical specifications

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All members of the International Union of Railways

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Summary

This leaflet specifies the degree of finish, the dimensional requirements and the surface roughness of solid wheels for tractive and trailing stock together with the applicable tolerances. It specifies the information to be supplied by the purchaser and the inspections that shall be carried out.

Status of leaflet:

- obligatory for all UIC and ERRI technical documents,

- recommendatory for all technical documents of UIC member railways.

1 - Purpose and scope

1.1 - The present leaflet specifies the dimensional requirements[1] (see Appendix A - page 8) shown in table 1 - page 9 (see also point 5.1 - page 6) for forged, rolled or cast solid wheels with curved or straight webs in various degrees of finish.

This technical specification contains several points of technical convergence with *ISO Standard 1005/8* (see Bibliography - page 11), which covers the same field.

1.2 - The quality requirements for solid cast wheels are given in *UIC Leaflet 812-3* (see Bibliography - page 11).

1. The term "dimensional requirements" applies to the tolerances.

2 - References

(see Bibliography - page 11) :

- *ISO 1101*: Tolerances of form and position - Part 1: general observations, symbols, indications on drawings.

3 - Information to be supplied by the purchaser

The purchaser must supply the following information regarding dimensional, roughness and unbalance requirements in this enquiry and order:

1. the number of the present leaflet,

2. a dimensional drawing,

3. which tolerances category shall apply (see table 1 - page 9 of Appendix A),

4. the degree of finish (see point 4 - page 5),

5. the dimensional requirements and roughness values if they deviate from the present technical specification,

6. if one of the optional verifications is required (see table 1 and point 6.1 - page 7).

4 - Degree of finish on delivery

The various conditions of finish and manufacture, in which wheels listed in the present technical specification can be supplied, are as follows:

4.1 - Finish

In accordance with *UIC Leaflet 812-3, point 4.3*, the term "finished" indicates the wheel condition in which all the portions of the wheel to be machined - and which are specified in the order or drawing - have undergone machining operations other than those normally carried out by the wheelset manufacturer immediately before mounting the wheel on the axle, for example the final "finishing" operation on the bore. This restriction implies that the requirements for the rough finished bore are covered in table 1 - page 9 of Appendix A under the term "finished", whereas those for the finally finished bore are covered by the term "ready for assembly".

4.2 - Ready for assembly

"Ready for assembly" indicates the wheel condition after all necessary machining operations immediately before mounting the wheels on axles have been carried out.

5 - Requirements

5.1 - Dimensional requirements

5.1.1 - The dimensional requirements shall be those given in table 1 - page 9 of Appendix A (for rough machined portions of wheels, see also footnote e).

5.1.2 - The manufacturer must ensure that tolerances are maintained in such a way that, when the wheels are assembled on the axles (see *UIC Leaflet 813*) (see Bibliography - page 11), the tolerance values as given in *UIC Leaflet 813* are achieved without further machining.

5.2 - Surface roughness

5.2.1 - Unless otherwise agreed, the maximum mean surface roughness Ra of machined surfaces in the "finished" and "ready for assembly" conditions shall be as follows:

Wheel portion	Degree of wheel finish	Mean surface roughness Ra
Bore	Finished	≤ 12,5 μm
	Ready for assembly	0,8 to 3,2 μm
All other portions	Finished or Ready for assembly	≤ 12,5 μm[a]

a. When ultrasonic inspection is specified in UIC Leaflet 812-3, the running surface and inner surface must reveal a mean surface roughness Ra ≤ 6,3 μm.

5.2.2 - For unmachined surfaces in the "finished" and "ready for assembly" conditions (see table 1, footnote e), the surface quality shall be specified by the purchasing Railway in the order or its appended documents.

6 - Inspection

6.1 - Dimensional requirements

When an "m" is indicated in the "inspection" column of table 1 - page 9, verification of the corresponding dimensional requirement is mandatory. Because of practical difficulties of verification of certain dimensional values under production conditions, the dimensional requirements identified by an "o" in the "inspection" column of table 1 shall only be verified if stipulated by the purchasing Railway in the order.

Definitions for the various geometrical tolerances are given in *ISO Standard 1101* (see Bibliography - page 11).

6.2 - Surface roughness

If compliance with requirements for surface roughness is to be verified, the number of wheels to be inspected and all other necessary details shall be specified by the purchasing Railway in the order or its appended documents.

Appendix A - Symbol of dimensional requirements

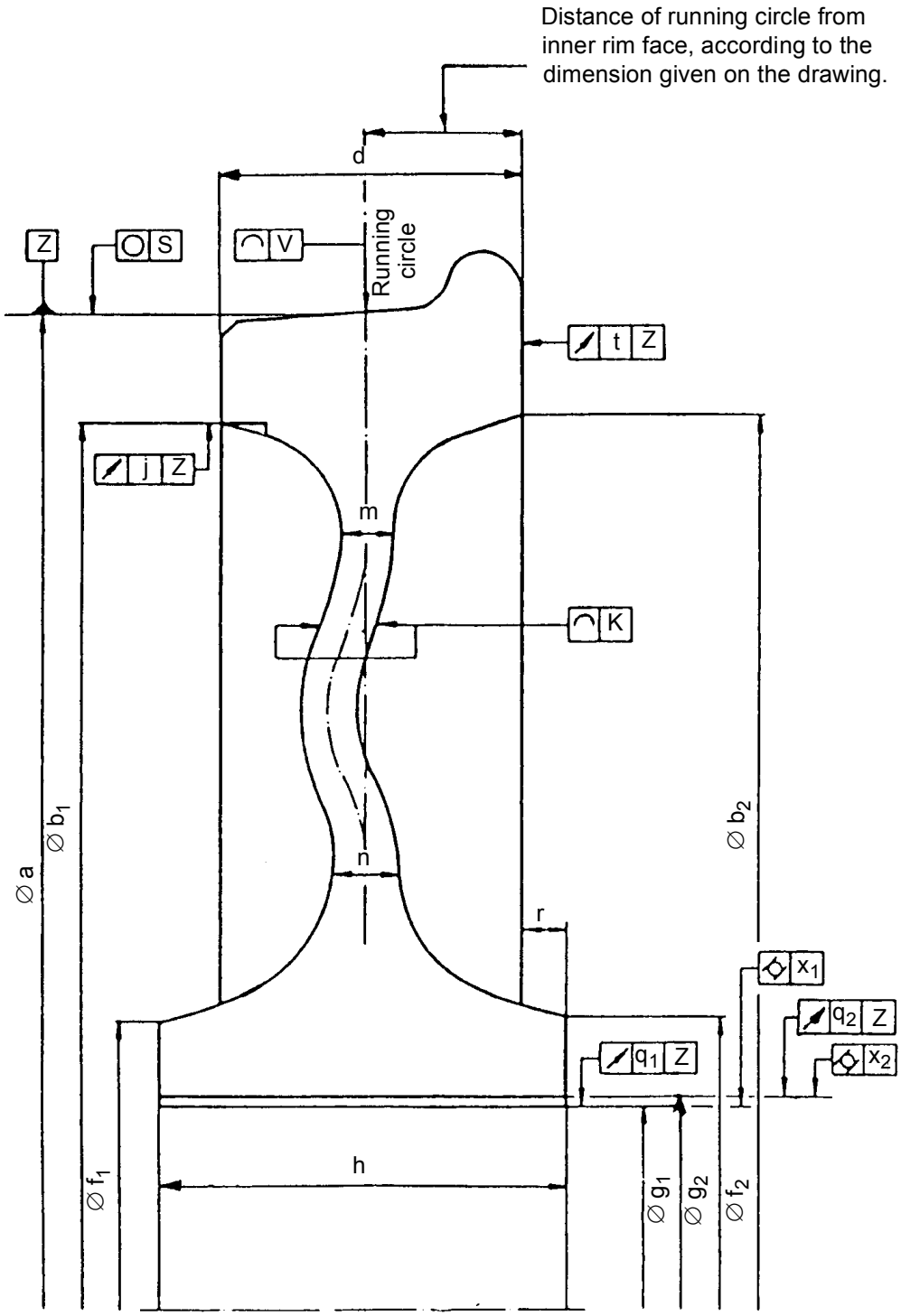

Fig. 1 - Symbol of dimensional requirements

Table 1 : Tolerances

Designation		Tolerances					Inspection[c]
		Symbolisation (see Fig. 1)		Values			
		Dimen-sional	Geome-trical[a]	Category N Normal speed	Category H[b] High speed	Rough portions	
Rim	External diameter	a		+ 4[d] 0	+ 4[d] 0		m
	Internal diameter (outer)	b_1		0 - 4	0 - 4		m
	Internal diameter (inner)	b_2		0[e] - 4	0 - 4	0 - 6	m
	Width	d		+ 1 - 1	+ 1 - 1		m
	Tread profile		v	The tolerances are as indicated on the drawing			m
	Tread roundness		S	0,2	0,1		o
	Radial run-out of internal diameter (jaw grip)		j	0,2	0,2		o
	Axial run-out		t	0,5	0,5		o
Hub	External diameter (outer)	f_1		+ 5[e] 0	+ 5 0	+ 10 0	m
	External diameter (inner)	f_2		+ 5[e] 0	+ 5 0	+ 10 0	m
	Internal diameter (bore) - "finished" condition[f]	g_1		0[g] - 2	0[g] - 2		m
	Internal diameter (bore) - "ready for assembly" condition[f]	g_2		h	h		m
	Internal diameter (bore) cylindricity - "finished" condition[f]		x_1	0,5[i] 0,2[j]	0,5[i] 0,1[j]		o
	Internal diameter (bore) cylindricity - "ready for assembly" condition		x_2	0,02[k]	0,02[k]		m
	Length	h		+ 3[d] 0	+ 3[d] 0		m
	Hub to wheel rim overhang	r		+ 3[d] 0	+ 3[d] 0		m
	Bore run-out: "finished" condition[f]		q_1	1,0[i] 0,2[j]	1,0[i] 0,1[j]		m

Table 1 : Tolerances

Designation		Tolerances					Inspection[c]
		Symbolisation (see Fig. 1)		Values			
		Dimen-sional	Geome-trical[a]	Category N Normal speed	Category H[b] High speed	Rough portions	
Hub (cont'd)	Bore run-out: "ready for assembly" condition		q_2	0,3	0,1		o
Web	Form		k	8[e]	4[l]	8	o
	Thickness at connection with rim	m		+ 5[e] 0	+ 2 0	+ 8 0	m
	Thickness at connection with hub	n		+ 5[e] 0	+ 2 0	+ 10 0	m

a. See ISO 1101.
b. Category H is applicable to wheels designed for speeds in excess of 200 km/h.
c. m is mandatory, o is recommendatory.
d. For tractive stock, other values may be necessary.
e. For normal operating speeds, the web, the outer diameter of the hub and the inner diameter of the rim tray, with the purchaser's approval, may be left unmachined in the "finished" and "ready for assembly" conditions.
f. See point 4 for terms related to bore of hubs.
g. The machining allowance on bore of "finished" wheel shall be 3 mm (i.e. $g_2 - g_1 = 6$ mm).
h. The tolerances on diameter and the interference value to ensure the required fit on the axle shall be in accordance with the specification or drawing.
i. Applicable if balancing is not required or if the wheel tread is to be used as the datum for balancing.
j. Applicable if the bore of the hub is to be used as the datum for balancing.
k. Any slight taper within the permitted tolerance shall be such that the "larger" diameter is at the axle entry end of the bore on assembly of the wheel on to the axle.
l. For shapes other than those given in figure 1, the form tolerance, k, for the web may not be applicable.

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2. Minutes of meetings

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3. International standards

ISO
ISO 1005/8: Railway rolling stock material - Part 8: Solid wheels for tractive and trailing stock - Dimensional and balancing requirements, 1986

ISO 1101: Tolerances of form and position - Part 1: general observations, symbols, indications on drawings, 1983

Warning

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