



UIC CODE

Leaflet to be classified in Volumes :

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

829-3

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Brought up-to-date on

PROVISIONAL TECHNICAL SPECIFICATION
FOR THE SUPPLY OF PARTS IN FORGED
OR ROLLED STEEL INTENDED FOR THE
UIC TYPE AUTOMATIC COUPLING
WITH A CENTRE BUFFER FOR TRACTIVE
AND TRAILING STOCK

(Revised on 1-1-1984)

**NUMERISATION DANS
L'ETAT DU DOCUMENT**

Article 1

PURPOSE

This specification governs the supply of parts in forged or rolled steel, whether welded or not, intended for the UIC automatic coupling with a centre buffer for tractive and trailing stock.

It does not concern manganese steel wear plates which are covered by UIC Leaflet No. 893.

1.1. Classification

The parts covered by this specification are classified in two categories, stated in the order of its appended documents :

Category A - parts for which the stresses borne in service are considerable or directly affect the satisfactory functioning of the coupling.

Category B - parts for which the stresses borne in service are low.

Article 2

CHARACTERISTICS

2.1. Component materials

2.1.1. List of component materials

Depending on their nature, the parts are obtained from half-finished products or from rolled products :

- of ordinary steel,
- of non-alloy or special alloy steels for heat treatment,
- of stainless steel,
- of free-cutting steel,
- of steel for shaping or tubular steel.

the grades and qualities of which are indicated in the orders or their appended documents.

2.1.2. Properties of the component materials

The component materials must have the chemical, physical, mechanical and geometrical characteristics indicated in the order or its appended documents or by the specifications (ISO/R - Euronorms) governing their supply.

2.2. Parts

2.2.1. Physical properties

2.2.1.1. Appearance

The rough components or portions of components must be perfectly trimmed, and have smooth surfaces carefully freed from scale.

The surfaces of the machined sections must conform fully to the indications in the working documents; they must not show any tooling marks likely to be harmful in use.

2.2.1.2. Soundness

The parts must be sound throughout, including any welded areas; they must show no defect likely to interfere with their use; any welds must particularly be free from depressions, undercut, irregularities in weld head or excessive reinforcement, differences in level, or any other cause of stress concentrations.

At the time of the macroscopic and macrographic examinations of the drawbar portion, the surface examined must not show, after ordinary polishing, any cavity or discontinuity, and after preparation, the image obtained must be of uniform colour without clearly apparent segregation marks.

2.2.2. Dimensions

The shape, dimensions and their tolerances must comply with those fixed in the order or its appended documents.

Failing any indication on these documents, the tolerances to be complied with on the dimensions are as follows :

2.2.2.1. Dimensions limited by two black (as-rolled) or rough ground or by one black or rough ground and one machined surface.

2.2.2.1.1. Transverse dimensions or thicknesses of parts produced by the cutting or forming of sheet, wide plates, sections or tubes in the as-rolled condition :

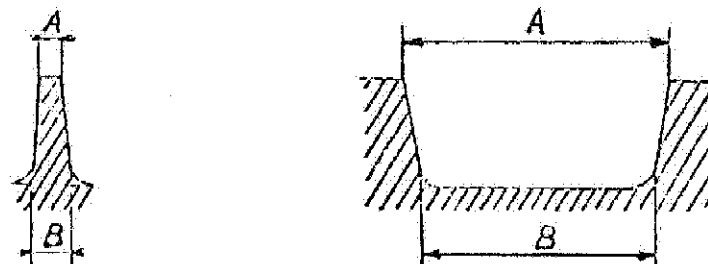
- tolerances quoted in the standards defining the products used.

2.2.2.1.2. Dimensions other than those in 2.2.2.1.1. :

Nominal dimensions "D" in mm	Tolerances
$D \leq 1$	$\pm 0,3$
$1 < D \leq 500$	Js 16/js 16 - general uses ISO/R 286
$500 < D \leq 3150$	Js 16/js 16 of tables 15 and 16 of ISO/R 286
$3150 < D \leq 5000$	± 8 mm
$5000 < D \leq 8000$	± 10 mm

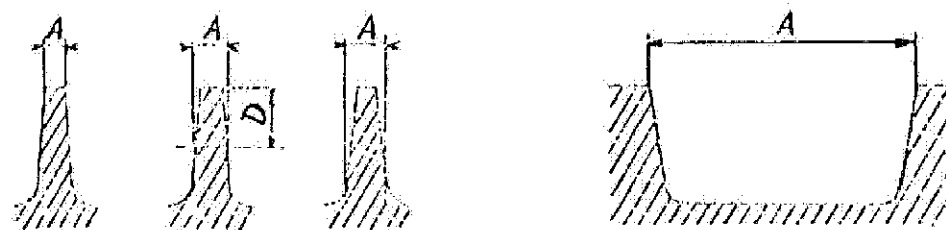
The tolerances in the above table (page 5) also apply to the dimensions of tapered parts in accordance with the following rules :

a) the taper is measured as follows :



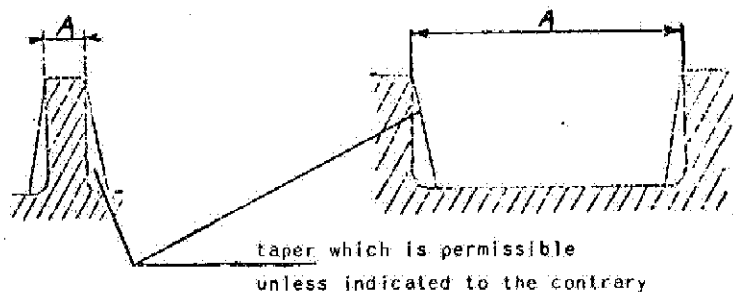
The tolerances apply to the dimensions A and B (the value of one of them can be calculated, where applicable, from the taper indicated on the drawing).

b) the taper is represented, but is not dimensioned :



The tolerances apply to the dimension A, measured at the point where the dimension is indicated.

c) the taper is not represented and not dimensioned :



The tolerances apply to the dimension A neglecting the taper.

2.2.2.2. Dimensions limited by two machined surfaces

- Linear dimensions

Nominal dimensions in millimeters	more than 0,5	more than 6	more than 30	more than 120	more than 315	more than 1000
	up to 6	up to 30	up to 120	up to 315	up to 1000	up to 2000
Tolerance in millimetres	± 0,1	± 0,2	± 0,3	± 0,5	± 0,8	± 1,2

- Angular dimensions

Differences	Length, in millimetres, of the shortest side of the angle			
	up to 10	more than 10 up to 50	more than 50 up to 120	more than 120 up to 400
in millimetres per 100 millimetres	± 1,8	± 0,9	± 0,6	± 0,3
in degrees and minutes	± 1'	± 30'	± 20'	± 10'

2.2.2.3. Dimensions and positions of the holes for fixing elements

	Nature of the holes	Tolerances
Positions of the holes	punched	± 1 mm
	drilled	refer to § 2.2.2.2.
Diameter of the holes	punched	± 0,5 mm
	drilled	refer to § 2.2.2.2. Only the positive tolerance is applicable

2.2.3. Mechanical properties.

2.2.3.1. Hardness

The hardnesses measured on the parts must comply with those indicated in the order or its appended documents, or correspond to the grade of steel, and the heat treatment, where applicable, shown in the documents.

2.2.3.2. Suitability for cold forming (parts in category A)

It must be possible to deform parts in category A without fracture occurring or the appearance of any cracks or fissures.

This characteristic is equally required of welds as appropriate, as well as in the other portions of the assembly.

In particular, portions of these parts with a uniform section must be able to withstand bending through 180°, ends parallel, over a former whose diameter depends on the tensile strength "R_m" of the material used as shown in the table.

Steel	Diameter of former and distance between the parallel ends after bending
where $R_m \leq 500 \text{ N/mm}^2$	2 e
where $500 \text{ N/mm}^2 < R_m \leq 600 \text{ N/mm}^2$	3 e
where $R_m > 600 \text{ N/mm}^2$	4 e

In this table, «e» is either the diameter of the circular sections before bending, or the thickness of sections which are not circular.

Away from the straight portions, the deformation which parts or fittings must be able to withstand corresponds to an elongation of at least 20 % measured along the surface, when the minimum tensile strength of the steel does not exceed 600 N/mm².

2.2.3.3. Notched bar impact test

As delivered, the absorbed energy obtained in notched bar impact tests (average of three test pieces) must not be less than the value indicated in the order or its appended documents.

In the case of the main coupler shaft, this value shall be 25 joules, on U-notched test pieces, tested at + 20° C.

2.2.4. Marks

Each part shall be marked as defined in the order or its appended documents and, as an obligatory requirement, for those in category A each part shall be marked to show:

- the grade of the material
- the supplier's identification
- the date of manufacture (month and last two figures of the year of manufacture).

The use of stamps with sharp edges is prohibited.

Article 3

MANUFACTURE

3.1. Manufacture of the component materials

Unless indicated to the contrary in the order or its appended documents, the steels intended for manufacture of the parts in category A shall be produced from fully killed steel prepared by the electric or open-hearth process, or by a top blown oxygen process.

For parts in category B, the steel making process is left to the choice of the supplier.

3.2. Manufacture of the parts

3.2.1. Roughing and Finishing

The parts shall be manufactured in accordance with the indications in the order or its appended documents.

Failing indication on these documents, the manufacturing process left to the manufacturer, should make it possible to obtain the degree of finish indicated in the order or its appended documents, without altering the material or the soundness of the parts.

3.2.2. Welding

Welding may only be carried out on those parts shown as assembled by welding on the drawings, and only in places where the welds are indicated.

Failing special indications concerning the welding of the parts, the manufacturer is free to choose the welding process, provided that this latter does not appreciably alter its properties.

The welders must be approved by the Railway.

3.2.3. Heat treatment

The parts shall undergo any heat treatment laid down in the order or its appended documents.

The heat treatment operations must be conducted so as to ensure uniformity of treatment of the various parts emanating from the same manufacture, and to avoid distortion necessitating setting operations which would be harmful to the quality of the parts.

The temperatures of the furnaces shall be controlled by recording pyrometers correctly calibrated.

3.2.4. Retouching

No retouching or repair of parts may be carried out without the prior approval of the Railway.

Superficial defects can be eliminated by removal of metal (by cold chiselling, filing, machining or other approved methods) provided that the dimensional tolerances are respected, and that the effects of any heat treatment are not destroyed, even partially.

Any unauthorised filling, any retouching for the purpose of hiding a defect, and any welding not provided for on the drawing, are strictly forbidden and shall result in rejection of the complete batch.

Article 4

INSPECTION

Unless indicated to the contrary in the order or its appended documents, the component materials or parts shall be subjected to inspection during manufacture and determination of properties by a representative of the Railway.

4.1. Inspection during manufacture

The representative of the Railway must be able to make all the tests to ensure that the conditions stated in the order or its appended documents for the manufacture of the component materials or parts, especially those involving welding, are fully complied with.

The charts of the recording pyrometers must be available to him, for the purpose of checking the temperature of the heat treatment furnaces.

4.2. Inspection of the component materials and parts

In principle, the component materials shall be the subject of a prior inspection; if these tests have not been carried out, the properties can be checked on the finished parts.

4.2.1. Submission

4.2.1.1. Condition of the component materials and parts on presentation

The component materials and parts shall be presented in delivery condition before any protection treatment takes place.

4.2.1.2. Grouping into batches

4.2.1.2.1. The component materials shall be presented grouped in batches of similar grade and similar quality of steel from the same cast. The tonnage of each of the batches must not exceed 20 t.

4.2.1.2.2. The parts shall be presented grouped in batches of the same type, grade and quality of steel, obtained from the same manufacturing process and having undergone, where applicable, the same heat treatment.

4.2.1.3. Advice of submission

The date of the submission must be advised to the representative of the Railway by written note, signed by the director of the producing factory or his authorised representative. This note must indicate the quantity of component materials or parts presented in each batch, as well as the reference of the order covering them. On submission, a certificate certifying that the manufacturing conditions prescribed have been complied with, shall be handed to the representative of the Railway.

4.2.2. Nature and number of the checks and tests

4.2.2.1. Each batch of component materials intended for manufacture of parts shall be submitted to tests, the nature and number of which are indicated in the specifications (ISO/R - Euronorms) governing their supply referred to in the order or its appended documents. However, in view of the indications in 4.2.1.2.1., the number of tests laid down by the specifications for the batches of 20 tons shall apply to larger batches.

The number of checks on appearance and dimensions of the products shall be left to the choice of the Railway.

4.2.2.2. Each batch of parts shall be subjected, on submission, to the tests, as indicated in the following table, depending on the size of the batch

Nature of the checks and tests	Number of parts to be tested for batches of the following size :				
	≤ 50	> 50 and ≤ 200	> 200 and ≤ 500	> 500 and ≤ 1000	> 1000
<i>All parts</i>	As decided by the representative of the Railway				
- Appearance and dimensions	3	6	9	12	15
- Hardness test on parts	1	2	3	4	5
- Notched bar impact test (1)					
<i>Parts in category A</i>					
- Chemical analysis	1	1	1	2	3
- Deformation test	1	2	3	4	5
<i>Drawbar</i>					
- Macroscopic and macrographic examination	1	2	3	4	5
- Notched bar test on U-notched specimen at + 20° C	1	2	3	4	5

(1) If the order or appended documents prescribe this test

4.2.3. Selection and preparation of the samples and test pieces

4.2.3.1. Selection

The representative of the Railway shall select, at random, from each batch presented, the samples which he intends to have tested and shall mark them indelibly.

The samples and test pieces must retain the marks and stamps of the representative of the Railway. Any transfer of these latter may only be effected by him.

4.2.3.2. Preparation of the samples and test pieces

When the working documents do not state the conditions of preparation of the samples and test pieces, the latter is carried out in accordance with the indications of the ISO/R 377, supplemented or clarified by the following regulations :

4.2.3.2.1. Component materials

The dimensions and tolerances of the samples and test pieces, selected from the materials shall be those indicated in the specifications (ISO/R - Euronorms) governing their supply, referred to in the order or its appended documents.

4.2.3.2.2. Parts

4.2.3.2.2.1. Chemical analysis:

For the chemical analysis of components in category A, the sample consists of a piece weighing at least 50 grams, obtained by sawing off a complete cross section of a component.

4.2.3.2.2.2. Macroscopy and macrography on the drawbar

For the macroscopic and macrographic examinations, the test piece consists of the drawbar itself. One of the ends of the latter is machined cold, in order to obtain a flat section perpendicular to its axis. The section thus obtained is then polished but not etched.

4.2.3.2.2.3. Hardness

For the hardness tests, the test pieces consist of the parts.

4.2.3.2.2.4. Deformation test

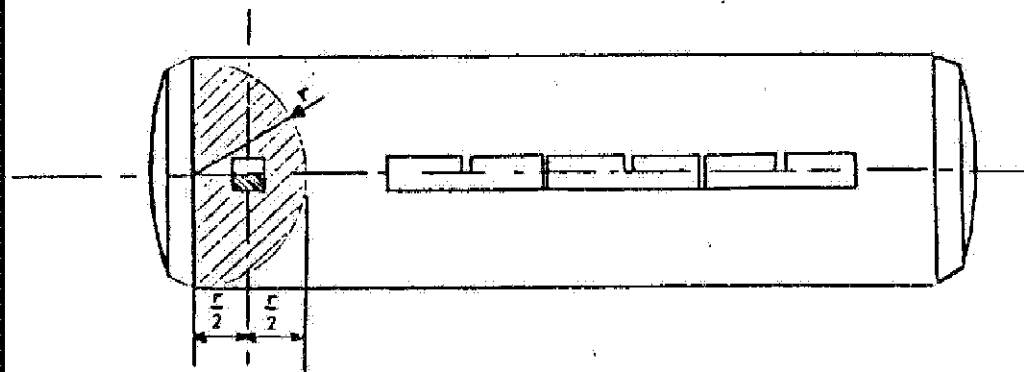
For the deformation test, the test piece consists of a part when the shape and dimensions of the latter enable the test to be carried out directly without preparation, but in cases where the portion to be deformed has a diameter or thickness greater than 25 mm, the thickness shall be reduced to about 25 mm by machining on one side only.

In cases where the shape or the dimensions of the part do not enable a bend test to be carried out after this sole reduction in thickness, a prismatic section test bar is cut from the part, as shown in the drawings and in accordance with ISO/R 85.

If welding has been used in the manufacture of the part, this test piece will be selected and prepared so that it contains in its centre a weld perpendicular to its main axis.

4.2.3.2.2.5. Notched bar impact test

For the notched bar impact test on the drawbar, the three test pieces are selected end to end, as shown in the following drawing:



For the other components, test pieces are taken as shown in the drawings.

The U-notch test pieces are prepared in accordance with the indications of ISO/R 83.

4.2.4. Carrying out the checks and tests

4.2.4.1. Component materials

The checks and tests on the component materials shall be carried out in accordance with the requirements in the specifications (ISO/R - Euronorms) governing their supply, and referred to in the order or its appended documents.

4.2.4.2. Parts

4.2.4.2.1. Chemical analysis

The chemical analysis shall be determined by the methods defined by the ISO recommendations.

4.2.4.2.2. Checking of the soundness of the welds

In the case of doubt regarding the quality of the welds, a penetrant or magnetic particle crack test may be requested by the representative of the Railway.

4.2.4.2.3. Checking of the dimensions

The checking of the dimensions is carried out by any appropriate means, and particularly by means of gauges supplied by the manufacturer.

4.2.4.2.4. Macrostructure of the drawbar

The surface of the section prepared as indicated in 4.2.3.2.2.2. is examined with the naked eye.

4.2.4.2.5. Macrographic examination of the drawbar

If the macrostructure (as defined in 4.2.4.2.4.) is satisfactory, the macrograph is obtained from the section of drawbar by sulphur printing. A sheet of silver bromide paper, soaked in water containing 2% by volume of pure sulphuric acid is applied to the degreased section for at least 3 minutes.

4.2.4.2.6. Hardness test

Depending on the type of hardness test prescribed, the latter must be conducted with the following ISO Recommendations :

Brinell hardness : ISO/R 79

Rockwell hardness : ISO/R 80

Vickers hardness : ISO/R 81

4.2.4.2.7. Deformation test

The deformation test consists of bending the component or the test piece, which is taken as indicated in 4.2.3.2.2.4., through 180° with ends parallel as described in ISO/R 85 and in 2.2.3.2., or, if this is not possible, of subjecting the part to deformation as provided for in the last paragraph of 2.2.3.2.

For machined test pieces, the tension surface must correspond to the non-machined part.

4.2.4.2.B. Notched bar impact test

The notched bar impact test on the drawbar must be conducted in accordance with the indications of ISO/R 83.

4.3. Results of the tests

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

Any result not in accordance with one of the other tests laid down shall result in rejection of the corresponding batch.

Re-tests may only be carried out, at the request of the manufacturer, with or without treatment to improve the properties, with the prior agreement of the Railway.

Article 5

DELIVERY

5.1. Protection against oxidation

After checking and stamping by the representative of the Railway, the parts are protected against oxidation by application of a coating approved by the Railway.

5.2. Packing - Protection against impacts

The parts must be carefully protected by a suitable packing in order to avoid any deterioration, especially of the machined parts, or distortion during handling or transport.

5.3. Guarantee

The parts are guaranteed for a period of 2 years against any defect imputable to the manufacture. This period shall be counted with effect from the end of the month marked on the parts.

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

Parts which, during the guarantee period, show defects rendering them unsuitable for service or decreasing their service life, shall be rejected.

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

When the check examination confirms that the defects are definitely imputable either to the manufacture, or to insufficient packing or protection against impacts, the defective parts shall be finally rejected.

In cases where the results of the check examination do not enable any agreement to be reached between the 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 delivery show defects resulting in rejection, the Railway may reject the whole of the delivery.

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.

APPLICATION

All Railways in the Union.

RECORD REFERENCES

Heading under which the question has been dealt with :

- Preparation of specifications for the supply of automatic coupling.

Traction and Rolling Stock Committee ; Graz, June 1971.