UIC CODE 893

2nd edition, June 2004

Translation

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Technical specification for sheets for wearing plates or wearing plates in manganese steel

Spécification technique pour la fourniture des tôles pour plaques d'usure ou des plaques d'usure en acier au manganèse
Technische Lieferbedingungen für Bleche für Führungsplatten oder Führungsplatten aus Manganstahl

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

Leaflet to be classified in Volumes:

V - Transport Stock

VIII - Technical Specifications

Application:

With effect from 1 January 1957, except:
- points 1.2.2.1 and 1.2.2.2 - indication of shear cutting, Note (1.1.85)
- point 2.1 - hardness, values relative to Category C (1.1.64)
- point 3, paragraph 1 - guarantee period (1.10.75)

All members of the International Union of Railways, except Network Rail until further notice

Record of updates

1st edition, January 1957	and its Amendments of 1.1.64, 1.10.75 and 1.1.85
2nd edition, June 2004	Retyped in FrameMaker Important: the articles (points) in this leaflet have been renumbered in the new edition. Please take account of this when using cross-references from other leaflets.

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

Contents

Summary

This specification governs the supply of manganese steel sheets for the manufacture of separate hard-wearing plates, together with the requirements for the plates themselves.

1 - Conditions of manufacture

1.1 - Materials

The sheets or plates governed by this specification shall be manufactured in the following categories:

Category C:	gauged sheets or plates (liable to show slight cold working)
Category E:	cold-rolled and gauged plates (showing heavy cold working and precise gauging)

The characteristics of these two categories are given in points 1.6 - page 4 and 2.1 - page 5.

1.2 - Manufacture

The sheets shall be manufactured by strip-rolling from manganese steel ingots from casts prepared in an open-hearth (acid or basic) furnace or in an electric furnace; the use of blooms or billets produced from ingots obtained under the above-mentioned conditions shall be permitted.

After rolling, the sheets shall be heated and maintained for a sufficient time at a temperature between 1 000°C and 1 100°C, then immediately quenched in water at the ambient temperature, in order to give the steel its cold austenitic structure.

Subsequently and where necessary, the sheets or plates shall undergo the following operations:

1.2.1 - Sheets

They shall be cold-rolled, under the conditions fixed by the supplier, in order that their thickness be brought to the required value, taking into account the tolerances given in point 1.6. This operation must be carried out so as to cause only slight cold-working.

1.2.2 - Plates

1.2.2.1 - Gauged plates

They shall be sawn or sheared from gauged sheets, manufactured under the conditions shown in the preceding point.

1.2.2.2 - Cold-rolled and gauged plates

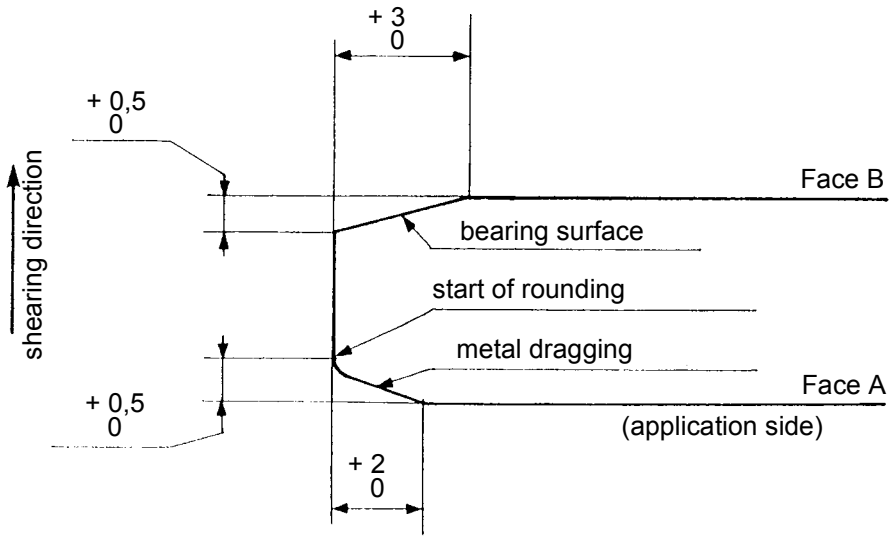
They shall be sawn or sheared from hot-rolled and heat-treated sheets. They shall then be cold-rolled under conditions fixed by the supplier, so as to obtain at the same time the gauging and cold-working corresponding to the characteristics prescribed in points 1.6 and 2.1.

When the plates have securing holes, these shall preferably be drilled; punching shall be permitted on condition that it does not cause grooves on the surface of the holes or any distortion incompatible with the tolerances stipulated for the flatness of the parts.

N.B.:

- In the case of shearing, all distortions of similar type resulting from the cutting process must occur on the same side of the sheet (same position in relation to a reference side of the cutter for the four sides of the same sheet).
  After shearing, the edges shall be trimmed by careful and regular grinding.
  Distortions shall not exceed the values given on the diagram below.

- Other manufacturing processes may be permitted subject to the prior agreement of the purchasing Railway. The provisions of points 1.6 - page 4 and 2.1 - page 5 must be observed.



1.3 - Markings

Each sheet shall have the following marks painted on at one corner and parallel to the small side of the sheet:

- cast number,

- factory mark,

- last two digits of the year of manufacture,

- indication of the category.

Example: 4632-XY-55-C

In the case of plates, the above-mentioned marks, with the exception of the cast number, shall be affixed to a metal label attached to each package.

1.4 - Appearance

The sheets and plates must be sound throughout; their surfaces must be smooth and show no crack, flaw, burr, groove, fold, lack of metal or defect whatsoever liable to adversely affect their use. The edges and the ends of the sheets must be carefully cut. All sharp edges shall be de-burred.

1.5 - Removal of surface defects

Concealment of defects is strictly forbidden and entails rejection of the complete supply.

1.6 - Dimensional tolerances

Dimensional tolerances shall be shown on the drawing. Failing such indication, the tolerances, expressed in millimetres, are given in the following table, in which e is the specified thickness.

Sheets and plates in Category C				**Plates in Category E**				
Length	Width	Thick-ness	Flatness (checked transversally and longitudinally)	Length	Width w		Thick-ness	Flatness (checked transversally and longitudinally)
					$w \leq 50$	$w > 50$		
± 2	± 2	$\pm 0,2$	$\leq 1,5$ ‰	- 0 - 1	$\pm 0,5$	± 1	$\pm 0,1$ when $t \leq 3$ + 0,2 - 0,1 when $t > 3$	For all dimensions $\leq 0,2$

In addition, the thickness of the plates in category E must not differ between any two points by more than 0,05 mm.

2 - Conditions of acceptance

2.1 - Properties required

2.1.1 - Chemical composition

Category	Carbon %	Silicon %	Manganese %	Sulphur %	Phosphorus %
C E	1 to 1,50	≤ 0,50	11 to 14	≤ 0,05	≤ 0,10

2.1.2 - Hardness

Category	Vickers test (HV)	Rockwell C test (HRc)
C	≤ 260	≤ 25
E	315 ≤ HV ≤ 390	32 ≤ HRc ≤ 40

2.2 - Submission for acceptance

The sheets or plates shall be submitted as ready for delivery, grouped in batches.

In the case of sheets, each batch consists of a rolled strip.

In the case of plates, each batch consists of the total of the components of the same dimensions submitted for acceptance.

2.3 - Extent of tests

At the mill	Hardness	Sheets	1 test on each sample
		Plates	3 tests up to 50 parts 5 tests from 51 to 200 parts 8 tests from 201 parts
In the laboratory of the purchasing Railway	Chemical analysis	Sheets	1 per batch
		Plates	1 per batch

2.4 - Additional tests

Any characteristic not in conformity with the required conditions entails rejection of the corresponding batch. However, when the purchasing Railway considers that it can accept check-tests, the number of these additional tests shall be decided by special agreement between the supplier and the purchasing Railway.

2.5 - Cutting out of test pieces

2.5.1 - Hardness test

2.5.1.1 - Sheets

Two samples shall be removed, each of which is situated at one of the edges perpendicular to the direction of the last rolling. Their width shall be 30 to 40 mm and their length equal to that of the corresponding edge.

They shall be cut out by cold machining in such a manner that no straightening is required after removal.

2.5.1.2 - Plates

The inspector removes, at random, the parts intended for testing.

2.5.2 - Chemical analysis

From one of the samples or one of the parts having been tested for hardness, where applicable, a piece weighing at least 150 g shall be removed.

The inspector stamps the samples and parts intended for testing.

2.6 - Hardness test

2.6.1 - Test pieces

Sheets: the samples defined in point 2.5 - page 6.

Plates: the parts themselves.

2.6.2 - Test method

The hardness shall be measured at several points on the samples or parts.

In preference, the Vickers test shall be adopted; it is then carried out under a load of 30 kg.

When a supplier does not possess a Vickers machine, the Rockwell test shall be permitted; it is then carried out with a diamond cone under a load of 150 kg.

In any case, the test shall be effected in accordance with ISO Recommendations.

2.6.3 - Results to be obtained

(see point 2.1 - page 5).

2.7 - Chemical analysis

2.7.1 - Test method

The determination of the percentages of the various constituents shall be effected in accordance with the national standards of the purchasing Railway.

2.7.2 - Results to be obtained

(see point 2.1 - page 5).

2.8 - Protection from rust

The surfaces of the sheets and plates shall be preserved by a coat of neutral non-dying oil, free from foreign bodies and very evenly spread, so that the conditions of transport, handling and storing for three months do not cause any rusting.

2.9 - Packing

Packing must be carried out under the conditions fixed by each purchasing Railway, so as to avoid any distortion, as the straightening required after such damage would be liable adversely to affect the satisfactory use of the parts.

3 - Guarantee

The sheets or wearing plates in manganese steel shall be guaranteed by the supplier, for one year, against any defect ascribable to manufacture and not revealed on acceptance at the factory.

In the case of plates used on new stock, the date of delivery of the vehicles on which they are to be used shall be considered as the date of delivery of the plates.

Sheets or plates which, during the guarantee period, show manufacturing defects rendering them unsuitable for service, shall be rejected.

Rejected sheets or plates shall be placed at the manufacturer's disposal in view of their replacement or reimbursement.

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Warning

Printed by the International Union of Railways (UIC)
16, rue Jean Rey 75015 Paris - France, June 2004
Dépôt Légal June 2004

ISBN 2-7461-0630-2 (French version)
ISBN 2-7461-0631-0 (German version)
ISBN 2-7461-0632-9 (English version)