INTERNATIONAL STANDARD

ISO 1005-1

Third edition
1994-08-01

Railway rolling stock material —

Part 1:
Rough-rolled tyres for tractive and trailing stock — Technical delivery conditions

Matériel roulant de chemin de fer —

Partie 1: Bandages bruts laminés pour matériel moteur et pour matériel remorqué — Conditions techniques de livraison

Reference number
ISO 1005-1:1994(E)

Contents

International Organization for Standardization
Case Postale 56 • CH-1211 Genève 20 • Switzerland

Printed in Switzerland

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 1005-1 was prepared by Technical Committee ISO/TC 17, *Steel*, Subcommittee SC 13, *Railway rolling stock material*.

This third edition cancels and replaces the second edition (ISO 1005-1:1982), of which it constitutes a technical revision.

ISO 1005 consists of the following parts, under the general title *Railway rolling stock material*:

— *Part 1: Rough-rolled tyres for tractive and trailing stock — Technical delivery conditions*

— *Part 2: Tyres, wheel centres and tyred wheels for tractive and trailing stock — Dimensional, balancing and assembly requirements*

— *Part 3: Axles for tractive and trailing stock — Quality requirements*

— *Part 4: Rolled or forged wheel centres for tyred wheels for tractive and trailing stock — Quality requirements*

— *Part 6: Solid wheels for tractive and trailing stock — Technical delivery conditions*

— *Part 7: Wheelsets for tractive and trailing stock — Quality requirements*

— *Part 8: Solid wheels for tractive and trailing stock — Dimensional and balancing requirements*

— *Part 9: Axles for tractive and trailing stock — Dimensional requirements*

Annex A of this part of ISO 1005 is for information only.

Introduction

At present, tyres are preferably used for repairs while new wheels are mainly manufactured as solid wheels. An important market for tyres seems to exist only in Asia and parts of Africa. However, this tendency is decreasing.

This will therefore be the last edition of ISO 1005-1 and it was decided not to include an alignment of tyre grades given in this part of ISO 1005 with the grades of solid wheels in ISO 1005-6.

Railway rolling stock material —

Part 1:
Rough-rolled tyres for tractive and trailing stock — Technical delivery conditions

1 Scope

1.1 This part of ISO 1005 specifies requirements for the manufacture and supply of rough-rolled tyres for tractive and trailing stock of unalloyed steels in accordance with table 1 and clause 4.

1.2 In addition to this part of ISO 1005, the requirements of ISO 404 are applicable.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this part of ISO 1005. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this part of ISO 1005 are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 83:1976, *Steel — Charpy impact test (U-notch).*

ISO 377-1:1989, *Selection and preparation of samples and test pieces of wrought steels — Part 1: Samples and test pieces for mechanical test.*

ISO 377-2:1989, *Selection and preparation of samples and test pieces of wrought steels — Part 2: Samples for the determination of the chemical composition.*

ISO 404:1992, *Steel and steel products — General technical delivery requirements.*

ISO 1005-2:1986, *Railway rolling stock material — Part 2: Tyres, wheel centres and tyred wheels for tractive and trailing stock — Dimensional, balancing and assembly requirements.*

ISO 5948:1994, *Railway rolling stock material — Ultrasonic acceptance testing.*

ISO 6506:1981, *Metallic materials — Hardness test — Brinell test.*

ISO 6892:1984, *Metallic materials — Tensile testing.*

ISO 10474:1991, *Steel and steel products — Inspection documents.*

3 Information to be supplied by the purchaser

The purchaser shall supply the following information in his enquiry and order:

a) the number of this part of ISO 1005;

b) the grade of steel (see 4.1 and table 1);

c) the type of heat treatment (see 4.2 and 6.5);

d) the dimensions of the tyre (see 5.4);

e) if microstructure examination is required (see 5.2.2.1 and table 2);

f) whether the chemical composition may be verified by cast analysis (see 5.1);

g) if macroscopic and macrographic tests are required (see 5.2.2.2 and 5.2.2.3 and table 2);

h) if ultrasonic acceptance tests are required (see 5.2.2.4 and table 2);

i) if a restricted Brinell hardness range is required (see 5.2.3 and table 2);

j) if any special marking is required (see 5.5);

k) if a special production process is required (see clause 6);

l) if special inspection is required (see clause 7);

m) if special preparation and sampling of test pieces is required (see 7.7.2 and 7.7.3.1);

n) if any protection against corrosion is required (see clause 8);

o) if the conditions of guarantee are to be agreed upon (see clause 9).

4 Classification

The tyres shall be specified in the order or its appended documents according to the grade of steel used, the heat-treatment condition of delivery and any optional tests or inspection required (see table 2, columns 2 and 3).

4.1 Steel grades

This part of ISO 1005 specifies the following grades of steel in accordance with the properties given in table 1:

C 46 GT-N, C 55 GT-N, C 57 GT-N and -E, C 67 GT-N and -E, C 77 GT-E.

4.2 Types of heat-treatment condition on delivery

The tyres shall be supplied

a) normalized or normalized and tempered (symbol N) — grades C 46 GT-N, C 55 GT-N, C 57 GT-N and C 67 GT-N; or

b) immersion quenched and tempered (symbol E) — grades C 57 GT-E, C 67 GT-E, and C 77 GT-E.

Irrespective of the heat-treatment condition ordered, where no effective degassing has been carried out, suitable precautions, which may include for example slow cooling, shall be taken to avoid the formation of flakes (hydrogen cracking). If so requested, the representative of the railway authority shall be informed of the precautions taken.

4.3 Degree of finish

The degree of finish on delivery is rough rolled.

Table 1 — Grade of steel, chemical composition, heat treatment in delivery condition and mechanical properties

Steel designation		Chemical composition[1) 2)] by cast analysis (product analysis) % (*m/m*)						Heat treatment in delivery condition[3)]	Mechanical properties[4)]				
New	Old	C max.	Si max.	Mn max.	P max.	S max.	Others[5)]		R_{eH} or $R_{p0,2}$[6)] N/mm² min.	R_m N/mm²	A % min.	KU J min.[8)]	HB[7)]
C 46 GT-N	B1	0,46 (0,48)	0,38 (0,40)	1,15 (1,20)	0,035 (0,040)	0,035 (0,040)		N	For documentary purposes	600 to 720	18	15	
C 55 GT-N	B2	0,55 (0,58)	0,38 (0,40)	0,86 (0,90)	0,035 (0,040)	0,035 (0,040)		N		700 to 820	14	10	
C 57 GT-N	B3	0,57 (0,60)	0,38 (0,40)	1,05 (1,10)	0,035 (0,040)	0,035 (0,040)		N		750 to 880	12	10	
C 57 GT-E	B5	0,57 (0,60)	0,38 (0,40)	0,76 (0,80)	0,035 (0,040)	0,035 (0,040)		E		800 to 920	14	15	
C 67 GT-N	B4	0,67 (0,70)	0,38 (0,40)	0,86 (0,90)	0,035 (0,040)	0,035 (0,040)		N		800 to 940	10	10	
C 67 GT-E								E		940 to 1 090	11	10	
C 77 GT-E	—	0,77 (0,80)	0,38 (0,40)	0,86 (0,90)	0,035 (0,040)	0,035 (0,040)		E		1 050 to 1 200	10	8	

1) When selecting a steel from table 1, an important factor may be the risk of thermal damage arising from the use of brakes on the tread or from wheel slip. In cases of repeated braking at relatively high speeds, the purchaser should bear in mind that steels with a high carbon content will be more sensitive to thermal cracking than steels with a lower carbon content. However, it should be noted that steels with a higher carbon content have a greater strength and wear resistance. Where specifications have been developed primarily to give wear resistance, they may differ considerably in approach from this part of ISO 1005.

2) Unless otherwise agreed, the requirements for the chemical analysis shall be verified by cast analysis. However, in cases of dispute the compositions according to product analysis (given in brackets) shall be the deciding criteria.

3) N = normalized or normalized and tempered; E = immersion quenched and tempered.

4) R_{eH} = upper yield stress; $R_{p0,2}$ = 0,2 % proof stress (non-proportional elongation); R_m = tensile strength; A = percentage elongation after fracture $\left(L_o = 5{,}65\sqrt{S_o}\right)$; KU = impact strength for ISO U-notch test piece at 23 °C. 1 N/mm² = 1 MPa.

5) Cr ⩽ 0,28 % (⩽ 0,30 %); Cu ⩽ 0,28 % (⩽ 0,30 %); Mo ⩽ 0,08 % (⩽ 0,08 %); Ni ⩽ 0,28 % (⩽ 0,30 %); V ⩽ 0,05 % (< 0,05 %); the sum of Cr + Mo + Ni shall be max. 0,60 % for all grades.

6) If the measured 0,5 % total elongation proof stress $R_{t0,5}$ of the steel is not greater than 600 N/mm², $R_{t0,5}$ may be given instead of R_{eH} or $R_{p0,2}$.

7) Hardness values are not specified; but the range of variation of Brinell hardness shall not exceed 30 HB.

8) Mean value of three tests; one of the individual results may be lower than the minimum value as specified in this table, provided that it is not less than 70 % of this minimum value.

Table 2 — Type and number of tests

1		2	3	4	5	6	7	8
Test and checks		**Test and checks in the heat-treatment condition[1) 2)]** N	E	**Remarks[3) 4)]**	**Test unit[5)]**	**Number of tyres to be subjected to the tests and checks, per test unit of** ⩽ 100 tyres	> 100 tyres	**Number of tests per tyre**
Chemical analysis	Cast analysis[6)]	m	m	—	c	1	1	1
	Product analysis[6)]	o	o	—	c	1	2	1
Mechanical tests	Tensile test	m	m	h	c, h	1	2	1
	Impact test	m	m	h	c, h	1	2	3
Microstructure		—	o	h	c, h	1	2	1
Macroscopic — Macrographic		o	o	—	c	1	2	1
Brinell hardness (uniformity)		o	m	h	c, h	10 % (N) 100 % (E)		1 1
Ultrasonic flaw detection tests		o	o	h	t	100 %		1
Dimensional checks		m	m	f	t	100 %		1

1) N = normalized or normalized and tempered; E = immersion quenched and tempered.

2) m = mandatory test; o = optional test i.e. needs only to be carried out if specified in the order or its appended documents.

3) Unless otherwise agreed (see 7.1), the checks or tests, excluding the cast analysis, shall be carried out under delegated inspection by the manufacturer's qualified department (see ISO 404).

4) h = The test shall not be carried out before the specified heat treatment. f = The acceptance tests shall be carried out in the final delivery condition.

5) c = Tyres from the same cast. c, h = Tyres from the same cast and the same heat treatment cycle. t = The tyre is the test unit.

6) When no product analysis is ordered, at the time of first submission for inspection, the manufacturer shall provide a certificate for the results of his cast analysis.

5 Requirements

5.1 Chemical composition

5.1.1 The chemical composition of the tyres shall comply with the requirements given in table 1.

5.1.2 Unless otherwise agreed, the requirements for the results of the product analysis shall be considered to be complied with when the results of the cast analysis are in accordance with the relevant specification in table 1.

5.2 Physical properties

5.2.1 Appearance

The tyres shall be free from burr and flash. The surface shall not show any mark other than in the positions specified in the order or its appended documents. Brinell hardness testing impressions may, however, be left on the surface of the rim.

5.2.2 Soundness

The tyres shall be sound throughout and without any defects detrimental to their use.

5.2.2.1 Microstructure

If an examination of the microstructure for quenched and tempered tyres is agreed upon at the time of enquiry and order, then the requirements for the structure shall also be agreed upon (see 7.7.3.5).

5.2.2.2 Macroscopic appearance

After polishing, examination of the surface shall reveal no discontinuity.

5.2.2.3 Macrographic appearance

The sulfur print shall not reveal any faults worse than those shown in the prints contained in the album in annex A.

5.2.2.4 Ultrasonic flaw detection test

When ultrasonic flaw detection tests are ordered, the acceptance standard specified in ISO 5948 shall apply.

5.2.3 Uniformity of hardness

If stated in the order, the difference between the extreme hardness values obtained on tyres of the same grade of steel of similar dimensions, coming from the same batch, shall be as specified in table 1.

5.3 Mechanical properties

The mechanical properties of the tyres shall be as specified in table 1.

5.4 Dimensional characteristics

5.4.1 The dimensions of the tyres shall be given in the order or its appended documents.

5.4.2 Tolerances on dimensions and shape, and the permitted machining allowances, shall be as specified in ISO 1005-2.

5.5 Marking

The marks with their specified dimensions shall be stamped in the positions given in national standards, the order or its appended documents.

Unless otherwise specified, each tyre shall receive the following marks:

a) manufacturer's mark;

b) cast number;

c) grade of steel and heat-treatment condition (see 4.2);

d) date of manufacture (month and last two figures of the year of manufacture);

e) the inspector's mark.

Unless otherwise specified, the marks shall be hot-stamped immediately after rolling, with a height of 8 mm to 10 mm and a depth of approximately 4 mm, on the plane face situated on the side opposite the flange of the tyre and in such a way as to remain after successive re-turning of the tread. Stamps with acute-angled character forms shall not be used (see 6.4).

6 Manufacture

6.1 Steelmaking process

The tyres shall be made from steel produced by open hearth, electric arc or basic oxygen processes; other processes may be used, by agreement between the manufacturer and the purchaser.

The steel shall be killed in the furnace or in the ladle, and shall be bottom-poured or continuously cast, unless otherwise agreed.

6.2 Manufacturing process

At the manufacturer's option, the tyres are produced either

— from cropped ingots capable of producing two or more tyres; or

— from cropped blooms.

Special individual ingots may only be used with the prior agreement of the purchaser.

Cropping shall be sufficient to eliminate defective sections of the ingot. Any surface defects shall be completely removed before or during manufacture, if this is not possible, the defective sections shall be discarded (see 6.3). The sections of ingots or blooms shall be forged and punched with a forging hammer or a press; they shall be rough shaped by means of a forging hammer, press or roughing mill and finally shaped by rolling, supplemented by sizing if necessary. The finished rolled tyres shall comply with 5.4.

The amount of the punched-out portion shall be sufficient for the removal of serious segregations. If these operations leave burrs, which may adversely affect the further manufacture or the use of the tyre, these burrs shall be removed before rolling, unless allowances are made to ensure removal at a later stage in processing.

Suitable precautions shall be taken during hot working to ensure that material is not damaged by excessive temperatures (over-heating) or by grain growth due to cessation of work at high temperatures. Generally, forging should not be done at temperatures above 1 260 °C and should terminate between 850 °C and 1 000 °C. After forging or rolling, sizing where applicable and stamping of identification marks, the tyres shall be left to cool in still air. If the steel has not been degassed, suitable precautions shall be taken to avoid the formation of flakes (see 4.2).

6.3 Removal of defective sections

Defective sections which do not comply with the soundness characteristics specified in 5.2.1 and 5.2.2 shall be removed before or during the manufacture.

6.4 Identification of the tyres during manufacture

All ingots, sections and tyres shall be suitably marked at each stage of manufacture so that before delivery each tyre can be identified as specified in 5.5. Where punched identification marks differ from the final identification marks defined in 5.5, they shall be sufficiently shallow not to remain visible on the finished tyre.

6.5 Heat treatment

After forming and marking, the tyres shall undergo, where applicable, the heat treatment specified in the order or its appended documents. As a general rule, the different heat-treatment operations shall be carried out in such a way as to ensure uniformity of structure of comparable parts of the same tyre and of tyres from the same batch (see 4.2).

6.6 Removal of surface defects

6.6.1 Authorized repairs

Surface defects may be eliminated by removal of metal by chipping or machining or by soft grinding, provided that no heat cracking is produced and that the dimensional tolerances are maintained.

After forming and heat treatment of tyres, any ovality which does not exceed 6 mm may be corrected by cold-forming operations without renewal of the heat treatment. If the ovality exceeds 6 mm, hot rectification shall be carried out and all such tyres shall be subjected to a second heat treatment identical to the first.

6.6.2 Unauthorized repairs

Any welding, gas-torch treatment, heating, electric burns, filling by metallization, electrolytic or chemical deposits, etc., and any retouching with the object of concealing a defect, are not permitted and shall result in the rejection of the complete heat-treatment cycle.

7 Inspection

7.1 Responsibilities and type of inspection

7.1.1 The purchaser shall specify in the order whether inspection to ensure compliance with manufacturing methods (see clause 6) and with the quality requirements (see clause 5) is to be carried out either

a) under delegated inspection by the qualified department of the manufacturer (see note 1); or

b) in the presence of the purchaser, his representative or a body designated by him.

Unless otherwise specified in the order, the provisions of 7.1.1a) shall apply. The inspection of quality requirements shall be as shown in table 2, columns 2 and 3.

NOTE 1 The term "qualified department" means testing and certification department of the manufacturer independent from his manufacturing departments, which is authorized to issue inspection certificates of type 3.1.B in accordance with ISO 10474.

7.1.2 Delegation of inspection by the purchaser to the qualified department of the manufacturer does not remove the right of the purchaser to monitor the effectiveness of the manufacturing controls and of the testing and inspection methods.

In this respect, he shall be allowed to witness any of the tests made under the responsibility of the manufacturer and to inspect the recorded results.

7.2 Inspection of manufacture

7.2.1 Whether the inspection of the manufacture is the responsibility of the manufacturer's qualified department or of the purchaser, the following shall apply.

7.2.1.1 The manufacturer shall advise the purchaser of the principal process which will be used in completing the order, and shall advise the purchaser of any subsequent fundamental changes which he proposes to introduce and which may affect the quality of the tyres, and seek his agreement. If the inspection remains the responsibility of the purchaser, his representative shall be allowed to inspect the manufacturing processes used, in order to ensure compliance with the requirements of this part of ISO 1005 and the prior agreement.

7.2.1.2 The manufacturer shall, at the time of submission for acceptance, certify that the manufacturing requirements of this part of ISO 1005 have been complied with (see 7.5).

7.3 Inspection of the characteristics of the tyres

7.3.1 Types of test

Table 2 specified the types of test to be carried out and whether they are mandatory or optional.

7.3.2 Test units

For each type of test, table 2, column 5 specifies the relevant composition of the test unit.

For specific inspection of the mechanical properties, each test unit shall be formed of tyres produced from the same cast and having undergone the same heat treatment. It may include tyres of different dimensions.

7.3.3 Condition of the tyres when submitted for inspection

When submitted for inspection, the condition of the tyres shall comply with the requirements of table 2, column 4.

7.4 Submission for inspection by the purchaser

The purchaser [see 7.1.1 b)] shall be notified in writing (see 7.5.2) of the date of submission for inspection, stating the order reference number and the number of tyres per type in each test unit formed for testing the mechanical properties.

7.5 Certification

7.5.1 Whether the inspection of manufacture is the responsibility of the manufacturer's qualified department or of the purchaser, the manufacturer shall certify that the manufacturing requirements of this part of ISO 1005 have been complied with. The final inspection certificate, in accordance with ISO 10474, shall also include the results of the following tests:

— chemical analysis;

— tensile test;

— impact test.

7.5.2 The manufacturer shall provide the relevant certificates for those tests and checks for which he is responsible, at the following times:

a) at the time of delivery, if he has the delegated responsibility for all tests; or

b) at the time of the first submission for inspection (see 7.4), if for that part of the testing he has the delegated responsibility.

7.6 Number of checks and tests

The number of tyres per test unit to be subjected to the checks and the number of tests per tyre are given in table 2, columns 6 to 8.

7.7 Sampling and preparation of samples and test pieces

7.7.1 Sampling

After identifying the heat-treatment cycle, the inspector shall select at random the tyre(s) intended for testing and indelibly stamp them.

He shall outline on each of the tyres a sample segment (see figure 1) from which the test pieces shall be taken.

7.7.2 Preparation of samples and test pieces

Unless otherwise specified, the conditions of preparation of the samples and test pieces shall be carried out in accordance with the provisions of ISO 377-1, with the following additional requirements.

The samples and test pieces shall retain the inspector's identification marks and stamps, and may not be altered except in his presence.

7.7.3 Number and position of test pieces

The test pieces shall be taken from the previously marked sample sections, and shall be stamped for identification by the inspector.

7.7.3.1 Product analysis

When a product analysis is to be carried out, the sample shall be taken in accordance with ISO 377-2, either

a) from chips representing a radial section of the tyre; or

b) from the tensile test piece, to be taken according to figure 1.

7.7.3.2 Tensile test

One test piece shall be selected from the sample at the position shown in figure 1.

The test piece shall be prepared in accordance with the requirements of ISO 6892, and shall preferably have a diameter (d) of at least 10 mm with a gauge length of $5d$.

7.7.3.3 Impact test (U-notch)

Three test pieces shall be taken from the sample at the positions shown in figures 1 and 2.

The impact test pieces shall be marked to identify their longitudinal surfaces which are parallel to section AA (see figure 2).

The test pieces shall be prepared in accordance with the requirements of ISO 83. The axis of the cylindrical bottom of the notch shall be parallel to diameter AA (see figure 2).

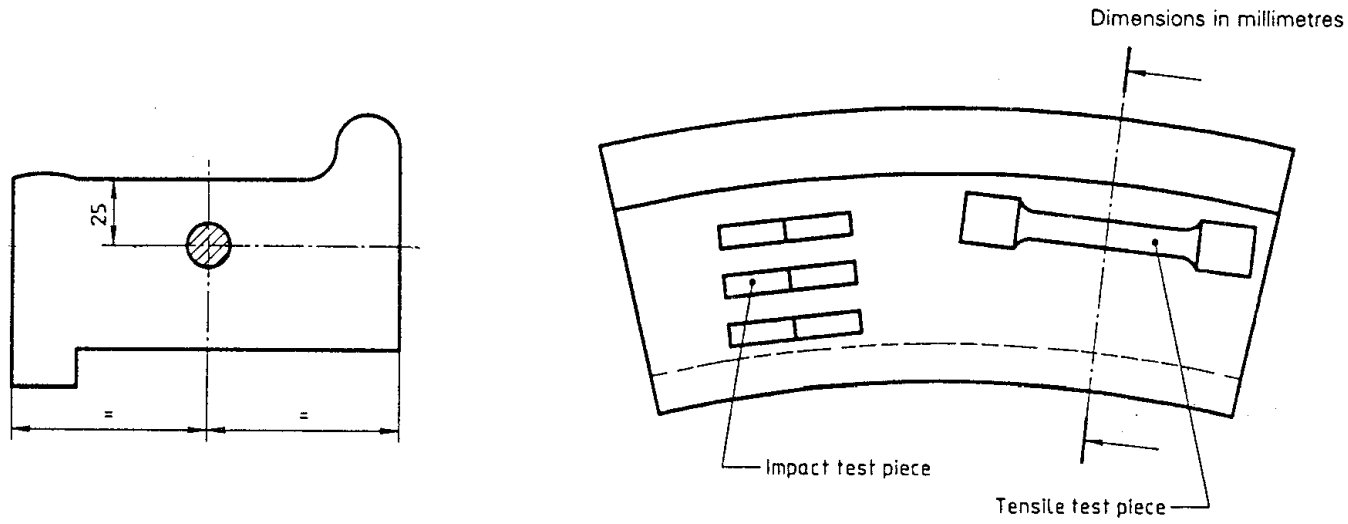


Figure 1 — Position of tensile and impact test pieces

7.8.8 Ultrasonic flaw detection test

The ultrasonic flaw detection test shall be carried out in accordance with the requirements of ISO 5948.

7.8.9 Checking of the appearance

The appearance shall be checked by visual inspection before delivery.

7.8.10 Checking of dimensions

The dimensions shall be checked in accordance with the requirements of ISO 1005-2.

7.9 Conclusion of the inspection

Any defects in appearance or dimensions shall result in rejection of the tyre. The same shall apply to any ultrasonic examination revealing defects greater than those which may be tolerated. Any other result not conforming to the required standard shall entail rejection of the corresponding heat-treatment cycle subject to the requirements of ISO 404.

Before delivery, all accepted tyres shall be marked by the inspector carrying out the final inspection and the inspector's marks shall be placed in the same position as the manufacturer's marks.

7.10 Retests

Unless otherwise agreed, the requirements for retests in ISO 404 shall apply.

8 Delivery

Before storage or dispatch, the accepted tyres need only receive a protection against corrosion if required in the order or its appended documents.

In such cases, the method of protection against corrosion shall be agreed with the purchaser.

NOTE 2 The efficiency of any protective coating is only of limited life, especially during sea transport or in geographical regions of high humidity. Therefore, the delivered tyres should be inspected immediately on arrival at their destination, to see if a renewal of the protection is necessary.

9 Guarantee

The clauses covering conditions of guarantee, which are included in contracts, shall be agreed upon between the manufacturer and the purchaser at the time of enquiry and order.

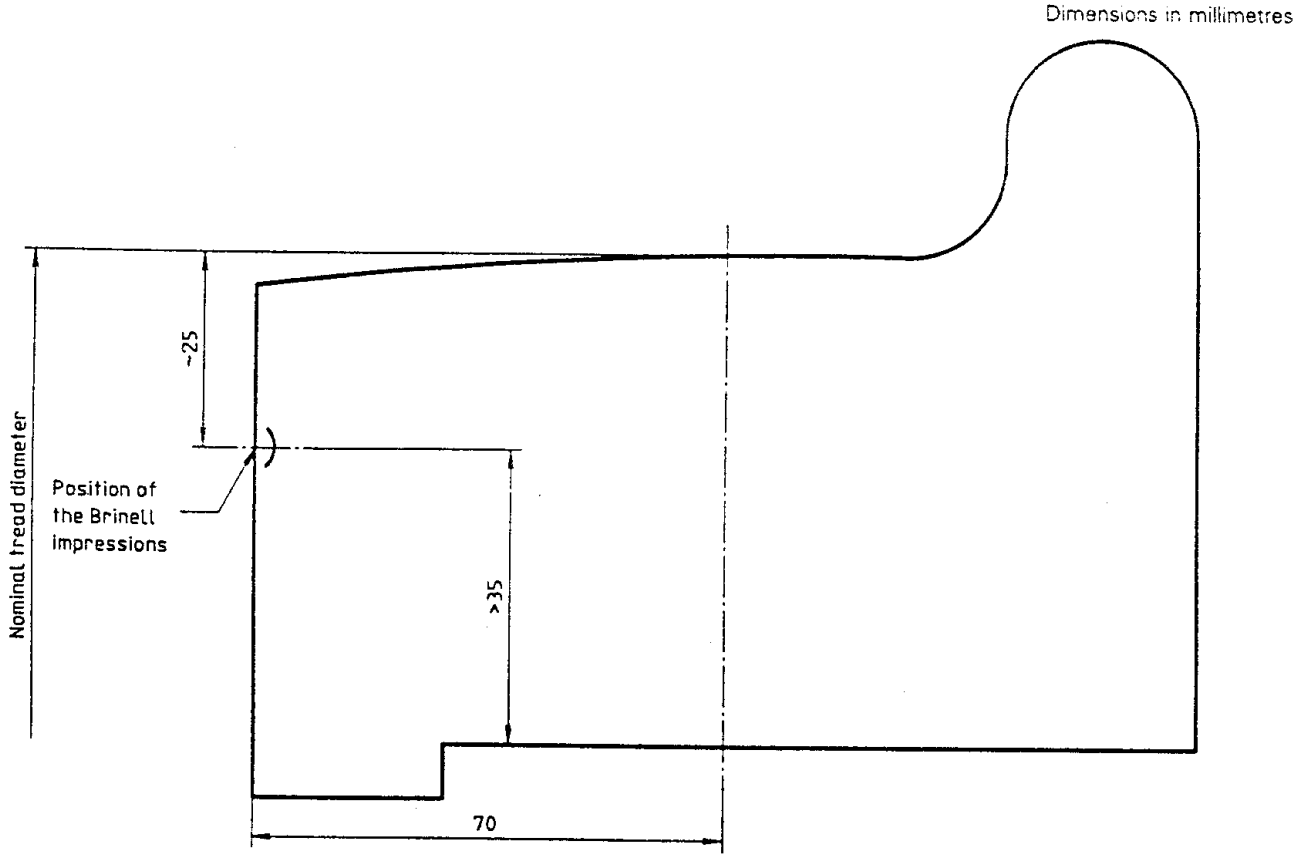


Figure 3 — Position of the Brinell hardness impressions

7.7.3.7 Ultrasonic test

The test piece shall consist of the tyre after heat treatment. Unless otherwise agreed, the area to be scanned shall be as specified in ISO 5948.

7.8 Test method

7.8.1 Chemical analysis

The chemical analysis shall be carried out in accordance with methods defined by corresponding International Standards or by any other method agreed by the purchaser. In case of dispute, only test methods recommended by ISO shall be used.

7.8.2 Tensile test

The tensile test shall be carried out in accordance with the requirements of ISO 6892.

7.8.3 Impact test (U-notch)

The impact test shall be carried out in accordance with the requirements of ISO 83.

7.8.4 Microstructure examination

The details of microstructure examination shall be agreed upon at the time of enquiry and order.

7.8.5 Macroscopic examination

The polished surface of the test piece shall be examined with a magnification of not more than 5.

7.8.6 Macrographic examination

If the examination defined in 7.8.5 is satisfactory, the macrographic image of the test piece is obtained by applying to its polished and degreased surface a sheet of gelatine silver bromide paper, first saturated in water containing 2 % by volume of pure sulfuric acid, and leaving for at least 3 min. Examples of prints produced by this technique are given in annex A.

7.8.7 Brinell hardness

The Brinell hardness test shall be carried out in accordance with the requirements of ISO 6506.

7.8.8 Ultrasonic flaw detection test

The ultrasonic flaw detection test shall be carried out in accordance with the requirements of ISO 5948.

7.8.9 Checking of the appearance

The appearance shall be checked by visual inspection before delivery.

7.8.10 Checking of dimensions

The dimensions shall be checked in accordance with the requirements of ISO 1005-2.

7.9 Conclusion of the inspection

Any defects in appearance or dimensions shall result in rejection of the tyre. The same shall apply to any ultrasonic examination revealing defects greater than those which may be tolerated. Any other result not conforming to the required standard shall entail rejection of the corresponding heat-treatment cycle subject to the requirements of ISO 404.

Before delivery, all accepted tyres shall be marked by the inspector carrying out the final inspection and the inspector's marks shall be placed in the same position as the manufacturer's marks.

7.10 Retests

Unless otherwise agreed, the requirements for r tests in ISO 404 shall apply.

8 Delivery

Before storage or dispatch, the accepted tyres nee only receive a protection against corrosion if require in the order or its appended documents.

In such cases, the method of protection against cc rosion shall be agreed with the purchaser.

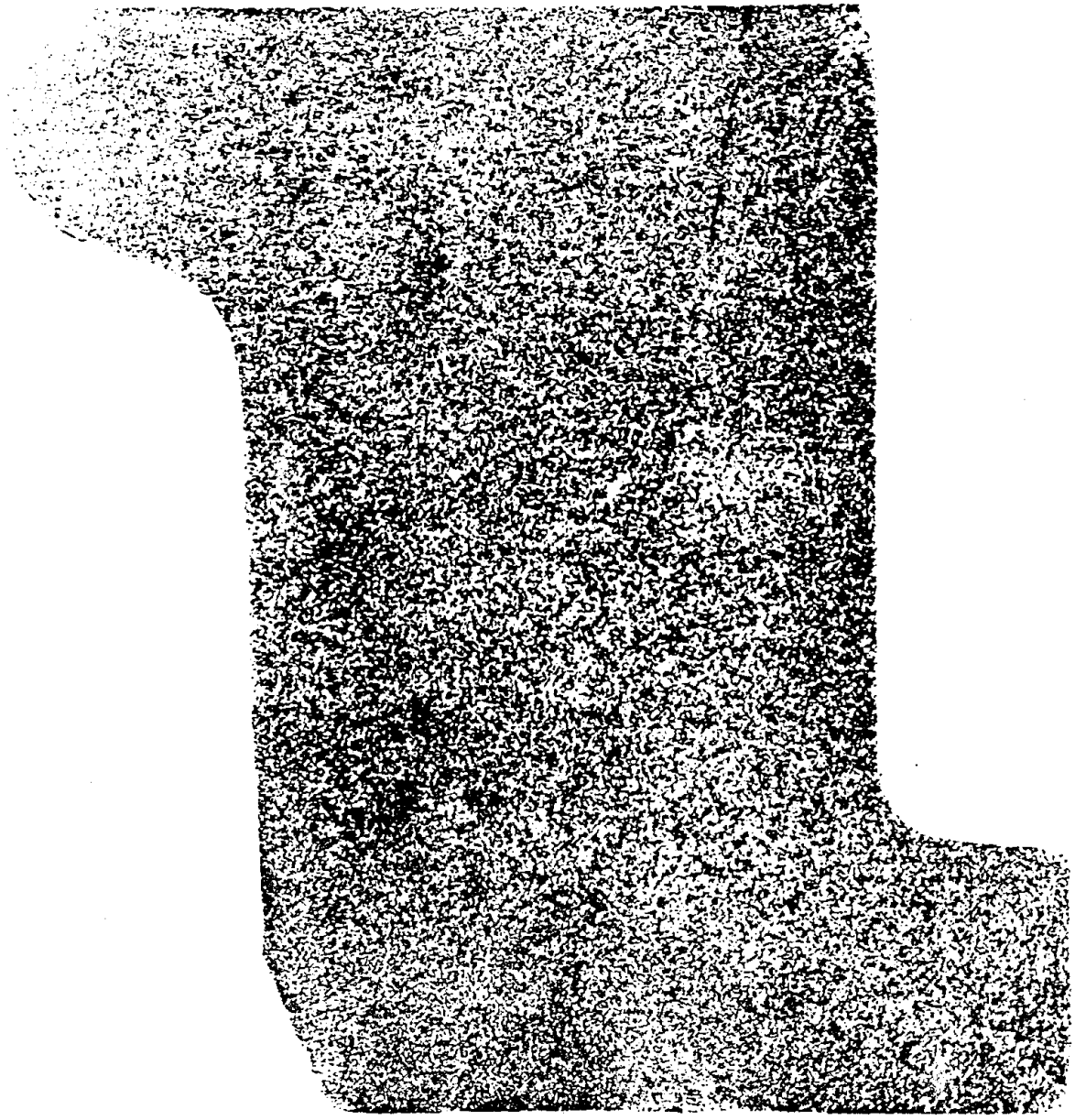
NOTE 2 The efficiency of any protective coating is on of limited life, especially during sea transport or in ge graphical regions of high humidity. Therefore, the delivere tyres should be inspected immediately on arrival at the destination, to see if a renewal of the protection is neces ary.

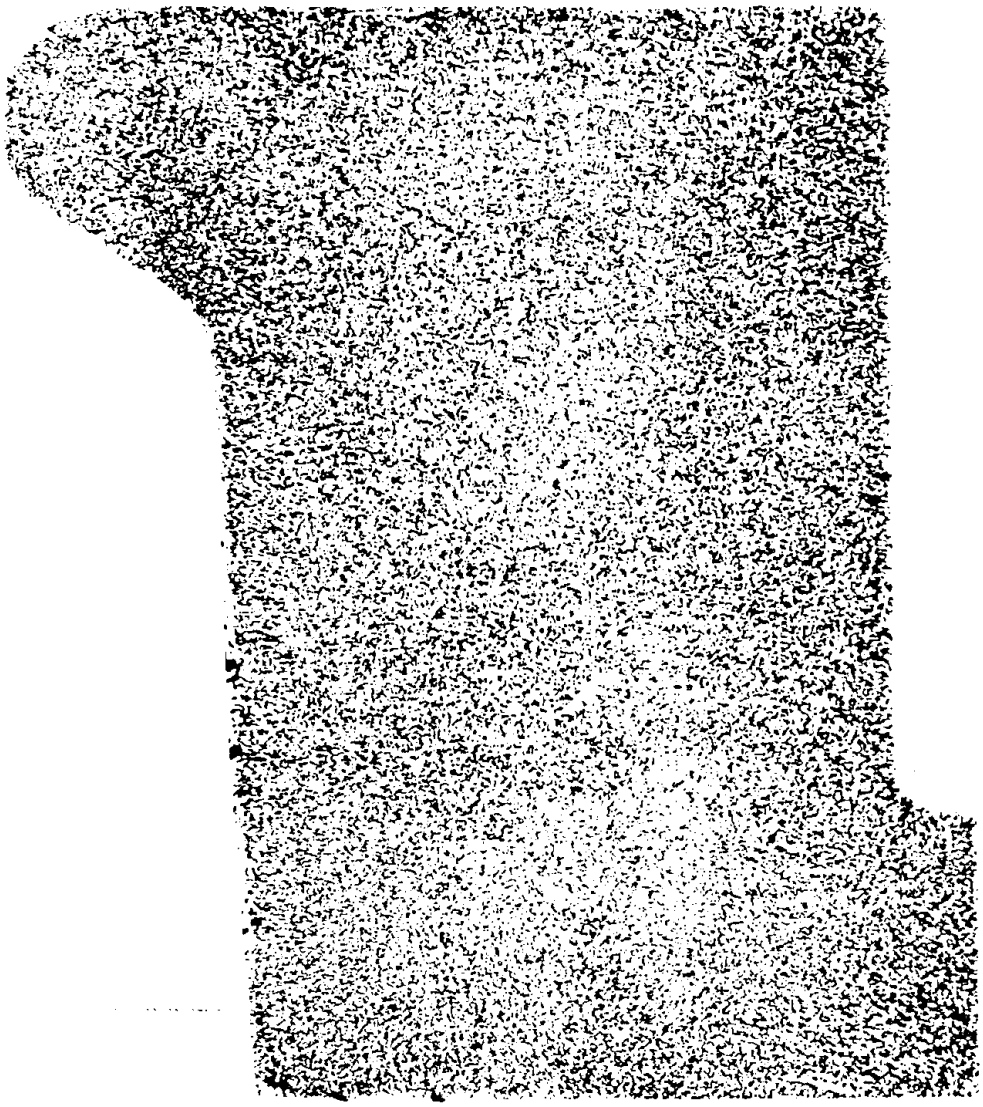
9 Guarantee

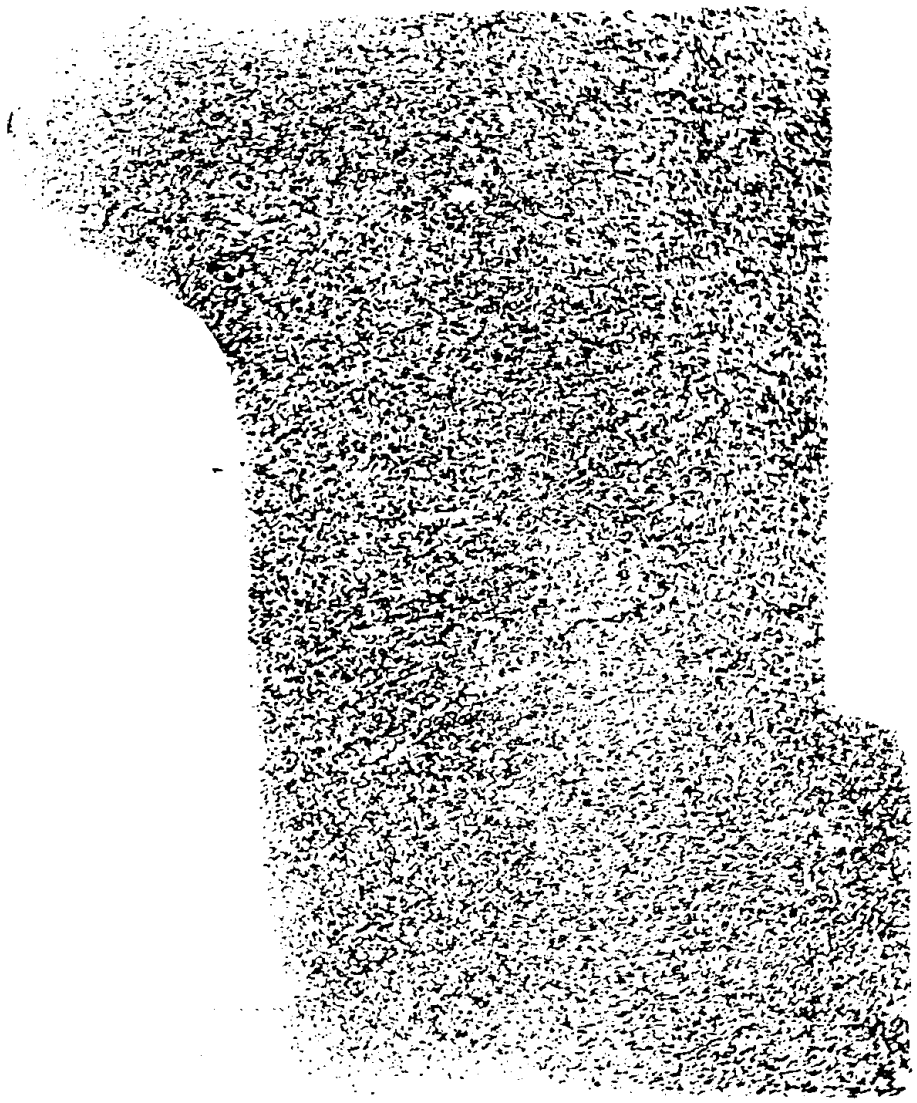
The clauses covering conditions of guarantee, whic are included in contracts, shall be agreed upon b tween the manufacturer and the purchaser at the tim of enquiry and order.

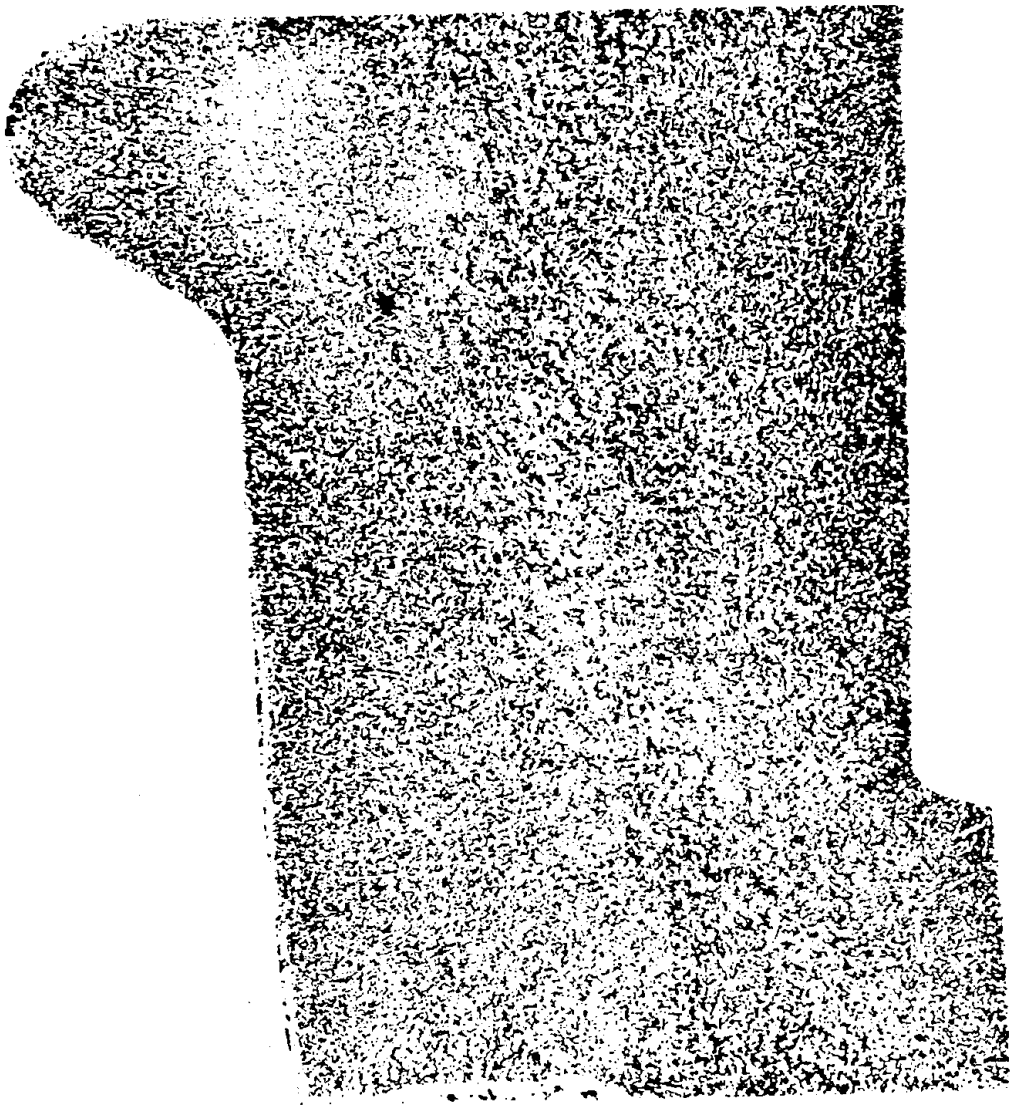
Annex A
(informative)

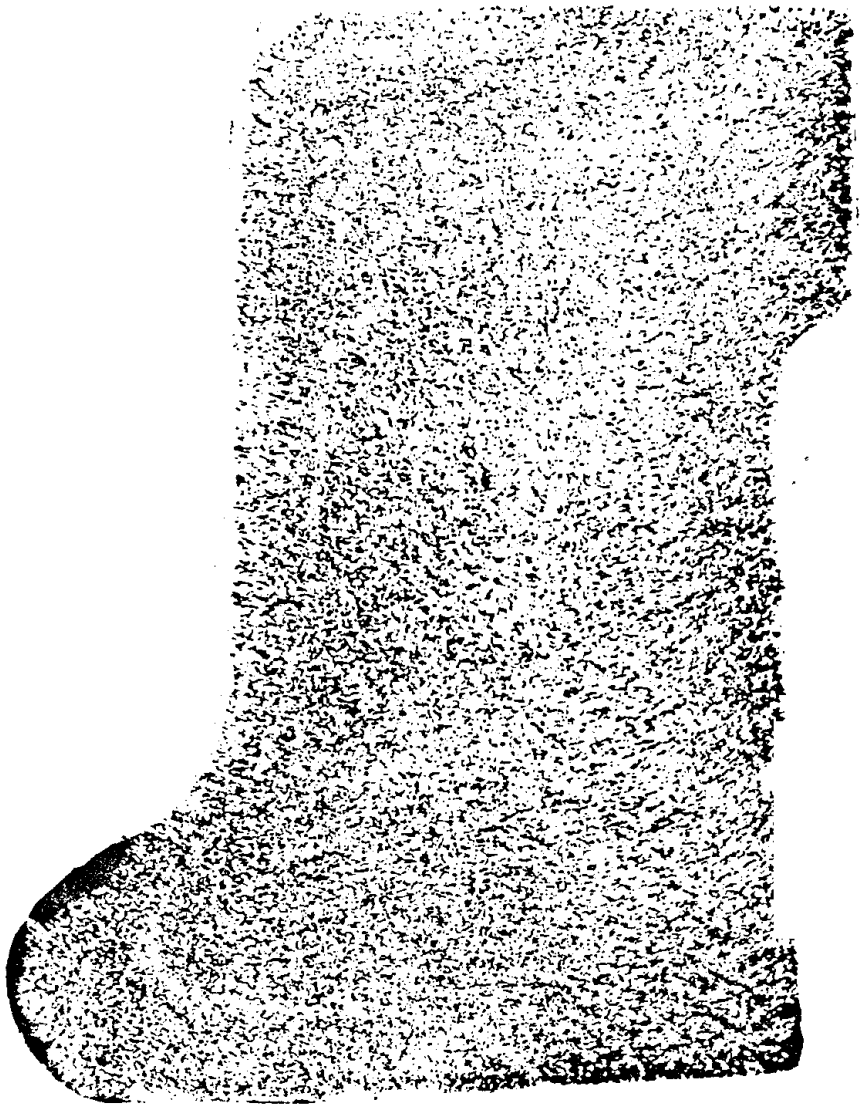
Examples of prints (see 7.8.6)

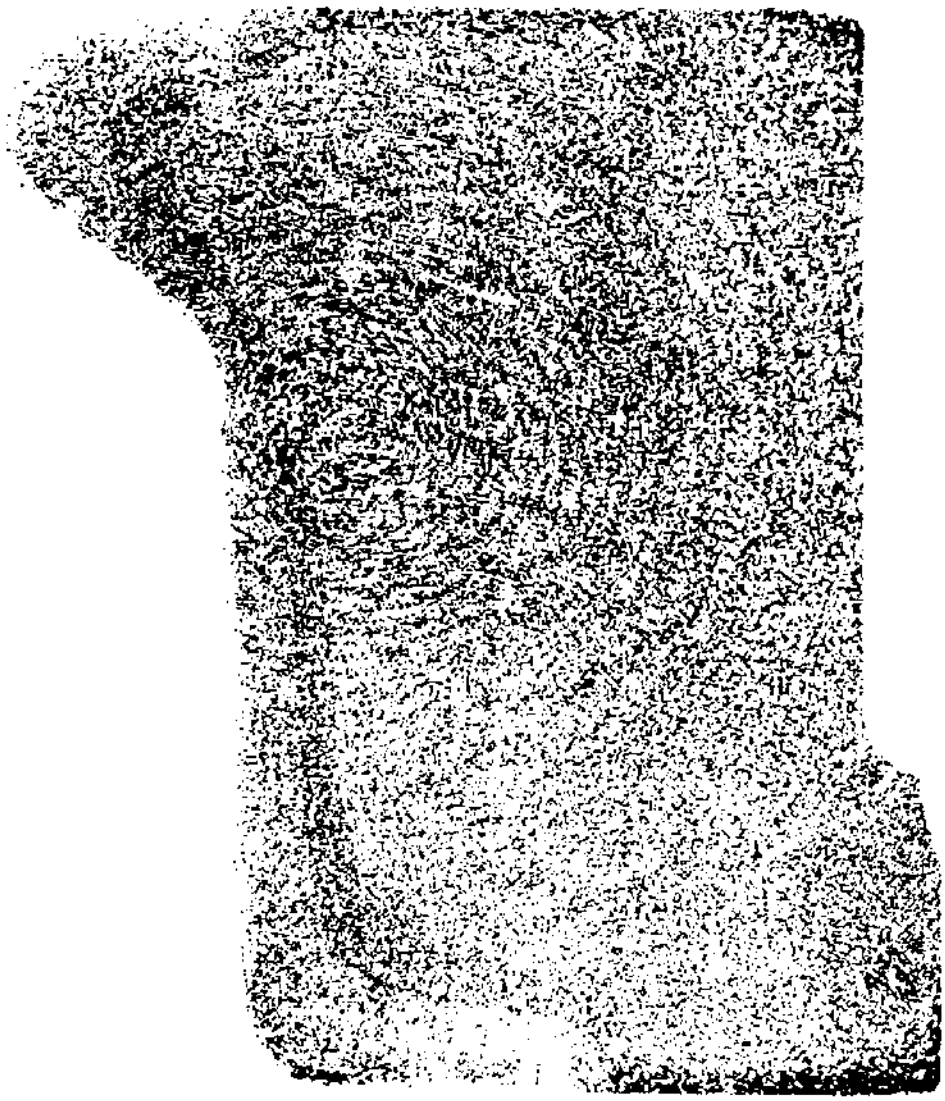












ICS 45.060.00

Descriptors: railway equipment, railway rolling stock, locomotives, railroad cars, steel products, rolled products, tyres, classification, specifications, materials specifications, dimensions, mechanical properties, physical properties, chemical composition, manufacturing requirements, delivery condition, tests, acceptance testing, chemical analysis, inspection, marking.

Price based on 17 pages