



USSR STATE STANDARD

ELECTRICALLY WELDED STEEL PIPES

SPECIFICATIONS

GOST 10705-80

Official Edition

English Version Approved by Interstandard

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USSR STATE STANDARD

**ELECTRICALLY WELDED STEEL PIPES.
SPECIFICATIONS****GOST 10705-80****OKP (All-Union Product Classification Code)
13 7300 13 8100 13 8300****Date of Introduction 01.01.82**

This Standard applies to electrically welded steel straight weld pipes with external diameters from 8 to 530 mm and up to 10 mm wall thickness. The pipes shall be manufactured of carbon steel and utilized in pipelines and in constructions of various purposes.

This Standard does not apply to steel pipes that are used in the manufacture of electric heaters.

1. RANGE OF SIZES

1.1. The dimensions and maximum deviations of pipes shall be in accordance with GOST 10704-91.

2. TECHNICAL REQUIREMENTS

2.1. Electrically welded steel pipes shall be manufactured in accordance with the requirements of this Standard and shall comply with technical production schedule approved in accordance with the established procedure.

2.2. Depending on quality indicators the following groups of pipes shall be manufactured:

Group A – with standardization of mechanical properties manufactured out of killed, semi-killed and rimmed steel of grades Cт2, Cт3, Cт4 in accordance with GOST 380-88 (category 4 in accordance with GOST 16523-89, category - 1 in accordance with GOST 14637-89);

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Correction is inserted (IUS {Standards Information Catalog} No. 5, 2005)

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Б - with standardization of chemical properties manufactured out of killed, semi-killed and rimmed steel of grades Ст2, Ст3, Ст4 in accordance with GOST 380-88 and GOST 14637-89, out of killed, semi-killed and rimmed steel, grades 08, 10, 15, 20 in accordance with GOST 1050-88, and out of steel grade 08Ю in accordance with GOST 9045-80.

Б - with standardization of mechanical properties manufactured out of killed, semi-killed and rimmed steel of grades Ст2, Ст3, Ст4 in accordance with GOST 380-88 (category 4 in accordance with GOST 16523-89 and categories 2 –5 in accordance with GOST14637-89), out of killed, semi-killed and rimmed steel, grades 08, 10, 15, 20 in accordance with GOST 1050-88 for pipes with 50 mm diameter of steel grade 08Ю in accordance with GOST 9045-80.

Б - with standardization of test hydraulic pressure.

(Amended Wording, Amendment No. 4).

2.3. The pipes shall be manufactured as heat treated (along entire volume of a pipe or along its welded joint) and without heat treatment. Manufacturer shall decide the type of heat treatment along entire volume of a pipe.

The heat treatment of the pipes can be carried out in a protective atmosphere by agreement between the customer and the manufacturer.

(Amended Wording, Amendment No. 1).

2.4. The mechanical properties of heat-treated pipes must comply with the standards specified in table 1.

T a b l e 1

Steel grade	Ultimate resistance σ_u , N/mm ² (kgf/mm ²)	Yield stress σ_y , N/mm ² (kgf/mm ²)	Specific elongation δ_s , %
	not less		
08Ю	255 (26)	174 (18)	30
08кп	294 (30)	174 (18)	27
08, 08пс, 10кп	314 (32)	196 (20)	25
10, 10пс, 15кп, Ст2сп, Ст2кп, Ст2пс	333 (34)	206 (21)	24
15, 15пс, 20кп, Ст3пс, Ст3сп, Ст3кп	372 (38)	225 (23)	22
Ст4сп, Ст4пс, Ст4кп, 20, 20пс	412 (42)	245 (25)	21

N o t e : Upon the customer request the pipes with 4 mm and above wall thickness manufactured with Ст3сп, 15, 15пс, 20кп grade steel shall be manufactured with 235(24) N/mm² (kgf/mm²) yield stress, 23% specific elongation; while the pipes manufactured with Ст4сп.20, 20пс grade steel shall have 255(26) N/mm² (kgf/mm²) yield stress, 22% specific elongation.

(Amended Wording, Amendment Nos. 2, 3 and 4).

T a b l e 2

Steel grade	Ultimate resistance σ_u N/mm ² (kgf/mm ²), at external diameter of pipes D , mm				Yield Stress σ_y , N/mm ² (kgf/mm ²)	Specific elongation δ_5 , %, at external diameter of pipes D , km			
	From 8 to 19		From 20 to 60 at wall thickness			From 63 to 152	From 8 to 19	From 20 to 60 at wall thickness	
	Above 0.06 D_e	0.06 D_e and below	0.06 D_e and below						
			Above 0.08 D_e	0.06 D_e and below					
Not less									
08Ю	314 (32)	314 (32)	294 (30)	-	174 (18)	7	7	16	
08пс, 08кп	372 (38)	372 (38)	314 (32)	294 (30)	174 (18)	6	6	15	
08	372 (38)	372 (38)	314 (32)	294 (30)	186 (19)	6	6	15	
Юкп, Cr2кп	372 (38)	372 (38)	333 (34)	314 (32)	174 (18)	6	6	15	
Юпс, Cr2пс	372 (38)	372 (38)	333 (34)	314 (32)	186 (19)	6	6	15	
10, Cr2пс	372 (38)	372 (38)	333 (34)	314 (32)	196 (20)	6	6	15	
15кп	441 (45)	441 (45)	372 (38)	353 (36)	186 (19)	5	5	14	
15пс, 20кп	441 (45)	441 (45)	372 (38)	353 (36)	196 (20)	5	5	14	
15, 20пс	441 (45)	441 (45)	372 (38)	353 (36)	206 (21)	5	5	14	
20	441 (45)	441 (45)	372 (38)	353 (36)	216 (22)	5	5	14	
Cr3кп	441 (45)	441 (45)	392 (40)	372 (38)	196 (20)	5	5	13	
Cr3пс	441 (45)	441 (45)	392 (40)	372 (38)	206 (21)	5	5	13	
Cr3кп	441 (45)	441 (45)	392 (40)	372 (38)	216 (22)	5	5	13	
Cr4кп	490 (50)	490 (50)	431 (44)	412 (42)	216 (22)	4	4	11	
Cr4пс	490 (50)	496 (50)	431 (44)	412 (42)	225 (23)	4	4	11	

Note: At the customer's request the specific elongation shall be increased by 3% as compared to the standards indicated in table 2 for pipes of all steel grades with diameter from 8 to 60 mm

T a b l e 3

Steel grade	Wall thickness, mm	Ultimate resistance σ_u N/mm ² (kgf/mm ²)	Yield stress σ_y , N/mm ² (kgf/mm ²)	Specific elongation δ_5 , %, for external diameter of pipes D , mm		
				From 159 to 246	From 273 to 377	From 402 to 530
				Not less		
08пс, 08кп 10, 10пс, 10кп, Ст2кп	6 and below	314 (32)	196 (20)	18	20	20
	More than 6			15		
Ст2сп, Ст2кп	6 and below	333 (34)	206 (21)	17	18	20
	More than 6			14		
15, 15пс, 15кп, 20, 20пс, 20кп	6 and below	353 (36)	216 (22)	17	18	20
	More than 6			14		
Ст3сп, Ст3пс, Ст3кп	6 and below	353 (36)	216 (22)	17	17	19
	More than 6			14		
Ст4сп, Ст4пс, Ст4кп	6 and below	402 (41)	225 (23)	15	17	18
	More than 6			11		

(Amended Wording, Amendment Nos. 1, 3 and 4).

2.5. Mechanical properties of base metal of the pipes of 8 to 152 mm inclusive external diameter without heat treatment and with heat treatment of a weld joint shall meet standards specified in table 2. Mechanical properties of base metal of the pipes of 159 to 530 mm inclusive external diameter without heat treatment and with heat treatment of a weld joint shall meet standards specified in table 3.

2.6. Cracks, laps, scabs and notches are not allowed on the surface of the pipes.

Ripple markings, nicks, dents, shallow notches, scale layer and traces of trimming are allowed provided maximum deviations of the wall thickness and diameter of the pipe are not violated. The offset of edges up to 10% of nominal wall thickness is allowed.

The surface of pipes that underwent heat treatment in protective atmosphere must not bear traces of trimming. Oxide scum is allowed.

Incomplete fusion of welds must be sealed and welded area must be trimmed.

(Amended Wording, Amendment Nos. 1 and 4).

2.7. One cross-sectional weld is allowed on pipes are 57 mm and above in diameter.

2.8. The external flash on the pipes must be removed. Wall thinning for 0.1 mm above minimal tolerance shall be allowed on the place of burring.

At the customer's request internal flash must be partly removed or flattened on the pipes with 33 mm and above internal diameter. In this case the height of a flash or its traces must not exceed 0.35 mm – at wall thickness below 2 mm; 0.4 mm – at wall thickness from 2 up to 3 mm; 0.5 mm - at wall thickness above 3 mm.

For pipes with internal diameter below 3 mm the height of internal flash or its traces shall be established by the agreement between the manufacturer and the customer.

(Amended Wording, Amendment Nos. 1 and 3).

2.9. The ends of pipes must be cut at right angle and deburred. Facets are allowed. For up to 219 mm diameter pipes slope of cutting shall not exceed 1 mm; for the pipes with diameter 219 mm and above slope of cutting shall not exceed 1.5 mm. The pipes shall be cut in the mill line in the process of manufacturing by the agreement between the manufacturer and the customer

(Amended Wording, Amendment No. 3).

2.10. Upon the customer request the facet positioned at a 25 – 30° angle to the end of the pipe shall be removed, and the end ring of 1.8 mm ±0.8 mm shall be left at the end of pipes with 5 mm and above wall thickness. By the agreement between the manufacturer and the customer the slope angle and width of end ring may be changed.

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2.11 Pipes must pass the following values of hydraulic test pressure:
for up to 102 mm diameter pipes – not less than 6.0 MPa (60 kgf/cm²)
for 102 mm and above diameter pipes - not less than 3.0 MPa (30 kgf/cm²).

At the customer's request the pipes of groups A and B must be capable of passing hydraulic test pressure in compliance with requirements of GOST 3845-75 at permissible stress equal to 40% of critical point, or to 90% of yield stress for the given grade of steel but not exceeding 20 MPa (200 kg-f/cm²).

(Amended Wording, Amendment No.3).

2.12. Heat-treated pipes made of Ст3сп, Ст3пс (categories 3 to 5), 08, 10, 15, 20 grades of steel and having 6 mm minimum wall thickness must pass impact testing. The standards of impact strength for base metal of pipes made of 08 and 20 grades of steel shall be optional until 01.01.91.

Standards of impact strength for base metal of pipes made of Ст3сп, Ст3пс (categories 3 to 5), 10, 15 and 20 grades of steel must meet the standards are specified in table 4.

Table 4

Steel grade	Impact strength KCU, J/cm ² (kg-f-m/cm ²), temperature of testing, °C		
	20	-20	20 (after mechanical aging)
	no less than		
Ст3сп, Ст3пс (Categories 3 to 5), 10, 15, 20	78.4 (8)	39.2 (4)	39.2 (4)

(Amended Wording, Amendment Nos. 1, 4).

2.13. Up to 152 mm diameter inclusive heat-treated pipes, and 20 to 152 mm diameter non-heat treated pipes with 0.06 D_H and below wall thickness, as well as pipes with heat treated weld joint must pass collapse testing.

Collapse testing of heat-treated pipes shall be carried out until a calculated interval between flattening planes is reached. The value of the interval (H) in mm shall be derived from the formula

$$H = \frac{(1+a)s}{a + \frac{s}{D}},$$

where s is the standard wall thickness in mm;

D is the standard external diameter of a pipe in mm;

n is the ratio, which is equal to 0.09 for pipes made of 08Ю, 08кп, 08пс, 08, 10кп, Ст2кп grades of steel; and equal to 0.08 for the pipes made of other grades of steel.

Collapse testing of non-heat treated pipes must be carried out until the interval equal to $2/3 D_H$ is reached. Collapse testing of pipes with heat treated weld joint must be carried out until the interval equal to $1/2 D_H$ is reached.

At the customer's request the collapse testing of 159 to 530 mm diameter heat treated pipes must be carried out until the interval equal to $2/3 D_H$ is reached.

(Amended Wording, Amendment Nos.1, 3, 4).

2.14. Up to 108 mm diameter pipes must pass flaring testing.

Non-heat treated up to 20 mm diameter pipes, and 20 to 60 mm diameter pipes with over $0.06 D_H$ wall thickness are not subject to flaring testing.

The expansion of the external diameter of heat treated pipes in the process of flaring must meet the standards specified in table 5.

Table 5.

Steel grade	Increase of external diameter of pipes, in %, at wall thickness	
	up to 4 mm	4 mm and above
08Ю, 08, 08кп, 08пс	12	8
10, 10кп, 10пс, 15, 15кп, 15пс, Ст2	10	7
20, 20кп, 20пс, Ст3, Ст4	8	6

Minimum increase of the external diameter of the non-heat treated pipes in the process of flaring must be 6%.

At the customer's request, in the process of flaring the minimum increase of the outer diameter of the heat treated pipes with 4 mm wall thickness that are made of 10кп, Ст2кп grade steel must be 12%.

(Amended Wording, Amendments Nos.1, 3, 4).

2.15 At the customer's request the pipes must pass testing stipulated in clauses 2.16 to 2.18.

2.16. Up to 530 mm inclusive heat treated pipes must pass bend testing. Minimum bend radius for up to 60 mm diameter pipes must be $2.5 D_H$, for base metal of over 60 mm to 530 mm diameter pipes shall be in compliance with GOST 3728-78. The value of bend radius can be decreased by agreement between the manufacturer and the customer.

(Amended Wording, Amendment No.1).

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2.17. 30 to 159 mm diameter heat treated pipes with D/s ratio equal to 12.5 and above must pass flange test. Minimum width of a flange as measured from the internal surface must be 12% of the inner diameter of a pipe and not less than 1.5 times of wall thickness.

The flange angle must make:

90° - for the pipes made of 08, 10, 15, Cт2 grades of steel;

60° - for the pipes made of 20, Cт3, Cт4 grades of steel.

2.18. 50 mm and over diameter pipes of groups A and B must pass the weld joint tension test.

Critical point of a weld joint of 219 to 530 mm diameter pipes that underwent heat treatment over entire volume of a pipe or only of a weld joint must meet the standards specified in table 1. Critical point of a weld joint of 50 to 203 mm diameter pipes that underwent heat treatment over entire volume of a pipe or only of a weld joint must be at least 0.9 against the standards specified in table 1.

Critical point of a weld joint of 50 mm and above diameter pipes that were not subject to heat treatment must meet the standards specified in tables 2 and 3.

(Amended wording, Amendment Nos.1 and 3).

2.19. Pipes must be hermetically sealed.

(Amended Wording, Amendment No.3).

3. ACCEPTANCE PROCEDURE

3.1. Pipes shall be accepted in batches. A batch shall consist of pipes of the same size, same steel grade, same type of heat treatment and same group of manufacturing, and shall be accompanied by one quality certificate, in compliance with GOST 10692-80 with the addition that the chemical composition of steel in accordance with the manufacturer's quality certificate.

Maximum quantity of pipes in a batch must be:

1,000 pieces – for up to 30 mm diameter pipes;

600 pieces – for 30 to 76 mm diameter pipes;

400 pieces – for 76 to 152 mm diameter pipes;

200 pieces – for over 156 mm diameter pipes.

(Amended Wording, Amendment No.1).

3.2. Where disputes arise over the evaluation of quality of chemical composition, at least one pipe of each batch shall be selected for testing.

3.3. Each pipe shall be subject to dimensions and pipe surface monitoring. Random monitoring of dimensions and pipe surface in each batch providing single-stage normal monitoring level in compliance with requirements of GOST 18242-72 is allowed. Monitoring plans shall be established by the agreement between the customer and the manufacturer.

(Amended Wording, Amendment No. 3).

3.3a. The welds of pipes belonging to groups A, B and B are 100% subject to non-destructive control. Group Д pipes are subject to non-destructive control or hydraulic pressure test.

While monitoring weld quality by non-destructive methods, 15% of the pipes of the same batch shall be monitored by an additional hydraulic pressure test.

The hydraulic pressure testing may be skipped by agreement between the customer and the manufacturer,

(Subsequently Inserted, Amendment No. 3).

3.4. 2% of pipes from a batch shall be selected to measure the height of internal flash.

3.5. Two pipes from a batch shall be selected for test on flattening, expansion, edging, bend, impact number, base metal strain aging aptitude, tension of base metal and weld.

Yield stress of base metal of the pipes shall be measured at the customer's request.

The measurement of impact number may be skipped at the customer's request.

The pipes which underwent flattening testing shall not be subject to expansion testing.

(Amended Wording, Amendment No. 1).

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

The results of re-testing shall be assigned to the entire batch.

Incomplete fusion of welds shall be sealed and the welded area must be trimmed.

3.7. The welded areas must be monitored by methods of non-destructive control or repeated hydraulic tests of the pipe.

(Subsequently Inserted, Amendment No. 1)

4. TEST METHODS

4.1. To carry out quality control, one sample for each type of test shall be cut out of each selected pipe, for impact number testing three samples for each test temperature shall be cut out of each selected pipe.

4.2. The chemical composition of steel shall be determined in accordance 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 12344-88, GOST 12345-88, GOST 12346-78, GOST 12347-77, TOCT 12348-78, GOST 12349-83, GOST 12350-78, GOST 12351-81, GOST 12352-81, GOST 12353-78, GOST 12354-81. Samples for determining the chemical composition shall be taken in accordance with GOST 7565-81.

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4.3. The surface of the pipes shall be inspected visually. The depth of defects shall be inspected by notching or by some other method.

It is allowed to monitor pipe surfaces and sizes by non-destructive methods on the basis of technical documentation.

(Amended Wording, Amendment No. 1).

4.4. The measurement of pipes shall be carried out as follows:

length – using measuring tape in accordance with GOST 7502-89;

external diameter and ovality – using adjustable external gage in accordance with GOST 2216-84, or a slide gage in accordance with GOST 166-88, or a micrometer in accordance with GOST 6507-89;

internal diameter – using an internal gage in accordance with GOST 14810-69, or caliber in accordance with GOST 2015-84, or by a subtraction of a figure representing doubled wall thickness from the external diameter;

curvatures – using a leveling ruler in accordance with GOST 8026-92 and a test rod;

wall thickness, variations in wall thickness and height of internal flash - using a micrometer in accordance with GOST 6507-90 or pipe-thickness gage in accordance with GOST 11358-89;

offset of edges – using template based on technical documentation, or micrometer in accordance with GOST 6507-90, or depth gage in accordance with GOST 162-90;

slope of cutting shall be ensured by the design of the equipment for processing pipe ends, the angle of facet slopes - with an angle gage in accordance with GOST 5378-88. In case of discrepancy in quality evaluation, the slope of cutting shall be measured with a square and a test rod;

face ring on the ends of pipes – using a ruler in accordance with GOST 427-75;

depth of surface defects – using a depth gage in accordance with GOST 162-90.

For pipes with 35 and below ratio of external diameter to wall thickness D_e/S_e , the measurement of the external diameter of a pipe shall be carried out at a distance of no less than 15 mm from pipe end for pipes with 35 to 75 ratio of D_e/S_e , the measurement shall be conducted at a distance of no less than $2/3 D_e$; and on a distance of no less than D_e - for pipes with D_e/S_e ratio exceeding 75.

(Amended Wording, Amendment Nos. 1 and 3).

4.5. The impact bending test shall be carried out on axial samples type 3 in accordance with GOST 9454-78, cut out of the section of a pipe located approximately at a 90° angle to the weld.

The impact number shall be calculated as the arithmetic mean value based on the results of testing of three samples. A decrease of the impact number by $9.8 \cdot 10^4$ Joule/m² (1 kgf·m/cm²) is allowed on one of the samples.

The customer shall select the temperature of the impact bending test of pipes manufactured with steel grades 08, 10, 15 and 20.

(Amended Wording, Amendment No. 1).

4.6. Pipe base metal tendency towards mechanical aging shall be determined in accordance with GOST 7268-82. Sample correction by static load is allowed.

4.7. The elongation test shall be carried out in accordance with GOST 10006-80 on the axial (as a strip or cut of a pipe) proportional short sample.

When conducting testing on cross-sectional samples, a sample shall be cut out of a pipe section located at a 90° angle to the weld, the calculated section of the sample is not subject to flattening.

It is allowed to monitor ultimate resistance, yield stress and specific elongation by methods of non-destructive monitoring instead of carrying out an elongation test.

In case disputes arise, testing shall be carried out in accordance with GOST 10006-80.

(Amended Wording, Amendment No. 1).

4.8. Flattening test shall be carried out in accordance with GOST 8695-75.

4.9. Expansion test shall be carried out in accordance with GOST 8694-75 at a 30° angle tapered expander. It is allowed to use expanders with 1:10 taper and to remove the flash on the expansion section.

(Amended Wording, Amendment No. 3).

4.10. The bend test shall be carried out in accordance with GOST 3728-78. 114 mm diameter pipes shall be tested on 12 mm wide cut axial strips.

4.11. Edging test shall be carried out in accordance with GOST 8693-80. Flash removal is allowed in beading section.

4.12. Ultimate resistance of the welded joints of 50 – 530 mm diameter pipes shall be measured on ring samples on the basis of technical documentation.

For 219 mm and above diameter pipes testing is allowed to be carried out in accordance with GOST 6996-66 on type XII samples with the removed reinforcement of a welded joint, cut perpendicularly to the pipe axis with static load applied during sample correction.

4.13. Hydraulic test of pipes shall be carried out in accordance with GOST 3845-75, endurance under pressure 5 seconds.

4.14. A weld shall be monitored by methods of non-destructive monitoring (ultrasonic, eddy current, magnetic or equivalent X-ray method) on the basis of technical documentation.

8. MARKING, PACKING, TRANSPORTATION AND STORAGE

5.1. Marking, packing, transportation and storage shall be carried out in accordance with GOST 10692-80.

DETAILS

1. DEVELOPED AND SUBMITTED by the USSR Ministry of Ferrous Metallurgy

DEVELOPERS:

M. M. Bernshtein, N. F. Kuzenko

2. APPROVED AND INTRODUCED by Decree No. 5970 of the USSR State Committee for Standards, dated 25.12.80,

3. IN PLACE OF GOST 10705-63

4. REFERENCE DOCUMENTATION

Number of reference document referred to	Number of clause	Number of reference document referred to	Number of clause
GOST 162-90	4.4	GOST 11358-89	4.4
GOST 166-89	4.4	GOST 12344-88	4.2
GOST 380-2005	2.2	GOST 12345-88	4.2
GOST 427-75	4.4	GOST 12346-78	4.2
GOST 1050-88	2.2	GOST 12347-77	4.2
GOST 2015-84	4.4	GOST 12348-78	4.2
GOST 2216-84	4.4	GOST 12349-83	4.2
GOST 3728-78	2.16, 4.10	TOCT 12350-78	4.2
GOST 3845-75	2.11, 4.13	GOST 12351-81	4.2
GOST 5378-88	4.4	GOST 12352-81	4.2
GOST 6507-90	4.4	GOST 12353-78	4.2
GOST 6996-66	4.12	GOST 12354-81	4.2
GOST 7268-82	4.6	GOST 14637-89	2.2
GOST 7502-89	4.4	GOST 14810-69	4.4
GOST 7565-81	4.2	GOST 16523-89	2.2
GOST 8026-92	4.4	GOST R ISO 2859-1-2007	3.3
GOST 8693-80	4.11	GOST 22536.0-87	4.2
GOST 8694-75	4.9	GOST 22536.1-88	4.2
GOST 8695-75	4.8	GOST 22536.2-87	4.2
GOST 9045-80	2.2	GOST 22536.3-88	4.2
GOST 9454-78	4.5	GOST 22536.4-88	4.2
GOST 10006-80	4.7	GOST 22536.5-87	4.2
GOST 10692-80	3.1, 5.1	GOST 22536.6-88	4.2
GOST 10704-91	1.1		

5. REVISED EDITION (June, 1993) with Amendment Nos. 1, 2, 3, 4, approved in December, 1986, December, 1987, June, 1989, July, 1991 (IUS (Standard Information Catalog) 2-87, 3-88, 10-89, 10-91).

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Amendment No. 5 to GOST 10705-80 Electrically Welded Steel Pipes. Specifications

Accepted by Interstate Council for Standardization, Metrology and Certification (Protocol No. 13, dated 28.05.98)

Registered by Technical Secretariat of Interstate Council No. 3166

Votes in favor:

State	National Standards Body
Republic of Azerbaijan	Azgosstandart
Republic of Armenia	Armgosstandart
Republic of Belarus	Belstandart
Republic of Kazakhstan	Gosstandart of the Republic of Kazakhstan
Republic of Kirghizia	Kirghizstandart
Republic of Moldova	Moldovstandart
Russian Federation	Gosstandart of Russia
Republic of Tadjikistan	Tadjikgosstandart
Turkmenistan	Head State Inspectorate of Turkmenistan
Ukraine	Gosstandart of Ukraine

Introduction. The first paragraph shall be reworded as follows:

“This Standard applies to electrically welded steel straight-line-seam pipes from 8 to 530 mm in diameter. The pipes shall be manufactured from carbon steel and low-alloyed steel, applied in pipelines and structures of various purpose”.

Clauses 2.2 to 2.6 shall be reworded as follows:

“2.2. Depending on quality indicators the following groups of pipes shall be manufactured:

Group A – With standardization of mechanical properties, manufactured from killed, semi-killed and rimmed steel of grades CT1, CT2, CT3 and CT4 in accordance with GOST 380-94 (category 4 in accordance with GOST 16523-89 and category 1 in accordance with GOST 14637-89);

Group B - With standardization of chemical composition, manufactured from killed, semi-killed and rimmed steel of grades CT1, CT2, CT3, CT4 in accordance with GOST 380-94 and GOST 14637-89, from killed, semi-killed and rimmed steel of grades 08, 10, 15 and 20 in accordance with GOST 1050-88, from steel of grade 08Ю in accordance with GOST 9045-93 and from low-alloyed steel of grade 22ГЮ with chemical composition specified in table 1a (for pipes from 140 to 426 mm in diameter).

Group B - With standardization of mechanical properties, manufactured from killed, semi-killed and rimmed steel of grades CT1, CT2, CT3 and CT4 in

accordance with GOST 380-94 (category 4 in accordance with GOST 16523-89 and categories 2 to 5 in accordance with GOST 14637-89), from killed, semi-killed and rimmed steel of grades 08, 10, 15 and 20 in accordance with GOST 1050-88, from steel of grade 08Ю in accordance with GOST 9045-93 and from low-alloyed steel of grade 22ГЮ with chemical composition specified in table 1a (for pipes from 140 to 426 mm in diameter).

Group Г - With standardization of test hydraulic pressure.

2.3. The pipes shall be manufactured as heat treated (along the entire pipe volume or along its welded joint), hot-reduced and without heat treatment.

The manufacturer shall choose the type of heat treatment along the entire pipe volume.

The heat treatment of pipes may be carried out in protective atmosphere by agreement between the customer and the manufacturer.

The pipes made from steel of grade 22ГЮ shall be manufactured as heat-treated along their welded joint or along the entire volume; the pipes made from steel of grade Cт1 shall be manufactured without heat treatment.

Table 1a

Steel grade	Element Mass Fraction, in percentage									
	Carbon	Silicon	Manganese	Aluminum	Titanium	Chromium	Nitrogen	Calcium	Sulfur	Phosphorus
22ГЮ	0.15 to 0.22	0.15 to 0.30	1.20 to 1.40	0.02 to 0.05	0.03	0.4	0.012	0.02	0.01	0.02

2.4. Mechanical properties of parent metal of heat-treated and hot-reduced pipes manufactured from carbon steels shall comply with the norms specified in table 1. Mechanical properties of heat-treated pipes manufactured from steel of grade 22ГЮ shall be established by agreement between the parties.

Table 1

Steel grade	Point of maximum load σ_m , in N/mm ² (kgf/mm ²)	Yield stress σ_y , in N/mm ² (kgf/mm ²)	Percent elongation δ_5 , in %
	no less than		
08Ю	255 (26)	174 (18)	30
08кп	294 (30)	174 (18)	27
08, 08пс, 10кп, 10, 10пс, 15кп,	314 (32)	196 (20)	25
Ст2сп, Ст2пс and Ст2кп, 15, 15пс, 20кп,	333 (34)	206 (21)	24
Ст3сп, Ст3пс and Ст3кп, 20, 20пс, Ст4сп,	372 (38)	225 (23)	22
Ст4пс and Ст4кп	412 (42)	245 (25)	21

N o t e : At the customer's request the pipes with 4 mm and more wall thickness, made from steel of grades Ст3сп, 15, 15пс and 20кп shall have the yield stress of 235 N/mm² (24 kgf/mm²) and percent elongation equal to 23%. The same pipes made from steel of grades Ст4сп, 20 and 20пс shall have the yield stress of 255 N/mm² (26 kgf/mm²) and percent elongation equal to 22%.

2.5. Mechanical properties of parent metal of the pipes from 10 to 152 mm in diameter inclusive without heat treatment and with heat treatment of a weld joint shall comply with the norms specified in table 2. Mechanical properties of parent metal of the pipes over 152 to 530 mm in diameter inclusive without heat treatment and with heat treatment of a weld joint shall comply with the norms specified in table 3.

2.6. Cracks, laps, scabs and notches are not allowed on the surface of the pipes.

Pitted surface, nicks, dents, small grooves, slag layer and traces of trimming are allowed provided that maximum deviations of the pipe wall thickness and diameter are not exceeded. The edges offset up to 10% of the nominal wall thickness is allowed.

The surface of pipes, heat-treated in protective atmosphere, shall not have a slag. Oxide film on the pipe surface is allowed.

The places of seams fusion lack shall be welded and the welded area shall be trimmed. The offset of welded edges for no more than 20% of the nominal wall thickness and the height of reinforcing bead of no more than 2.5 mm on the pipes of 159 mm and more in diameter in places of welding repair of the seams is allowed by agreement with the customer.

Table 2

Steel grade	Point of maximum load σ_m , in N/mm ² (kgf/mm ²), for external pipe diameter D , in mm		Yield stress σ_y , in N/mm ² (kgf/mm ²)	Percent elongation σ_5 , in %, for external pipe diameter equal to D , in mm	
	from 10 to 19	over 19 to 60		10 to 60 for wall thickness equal to	
				more than 0.06 D	0.06 D and less
no less than					
08Ю	314 (32)	294 (30)	176 (18)	7	16
08пс, 08кп, Cr1пс and 08 and Cr1кп	372 (38)	314 (32)	176 (18)	6	15
10кп and Cr2кп	372 (38)	314 (32)	186 (19)	6	15
10пс and Cr2пс	372 (38)	333 (34)	176 (18)	6	15
10 and Cr2кп	372 (38)	333 (34)	186 (19)	6	15
15кп	372 (38)	333 (34)	196 (20)	6	15
15пс and 20кп	441 (45)	372 (38)	186 (19)	5	14
15 and 20пс	441 (45)	372 (38)	196 (20)	5	14
20	441 (45)	372 (38)	206 (21)	5	14
Cr3кп	441 (45)	372 (38)	216 (22)	5	14
Cr3пс	441 (45)	392 (40)	196 (20)	5	13
Cr3кп	441 (45)	392 (40)	206 (21)	5	13
Cr4кп	441 (45)	392 (40)	216 (22)	5	13
Cr4кп and 22ГЮ	490 (50)	431 (44)	216 (22)	4	11
	490 (50)	431 (44)	225 (23)	4	11
	—	490 (50)	344 (35)	—	—

Note. At the customer's request the percent elongation for pipes of all steel grades from 10 to 60 mm in diameter may be increased by 3% in comparison with the norms specified in table 2

Table 3

Steel grade	Wall thickness, in mm	Point of maximum load σ_m , in N/mm ² (kgf/mm ²)	Yield stress σ_y , in N/mm ² (kgf/mm ²)	Percent elongation σ_5 , in %, for pipes diameter equal to D , in mm		
				over 152 to 244.5	over 244.5 to 377	over 377 to 530
				no less than		
08, 08пс and 08кп	6 and less	—	—	18	20	20
	More than 6	314 (32)	196 (20)	15	15	16
10, 10пс, 10кп, Ст2кп Ст2сп and Ст2пс	6 and less	—	—	17	18	20
	More than 6	333 (34)	206 (21)	14	14	15
15, 15пс, 15кп, 20, 20пс and 20кп	6 and less	353 (36)	216 (22)	17	18	20
	More than 6			14	14	15
Ст3сп, Ст3пс and Ст3кп	6 and less	353 (36)	216 (22)	17	17	19
	More than 6			14	14	14
Ст4сп, Ст4пс and Ст4кп	6 and less	402 (41)	225 (23)	15	17	18
	More than 6			11	12	13
22ГЮ	Any thickness	490 (50)	344 (35)	15	15	15

Repair of pipes parent metal by means of welding is not allowed.

In case of welding repair of heat-treated pipes they shall be subjected to repeated heat treatment (accordingly along the whole volume or the welded joint)".

Clause 2.7 shall be supplemented with the following paragraph:

"A single transverse joint on the pipes of less than 57 mm in diameter is allowed by agreement between the customer and the manufacturer".

Clauses 2.11, 2.12 and 2.13 shall be reworded as follows:

"2.11. Pipes shall withstand the test hydraulic pressure. Depending on test pressure value the pipes are subdivided into two types:

Type I includes the pipes up to 102 mm in diameter, that shall withstand the test pressure of 6.0 MPa (60 kgf/cm²), and the pipes of 102 mm and more in diameter, that shall withstand the test pressure of 3.0 MPa (30 kgf/cm²).

Type II includes the pipes of groups A and B, supplied at the customer's request with hydraulic test pressure, calculated in accordance with GOST 3845-75, with permissible stress equal to 90% of normative yield stress for pipes manufactured from the given steel grade, but not exceeding 20 MPa (200 kgf/cm²).

2.12. Heat-treated pipes manufactured from steel of grades Ст3сп, Ст3пс (categories 3 to 5), 10, 15 and 20 with wall thickness of no less than 6 mm shall withstand the test for impact bending of parent metal. And in this case and the norms of impact strength shall correspond to those specified in table 4.

Table 4

Steel grade	Impact strength KCU, in J/cm ² (kgf·m/cm ²), at the following test temperature, in °C		
	+20	-20	+20 (after mechanical ageing)
	no less than		
Ст3сп, Ст3пс, (categories 3 to 5), 10, 15 and 20	78.4 (8)	39.2 (4)	39.2 (4)

Test for impact bending of parent metal of heat-treated pipes manufactured from steel of grade 22ГЮ shall be carried out at the customer's request, and the norms for impact strength shall be established by agreement between the parties.

2.13. Heat-treated pipes of up to 152 mm in diameter inclusive, hot-reduced and non-heat treated pipes over 20 to 152 mm in diameter with wall thickness equal to 0.06 D_H and less, as well as the pipes with heat-treated weld joint shall withstand the flattening test.

The flattening of heat-treated pipes shall be carried out until reaching the interval between flattening planes H , in mm, calculated using the formula:

$$H = \frac{(1 + a) \cdot S}{a + \frac{S}{D_H}} \quad (1)$$

where a is the factor equal to 0.09 for pipes manufactured from steel of grades 08Ю, 08кП, 8пс, 08, 10кП and Ст2кП, and the factor equal to 0.08 for pipes manufactured from other steel grades;

S is the nominal wall thickness, in mm;

D_H is the nominal external diameter of a pipe, in mm.

The flattening of non-heat treated pipes shall be carried out until the interval equal to $2/3 D_H$ is reached. The flattening of pipes with heat-treated weld joint shall be carried out until the interval equal to $1/2 D_H$ is reached.

At the customer's request the flattening of heat-treated pipes over 152 to 530 mm in diameter shall be carried out until the interval equal to $2/3 D_H$ is reached".

Clauses 3.3a and 3.7 shall be reworded as follows:

"3.3a. The welds of pipes belonging to groups A, Б and В shall be subjected to 100% non-destructive inspection.

(Correction)

When executing the non-destructive inspection along the whole pipe perimeter the hydraulic testing of pipes of the Ist type may be omitted.

Each pipe may be tested by increased hydraulic pressure instead of non-destructive inspection for the welds of pipes of the Ist type. The pressure shall be calculated according to the requirements of GOST 3845-75 for permitted stress equal to 85 % of the yield stress for the pipes of 273 mm and more in diameter and 75 % of the yield stress for the pipes of less than 273 mm in diameter. But the permitted stress shall not exceed 12 MPa (120 kgf/cm²).

Pipes belonging to E group shall be tested by hydraulic pressure or the pipes welds shall be inspected by means of non-destructive methods.

3.7. Places of weld sealing for pipes belonging to A, Б and В groups shall be inspected by non-destructive methods, and the repaired pipes shall be tested by hydraulic pressure according to the requirements of Clause 3.3a of this Standard.

Places of weld sealing for pipes belonging to Д group shall be inspected by non-destructive methods, or the repaired pipes shall be tested by hydraulic pressure".

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