USSR STATE STANDARD

OIL WELL PIPES AND PIPE COUPLINGS

SPECIFICATIONS

GOST 633-80

Official Edition

USSR STATE COMMITTEE FOR STANDARDS
Moscow

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USSR STATE STANDARD

OIL WELL PIPES AND PIPE COUPLINGS

Specifications

GOST 633-80*

In place of GOST 633-63

OKP (All-Union Product Classification Code) 13 2700

The date of introduction is set by Decree No. 1658, dated April 11, 1980, of the USSR State Committee for Standards

From 01.01.83

regarding modification *A* pipes **From 01.01.84**

Reviewed in 1985. Term extended by Gosstandart Decree No. 175, dated 24.01.86

until 01.01.93

Failure to comply with this Standard will result in legal proceedings

This Standard applies to oil-well steel pump and compressor seamless plain pipes and couplings to them, external-upset pipes and couplings to them, plain tight-joint pipes and couplings to them, as well as integral-joint external-upset pipes used in oil and gas well operation.

This Standard establishes technical level parameters for premium (modification *A* pipes) and first (modification *Б* pipes) quality grades.

1. RANGE OF SIZES

1.1. Pipes covered by this Standard shall be manufactured in two modifications, differing in accuracy and quality, (*A* and *Б*).

The range of pipes sizes is listed in table 1.

1.2. The dimensions and weights of pipes and couplings to them shall be as indicated in fig. 1 and table 2 for plain pipes and couplings to them; fig. 2 and table 3 for external-upset pipes (B) and couplings to them; and fig. 3 and table 4 for plain tight-joint pipes (НКМ) and couplings to them. The dimensions and weights of integral-joint external-upset pipes (НКБ) shall be as specified in fig. 4 and table 5.

** Revised Edition (July 1987) incorporating Amendment Nos. 1 and 2 approved in September 1983 and January 1986 (IUS (Standards Information Catalog) 11-83, 5-86).*

Table 1

Range of Pipes Sizes

Pipes nominal diameter, mm	Wall thickness, mm	Pipes type			
		plain	external-upset (B)	plain tight-joint (НКМ)	integral-joint external-upset (НКБ)
27	3.0	–	ДКЕ	–	–
33	3.5	ДКЕ	ДКЕ	–	–
42	3.5	ДКЕ	ДКЕ	–	–
48	4.0	ДКЕ	ДКЕ	–	–
60	5.0	ДКЕ	ДКЕЛМР	ДКЕЛМР	ДКЕЛМР
73	5.5	ДКЕЛМР	ДКЕЛМР	ДКЕЛМР	ДКЕЛМР
	7.0	ДКЕЛМР	ДКЕЛМР	ДКЕЛМР	ДКЕЛМР
89	6.5	ДКЕЛМР	ДКЕЛМР	ДКЕЛМР	ДКЕЛМР
	8.0	–	ДКЕЛМР	ДКЕЛМР	ДКЕЛМР
102	6.5	ДКЕЛМР	ДКЕЛМР	ДКЕЛМР	ДКЕЛМР
114	7.0	ДКЕЛМР	ДКЕЛМР	ДКЕЛМР	ДКЕЛМР

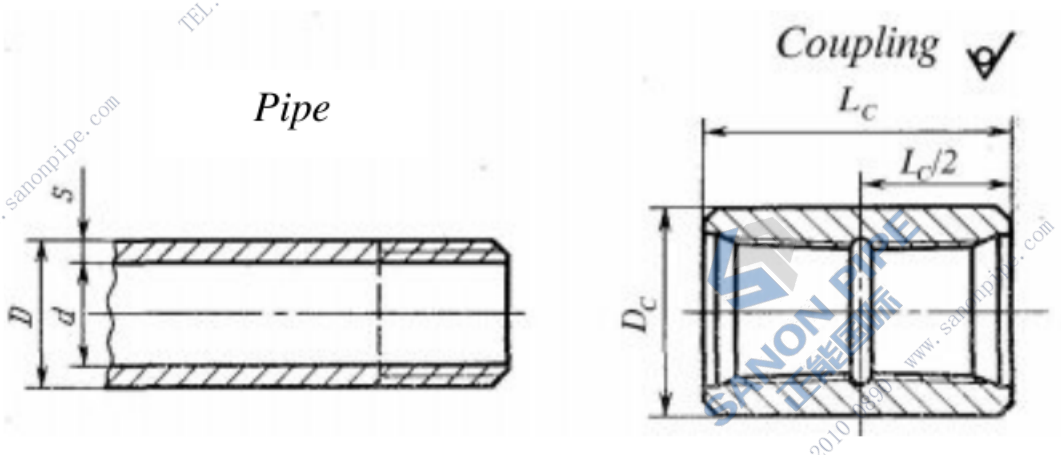


Fig. 1

Table 2

Plain pipes and couplings to them

Dimensions in mm

Pipes nominal diameter	Pipes				Coupling		
	External diameter D	Wall thickness s	Internal diameter d	Weight, kg/m	External diameter D_C	Length L_C	Weight
33	33.4	3.5	26.4	2.6	42.2	84	0.4
42	42.2	3.5	35.2	3.3	52.2	90	0.6
48	48.3	4.0	40.3	4.4	55.9	96	0.5
60	60.3	5.0	50.3	6.8	73.0	110	1.3
73	73.0	5.5	62.0	9.2	88.9	132	2.4
		7.0	59.0	11.4			
89	88.9	6.5	75.9	13.2	108.0	146	3.6
102	101.6	6.5	83.6	15.2	120.6	150	4.5
114	114.3	7.0	100.3	18.5	132.1	156	5.1

Note. At the customer's request, pipes of modification *Б* shall be produced up to group of strength E inclusive, with ends heat-hardened to a minimum length of thread length L plus 50 mm.

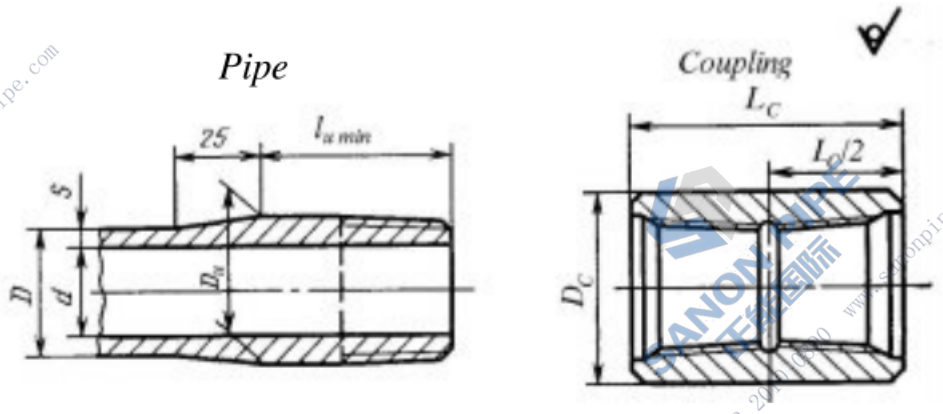


Fig. 2

Table 3

External upset pipes and couplings to them (B)

Dimensions in mm

Pipes nominal diameter	Pipes							Coupling		
	External diameter D	Wall thickness s	Internal diameter d	Upset external diameter D_u (max. deviation +1.5)	Upset portion length $l_{u\,min}$	Plain portion weight, kg/m	Weight increase due to two end upsets, kg	External diameter D_C	Length L_C	Weight, kg
27	26.7	3.0	20.7	33.4	40	1.8	0.1	42.2	84	0.4
33	33.4	3.5	26.4	37.3	45	2.6	0.1	48.3	90	0.5
42	42.2	3.5	35.2	46.0	51	3.3	0.2	55.9	96	0.7
48	48.3	4.0	40.3	53.2	57	4.4	0.4	63.5	100	0.8
60	60.3	5.0	50.3	65.9	89	6.8	0.7	77.8	126	1.5
73	73.0	5.5	62.0	78.6	95	9.2	0.9	93.2	134	2.8
		7.0	59.0			11.4				
89	88.9	6.5	75.9	95.2	102	13.2	1.3	114.3	146	4.2
		8.0	72.9			16.0				
102	101.6	6.5	88.6	108.0	102	15.2	1.4	127.0	154	5.0
114	114.3	7.0	100.3	120.6	108	18.5	1.6	141.3	160	6.3

Note. A manufacturing taper, not larger that 1 : 50, is allowable in the pipe interior at a distance of ($L_{u\,min}$ + 25) mm from the end

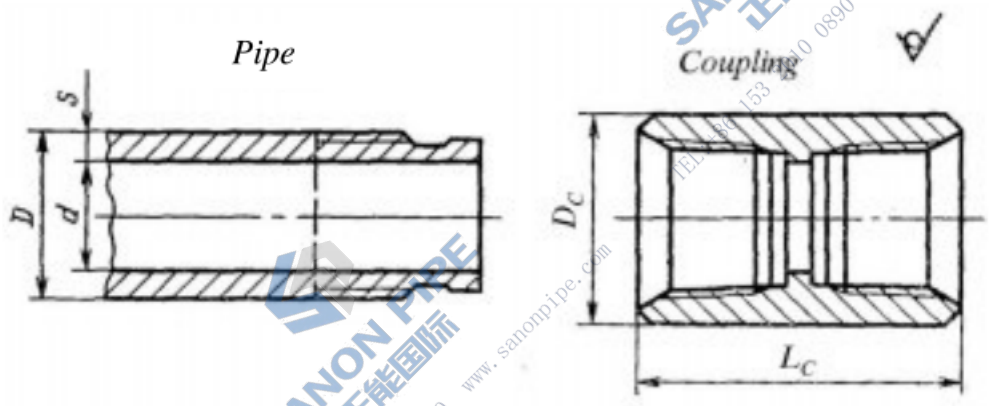


Fig. 3

Table 4

Plain tight-joint pipes and couplings to them (HKM)

Dimensions in mm

Pipes nominal diameter	Pipes				Coupling		
	External diameter D	Wall thickness s	Internal diameter d	Weight, kg/m	External diameter D_C	Length L_C	Weight, kg
60	60.3	5.0	50.3	6.8	73.0	135	1.8
73	73.0	5.5	62.0	9.2	88.9	135	2.5
		7.0	59.0	11.4			
89	88.9	6.5	75.9	13.2	108.0	155	4.1
		8.0	72.9	16.0			
102	101.6	6.5	88.6	15.2	120.6	155	5.1
114	114.3	7.0	100.3	18.5	132.1	205	7.4

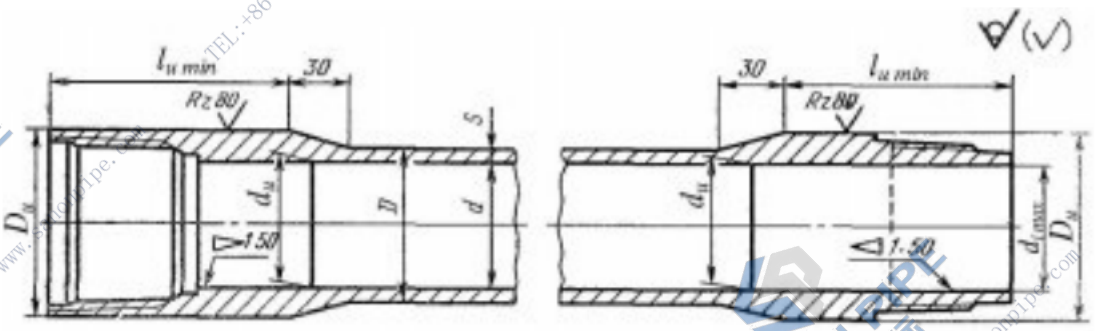


Fig. 4

(Amended Wording, Amendment No. 2).

1.3. Pipes of modification *A* of all types shall be produced in 10 m long pieces. Maximum deviation shall be ±5%.

Pipes of modification *Б* of all types shall be produced in two length groups:

Group 1, from 5.5 to 8.5 m;

Group 2, over 8.5 to 10.0 m.

At the customer's request, modification *A* pipes may be produced in length groups stipulated for modification *Б*.

Table 5

Integral-joint external-upset pipes (НКБ)

Dimensions in mm

Pipes nominal diameter	External diameter D	Wall thickness s	Internal diameter d	Upset external diameter D_u (max. deviation +1.5)	Internal diameter in pin end plane $d_{i\,max}$	Internal diameter at upset part end d_o	Upset part length $l_{u\,min}$	Plain pipes weight, kg/m	Weight increase due to two end upsets, kg
60	60.3	5.0	50.3	71	53.5	48.3	95	6.8	1.8
73	73.0	5.5	62.0	84	65.5	60.0	100	9.2	2.2
		7.0	59.0	86	63.0	57.0		11.4	2.6
89	88.9	6.5	75.9	102	79.5	73.9	100	13.2	3.2
		8.0	72.9	104	77.0	70.9		16.0	3.7
102	101.6	6.5	88.6	116	92.0	86.6	100	15.2	4.0
114	114.3	7.0	100.3	130	104.0	98.3	100	18.5	4.8

Note to Tables 2–5. In weight calculations specific weight of steel was assumed as equal to 7.85.

The length of a piece of pipe shall be defined as the distance between its end faces; with the coupling screwed on, i.e. the distance from the free end face of the coupling to the thread vanish point at the opposite end of the piece of pipe.

(Amended Wording, Amendment No. 2).

1.4. Maximum dimensional and weight deviations of the pipes and couplings shall be as follows:

a) For the external diameter of pipes:

Modification *A*

pipes with a nominal diameter up to 102 mm ..... ±0.8 mm

pipes with a nominal diameter of 114 mm ..... ±0.9 mm

Modification *Б*

pipes with a nominal diameter from 27 to 48 mm ..... $^{+0.8}_{-0.2}$ mm

pipes with a nominal diameter from 60 to 89 mm ..... $^{+1.0}_{-0.5}$ mm

pipes with a nominal diameter of 102 or 114 mm ..... $^{+1.2}_{-0.5}$ mm

Positive deviation of the pipes external diameter up to 1 mm is allowable outside the upset ends at a length not exceeding:

100 mm for pipes with couplings (B);

150 mm for НКБ pipes .

The ends of plain and HKM pipes shall be prepared in such a way as to ensure the minimum length, specified in clause 2.18, of complete thread free of black spots, and the minimum wall thickness at the pipe end face as specified in notes to tables 10 and 14.

b) For the wall thickness.....	Minus 12.5 %
Positive deviations are limited by the pipe weight.	
c) For coupling external diameter.....	±1.0%
d) For coupling length	±2 mm
e) For weight:..... of an individual piece of pipe (modification A)	+6.5 % −3.5
of a batch of pipes (total weight 20 metric tons as a minimum, modification A)	Minus 1.75 %
of an individual piece of pipe (modification Б)	+8.0 % −2.0

N o t e . For pipes of modification *A*, maximum weight deviations for batches weighing less than 20 metric tons shall not be regulated.

1.5. At end portions equal to one third of the pipes length, a curvature over 1 mm per 1 m of length shall not be permissible.

A general curvature of pipes exceeding the maximum value allowable under inspection in accordance with clause 4.4 shall not be allowed.

1.6. Conventional designations of pipes shall include the pipe type (except for plain pipes), nominal diameter of the pipe, wall thickness, group of strength, and designation of this Standard.

Conventional designations of couplings shall include the pipe type (except for plain pipes), nominal diameter, group of strength, and designation of this Standard.

Examples of conventional designations

Steel pipes of strength group E, with a nominal diameter of 60 mm and a wall thickness of 5 mm and couplings to them:

60×5-Е ГОСТ 633-80 – for plain pipes

60-Е ГОСТ 633-80 – for couplings to this pipes

В-60×5-Е ГОСТ 633-80 – for external-upset pipes

В-60-Е ГОСТ 633-80 – for couplings to this pipes

НКМ-60×5-Е ГОСТ 633-80 – for plain tight-joint pipes

НКМ-60-Е ГОСТ 633-80 – for couplings to this pipes

60×5-ТУК-Е ГОСТ 633-80 – for plain pipes with heat-hardened ends

Integral-joint external-upset pipes made of steel of strength group E with a nominal diameter of 60 mm and a wall thickness of 5 mm:

НКБ-60×5-Е ГОСТ 633-80

N o t e . For pipes and couplings of modification *A*, the letter "A" shall be placed after the designation of the Standard.

2. TECHNICAL REQUIREMENTS

2.1. Pipes and couplings shall be manufactured in conformity with the requirements of this Standard and production schedules approved in accordance with the established procedure.

2.2. The external and internal surfaces of pipes and couplings shall be free of oxide spots, cavities, laps, exfoliations, cracks and sand marks.

The above defects are allowed to be chipped off and scraped, provided their depth is within the maximum negative deviation of the wall thickness. Defect repairs by welding, staking or stopping up is not allowed.

Where the wall thickness can be measured directly, the depth of defects may exceed the specified value, provided the minimum wall thickness, defined as the difference between the nominal pipe wall thickness and the respective maximum negative deviation.

Individual insignificant nicks, dents, scratches, thin oxide films, and other defects left by the manufacturing process may be neglected, if the wall thickness remains within the maximum negative deviation.

2.3. Transitions from the upset portions of the pipes to its portion with the wall thickness *s* shall be free of rough steps.

The interior surface of the external-upset pipes with couplings may not have more than three defect areas (underfilling with metal and repaired defects), the dimensions of the defects not exceeding 25 mm in length over the circumference, 15 mm in width, and 2 mm in depth.

Defects mentioned in clause 2.2 are not allowed on the exterior or interior surfaces of external-upset integral-joint pipes within 85 mm from the end faces. At distances over 85 mm there shall be no more than three defect areas (underfilling with metal and repaired defects), the dimensions of the defects not exceeding 1/3 of circumference in length, 15 mm in width, and 2 mm in depth.

The wall thickness in the transition section of externally-upset pipes shall be no less than the minimum wall thickness allowable in the plain section of the pipes.

2.4. Phosphorus and sulfur content in steel shall not exceed 0.045% each.

2.5. Pipes and couplings shall be produced from steel of the same strength group selected from among those specified in table 6.

2.6. Plain pipes and couplings to them, as well as tight-joint plain pipes and couplings to them belonging to strength class К or higher, external-upset pipes and couplings to them and external-upset integral-joint pipes, irrespective of strength class, shall be subjected to heat-treatment or ausforming. Plain and tight-joint plain pipes of strength class К and modification Б may be heat-treated by hot rolling.

Table 6

Variable	Normal mechanical properties for steel of strength group:						
	Д		К	Е	Л	М	Р
	Modification						
	А	Б					
Ultimate tensile strength σ_t, min,							
MPa	655	638	687	689	758	823	1000
(kgf /mm^2)	(66.8)	(65.0)	(70.0)	(70.3)	(77.3)	(83.9)	(101.9)
Yield strength σ_y, min,							
MPa	379	373	491	552	654	724	930
(kgf /mm^2)	(38.7)	(38.0)	(50.0)	(56.2)	(66.8)	(73.8)	(94.9)
max,							
MPa	552	–	–	758	862	921	1137
(kgf /mm^2)	(56.2)	–	–	(77.3)	(87.9)	(93.9)	(116.0)
Elongation δ_5, %, min	14.3	16.0	12.0	13.0	12.3	11.3	9.5

Note. For pipes of modification Б made from steel of strength group Д, the maximum value of yield strength is not limited.

(Amended Wording, Amendment No. 2).

2.7. Pipes shall pass the flattening test. The distance between parallel planes after the test shall not exceed that specified Table 7.

Table 7

Strength group	Diameter to wall thickness ratio *D/s*	Distance between parallel planes, mm
Д	16 and over	0.65 *D*
К, Е		0.70 *D*
Л		0.75 *D*
Д	Below 16	(0.98 – 0.02 *D/S*) *D*
К, Е		(1.28 – 0.03 *D/S*) *D*
Л		(1.23 – 0.03 *D/S*) *D*

Note. For pipes of strength groups M and P, the distance between parallel planes shall be established by agreement between the customer and the manufacturer.

2.8. Threads and tapered tightening bores of couplings shall be zinc-coated or phosphated.

2.9. Every piece of plain, plain tight-joint or external-upset pipes shall be supplied with a coupling, machine-screwed upon one of its ends. At the customer's request, couplings may be supplied without pipes.

(Amended Wording, Amendment No. 2).

2.10. Grease or another sealant shall be applied when assembling couplings with pipes so as to ensure joint tightness and protection against scratches and corrosion.

2.11. The exterior surface of every piece of pipe and every coupling shall be painted in order to control corrosion during shipment.

Pipes and couplings may be supplied without painting or with a neutral grease coating, if so requested by the customer.

At the customer's request, pipes of modification *A* shall be provided with interior surfaces protected with special coatings which will minimize paraffin deposition and corrosion. The coatings shall be applied in conformity with technical documentation approved in the established order.

(Amended Wording, Amendment No. 2).

2.12. Pipes with couplings screwed on, as well as external-upset integral-joint pipes, shall pass hydraulic burst pressure test with a pressure stipulated in table 8.

Table 8

Hydraulic burst pressure for pipes testing

Pipes nominal diameter, mm	Wall thickness, mm	Pressure, MPa (kgf/cm^2), for steel pipes of strength group:						
		Д		К	Е	Л	М	Р
		Modification						
		А	Б					
27	3.0	67.2 (685)	66.2 (675)	87.3 (890)	98.1 (1000)	– –	– –	– –
33	3.5	64.3 (655)	63.3 (645)	83.4 (850)	93.7 (955)	– –	– –	– –
42	3.5	50.5 (515)	49.5 (505)	65.2 (665)	73.6 (750)	– –	– –	– –
48	4.0	50.5 (515)	49.5 (505)	65.2 (665)	73.6 (750)	– –	– –	– –
60	5.0	50.5 (515)	49.5 (505)	65.2 (665)	73.6 (750)	87.3 (890)	96.6 (985)	122.6 (1250)
73	5.5	45.6 (465)	45.1 (460)	59.4 (605)	66.7 (680)	79.0 (805)	87.3 (890)	112.3 (1145)
	7.0	57.9 (590)	57.4 (585)	75.0 (765)	84.9 (865)	100.6 (1025)	110.9 (1130)	112.6 (1250)

Table 8, (cont.)

Pipes nominal diameter, mm	Wall thickness, mm	Pressure, MPa (kgf/cm^2), for steel pipes of strength group:						
		Д		К	Е	Л	М	Р
		Modification						
		А	Б					
89	6.5	44.1 (450)	43.7 (445)	57.4 (585)	64.7 (660)	76.5 (780)	84.4 (860)	108.9 (1110)
	8.0	54.4 (555)	53.5 (545)	70.6 (720)	79.5 (810)	94.2 (960)	104.0 (1060)	122.6 (1250)
102	6.5	38.7 (395)	38.3 (390)	50.0 (510)	56.4 (575)	66.7 (680)	73.6 (750)	95.2 (970)
114	7.0	37.3 (380)	36.8 (375)	48.1 (490)	54.4 (555)	64.3 (655)	71.1 (725)	91.2 (930)

Notes:

1. If the design pressure *(P)* exceeds 68.6 MPa (700 kgf/cm^2), the test pressure shall equal 68.6 MPa (700 kgf/cm2). At the customer's request, the pressure selected for the test may be equal to the design pressure *(P)* or 122.6 MPa (1250 kgf/cm^2), whichever the smaller.

2. By agreement between the manufacturer and the customer, the test pressure for modification Б strength group Д or К plain and external-upset pipes and couplings to them of may be limited by the value of 19.7 MPa (200 kgf/cm^2), for those of strength groups E and higher it may be limited by 29.4 MPa (300 kgf/cm^2).

The value of the burst pressure *(P)* shall be calculated as:

$$p = \frac{200 \cdot s \cdot R}{D}, \text{ kgf/cm}^2;$$

$$p = \frac{2 \cdot s \cdot R}{D}, \text{ MPa,}$$

where s = nominal wall thickness, mm;

D = nominal external diameter of pipes, mm;

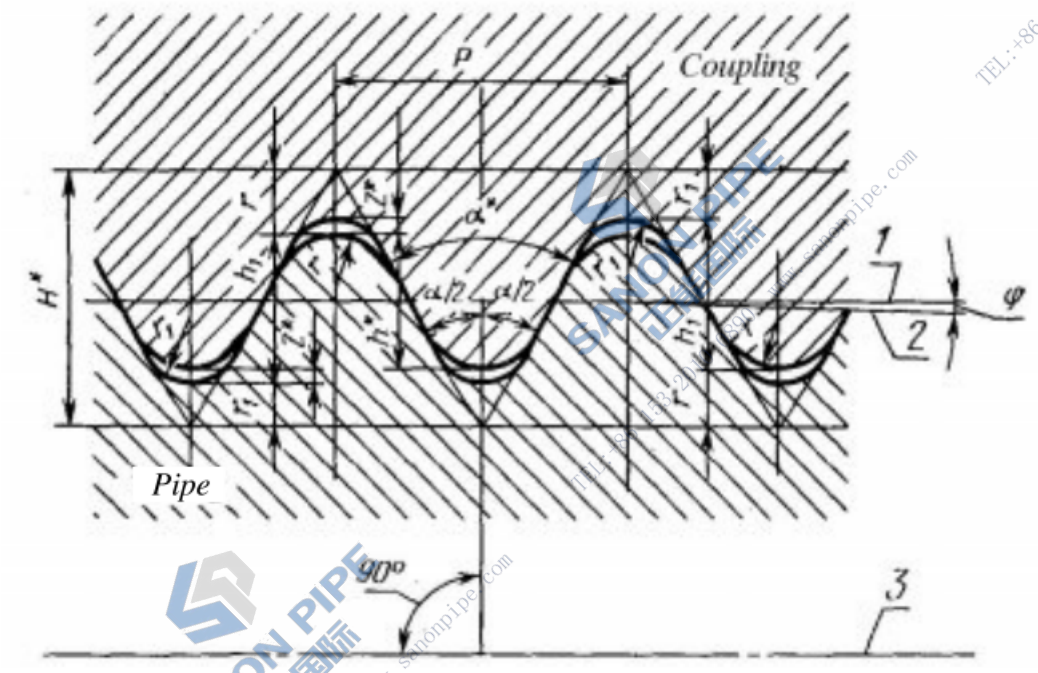
R = permissible stress, kgf/mm^2 (MPa), assumed to be equal to $0.8\,\sigma_{y\,min}$.

(Amended Wording, Amendment No. 2).

2.13. Principal parameters and dimensions of thread connections of plain and external-upset pipes and couplings to them

2.13.1. The thread form and dimensions on pipes and couplings to them shall correspond to those indicated in fig. 5 and table 9.

2.13.2. Threaded connection dimensions on plain pipes and couplings to them shall correspond to those indicated in fig. 6 and table 10, those on external-upset pipes and couplings to them shall be as shown in fig. 6 and in table 11.



* Reference dimensions.

1 – line parallel to the axis of thread; *2* – line of effective diameter of thread; *3* – axis of thread

Fig. 5

Table 9

Dimensions in mm

Thread parameter	Normal value	
	Threads per 25.4 mm	
	10	8
Thread pitch P	2.540	3.175
Depth of basic profile H*	2.200	2.750
Height of thread h_1	$1.412^{+0.05}_{-0.10}$	$1.810^{+0.05}_{-0.10}$
Depth of thread h*	1.336	1.734
Angle of thread α*	60°	
Flank angle α/2	30° ± 1°	
Tip radius r	$0.432^{+0.045}$	$0.508^{+0.045}$
Root radius r_1	$0.356_{-0.045}$	$0.432_{-0.045}$
Air gap z*	0.076	
Taper angle φ	1°47 '24"	
Taper 2 tg φ	1:16	

Notes:

1. Thread pitch P shall be measured in a line parallel to the axis of thread on the pipes or the coupling.

2. Maximum deviations of the r and r_1 radius values are included for the purposes of thread-forming tool design, they shall not be included in inspection routine.

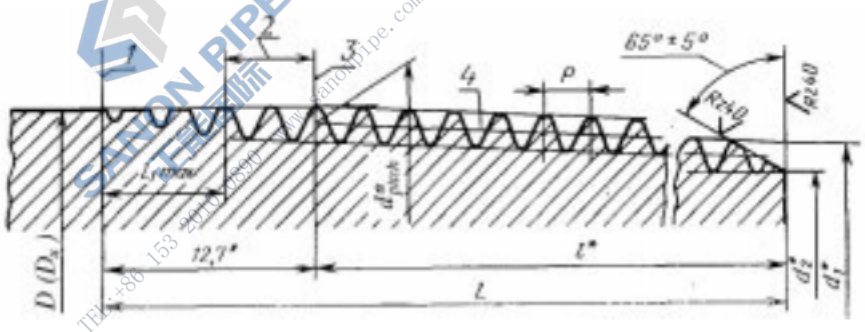
2.13.3. Maximum deviations from nominal thread dimensions shall be as specified in table 12.

2.13.4. Standoff of the thread on a galvanized or phosphated coupling, when checked with a threaded plug gage, shall be equal to standoff *A* (see fig. 7 and tables 10 and 11) assumed as normal for manual assembly of couplings and pipes. The maximum deviations are $\pm P_1$.

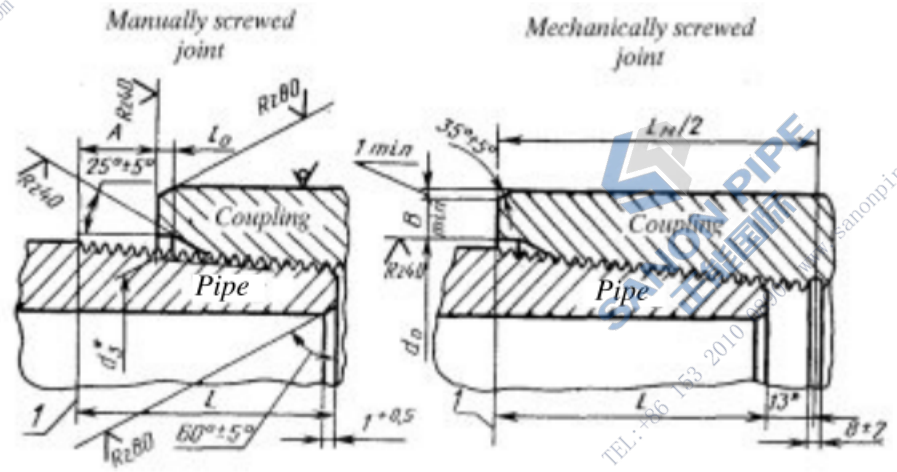
N o t e . The value of P_1 corresponds to the thread pitch and has been assumed equal to 2.5 mm (for pipes and couplings with a thread pitch of 2.540 mm) or 3.2 mm (for pipes and couplings with a thread pitch of 3.175 mm).

2.13.5. Pipes thread standoff A_t, when checked with a threaded plug gage, shall be equal to P_1. The maximum deviations are $\pm P_1$.

2.13.6. When galvanized or phosphated couplings shall be manually assembled with pipes, the standoff shall be equal to *A* (see fig. 6 and tables 10 and 11). The maximum deviations are $\pm P_1$. Selective assembly by matching couplings and pipe ends in terms of standoff is allowable.



N o t e . The D_u dimension refers to external-upset pipes.



* Reference dimensions.

1 – thread vanish point; *2* – truncated thread; *3* – reference plane; *4* – thread pitch line

Fig. 6

Table 10

Threaded connections of plain pipes and couplings to them

mm

Pipes nominal diameter	Pipes external diameter D	Thread pitch P	Thread pitch diameter in reference plane d^*_{pitch}	Thread diameter at pipe end face		Pipes thread length				Minor thread diameter at coupling end face d^*_3	Coupling boring diameter d_0 (max. deviation +0.8)	Coupling boring depth l_0 (max. deviation $^{+1.5}_{-0.5}$)	Coupling end face width B_{min}	Distance between coupling end face and pipes thread vanish point with manual assembly (standoff) A
				minor d_1^*	major d_2^*	total (to vanish point) L		to reference plane (complete thread) l^*	vanish $l_{1\,max}$					
						no-minal	max. deviation							
33	33.4	2.540	32.065	32.382	29.568	29	±2.5	16.3	8	31.210	35.0	8.0	2.0	5.0
42	42.2		40.828	40.948	38.124	32		19.3		39.973	43.8		2.5	
48	48.3		46.924	46.866	44.042	35		22.3		46.069	49.9		1.5	
60	60.3		58.989	58.494	55.670	42		29.3		58.134	61.9		4.0	
73	73.0		71.689	70.506	67.682	53		40.3		70.834	74.6		5.5	
89	88.9		87.564	85.944	83.120	60		47.3		86.709	90.5		6.5	
102	101.6	3.175	99.866	98.519	94.899	62	±3.2	49.3	10	98.519	103.2	9.5	6.5	6.5
114	114.3		112.566	111.031	107.411	65		52.3		111.219	115.9		6.0	

Notes:

1. The thread vanish point is defined as the point of intersection of the thread vanish cone generatrix with the generatrix of the cylinder of a diameter equal to the pipe external diameter.

2. The coupling may have a tapered boring at its end face, the generatrix of the boring lying parallel to that of the tread cone. The smaller diameter of the tapered boring shall be equal to d_0 of cylindrical boring.

3. The minimum wall thickness under the thread at the pipe end face (t) shall be calculated to the nearest 0.1 mm as $t = 0.875s - 0.5 \cdot \{(D + \Delta) - d_2\}$,

where s = nominal wall thickness, mm;

D = pipe nominal external diameter, mm;

d_2 = internal thread diameter in the plane of the pipe end face, mm;

Δ = value of maximum positive deviation of the pipe external diameter, mm, as specified in clause 1.4a.

If the value of t calculated by the above formula is smaller than 1.0 mm for pipes with a nominal diameter up to 48 mm inclusive and less than 2.0 mm for other pipe diameters, the value of t accepted shall be equal 1.0 mm.

(Amended Wording, Amendment No. 2).

Table 11

Thread connections for external-upset pipes and couplings to them

mm

Pipes nominal diameter	Pipes external diameter D	Thread pitch P	Thread pitch diameter in reference plane d^*_{pitch}	Thread diameter at pipe end face		Pipes thread length			Internal thread diameter at coupling end face d^*_3	Coupling boring diameter d_0 (max. deviation +0.8)	Coupling boring depth l_0 (max. deviation $^{+1.5}_{-0.5}$)	Coupling end face width B_{min}	Distance between coupling end face and pipes thread vanish point with manual assembly (standoff) A
				outer d^*_1	internal d^*_2	total (to vanish point) L nominal	total (to vanish point) L max. deviation	to reference plane (complete thread) l^*	vanish $l_{i\,max}$				
27	33.4	2.540	32.065	32.383	29.568	29	±2.5	16.3	8	31.210	35.0	8.0	2.0	5.0
33	37.3		35.970	36.100	33.276	32		19.3		35.115	38.9		3.0	
42	46.0		44.701	44.643	41.819	35		22.3		43.846	47.6		2.5	
48	53.2		51.845	51.662	48.833	37		24.3		50.990	54.8		2.5	
60	65.9	3.175	64.148	63.551	59.931	50	±3.2	37.3	10	62.801	67.5	9.5	3.5	6.5
73	78.6		76.848	76.001	72.381	54		41.3		75.501	80.2		4.5	
89	95.2		93.516	92.294	88.674	60		47.3		92.169	96.9		6.5	
102	108.0		106.216	104.744	101.124	64		51.3		104.869	109.6		6.5	
114	120.6		118.916	117.256	113.636	67		54.3		117.569	122.3		7.5	

Notes:

1. The thread vanish point is defined as the point of intersection of the thread vanish cone generatrix with the generatrix of the cylinder of a diameter equal to the external diameter of the upset portion of pipes.

2. The coupling may have a tapered boring at its end face, the generatrix of the boring lying parallel to that of the tread cone. The smaller diameter of the tapered boring shall be equal to d_0 of the cylindrical boring.

Table 12

mm

Maximum deviations of			
thread pitch		thread taper	
over 25.4 mm	over entire length of complete thread	on pipes	on couplings
±0.075	±0.120	+0.36 –0.22	+0.22 –0.36

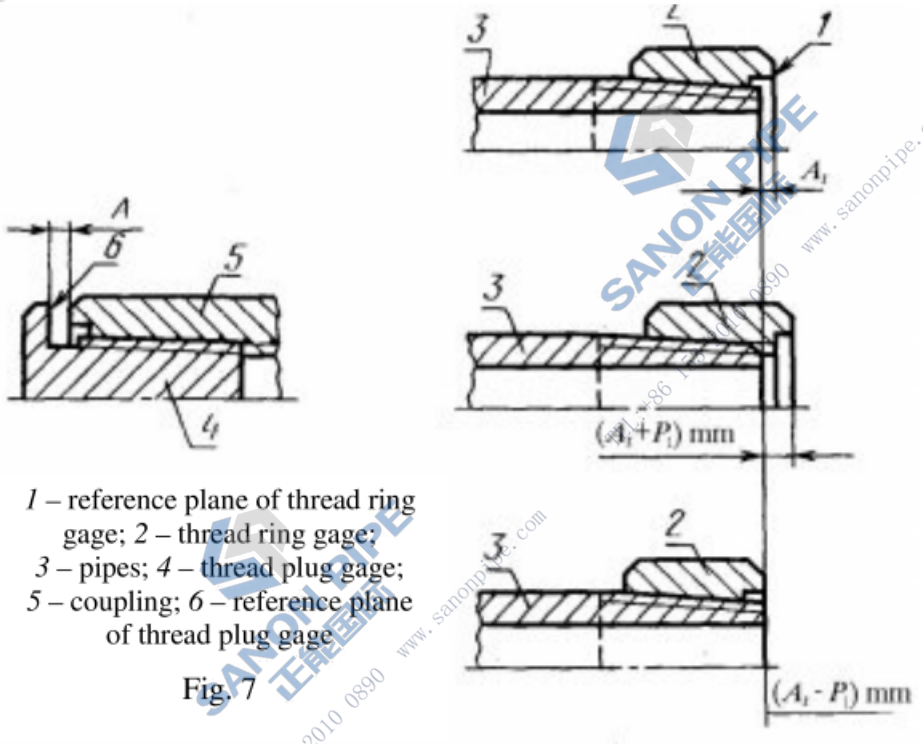
Notes:

1. Maximum deviations of thread pitch over a length not exceeding 25.4 mm are allowed for a distance between any two complete threads. For thread-to-thread distances exceeding 25.4 mm, the maximum deviations may be increased proportionally to the distance increase, provided they remain within the values specified in the table for the entire length of complete thread.

2. Maximum deviations of taper (deviation from the difference between the two diameters) are indicated for a thread length of 100 mm, they refer to the pitch diameter of the thread on pipes and coupling, as well as to the major diameter of pipes thread and the minor diameter of coupling thread.

2.13.7. After mechanical assembly of coupling with pipes, the end face of the coupling shall coincide with the pipes thread vanish point (see fig. 6). The maximum deviations are $\pm P_1$.

2.13.8. A groove facilitating withdrawal of the thread-forming tool may be turned in the middle of the coupling, the depth of the groove not exceeding the thread height h_1 by more than 0.5 mm. The groove shall not have sharp edges (undercuts). Couplings having no groove may have opposing threads cut through at a distance not exceeding (13 – P) mm, counting in both directions from the center of the coupling.



1 – reference plane of thread ring gage; *2* – thread ring gage; *3* – pipes; *4* – thread plug gage; *5* – coupling; *6* – reference plane of thread plug gage

Fig. 7

2.14. Principal parameters and dimensions of connections of plain tight-joint pipes and couplings to them (HKM)

2.14.1. The thread form and dimensions for pipes with nominal diameters from 60 to 102 mm and couplings to them shall correspond to those indicated in fig. 8 and table 13, while those for pipes with a nominal diameter of 114 mm and couplings to them shall be as shown in fig. 9 and table 13.

Table 13

Dimensions in mm

Parameter of a thread		Normal value	
		for HKM pipes with nominal diameters from 60 to 102 mm and couplings to them and НКБ pipes of all diameters	for HKM pipes with a nominal diameter of 114 mm and couplings to them
Thread pitch P		4.232	5.080
Height of thread h_1:			
male thread		$1.20^{+0.05}$	1.60±0.03
female thread		$1.30^{+0.05}$	1.60±0.03
Angle of thread α*		33°	13°
Flank angles:			
	α_1	3° ± 1°	3° ± 1°
	α_2	30° ± 1°	10° ± 1°
Thread fillet radii:			
	r	–	$0.20^{+0.05}$
	r_1	$0.20_{-0.05}$	$0.20_{-0.05}$
	r_2	$0.25_{-0.05}$	–
	r_3	–	$0.80^{+0.05}$
	r_4	–	$0.80_{-0.05}$
Chamfer width C		$0.30^{+0.05}$	–
Thread tip width:			
	b*	1.659	2.29
	b_1*	1.600	2.29
Thread rot radii:			
	b_2	$1.800^{+0.05}$	$2.43^{+0.05}$
	b_3	$1.794^{+0.05}$	$2.43^{+0.05}$
Taper angle φ		2°23′09″	1°47′24″
Taper 2 tg φ		1: 12	1:16

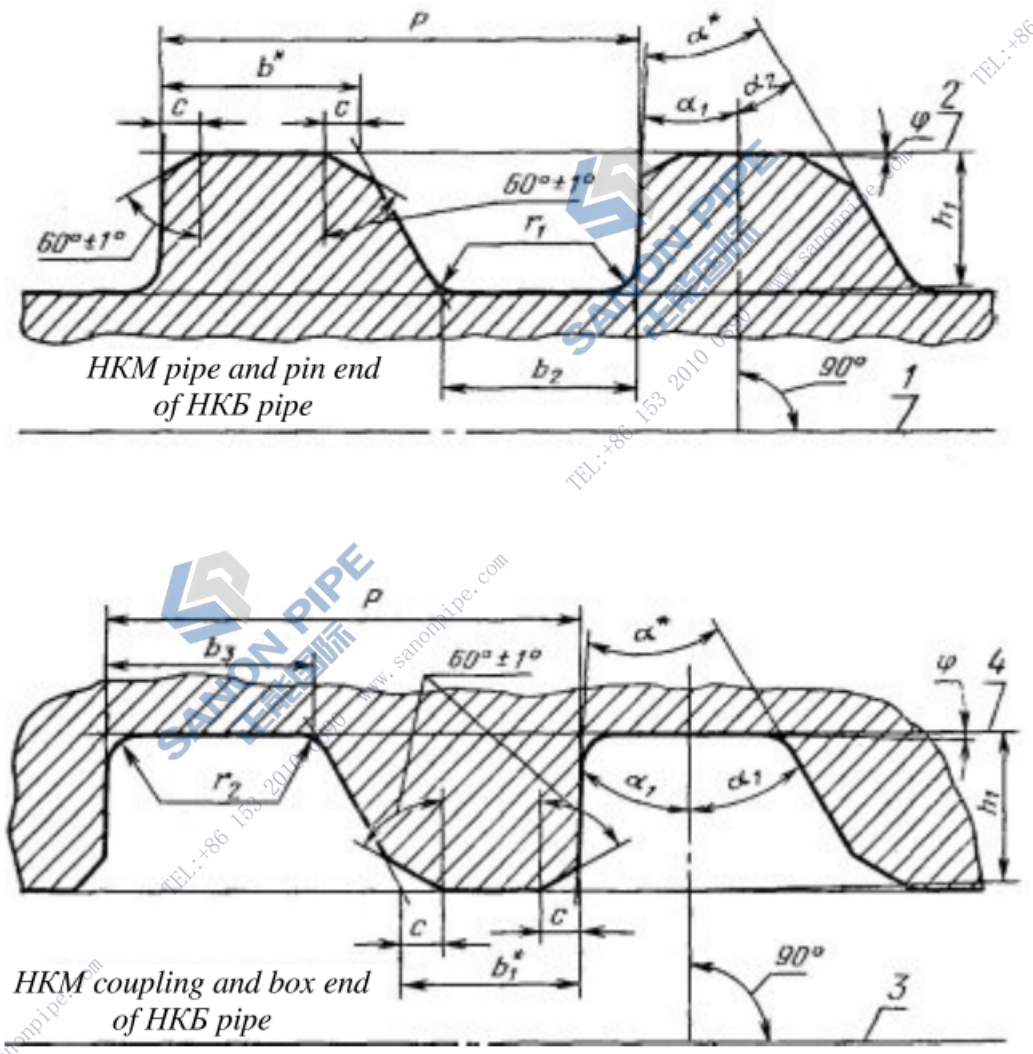
Note.

1. Thread pitch P shall be measured in a line parallel to the axes of threads on the pipes and the coupling.

2. All maximum deviations for thread form elements, except the maximum deviations for flank angles and depth of thread, are included for the purposes of thread-forming tool design, they shall not be included in inspection routine.

3. Male thread depth h_1 on НКБ pipes shall be ensured by respective positioning of the plain and threaded ring gages and shall not be included in inspection routine.

4. Chamfers C may be replaced with a fillet of a radius $r = 0.2^{+0.05}$ mm (except for male threads on НКБ pipes).



* Reference dimensions.

1 – axis of HKM pipes and pin end of a НКБ pipe; *2* – line parallel to the axis of a HKM pipe and pin end of a НКБ pipe; *3* – axis of a HKM coupling and box end of a НКБ pipe; *4* – line parallel to the axis of a HKM coupling and box end of a НКБ pipe

Fig. 8

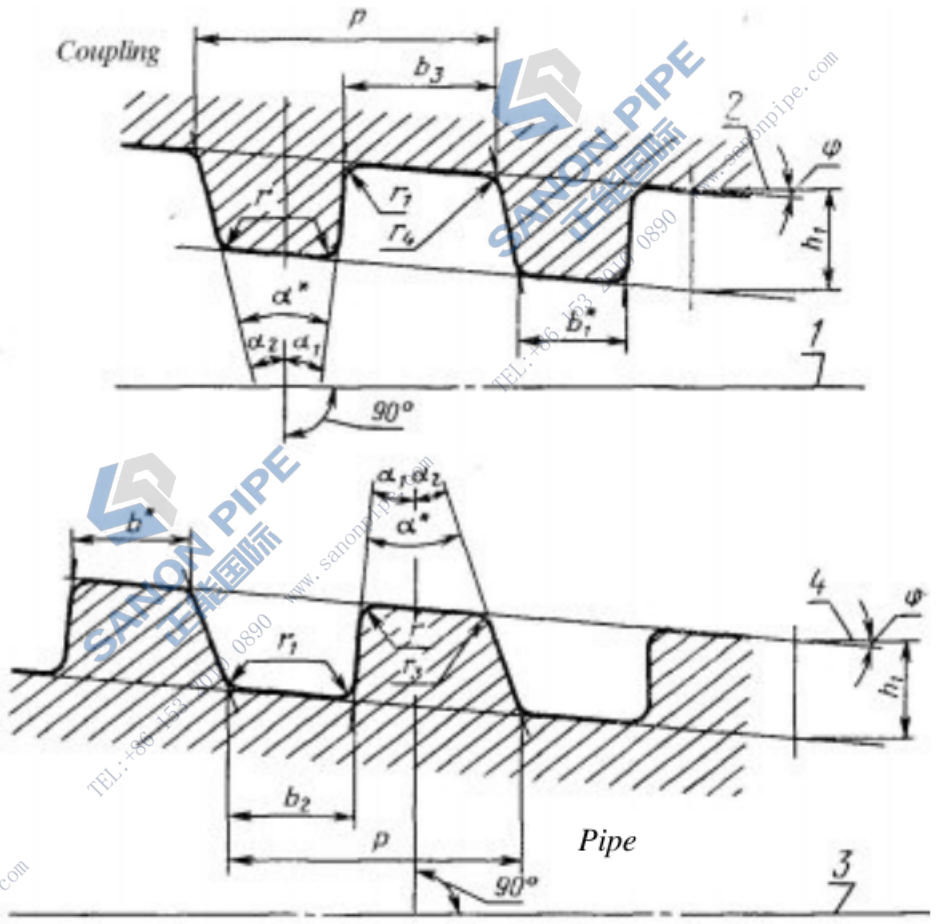
2.14.2. Connection dimensions shall correspond to those indicated in fig. 10 and table 14 (for pipes) or fig. 10 and table 15 (for couplings).

(Amended Wording, Amendment No. 2).

2.14.3. Maximum deviations from thread nominal dimensions shall be as specified in table 16.

2.14.4. Maximum deviations for taper over the entire length of the tapered tightening belt on pipes and the tapered tightening boring on couplings shall be ±0.03 and ±0.06 mm, respectively.

2.14.5. When standoff of the pipes thread is determined, the reference plane of the ring gage shall be at a distance *H* from the pipe end (Fig. 11):



* Reference dimension.

1 – coupling thread axis; *2* – line parallel to coupling thread axis; *3* – pipe thread axis; *4* – line parallel to pipe thread axis

Fig. 9

$20_{-1.2}$ mm for standoff over a plain ring gage and threaded ring gages with complete and incomplete thread (for pipes of nominal diameters from 60 to 102 mm);

$24_{-2.5}$ mm for standoff over plain and threaded ring gages (for pipes of a nominal diameter of 114 mm).

2.14.6. When checking the value of the tapered tightening belt diameter on pipes of nominal diameters from 60 to 102 mm, the reference plane of the plain ring gage shall lie flat with the pipe end face or stay at a distance not exceeding H_1 = 1.2 mm from it (see fig. 11).

Table 14

Connections of plain tight-joint pipes (HKM)

Dimensions in mm

Nominal diameter	External diameter D	Taper K	Minor thread diameter in reference plane d^*_{mn}	Major thread diameter at end face d_1^*	Tapered tightening belt diameter at end face d_2^*	Distance from end face to thread vanish point L (maximum deviation -1)	Distance from end face to reference plane l^*	Distance from end face to start of thread l_1 (maximum deviation -1)	Length of tapered tightening belt l_2 (maximum deviation -1)	Thread vanish $l_{3\,max}$	Groove depth f (maximum deviation +0.25)
60	60.3	1:12	57.925	56.575	54.175	65	45	20	10	8	1.6
73	73.0		70.625	69.275	66.875	65	45				
89	88.9		86.500	84.317	81.917	75	55				
102	101.6		99.200	97.017	94.617	75	55				
114	114.3	1:16	111.100	110.175	106.375	98	66	29	14	10	2.0

Notes:

1. The thread vanish point is defined as the end of the root side of a continuously vanishing thread, the farthest from the pipe end face.

2. The minimum wall thickness *(t)* of the tapered tightening belt at the pipe end face shall be calculated by the formula presented in Note 3 to Table 10. The value of d_2 is assumed as the diameter of the tapered tightening belt at the end face. If the value of t calculated by the formula proves smaller than 1.8 mm, the value of t accepted shall be equal to 1.8 mm, except for pipes of a diameter of 60 or 73 mm (with 5.5 mm wall thickness), for which the value of t shall be accepted as equal to 1.2 and 1.5 mm, respectively.

Connections of couplings to plain tight-joint pipes – HKM

Dimensions in mm

Nominal diameter	Taper K	Thread minor diameter in reference plane d^*_{mr}	Thread minor diameter in end face d^*_3	Tapered tightening boring diameter in design plane d^*_{tight}	Chamfer diameter at end face d_0 (max. deviation +1.0)	Internal diameter d_c (max. deviation ±0.5)	End face to thrust shoulder distance L_1 (max. deviation +1.0)	End face to design plane distance l^*_4	Thread taper length l_5 (max. deviation -1)	Complete thread length $l_{6\,min}$	End face to reference plane distance l^*_7	End face width B_{min}
60	1:12	57.925	59.225	54.475	62.5	50	63	57	53	48	15.6	3.5
73		70.625	71.875	67.125	75.0	60	63	57	53	48	15.0	5.0
89		86.500	87.700	82.117	91.0	74	73	67	63	58	14.4	6.5
102		99.200	100.350	94.767	104.0	88	73	67	63	58	13.8	6.0
114	1:16	111.100	112.475	106.425	116.5	100	96	88	82	72	22.0	5.5

N o t e . The thread vanish point may lie on the chamfer located between the thread and the tapered tightening boring.

Table 16

mm

Modification	Thread pitch	Maximum deviations of			
		thread pitch		taper	
		over a length of 25.4 mm	over entire complete thread	of male thread	of female thread
A and *Б*	4.232	±0.04	±0.08	+0.15	–0.15
A	5.080	±0.05	±0.10	+0.15	–0.15
Б				+0.30	+0.20
				–0.20	–0.30

Notes:

1. Maximum deviations of thread pitch over a length not exceeding 25.4 mm are allowed for a distance between any two complete threads. For thread-to-thread distances exceeding 25.4 mm, the maximum deviations may be increased proportionally to the distance increase, provided they remain within the values specified in the table for the entire length of complete thread.

2. Maximum deviations of taper (deviation from the difference between the two diameters) are indicated for a thread length of 100 mm, they refer to the pitch diameter on pipes and coupling. The taper on the minor diameter of plain tight-joint pipes shall be checked on the aggregate length of complete and truncated threads (up to the start of thread vanish).

On pipes of a nominal diameter of 114 mm, the reference plane of a plain ring gage shall coincide with the pipe end face or come short of it by H_1 = 1.6 mm (see fig. 11).

(Amended Wording, Amendment No. 2).

2.14.7. Standoff of a galvanized or phosphated coupling thread when checked with a threaded plug gage shall be equal to the value H_2 (see fig. 11):

$5.0_{-1.2}$ mm for couplings to pipes of nominal diameters from 60 to 102 mm;

$6.0_{-2.5}$ mm for couplings to pipes of a nominal diameter of 114 mm.

The reference plane of a plain plug gage, when used to check galvanized or phosphated thread on couplings to pipes of nominal diameters from 60 to 102 mm, shall coincide with the coupling end face or lay sunk with respect to the coupling end face to a depth not exceeding H_3 = 1.2 mm (see fig. 11). When inspecting the thread on couplings to pipes with a nominal diameter of 114 mm, the reference plane of a plain plug gage shall lay sunk with respect to the coupling end face to a depth H_3 = 6.0... 8.5 mm (see fig. 11).

2.14.8. When determining the diameter of a galvanized or phosphated tapered tightening boring in a coupling, the reference plane of a plain plug gage shall lie at a distance H_4 (see fig. 11) from the coupling end face, H_4 being equal to:

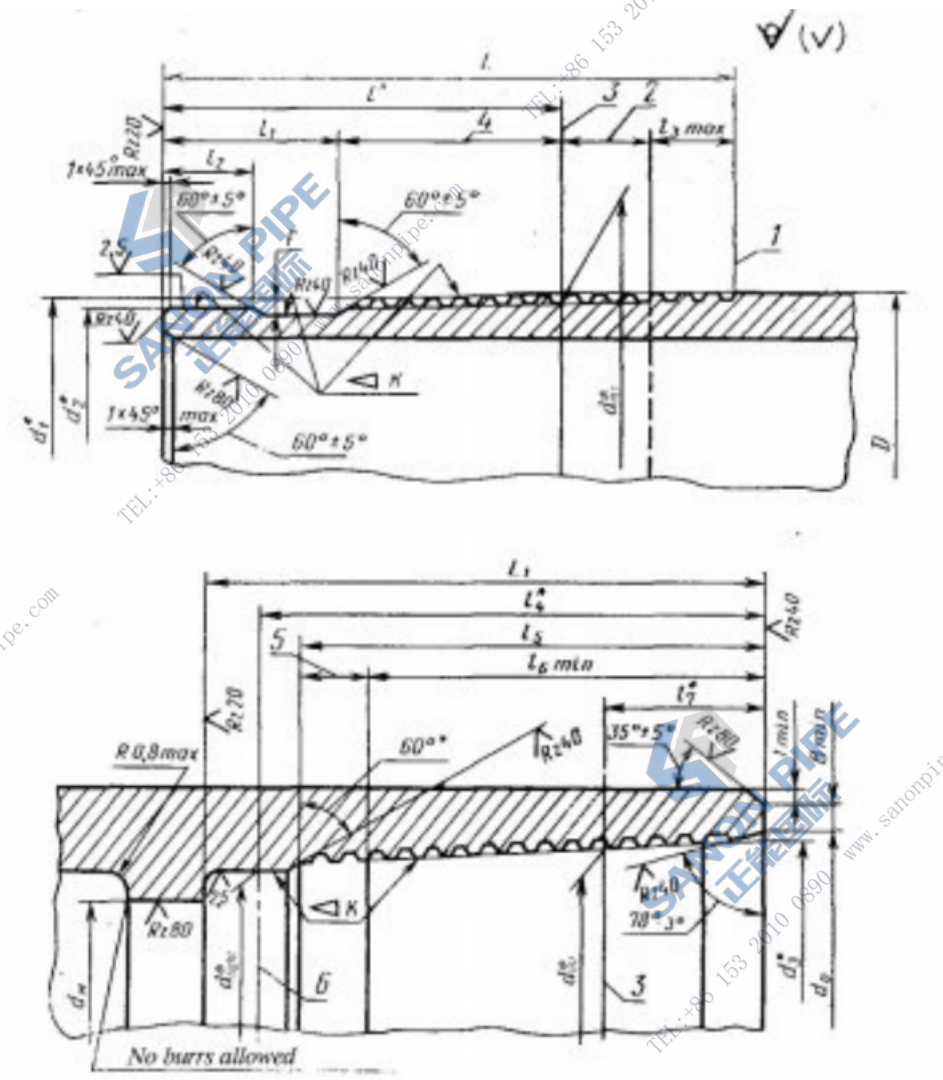
$45_{-1.2}$ mm for pipes of a nominal diameter of 60 or 73 mm;

$55_{-1.2}$ mm for pipes of a nominal diameter of 89 or 102 mm;

$84^{+1.6}_{-0.8}$ mm for pipes of a nominal diameter of 114 mm.

(Amended Wording, Amendment No. 2).

2.14.9. After mechanical assembly of galvanized or phosphated couplings with pipes, the standoff shall be equal to magnitude H_5 (fig. 12):

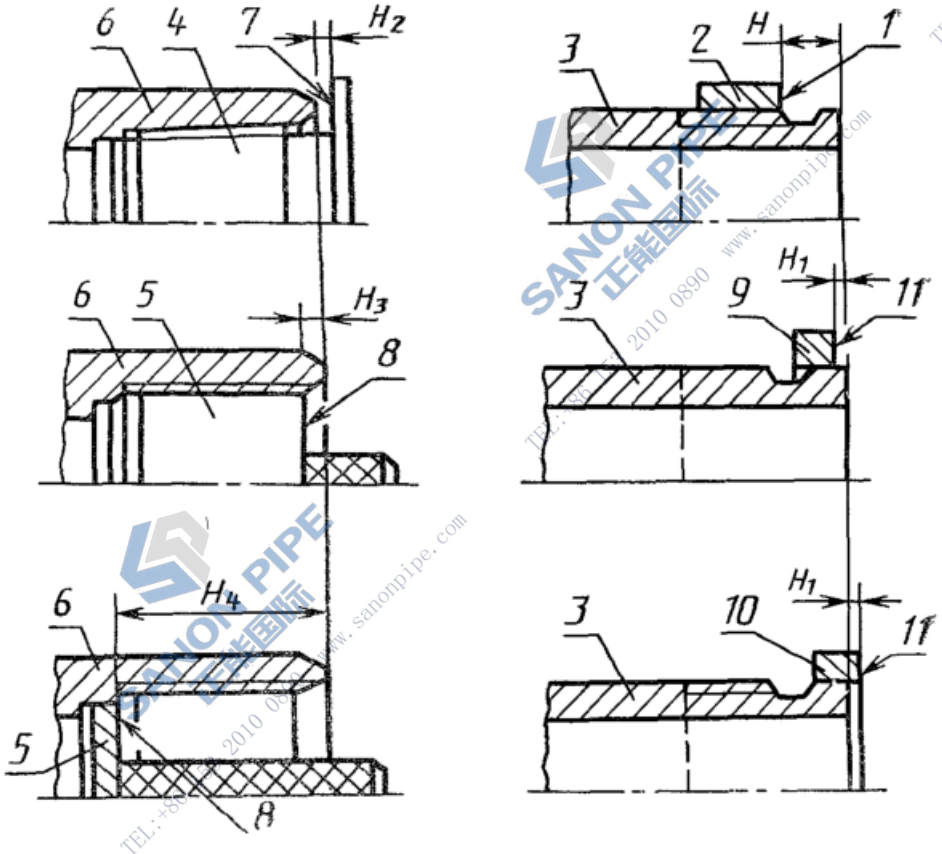


* Reference dimensions.

1 – thread vanish point; *2* – truncated thread; *3* – reference plane; *4* – complete thread length; *5* – thread vanish; *6* – design plane

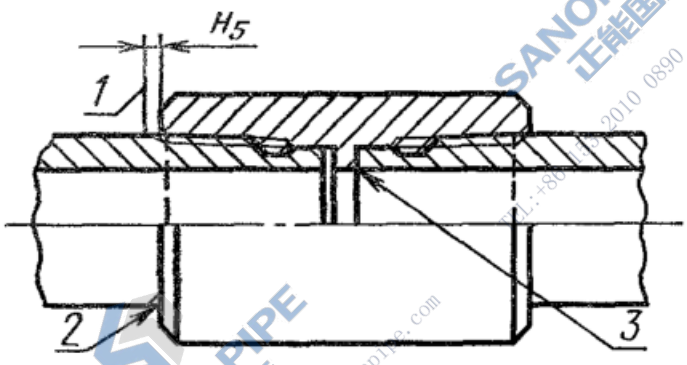
Fig. 10

N o t e . The chamfer 35°±5° at the coupling end face may be replaced with a fillet of a radius not exceeding the chamfer width.



1 – threaded and plain ring gage reference plane; *2* – threaded and plain ring gages; *3* – pipe; *4* – threaded plug gage; *5* – plain plug gage; *6* – coupling; *7* – threaded plug gage reference plane; *8* – plain plug gage reference plane; *9* – plain plug gage for inspection of pipes of nominal diameters from 60 to 102 mm; *10* – plain plug gage for inspection of pipes of a nominal diameter of 114 mm; *11* – plain plug gage reference plane

Fig. 11



1 – thread vanish point; *2* – manually assembled connection; *3* – mechanically assembled connection

Fig. 12

Table 17

Connections of the pin ends of external-upset integral-joint pipes (НКБ)

mm

Pipes nominal diameter	Thread minor diameter in reference plane d^*_{mr}	Major diameter of thread cone larger base D_1^*	Major diameter of thread at end face d_1^*	Tapered tightening belt diameter at end face d_2^*	End face to thrust shoulder A distance L (max. deviation +0.5)	End face to thread vanish start distance l_{min}	End face to reference plane distance l_1^*
60	62.267	66	60.167	57.167	70	62	54
73	75.267	79	72.750	69.750	75	67	59
89	91.267	95	88.750	85.750	75	67	59
102	104.267	108	101.750	98.750	75	67	59
114	117.267	121	114.750	111.750	75	67	59

Table 18

Connections of the box ends of external-upset integral-joint pipes (НКБ)

mm

Pipe nominal diameter	Thread minor diameter in reference plane d^*_{mr}	Minor diameter of thread at end face d^*_3	Tapered tightening boring diameter in reference plane d^*_{tight}	Tapered boring diameter at end face d_0^*	End face to thrust shoulder Γ distance L_1 (max. deviation –0.5)	End face to design plane distance l_2^*	Thread cone length l_3 (max. deviation ±0.5)	Length of complete thread l_{4min}
60	62.267	63.4	57.30	65.8	70	66	60	56
73	75.267	76.5	69.80	78.8	75	72	65	61
89	91.267	92.4	85.80	94.8	75	72	65	61
102	104.267	105.4	98.80	107.8	75	72	65	61
114	117.267	118.4	111.80	120.8	75	72	65	61

Note. The thread vanish point may lie on the chamfer located between the thread and the tapered tightening boring (for pipes with a nominal diameter of 114 mm).

4.4 mm for pipes with a nominal diameter of 60 mm;
5.0 mm for pipes with a nominal diameter of 73 mm;
5.6 mm for pipes with a nominal diameter of 89 mm;
6.2 mm for pipes with a nominal diameter of 102 mm;
8.0 mm for pipes with a nominal diameter of 114 mm.

Maximum deviation is ±2 mm.

Selective assembly by matching couplings and pipe ends in terms of standoff is allowable.

2.14.10. After mechanical assembly of the pipes and the coupling, the pipe end face shall contact the coupling thrust shoulder over the entire periphery of the thrust surfaces (see fig. 12). A gap between the thrust surfaces of the pipes and the coupling, not exceeding 0.5 mm, is allowed (for modification *Б*).

2.14.11. Pipe end faces and coupling thrust shoulders shall lie at a right angle to the thread axis. Maximum deviation from the right angle is -0.06 mm.

Maximum deviation from flatness on the width of the thrust surfaces is -0.06 mm.

2.14.12. Threads shall be coaxial with tapered tightening surfaces on pipes and couplings. Maximum deviation from coaxiality is 0.04 mm.

2.15. Principal parameters and dimensions of connections of integral-joint pipes and couplings to them (НКБ)

2.15.1. The thread form and dimensions on pin and box ends of pipes shall correspond to those indicated in fig. 8 and table 13.

2.15.2. Connection dimensions shall correspond to those indicated in fig. 13 and table 17 (for the pin end) or fig. 13 and table 18 (for the box end).

(Amended Wording, Amendment No. 2).

2.15.3. Maximum deviations from nominal dimensions of the thread shall be as specified in table 16.

2.15.4. Maximum deviations for taper over the entire length of the tapered tightening boring on the box end of pipes and the tapered tightening belt on the pin end shall be ±0.06 and ±0.03 mm, respectively.

2.15.5. When standoff of the pipe pin end thread is determined, the reference plane of the plain and threaded ring gages with complete and incomplete thread shall be at a distance of $18^{+1.2}$ mm from the pipe end (fig. 14).

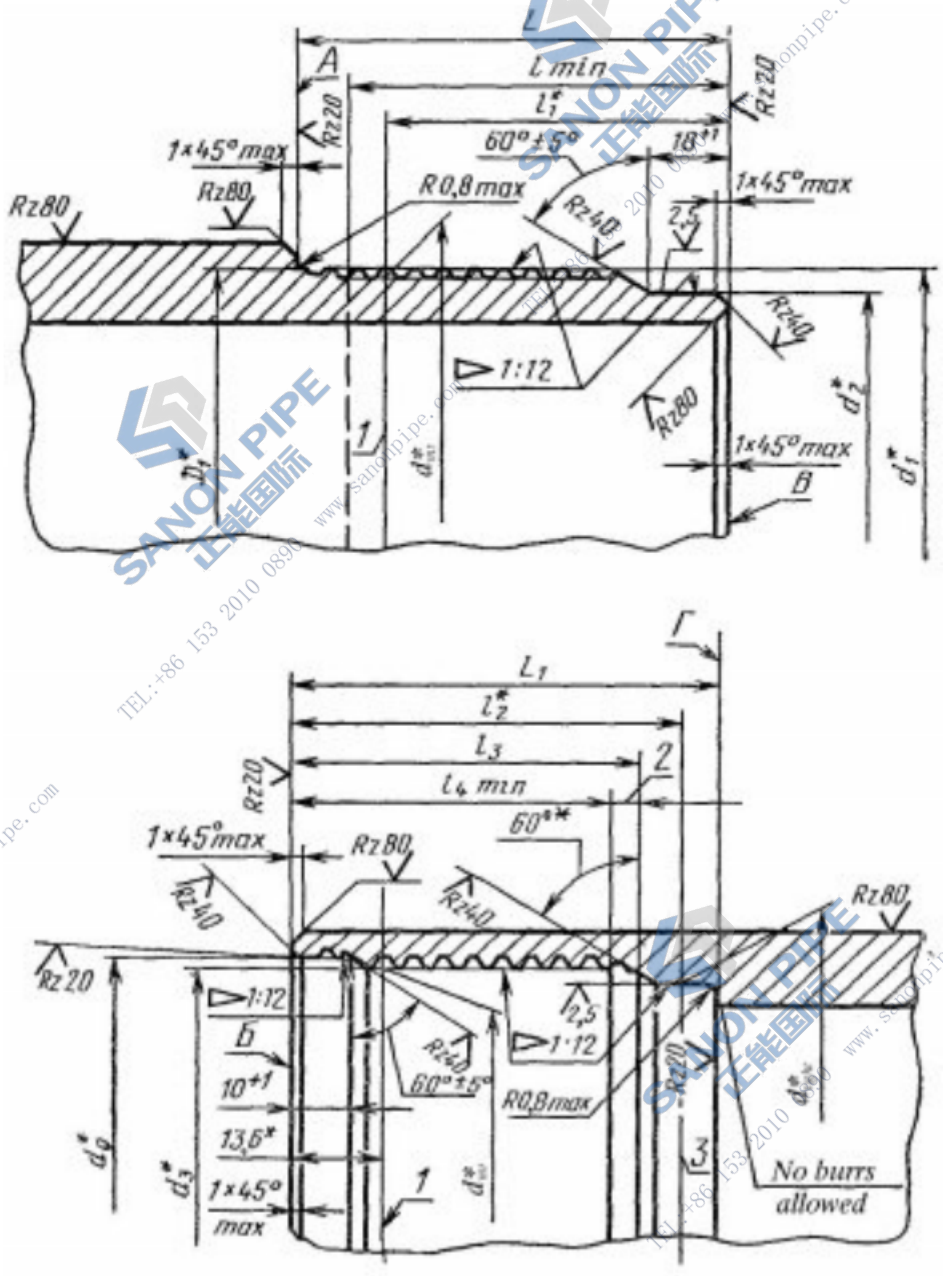
2.15.6. When checking the value of the tapered tightening belt diameter on the pipes box end, the reference plane of the plain ring gage shall lie flat with the pipe end face or stay at a distance not exceeding $H_1 = 1.2$ mm from it (Fig. 14).

2.15.7. Standoff of pipes box end when checked with a threaded plug gage shall be equal to $5_{-1.2}$ mm (see fig. 15).

The reference plane of a plain plug gage, when used to check the pipes box end, shall coincide with the pipe end face or lie sunk with respect to the end face to a depth not exceeding 1.2 mm (see fig. 15).

2.15.8. When determining the diameter of the tapered tightening boring in the box end of pipes, the reference plane of a plain plug gage shall lie at a distance *H* (see fig. 15) from the coupling end face, the distance being equal to:

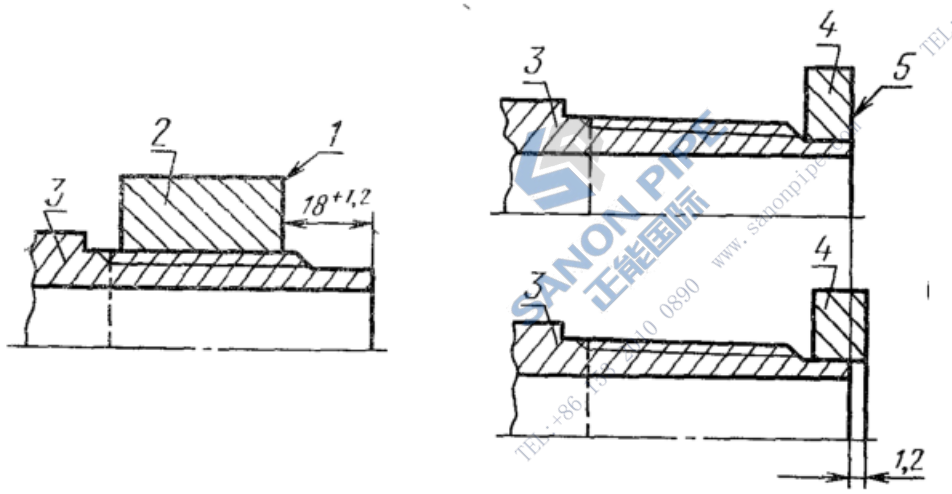
54 mm for pipes of a nominal diameter of 60 mm;
59 mm for pipes of other nominal diameters.
Maximum deviation is +1.2 mm.



* Reference dimensions.

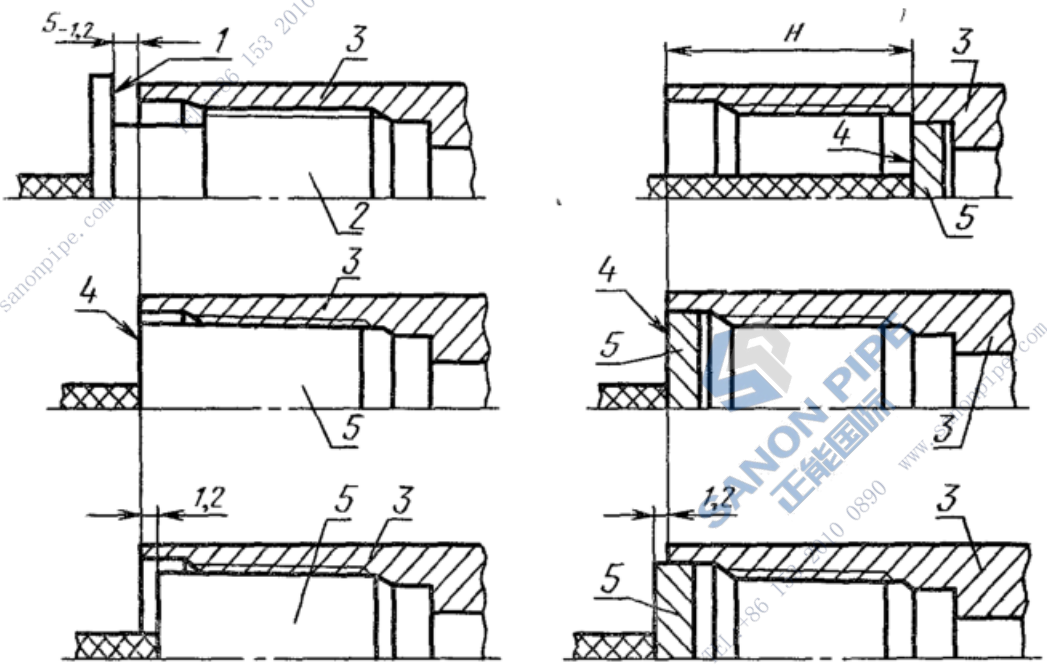
1 – reference plane; *2* – thread vanish, *3* – design plane

Fig. 13



1 – reference plane of threaded (complete and incomplete thread) and plain ring gages; *2* – threaded (complete and incomplete thread) and plain ring gages; *3* – pin end of pipe, *4* – plain ring gage; *5* – reference plane of plain ring gage

Fig. 14



1 – reference plane of threaded plug gage; *2* – threaded plug gage; *3* – box end of pipe, *4* – reference plane of plain plug gage; *5* – plain plug gage

Fig. 15

2.15.9. When checking the diameter of a tapered boring in the box end of pipes, the reference plane of a plain plug gage shall coincide with the pipe end face or lay sunk with respect to the end face to a depth not exceeding 1.2 mm (see fig. 15).

2.15.10. Thrust surfaces *A, Б, B* and *Г* shall lie at right angle to the thread axis. Maximum deviation from the right angle is -0.06 mm.

Maximum deviation from flatness on the width of the thrust surfaces is -0.06 mm.

2.15.11. Threads shall be coaxial with tapered tightening surfaces on the pin and box ends of pipes. Maximum deviation from coaxiality is -0.04 mm.

2.15.12. The surface of the plain portion of the thread cone on the pin end of pipes, located behind the thread vanish portion, shall be a continuation of the surface formed by thread tips.

2.15.13. Wall thickness difference over 1 mm in the planes of end faces *Б* and *B* is not allowed.

2.15.14. Thrust surfaces *A* and *Г* shall have a width no smaller than that specified in table 19.

Table 19

mm

Pipe nominal diameter	Wall thickness	Minimum width of thrust surfaces	
		A	*Г*
60	5.0	1.75	2.00
73	5.5 7.0	1.75 2.75	2.25 3.50
89	6.5 8.0	2.75 3.75	3.25 4.50
102 114	6.5 7.0	3.25 3.75	3.50 4.00

2.15.15. The outer surface of the cylindrical part of external-upset pin and box ends of a diameter D_u shall be free of black spots extending for more than ¼ of circumference. No black spots shall bring diameter D_u outside its maximum deviations.

2.16. Threads on both ends of a coupling shall be coaxial. Maximum deviations from coaxiality shall be 0.75 mm in the end face and 3 mm per 1 m of length. The maximum deviation from coaxiality in the end face may be increased to 1 mm if at the same time the maximum deviation per 1 m of length is reduced to 2 mm.

2.17. The surfaces of the thread, tapered tightening surfaces, thrust ands and shoulders in pipes and couplings, and the tapered borings in НКБ pipes shall be smooth, free of burrs, fissures or other defects disrupting their continuity, strength, and joint tightness.

The thread surface roughness parameter *Rz* as specified in GOST 2789-73 shall not exceed 20 μm.

By agreement between the customer and the manufacturer, the thread surface roughness parameter *Rz* as specified in GOST 2789-73, if it does not exceed 40 μm, may be disregarded on modification *Б* plain and external-upset pipes and couplings to them.

2.18. Threads with black spots on thread tips are not allowable at distances shorter than *(l – a)* from the end of a piece of pipes. The value of *a* is equal to 7.5 mm for a thread with a pitch of 2.54 mm; 8.5 mm for a thread with a pitch of 4.232 mm; and 10.0 mm for threads with a pitch of 3.175 or 5.08 mm.

2.19. The maximum difference (ovality) in thread diameters in one cross-section of couplings and box ends of integral-joint pipes shall not exceed:

0.10 mm for couplings and box ends of pipes of nominal diameters from 27 to 60 mm;
0.13 mm for couplings and box ends of pipes of a nominal diameter of 73 or 89 mm;
0.15 mm for couplings and box ends of pipes of a nominal diameter of 102 or 114 mm.

2.20. Pipes shall be subjected to nondestructive testing with the purpose of detection of longitudinal defects.

3. ACCEPTANCE PROCEDURE

3.1. Pipes shall be presented for acceptance by batches.

A batch shall consist of pipes of the same nominal diameter, same wall thickness and group of strength, same type and same modification; it shall be accompanied with one shipping document certifying that its quality conforms to the requirements of this Standard and containing:

manufacturer's name;

pipe nominal diameters and wall thickness in millimeters, pipe lengths in meters;

group of length (for modification *Б* pipes), pipes weight in kilograms;

pipes type;

modification (for modification *А* pipes);

group of strength, heat number, weight percentage of sulfur and phosphorus for all heats included in the batch;

numbers of pipes (from – to for each heat);

test results;

designation of this standard.

3.2. Checks for appearance, sizes of defects, dimensions and parameters, except for those mentioned below in this clause, shall be performed on every piece of pipe and every coupling in a batch.

The thread pitch (on a 25.4 mm length and over the entire length), thread flank angles, taper of the thread effective diameter on plain and external-tapered pipes and couplings to them, taper of the thread minor diameter on НКМ pipes and pin ends of НКБ pipes, and of the thread major diameter of НКМ couplings and box ends of НКБ pipes, height of thread, right angles and flatness of thrust surfaces, coaxiality of the thread and tapered tightening surfaces on НКМ pipes and couplings and НКБ pipes, and the width of thrust shoulder *Г* on НКБ pipes shall be checked periodically on the numbers of products and at the times agreed between the manufacturer and the customer.

Coaxiality inspection shall be done on at least 1% of couplings of each batch.

Internal diameter and general curvature of НКБ pipes shall be inspected before the end upsetting.

3.3. Every connection in a batch of НКМ pipes shall be checked for quality of match between the pipe end and the coupling thrust shoulder.

3.4. Weight check shall be performed on each piece of pipe of А or Б modification.

It is allowed to skip the weight check on pipes of modification Б, but to accept it on the basis of actual design weight.

3.5. The percentage by weight of sulfur and phosphorus shall be inspected for each heat. For pipes made of metal produced at a supplier's plant, the percentage by weight of sulfur and phosphorus shall be certified by a quality certificate issued by the metal manufacturer.

3.6. Mechanical properties of the metal shall be tested on samples of one piece of pipe and one coupling taken from each size of each heat of metal.

3.7. Collapse tests shall be done on one piece of pipe of each size sampled from each heat of metal.

3.8. Testing on internal hydraulic pressure shall be performed on each piece of pipe with a coupling attached and fixed on it, as well as each piece of НКБ pipe.

The НКБ pipes may be tested after heat treatment, but before thread cutting.

3.9. Nondestructive testing for longitudinal defects shall be done on each piece of pipes.

At the customer's request, modification *Б* pipes of group of strength Д or К and modification *А* pipes of group of strength Д may be delivered without nondestructive testing.

(Amended Wording, Amendment No. 2).

3.10. If the tests produce negative results in at least one parameter, the same test shall be repeated on a double volume sample taken from the same batch.

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

4. TEST METHODS

4.1. Exterior and interior surfaces of pipes and couplings shall be inspected visually.

4.2. Defect penetration depth shall be checked by scoring or another method in one to three places.

4.3. Geometric dimensions and parameters of pipes and couplings shall be verified with the help of general-purpose measuring devices or special instruments ensuring the necessary measurement accuracy and according to technical documentation approved in accordance with the established procedure.

4.4. Pipe internal diameters and general curvature shall be checked over the entire length of the pipe with the help of a cylindrical mandrel 1250 mm long with an external diameter specified in table 20.

Table 20

mm

Pipe nominal diameter	Wall thickness	Mandrel external diameter
27	3.0	18.3
33	3.5	24.0
42	3.5	32.8
48	4.0	37.9
60	5.0	47.9
73	5.5	59.6
	7.0	56.6
89	6.5	72.7
	8.0	69.7
102	6.5	85.4
114	7.0	97.1

Notes:

1. By agreement between the customer and the manufacturer, pipes of sizes 60×5 mm and 73×5.5 mm shall be checked with increased diameter mandrels of 49.0 and 60.5 mm, respectively.

2. Maximum deviation from the cylindrical mandrel diameter is +0.25 mm.

3. НКБ pipes shall be checked with mandrels of an external diameter 2 mm smaller than the dimension d_u specified in table 5.

(Amended Wording, Amendment No. 2).

4.5. **(Removed, Amendment No. 2).**

4.6. On the end portions of pipes, curvature shall be checked by measuring the deflection and calculating the quotient of the deflection (in millimeters) by the distance from the place of measurement to the nearest end of pipes (in meters).

When the curvature is determined for external-upset pipes, the upset part shall not be taken into account.

4.7. Bevel of the thread major diameter on pipes and the pin ends of НКБ pipes and on couplings and the box ends of НКБ pipes, as well as bevel of tapered tightening surfaces on НКМ pipes and couplings and НКБ pipes shall be checked by means of plain tapered gages (ring and plug types, both complete and incomplete) or special tooling.

4.8. The under-thread wall thickness *(t)* shall be checked under the root of the first thread counting from the end face of pipes.

4.9. Out-of-roundness of thread on couplings and the box ends of НКБ pipes shall be checked with an incomplete plain gage (blade).

N o t e . For example, when checking thread out-of-roundness on couplings and box ends of pipes of a nominal diameter of 73 or 89 mm, the difference of distance (in millimeters) from the end face of the gage to that of the coupling or box end with the gage in various positions shall not exceed $0.13 \text{ mm} \times \frac{1}{2\text{tg}\varphi}$.

4.10. In order to check alignment of threads on both ends, the coupling shall be screwed on a threaded cylindrical rod accurately aligned and centered in a lathe chuck or a special device. Another accurately finished cylindrical rod at least 250 mm long shall be screwed into the free end of the coupling.

The coupling shall be rotated, and run-out (twice the value of misalignment) of the rod at the coupling end face and at the end of the rod shall be measured with a dial indicator accurate to the nearest 0.01 mm. The magnitude of rod end run-out shall be read out in the midsection of the coupling.

4.11. Thread standoff on plain and external-upset pipes shall be checked with the help of a threaded ring gage.

4.12. Thread standoff on couplings to plain and external-upset pipes shall be checked with the help of a threaded plug gage.

4.13. Thread standoff on НКМ pipes and pin ends of НКБ pipes shall be checked with plain and threaded ring gages, while to check the diameter of the tapered tightening belt, plain ring gages shall be used.

4.14. Thread standoff on couplings to НКМ pipes and the box ends on НКБ pipes shall be checked with plain and threaded plug gages, the diameters of the tapered tightening boring and tapered cutout shall be inspected with plain plug gages.

4.15. When checking the contact between HKM pipes and the coupling thrust shoulder, a 0.03 mm feeler gage (for pipes of modification *A*) or a 0.5 mm feeler gage (for pipes of modification *Б*) shall not pass over the entire periphery of the joint.

4.16. Pipe weight check shall be done on special devices capable of measuring to the accuracy stipulated in this Standard.

4.17. Weight percentages of sulfur and phosphorus shall be determined on samples withdrawn in the course of steel teeming as indicated in GOST 7565-81.

4.18. Tension tests shall be carried out in accordance with GOST 10006-80, using short longitudinal samples.

In order to test the metal for mechanical properties, one test piece shall be cut out of each piece of pipe or coupling blank. The test pieces shall be cut out along any end of pipe or coupling blank by a method that does not cause changes in metal structure or mechanical properties. Test pieces of all external-upset pipes shall be cut from the upset portion.

The ends of the test piece may be flattened for clamping in the tension testing machine grips.

4.19. Flattening test shall be carried out in accordance with GOST 8695-75, using 60 mm wide ring pieces cut off of finished pipes (or before thread cutting).

The test pieces shall be cut off the plain portion of pipes.

The ring test pieces may have a chamfer not larger than $1 \times 45°$.

When testing pipes of the group of strength K or higher, premature appearance of cracks or tears in the plane of maximum bending of the test piece (along the line of load application) shall be allowed.

4.20. Duration of the hydraulic pressure test shall not be less than 10 seconds.

No leaks shall be detected through the pipes and coupling walls or threads.

Pieces of pipe that show water leak through the connection shall be re-threaded with subsequent re-testing with hydraulic pressure.

4.21. Nondestructive testing of pipes for absence of longitudinal defects is described in obligatory Appendix 3.

5. MARKING, PACKAGING, AND TRANSPORTATION AND STORAGE

5.1. Marking, packaging, transportation, and storage shall be in accordance with GOST 10692-80 with the following additions.

5.1.1. The following marking shall be clearly applied on each piece of pipe by impact method or by roll forming at a distance of 0.4 – 0.6 m from the pipe end carrying the coupling (or from the box end of НКБ pipes):

Pipe nominal diameter in millimeters

Pipe number

Group of strength

Wall thickness in millimeters (for pipes with nominal diameters of 73 and 89 mm)

Manufacturer's trade mark

Month and year of manufacture

The location of the marking shall be encircled or underlined with a stable light paint.

The symbols of the marking shall be 5 to 8 mm high.

When the marking is applied on pipes by a mechanical method, symbols may be arranged in one line. Each piece of pipe may be marked with the heat ID number.

(Amended Wording, Amendment No. 1).

5.1.2. The following marking shall be applied on each piece of pipe with a durable light paint next to the marking applied by the impact or roll forming method:

Pipe nominal diameter in millimeters

Group of strength (and the inscription "OOE" on plain pipes with heat-hardened ends)

Wall thickness in millimeters (for pipes with nominal diameters of 73 and 89 mm)

Pipe length in centimeters

Pipe weight in kilograms (applied in case of weight checkout)

Pipes type (except for plain pipes)

Pipe modification (in case of modification *A* pipe shipment)

The manufacturer's name or trade mark

The symbols of the marking shall be 20 to 50 mm high.

For pipes with nominal diameters of 27 to 48 mm, the paint marking on each piece of pipe may be replaced with a metal label with the data impressed by the impact method or roll forming, the label being securely attached to each bundle of pipes. The label shall, additionally, indicate the total length and weight of the pipes in the bundle.

(Amended Wording, Amendment No. 2).

5.1.3. The following marking shall be clearly applied on each coupling by impact method or by roll forming: the manufacturer's trade mark, the group of strength, and the coupling modification (for couplings of modification *A*).

5.1.4. All symbols of marking shall run along the generatrix of the pipes and coupling. The symbols of marking applied by roll forming should may run at right angle to the generatrix.

5.1.5. The thread, thrust faces and shoulders, and tapered tightening surfaces of pipes and couplings shall be protected from damage by special protective rings and sleeves made of metal. Polyethylene sleeves in accordance with GOST 16338-77 or with regulatory engineering documentation, or sleeves of other non-metallic materials made in accordance with regulatory engineering documentation coordinated with the customer may be used to protect triangular thread on couplings to pipes of nominal diameters up to 89 mm .

The rings shall cover the pipes connections and pin ends of НКБ pipes over a minimum length of L minus 3 threads. The sleeves shall cover connection on couplings and box ends of НКБ pipes over a minimum length of $^2/_3\ L$.

All rings and sleeves shall extend by at least 10 mm beyond the edges of pipes and coupling end faces.

The design of rings and sleeves shall make their unscrewing possible.

When rings and sleeves are screwed on, the thread, thrust faces and shoulders, as well as the tapered tightening surfaces shall have been coated with an anticorrosive grease.

(Amended Wording, Amendment No. 1).

5.1.6. Pipes of only one batch shall be placed into a rail car for shipping. Pipes shall be transported in bundles, securely bound together in at least two places.

The weight of a bundle shall not exceed 5 metric tons or, at the customer's request, 3 metric tons.

Bundles of pipes of different lots may be shipped in the same rail car, provided they are separated from one another.

(Amended Wording, Amendment No. 2).

5.1.7. When binding pipes into bundles, the couplings on pipes or the box ends of НКБ pipes shall be arranged at the same end of the bundle.

Appendices 1, 2. **(Removed, Amendment No. 2).**

APPENDIX 3
(Obligatory)

NONDESTRUCTIVE TESTING OF PIPES

Pipe inspection for longitudinal defects shall be performed on nondestructive testing equipment over the entire length of pipes before thread cutting.

The detection limit of the equipment shall be set using a working test specimen, prepared by artificially introducing defects into a plain section of pipes of the size to be inspected.

Those pieces of pipe that fail nondestructive testing shall be rejected. It is allowed to repair rejected pieces of pipe with subsequent re-testing.

Modification *A*

The test specimen shall have artificial defects of dimensions specified in the following table.

Dimensions in mm

Test method	Ultrasonic testing			Magnetic induction testing
Type of artificial defect	Rectangular notch on the exterior surface running parallel to the specimen axis			Through-the-wall hole normal to the specimen axis
Size of artificial defect	Length	Depth, % of nominal wall thickness	Width	Diameter (maximum deviation ±0.1)
For all groups of strength	50 min	5.0 ±0.75, or 0.3±0.05 mm, whichever the larger	1.0 max	1.6
For groups of strength Д, К and Е (by agreement between the customer and the manufacturer)	Equal to double width of the detector piezoelectric crystal plate	12.5 ±2.0, or 0.6±0.05 mm, whichever the larger	1.0 max	3.2

Defects that produce an instrument signal stronger than the one received during the tester setting using the test specimen are considered critical faults; a piece of pipe showing critical faults shall be rejected. When the setting is done on an artificial defect of a depth of 5% of the nominal wall thickness, the faults detected may be filed down, provided the minimum allowable wall thickness is left.

Pipe ends that are not subjected to inspection on automatic fault finding equipment shall be checked for defects running parallel to the pipes axis on the exterior and interior surfaces, using the magnetic particle technique or any other method of flaw detection capable of indicating defects equivalent in size to the artificial defects specified in the above table.

All pieces of pipes that passed the flaw detection shall be additionally marked with the symbol "O" applied around the group of strength designations. Nondestructive testing procedures shall also be indicated in the quality certificate.

Use of eddy-current method of flaw detection is allowed if requested by the customer.

Modification *5*

Pipes shall be inspected in conformity with instruction approved in accordance with the established procedure.

Ultrasonic quality control, if any, shall be carried out in accordance with GOST 17410-78.

(Amended Wording, Amendment No. 2).

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Amendment No. 3 to GOST 633-80. Oil Well Pipes and Pipe Couplings. Specifications

Approved and introduced by Decree No. 4794, dated 22.12.87 of the USSR State Committee for Standards

Date of Introduction 01.06.88

Introduction. The second paragraph shall be removed.

Clause 1.4. The text "total weight 20 metric tons as a minimum" shall be replaced with the text "total weight 60 metric tons as a minimum". Note: The value "20 metric tons" shall be replaced with "60 metric tons".

Clause 2.14.1. Table 13, column "Normal value for НКМ pipes with nominal diameters from 60 to 102 mm and couplings to them and НКБ pipes of all diameters". The value "4.232" shall be replaced with "4.233".

Clause 2.14.2. Table 14, column "Thread vanish $l_{3\ max}$". The value "8" shall be replaced with "10", the value "10" with "13".

Table 15, column "Complete thread length $l_{6\ min}$". The value "48" shall be replaced with "43" (twice), the value "58" with "53" (twice)

Fig. 10. The chamfer angle "$78°_{-3°}$" shall be replaced with "$80°^{+3°}$".

Clause 2.14.3. Table 16, column "Thread pitch". The value "4.232" shall be replaced with "4.233".

Clause 2.14.5 shall be reworded as follows: "2.14.5. When standoff of the pipe thread is determined, the reference plane of ring gages shall be at the following distance H from the pipe end (fig. 11):

$20_{-1.2}$ mm for standoff over a threaded ring gage with complete and incomplete thread (for pipes of nominal diameters from 60 to 102 mm);

$20_{-2.4}$ mm for standoff over a plain ring gage (for pipes of nominal diameters from 60 to 102 mm);

$24_{-2.5}$ mm for standoff over plain and threaded ring gages (for pipes of a nominal diameter of 114 mm)."

Clause 2.15.2. Table 18, column "Length of complete thread l_{4min}". The value "56" shall be replaced with "50", the value "61" with "55" (4 times).

Clause 2.18. The text "with a pitch of 4.232 mm" shall be replaced with "with a pitch of 4.233 mm".

Clause 3.2. The following text shall be added to the second paragraph: "the linear and angular dimensions specified in figs. 6, 10, 13, and tables 10, 11, 14, 17, and 18", this text being inserted after the text "shoulder Γ on НКБ pipes".

Clause 3.4 The following paragraph shall be added: "Couplings shall be accepted on the basis of actual design weight".

Clause 5.15. The reference to GOST 16338-77 shall be replaced with that to GOST 16338-85.

(IUS No. 3 1988)