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# SEAMLESS HOT-ROLLED STEEL PIPES.

TECHNICAL REQUIREMENTS

**GOST 8731-74**  
**(CMEA Standard 1482-78)**



Official Edition

USSS STATE COMMITTEE FOR STANDARDS

M o s c o w

## USSR STATE STANDARD

## SEAMLESS HOT-ROLLED STEEL PIPES

## Technical requirements

OKP (All-Union Product Classification Code) 13 1200, 13 1700,  
13 1900

## GOST

## 8731-74\*

(CMEA Standard 1482-78)

In place of  
GOST 8731-66

Period of validity set by Decree No. 2560, dated Nov 19, 1974 of the USSR State Committee for Standards is:

from 01.01.76

Reviewed in 1985. Term extended by Gosstandart Decree No. 3259 dated Oct 3, 1985 until :

01.01.91

Failure to comply with this standard will result in legal proceedings

This Standard applies to general purpose hot-rolled seamless pipes made of carbon or alloyed steel.

This Standard corresponds to CMEA Standard 1482-78.

The technical requirements, set by this Standard, are applicable to pipes of the premium quality.

### 1. TECHNICAL REQUIREMENTS

The dimensions of the pipes and deviations must comply with values set by GOST 8732-78 and GOST 9567-75.

1.2 Depending upon their characteristics the pipes shall be classified into the following groups:

Group A: pipes with rated mechanical properties (see table 1) made of the following grades of steel: Ст2сп, Ст4сп, Ст5сп and Ст6сп according to GOST 380-71;

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*\*Revised Edition (Aug, 1985) with Amendment Nos 2,3,4 and 5 approved in  
April 1976, March 1980, January 1982 and March 1984  
(IUS (Standards Information Catalog) No. 4-76, 4-80, 4-82 and 6-84)*

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Table 1

Grade of steel	Breaking down point $\sigma_b$ , MPa (kgf/mm <sup>2</sup> )	Yield point $\sigma_y$ , MPa (kgf/mm <sup>2</sup> )	Relative elongation $\delta_5$ , %
	No less than:		
Ст2сп	343(35)	216(22)	24
Ст4сп	412(42)	245(25)	20
Ст5сп	490(50)	274(28)	17
Ст6сп	588(60)	304(31)	14

Note. By agreement with the customer the pipes may be made of steel grade Ст3сп.

Table 2

Grade of steel	Breaking-down point, $\sigma_b$ , MPa (kgf/mm <sup>2</sup> )	Yield point, $\sigma_y$ , MPa (kgf/mm <sup>2</sup> )	Relative elongation, $\delta_5$ , %	Brinell hardness (pipe wall thickness over 10 mm)	
	No less than:			Diameter of dent, no less than, mm	Hardness H, no more than
10	353(36)	216(22)	24	5.1	137
20	412(42)	245(25)	21	4.8	156
35	510(52)	294(30)	17	4.4	187
45	588(60)	323(33)	14	4.2	207
10Г2	421(43)	265(27)	21	4.3	197
20X	431(44)	—	16	—	—
40	657(67)	—	9	3.7	269
30XCA	686(70)	—	11	—	—
15XM	431(44)	225(23)	21	—	—
30XMA	588(60)	392(40)	13	—	—
12XH2	539(55)	392(40)	14	—	—
Ст4сп	412(42)	245(25)	20	—	—
	490(50)	274(28)	17	—	—

Notes:

1. For pipes with walls in excess of 45 mm thickness the mechanical properties required shall be agreed on by the manufacturer and the customer.
2. The mechanical properties of pipes made of steel grades which are not specified in table 2, rates of impact strength and percentage of area reduction for the steels of any grades shall be set by agreement of the manufacturer and the customer.

**Group Б:** pipes made of killed steel of rated chemical composition in accordance with GOST 380-71, 1-st category, group Б, with normal content of manganese according to GOST 1050-74, also pipes made of steels by GOST 4543-71 and GOST 19282-73;

**Group В:** pipes with rated mechanical properties, as specified in table 2, and chemical composition of steel grades according to GOST 1050-74, GOST 4543-71, GOST 19282-73 and GOST 380-71;

**Group Г:** pipes made of steel grades in accordance with GOST 1050-74, GOST 4543-71 and GOST 19282-73 with rated chemical composition and tests for mechanical properties made on heat-treated samples;

**Group Д:** pipes made of steel without rated mechanical and chemical composition characteristics but made to comply with the rated test hydraulic pressure.

**(Amended wording, Amendment Nos. 4 and 5).**

1.3. At the customer's request, the pipes shall be produced heat-treated. The heat treatment conditions and mechanical properties shall be set to comply with specifications and technical documentation approved in accordance with established procedure.

1.4. The pipes shall be free of cracks, slivers, scabs or laps on the surface. Minor and individual dents, nicks, notches on the surface, thin film of scale, traces of cleared defects and small slivers shall be considered as acceptable when they do not bring the wall thickness out of minimum limits.

The pipe ends shall be cut at a straight angle, a chamfer of no less than 70° relative to the pipe axis may be allowed. The pipe ends shall be cleared of burrs, some chamfer is permitted to be made in such clearing.

1.6. The pipes with walls 20 mm thick or over may be cut with oxyacetylene or plasma cutters or else with a saw. For plasma or oxyacetylene cutting, there shall be 20 mm of pipe length allowance reserved for each cut. At the customer's request, the pipes with 20 mm plus wall thickness may be manufactured from a rolled or forged blank with pipe ends uncut. The pipe ends which were not cut off shall be marked with paint and shall not be counted as pipe length supplied. 1.8. When requested by the customer, the ends of the pipes with walls 5 to 20 mm thick, to be later welded, may be chamfered to 35 to 40° relative to the pipe butt. Care shall be taken to reserve a flat rim on the pipe end 1 to 3 mm wide.

1.9. The pipes of any type, operating under excess pressure (operating conditions shall be specified in the work order) shall withstand tests with applied hydraulic pressure that may be found using the formula given in GOST 3845-75, where "R" stands for value of the allowed stress equal to 40% of the pipe ultimate breaking strength for this particular grade of steel.

The pipes stability to hydraulic pressure shall be ensured by the manufacturing process

**(Amended Wording, Amendment No. 4).**

1.9a. When requested by the customer, the pipes shall be manufactured to withstand hydraulic pressure prescribed by GOST 3845-75, but no more than 20 MPa (200 kgf/cm<sup>2</sup>).

By agreement between the customer and the manufacturer the pipes shall be tested with hydraulic

pressure exceeding 20 MPa (200 kgf/cm<sup>2</sup>).

In place of the hydraulic tests the pipes may be tested by non-destructive methods that ensure

compliance of pipes with required strength characteristics.

**(Subsequently Inserted, Amendment No.4).**

When requested by the customer, the pipes made of steel grades 10, Ст2сп, 20, Ст4сп and 15XM shall successfully go through one or a number of technological tests explained in clauses 1.11 to 1.14 depending on the further use and operating conditions of these pipes.

1.11. The pipes shall withstand the bending test.

1.12. The flaring test shall be positively passed by pipes of 159 mm in diameter, maximum, with walls less than 8 mm thick. The pipes shall be flared on a mandrel with 1 : 10 cone ratio until the pipe external diameter reaches the value given in the table below:

Table 3

Steel grade	Pipe diameter enlargement by :	
	Pipe wall thickness below 4 mm	Pipe wall thickness over 4 mm
10, Ст2сп	10 %	6 %
20, Ст4сп, 15XM	8 %	5 %

1.13. The flattening test shall be carried out for the pipes with walls more than 10 mm thick. The pipes shall be subjected to pressure until the clearance between the opposite flattened surfaces (*H*) reaches the value (in mm) calculated with the formula below:

$$H = \frac{(1 + C) \cdot S}{C + S / D},$$

Where: *C* = 0.09 for steel grade 10;

*C* = 0.08 for other grades of steel;

*S* is the nominal wall thickness, mm;

*D* is the nominal external diameter of the pipe, mm.

**(Amended Wording, Amendment No. 2).**

The collar forming test shall be positively passed by pipes with external diameter from 30 to 160 mm and the following wall thickness:

no more than 10% of the pipe external diameter for pipes with up to 60 mm external diameters;

no more than 8% of the pipe external diameter for pipes with external diameters from 60 to 108 mm;

no more than 6% of the pipe external diameter for pipes with wall thickness from 108 to 140 mm;

no more than 5% of the pipe external diameter for pipes with external diameter from 140 to 160 mm.

The width of the collar as measured from the pipe inner surface shall be no less than 12% of the pipe internal diameter and no less than 1.5 times the pipe wall thickness.

The collar formed at the tests shall be at 90° for the pipes made of steel grades 10 and Ст2сп, and at 60° for the pipes made of steel grades 20, Ст4сп and 15XM.

1.15. When requested by the customer, the pipes with 12 mm thick walls or over shall be checked for macrostructure.

The check shall reveal no shrinkage bubbles, hollows, cracks, air bubbles or other defects visible to the naked eye.

## 2.ACCEPTANCE PROCEDURE

2.1The pipes shall be accepted in batches. One batch shall contain pipes of the same diameter and wall thickness, the same grade of steel and type of heat treatment (in case pipes are heat- treated). Such a batch shall be accompanied with a quality certificate in compliance with GOST 10692-80 . The quality certificate shall have a supplement with information on the steel chemical composition on the basis of the certificate of quality of the blank used.

**(Amended Wording, Amendment No. 4).**

2.2Each batch shall contain the following number of individual pipes, maximum:

400 -for pipes less than 76 mm in diameter;

200 -for pipes of other dimensions.

The batches may contain up to 600 pipes provided these pipes are less than 76 mm in diameter and with wall thickness of less than 2.5 mm.

2.3. When requested by the customer, a batch of pipes shall be formed of pipes manufactured of steel smelted in the same heat.

2.4. Each pipe shall be subjected to visual examination and dimensional check.

2.5.The chemical composition of the steel of the pipes shall be accepted on the basis of the steel blank

quality certificate. In case of some doubt, the steel chemical composition shall be tested.

2.6.Two pipes from a batch shall be taken for testing pipe macrostructure, mechanical properties, for bending test, for flaring test, for flattening test and for the collar formation test. The pipe steel hardness shall be tested on 2% of the pipes in a batch, but on no less than two pipes.

The hydraulic pressure test shall be performed on each pipe in accordance with clause 1.9a.

The chemical composition shall be checked on one pipe in each batch.

**(Amended Wording, Amendment No. 4).**

2.7. **(Removed. Amendment No.4).**

2.8. The pipes steel yield limit test and hardness test by Brinell shall be performed at the request of the customer.

**(Amended Wording, Amendment No. 4).**

2.9. (Removed. Amendment No.4).

2.10. In case of negative results in tests even on one of the parameters, the same parameter shall

be tested again on twice as many pipe samples from the same batch.

The results obtained in the repeated test shall be considered final and shall be applied to all the pipes in the batch.

### 3. TESTING PROCEDURE

3.1. One sample piece shall be cut from each pipe selected for all types of tests except hardness and macrostructure tests.

In the case of macrostructure test, the sample pieces shall be cut from both ends of the pipe. The statistical quality monitoring method may be used to determine the number of samples required.

3.2. The pipes shall be examined without magnifying devices. The depth of defects shall be determined by filing or by another method.

Special instruments may be used to check pipe dimensions and surface quality.

3.3. Where disputes arise over the quality of the pipe steel, the chemical composition of the steel shall be checked for compliance with the following standards: GOST 22536.0-77

through 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 12353-78, GOST 12354-81, GOST 12355-78, GOST 12356-81, GOST 12357-84, GOST 12358-82, GOST 12359-81, GOST 12360-82, GOST 12361-82, GOST 12362-79, GOST 12363-79, GOST 12364-84, GOST 12365-84 and GOST 20560-81.

3.4. The sampling for chemical composition tests shall be performed in accordance with GOST 7565-81.

3.5. The elongation test shall be performed in accordance with GOST 10006-80 on a short and proportional lengthwise sample. The steel strip samples or pipe cut samples shall be subjected to no more than 10 mm/min rate of elongation when the test is within the yield limit and no more than 40 mm/min when beyond the yield limit.

The mechanical properties of pipes made of steel grades 10, 20, 35 and 45 may be tested by non-destructive methods according to specifications and technical documentation.

When the results of the tests become a matter of dispute, the tests shall be conducted in accordance with GOST 10006-80.

**(Amended Wording, Amendment No. 3).**

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3.6. The steel hardness test shall be conducted in accordance with GOST 9012-59 on both ends of a pipe.

This test may also be carried out on samples intended for the elongation test.

The hardness test may be performed by non-destructive methods.

In case of disputes, the tests shall be performed in accordance with GOST 9012-59.

**(Amended Wording, Amendment Nos. 3 and 4).**

The pipe flattening test shall be conducted in accordance with GOST 8695-75.

3.8. When miniature ruptures or other small size defects have been detected on the flattened

samples, repeated test on another sample cut from the same pipe is allowed. Before this sample is taken for the test, it has to be cleared of the surface layer (both inside and out) to a

depth of no more than 0.2 mm on pipes less than 108 mm in diameter, and to a depth of no more than 1 mm for pipes with a diameter in excess of 114 mm.

3.9. The hydraulic pressure test on the pipes shall be conducted in accordance with GOST 3845-75; the pipes shall be subjected to pressure for no less than 10 seconds.

3.10. The bending test on the pipes shall be carried out according to GOST 3728-78.

3.11. The flaring test on the pipes shall be performed according to GOST 8694-75.

3.12. The collar formation test on the pipes shall be performed according to GOST 8693-80.

3.13. The pipe steel macrostructure shall be tested on an etched cross-cut circular sample.

**4. MARKING, PACKING, SHIPPING, AND STORAGE**

The pipe marking, packing, shipment and storage shall be performed in accordance with GOST 10692-80.

The pipes which have been granted the State Quality Symbol shall be marked according to

GOST 1.9- 67.

**(Amended Wording, Amendment No. 3).**

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**Amendment No. 6 GOST 8731-74. Seamless Hot-Rolled Steel Pipes. Technical Requirements.**

**Approved and introduced by Decree No. 397, dated Apr 15, 1992 of Gosstandart of Russia.**

**Date of Introduction: Sept 1, 1992**

The Introduction. The 2-nd and the 3-rd paragraphs shall be removed.

Clause 1.2.: Group Б shall be reworded as follows:

"Group Б: pipes made of killed steel of rated chemical composition in accordance with GOST 380-88, GOST 1050-88, GOST 4543-71 and GOST 19281-89."

Reference to GOST 380-71 shall be replaced with GOST 380-88; GOST 1050-74 with GOST 1050-88; GOST 19282-73 with GOST 19281-89.

Clause 3.2. Reference to GOST 166-80 shall be replaced with GOST 166-89; GOST 882-75 with

TU 2- 034- 225-87; GOST 7502-80 with GOST 7502-89; GOST 6507-78 with GOST 6507-90.

Clause 3.3. Reference to GOST 12344-78 shall be replaced with GOST 12344-88; GOST 12345-80 with GOST 12345-88; GOST 22536.0-77 to GOST 22536.6-77 with GOST 22536.0-87, GOST 22536.1-88, GOST 22536.2-87, GOST 22536.3-88, GOST 22536.4 -88, GOST 22536.5-87, GOST 22536.6-88; GOST 20560-81 with GOST 28473-90.

Clause 3.5. The 2-nd paragraph shall be reworded as follows:

"The mechanical properties of pipes may be tested by non-destructive methods according to specifications and technical documentation."

IUS (Standard Information Catalog) No. 7 of 1992



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Correction to GOST 8731-74 Seamless Hot-Rolled Steel Pipes. Technical Requirements.  
(see collection "Pipes metal and adapting parts for them. Part 1. Seamless smooth pipes".  
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In what place	Printed	Shall be printed
Clause 1.2. Table 2. Column "Steel grade"	40	40X

(IUS {Standards Information Catalog} No. 4, 1999)



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