



USSR STATE STANDARD

**SEAMLESS STEEL TUBES FOR
PETROLEUM PROCESSING AND THE
PETROCHEMICAL INDUSTRY**

SPECIFICATIONS

GOST 550-75

Official Edition

USSR STATE COMMITTEE FOR STANDARDS
Moscow

USSR STATE STANDARD

**SEAMLESS STEEL TUBES FOR PETROLEUM
PROCESSING AND THE PETROCHEMICAL
INDUSTRY****Specifications****GOST
550-75*****In place of
GOST 550-58**

OKP (All-Union Product Classification Code) 13 1900, 13 4400, 13 5100

Date of introduction established by Decree No. 1635, dated June 26, 1975, of State Committee for Standards of the USSR Council of Ministers**Reviewed in 1986. Term extended by Gosstandart Decree No. 4454 dated 20.12.86****From 01.01.77****Until 01.01.92****Term unlimited (IUS 9-9)****Failure to comply with this Standard will result in legal proceedings**

This Standard shall be applied to steel pipes designed for petroleum processing and the petrochemical industry.

The indicators of technological level established by this Standard, are foreseen for the highest and first category of quality.

1. RANGE OF SIZES

1.1 Depending on their purpose, pipes shall be manufactured in groups A and B.

1.2. The dimensions of cold worked, warm worked and hot worked pipes of group A shall be in accordance with those specified in table 1, dimensions of cold worked and warm worked pipes of group B shall be in accordance with GOST 8734-75, and the dimensions of hot worked pipes of group B shall be in accordance with GOST 8732-78.

1.3. The pipes of group A shall be manufactured with a length of cut in compliance with table 1, and a minimum length not less than 4 m.

Official Edition**Reprinting is prohibited**

** Revised Edition (December 1987) with Amendments Nos. 1, 2, 3, approved in October 1976, December 1981, December, 1986. IUS (Standards Information Catalog) 10-76, 3-82, 4-87.*

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External diameter, mm	For cut pipes,									
	(1.5)	2.0	2.5	3.0	3.5	4.0	5.0	6.0	7.0	8.0
(19.0)	9.0	—	9.0	—	—	—	—	—	—	—
20.0	—	9.0	9.0	—	—	—	—	—	—	—
25.0	—	9.0	9.0	9.0	—	—	—	—	—	—
38.0	—	9.0	9.0	9.0	9.0	—	—	—	—	—
48.0	—	—	—	—	—	9.0	9.0	—	—	—
(57.0)	—	—	—	—	—	9.0	9.0	—	—	—
60.0	—	—	—	—	—	10.0	10.0	10.0	—	—
76.0	—	—	—	—	—	12.0	12.0	12.0	—	12.0
(80.0)	—	—	—	—	—	9.0	9.0	—	—	—
89.0	—	—	—	—	—	12.1	12.1	12.1	12.1	12.1
(102.0)	—	—	—	—	—	—	12.2	12.2	12.2	12.2
108.0	—	—	—	—	—	12.2	12.0	12.2	12.2	12.2
114.0	—	—	—	—	—	—	—	12.0	12.1	12.1
127.0	—	—	—	—	—	—	—	12.1	12.1	12.1
133.0	—	—	—	—	—	—	12.0	12.2	12.0	12.2
146.0	—	—	—	—	—	—	—	—	—	—
152.0	—	—	—	—	—	—	—	12.1	12.1	12.1
159.0	—	—	—	—	—	—	—	12.1	12.1	12.1
168.0	—	—	—	—	—	—	—	—	—	—
194.0	—	—	—	—	—	—	—	—	12.0	12.0
219.0	—	—	—	—	—	—	—	—	—	12.0

Notes:

1. Pipe, whose dimensions are specified in parentheses, shall be used only for repairing purposes.
2. By agreement between the manufacturer and the customer, pipes may be manufactured with lengths exceeding those specified in table 1. It is allowed to manufacture pipes with welded butts, with the number of seams being no more than one per pipe.
3. Pipes with a diameter less than 57 mm shall be manufactured by cold working. Pipes with a diameter of 57 mm and larger shall be manufactured by hot working.
4. At the customer's request, the pipes with a diameter of 6-102 mm may be manufactured with a length up to 7 m, and pipes with diameters of 108-159 mm may be manufactured with a length of up to 9 m.

Table 1

not more than, with wall thickness, mm

9.0	10.0	11.0	12.0	(13.0)	14.0	16.0	18.0	20.0	22.0	26.0
–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–
12.2	12.2	12.2	12.2	9.5	12.2	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–
12.1	12.1	12.1	–	–	–	–	–	–	–	–
12.1	12.2	12.2	12.2	–	12.2	–	–	–	–	–
12.0	–	–	–	–	–	–	–	–	–	–
–	–	12.2	–	–	–	–	–	–	–	–
12.1	12.1	12.1	12.1	–	12.1	–	–	–	–	–
12.1	12.1	12.1	12.1	–	12.1	12.1	–	–	–	–
–	–	12.0	12.0	–	–	–	–	–	–	–
12.0	12.0	–	12.2	–	–	–	–	–	–	6.7
12.0	12.0	12.0	12.0	–	12.0	10.0	9.0	8.0	7.5	–

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The length of pipes of group B shall be in accordance with the requirements of GOST 8732-78 and GOST 8734-75.

(Amended Wording, Amendment No. 3).

1.4. The maximum deviations of pipes of group A shall correspond to the highest category of quality, and shall not exceed:

By external diameter

For cold worked and warm worked pipes made of steel of grades 10 and 20, in accordance with GOST 9567-75,

For pipes made of alloy steel:

with a diameter lower than 30 mm : ± 0.2 mm,

with a diameter over 30 mm: ± 0.3 mm,

For hot worked pipes $^{+0.5}_{-1.25}$ % ;

By wall thickness

For cold worked and warm worked pipes: ± 8 %,

for hot worked pipes with wall a thickness:

up to 15 mm: ± 12.5 %,

more than 15 mm: ± 10 %.

Maximum deviations of external diameter and wall thickness of pipes of group B, for the highest category of quality, shall be in accordance with those specified in GOST 8734-75, for enhanced manufacturing accuracy in accordance with GOST 8732-78, and for the first category of quality they shall be in accordance with the usual accuracy of manufacturing of pipes, in conformity with GOST 8732-78.

(Amended Wording, Amendment No. 3).

1.5. Ovality and pipe wall differences of pipes shall not exceed:

for group A: the maximum deviations on external diameter and wall thickness for steel of grades 10; 20 and 0.8, the maximum deviations of external diameter and wall thickness for steel of other grades;

for group B: the maximum deviations of external diameter and wall thickness specified in GOST 8732-78 and GOST 8734-75.

1.6. The curvature of any section of pipes of group A shall not exceed 1.5 mm per 1 m, whereas the curvature over the whole pipe length shall not exceed 8 mm.

The maximum curvature of pipes of group B shall be in accordance with GOST 8732-78 and GOST 8734-75.

(Amended Wording, Amendment No. 2).

1.7. The maximum deviations of lengths of pipes of A and B groups shall not exceed:

+10 mm: for a length of pipe lower than 6 m;

+15 mm: for a length of pipe more than 6 m, or an external diameter more than 152 mm.

Conventional designations

Pipe, cold worked and warm worked, with an external diameter of 25 mm, wall thickness of 2 mm, made of steel of grade 15 x 5 m, with a cut length of 9.0 m (group A):

Труба А– 25 × 2 × 9000– 15 × 5МГОСТ 550–75

Pipe, hot worked, with an external diameter of 219 mm, wall thickness of 10 mm, made of steel of grade 15X5BΦ, of a random length (group A):

Труба Б– 219 × 10– 15 × 5BΦ ГОСТ 550–75

To же,

As above, with a length divisible by 4.5 m:

Труба Б–219 × 10 × 4500 кр–15 × 5BΦ ГОСТ 550–75

2. TECHNICAL REQUIREMENTS

2.1. The pipes shall be manufactured according to the requirements of this Standard, and technical production schedules approved in accordance with the established procedure.

The pipes of groups A and B shall be produced of steel of grades 10, 20 in accordance with GOST 1050-74, grade 10Г2to be in accordance with GOST 4543-71, grades 12MX, 15X5, 15X5M, 15X5BΦ, 12X8BΦ to be in accordance e with GOST 20072-74, and grades of steel 12X8, 1X2M1with chemical composition to comply with Table 2.

Table 2

Steel grade	Fraction of total mass, %								
	Carbon	Manganese	Silicon	Chromium	Molybdenum	Sulfur	Phosphorus	Nickel	Copper
						Not more than			
12X8	Less than 0.12	0.3-0.6	0.17- 0.37	7.5- 9.0		0.030	0.035	0.40	0.25
1X2M1	0.08- 0.13	0.3-0.6	0.17- 0.37	2.0- 2.5	0.9- 1.10	0.035	0.035	0.50	0.30

Note. Maximum deviations of chemical composition for steel grade 1X2M1 shall be in accordance with the requirements of GOST 4543-71.

(Amended Wording, Amendments Nos. 1, 2, 3).

2.2. External and internal surfaces of pipes shall be free of oxide spots, cracks, ruptures, overlaps and capillary seams. These defects shall be fully removed by cold local flat trimming or continuous polishing, boring and turning. In this case, the wall thickness at the place of defect removal shall exceed the minimum allowed values.

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The macrostructure of pipes shall be free of cracks and delaminated flakes, visible without the use of magnifying devices, are not allowed.

Separate insignificant nicks, dings, marks and trace of facing defects are allowed, if the their depth does not take the pipe wall thickness beyond the maximum deviations, and the depth of marks does not exceed 1 mm, and for pipes of group A at length of 400 mm from the ends: 0.5 mm. For hot worked pipes of group B, shallow oxide spots in the limits of the specified deviations shall also be allowed..

2.3. The ends of pipes shall be cut at a right angle; in this case the slope of cutting shall not exceed 2°.

At the customer's request the ends of pipes with wall thickness more than 5 mm shall be provided with a facet edge for welding.

By agreement between the manufacturer and the customer, it is allowed to cut off pipes from steel of grades 10, 20 and 10Г2 using a plasmotron with facing angle relative to the end of pipe more than 10°.

2.2; 2.3. (Amended Wording, Amendment No. 2).

2.4. The pipes shall be manufactured in a heat-treated condition. Hot worked pipes made of steel of grades 10, 20 and 10Г2 may be manufactured after rolling heating. The mechanical characteristics of metal for pipes shall be in accordance with those specified in Table 3.

Table 3

Steel grade	Temporary tensile strength σ_b , N/mm ² (kgf / mm ²)	Yield stress σ_T , N/mm ² (kgf/mm ²)	Specific elongation σ_5 , %	Specific constriction ψ , %	Impact strength KCU J/cm ² (kgf·m/cm ²)	Brinell hardness HB, not more than	Types of pipes
Not less							
10	353 (36)	216 (22)	25	50	78 (8)	137	Hot worked
20	431 (44)	255 (26)	22	50	78 (8)	156	
10Г2	421 (43)	265 (27)	21	50	118 (12)	197	
12MX	412 (421)	245 (25)	21	45	69 (7)	156	
15X5	392 (40)	216 (22)	24	50	98 (10)	170	
15X5M	392 (40)	216 (22)	22	50	118 (12)	170	
15X5BΦ	392 (40)	216 (22)	22	50	118 (12)	170	
12X8BΦ	392 (40)	167 (17)	22	50	98 (10)	170	
1X2M1	441 (45)	265 (27)	20	45	98 (10)	227	
10	333 (34)	206 (21)	26			137	Cold worked and warm worked
20	412 (42)	245 (25)	23	-	-	156	
15X5M	392 (40)	216 (22)	22	-	-	170	
12X8	392 (40)	216 (22)	22			170	

Note. At the customer's request pipes made of steel grade 10Г2 shall have an impact strength at -40° not less than 25 J/cm² (2.5 kgf·m/cm²).

(Amended Wording, Amendments Nos. 1, 2, 3).

Hot worked pipes of steel of grade 15X5M can be made after normalization and tempering with rated mechanical characteristics not less than: σ_B : 588 N/mm² (60 kgf / mm²), σ_T : 412 N/mm² (42 kgf/mm²), σ_5 : 16 %, ψ 65 %, KCU : 98 J/cm² (10 kgf·m/cm²), and Brinell hardness of less than 235.

For pipes of the highest category of quality made of steel of grade 15X5M, the temporary tensile strength shall not be less than 421 N/mm² (43 kgf /mm²) for hot worked pipes and 412 N/mm² (42 kgf / mm²) for cold and warm worked pipes.

(Amended Wording, Amendments Nos. 1, 2, 3).

2.5. The pipes shall be tested with regards to hydraulic pressure P , MPa (kgf / cm²), whose value shall be evaluated using the formulas

$$P = \frac{2 \cdot s \cdot R}{D_{in}},$$

$$P = \frac{200 \cdot s \cdot R}{D_{in}}$$

but not less than 30 MPa (300 kgf / cm²).

where s is the minimum thickness of pipe walls, mm (with account of the negative tolerance);

D_{in} is the internal diameter of a pipe, mm;

R is the allowed stress, equal to 40 % of temporary tensile strength, N/mm² (kgf/mm²).

(Amended Wording, Amendment No. 3).

2.6. Pipes of group A, with diameter of less than 159 mm and wall thickness of less than 8 mm shall be tested for expansion without occurrence of cracks and fissures on the fixture with tapering not less than 6° (¹/₁₀) for an increase in external diameter given in table 4.

Table 4

Steel grade	Increase in external diameter of pipe, %, at wall thickness of:	
	less than 4 mm	over 4 mm
10, 10Г2	10	6
20	8	5
Others	6	

2.7. At the customer's request pipes shall be tested for flattening unless a distance of (N) in mm, achieved between flattened surfaces, calculated using the formula

$$H = \frac{(1+a)s}{a + \frac{s}{D_{ex}}}$$

where s is the rated wall thickness, mm;

D_{ex} is the rated external diameter, mm;

a is the specific elongation, equal to 0.08.

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2.8. At the customer's request the pipes shall be submitted for defectoscopy by non-destructive methods.

(Subsequently Inserted, Amendment No. 2).

3. ACCEPTANCE PROCEDURE

3.1. The pipes shall be accepted in batches. A batch shall consist of pipes of one dimension, of one heat treatment mode, and for steel of grades 12MX, 15X5, 15X5M, 12X8, 12X8BΦ and 1X2M1 of one cast, and shall be accompanied by one quality certificate in accordance with GOST 10692-80, with addition of the chemical composition of steel according to the quality certificate of the manufacturer of an intermediate product.

The quantity of pipes in a batch shall be established for hot worked pipes: less than 200 pieces, for cold worked and warm worked pipes: less than 400 pieces.

(Amended Wording, Amendments Nos. 2, 3).

3.2. Each pipe shall be inspected for external and internal surfaces, dimensions and defect detection.

3.3. Where disputes arise over the evaluation of chemical composition, not less than one pipe from the batch shall be selected for inspection.

3.4. The control of the macrostructure of pipes shall be carried out at the customer's request.

3.2.-3.4. (Amended Wording, Amendment No. 2).

3.5. For tests on elongation, impact strength, flattening, expansion, and for the control of the macrostructure of steel, two pipes from a batch shall be selected, and for hydrotesting - 2 % of pipes, but not less than two pipes from a batch.

3.6. Hardness testing shall be carried for 10 % of pipes of group A and 2 % of pipes of group B made of steel of grade 15X5M. The pipes of group B made of steel of other grades shall not be submitted for hardness control.

The standards of hardness of pipes with a wall thickness of not less than 2.5 mm shall be established by agreement between the manufacturer and the customer.

3.7. (Removed, Amendment No. 2).

3.8. If test results are unsatisfactory for even one of the indicators, a re-test shall be carried out on twice the number of samples, taken from the same batch.

The results of the re-test shall apply to the whole batch.

4. TEST METHODS

4.1. From each selected pipe shall be cut:

For elongation tests: one sample;

For hardness tests: two samples;

For impact tests: two samples;

For flattening tests: one sample;

For expansion tests: one sample;

For the examination of macrostructure: one sample.

4.2. Wall thickness shall be inspected from both mouths of pipe. The measurement of the pipe's external diameter shall be made in any place other than on places of defect removal.

Wall thickness in places of grinding shall be determined as a difference between the actual wall thickness at the end, nearest to the defect site, and the depth of grinding along the generatrix, or by measurement using an ultrasonic thickness gauge.

It is allowed to measure pipes by means of automatic instrument control. The external surface of pipes shall be examined without application of magnifying devices. The internal surface of pipes with diameters of 70 mm and more shall be examined from two sides with the help of a periscope with twofold and more enlarging, to the length of the periscope. When using defectoscopy, the periscope test shall not be carried out.

4.3. Chemical analysis sampling shall be made in accordance with GOST 7565-81.

The control of chemical composition shall be carried out in accordance with procedures of the manufacturer of pipes, and under disagreements in evaluation of chemical composition - in accordance with GOST 22536.0-87, GOST 22536.1-77, GOST 22536.2-87, GOST 22536.3-77, GOST 22536.4-77, GOST 22536.5-87, GOST 22536.6-77, GOST 12344-78, GOST 12345-80, GOST 12346-78, GOST 12347-77, GOST 12348-78, GOST 12349-83, GOST 12350-78, GOST 12351-81, GOST 12352-81, GOST 12354-81, GOST 12356-81, GOST 20560-81, GOST 12358-82, GOST 12359-81, GOST 12360-82, and GOST 12361-82.

4.4. The extension test shall be carried out using short proportional longitudinal samples in accordance with GOST 10006-80. Testing rates to less than the yield point shall be less than 10 mm/minute, and over the yield point less than 40 mm/minute.

It is allowed to examine mechanical characteristics of pipes made of steels of all grades, except for 15X5M, by non-destructive methods according to specifications and technical documentation.

Where the disputes arise over evaluation of quality, the inspection shall be carried out in accordance with GOST 10006-80.

(Amended Wording, Amendment No. 3).

4.5. The impact test shall be carried out for pipes with wall thickness more than 12 mm, in accordance with GOST 9454-78, on samples of type 1.

The examination of curvature of pipes shall be carried out by a verifying ruler in accordance with GOST 8026-75, and a gauge feeler in accordance with GOST 882-75.

(Subsequently Inserted, Amendment No. 3).

5. MARKING, PACKING, TRANSPORTATION AND STORAGE

5.1. Marking, packing, transportation, storage and execution of records shall be in accordance with GOST 10692-80 with the following additions.

(Amended Wording, Amendment No. 3).

5.1.1. The mark of the Quality Control Department, steel grade and batch number shall be distinctly applied at one of the ends of a pipe with a diameter of 25 mm and over and wall thickness of not less than 3 mm, at a distance less than 1 m from one of the ends.

5.1.2. Marking of pipes made of steel of grade 15X5M after normalization and tempering in addition shall bear the brand in a form of the Cyrillic letter “Y” (after a hyphen).

5.1.3. For pipes to which the State Quality Symbol has been assigned in accordance with the established procedure, the label and quality certificate shall bear the State Quality Symbol, according to the procedure established by Gosstandart.

(Amended Wording, Amendment No. 2).

Group B-62

Amendment No. 4 GOST 550-75 Seamless Steel Pipes for Petroleum Processing and the Petrochemical Industry. Specifications

Approved and introduced by Decree No. 922, dated 20.06.91, of the USSR Committee for Standardization and Metrology

Date of Introduction 01.01.92

Introduction. The second paragraph shall be removed.

Clause 2.1. Replace the reference: GOST 1050-74 with GOST 1050-88. Clause 2.5 shall be reworded as follows: “2.5. The pipes shall withstand a test hydraulic pressure (P_1 and P_2) according to the requirements of GOST 3845-75, but no more than 30 MPa (300 kgf/cm²), at an allowed stress equal to 40% of the tensile strength, N/mm² (kgf/mm²), for the specified grade of steel.”

Amendment to GOST 550-75 (cont.)

Clause 43. Replace the references: GOST 12344-78 with GOST 12344-88, GOST 12345-80 with GOST 12345-88, GOST 12357-66 with GOST 12357-84, GOST 12364-66 with GOST 12364-84, GOST 12365-66 with GOST 12365-84, GOST 22536.0-77 with GOST 22536.0-87, GOST 22536.1-77 with GOST 22536.1-88, GOST 22536.2-77 with GOST 22536.2-87, GOST 22536.3-77 with GOST 22536.3-88, GOST 22536.4-77 with GOST 22536.4-88, GOST 22536.5-77 with GOST 22536.5-87, GOST 22536.6-77 with GOST 22536.6-88, GOST 20560-81 with GOST 28473-90.

Clauses 3.5, 4.1, 4.5. Replace the words: “impact strength” with “impact bend”.

Clause 4.14. Replace the references: GOST 166-80 with GOST 166-89, GOST 6507-78 with GOST 6507-90, GOST 7502-80 with GOST 7502-89, GOST 882-75 by Technical Specifications TU 2-034-225-87.

IUS (Standards Information Catalog) No. 9, 1991