U S S R S T A T E S T A N D A R D

HIGH-ALLOY STEELS AND CORROSION-PROOF, HEAT-RESISTING AND HIGH-TEMPERATURE ALLOYS

GRADES

GOST 5632-72

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OKP (All-Union Product Classification Code) 08 7000

Date of Introduction 01.01.75

This Standard applies to wrought steels and alloys on iron-nickel and nickel bases, designed for operation in corrosion-active mediums and at high temperatures.

High-alloy steels conditionally includes such alloys, whose iron mass fraction is more than 45 %, and total mass fraction of alloying elements is no less than 10 % by top limit, and mass fraction of one of elements is no less than 8 % by bottom limit.

Alloys on iron-nickel basis include such alloys, whose basic structure is a solid solution of chromium and other alloying elements in iron-nickel basis (the sum of nickel and iron is more than 65 % at approximate nickel/iron ratio of 1:1.5).

Alloys on nickel basis include such alloys, whose basic structure is a solid solution of chromium and other alloying elements in nickel basis (content of nickel is no less than 50 %).

This Standard is developed taking into account the requirements of international standards ISO 683/XIII-85, ISO 683/XV-76, ISO 683/XVI-76 and ISO 4955-83.

Correction is inserted (IUS {Standards Information Catalog} No. 11-2001)

1. CLASSIFICATION

1.1. Depending on their basic properties the steels and alloys are subdivided into groups:

I - corrosion-proof (stainless) steels and alloys, possessing resistance against electrochemical and chemical corrosion (atmospheric, soil, alkaline, acid, salt), intercrystalline corrosion, energized corrosion, etc.;

II – heat-resisting (nonscaling) steels and alloys, possessing resistance against chemical destruction of a surface in gas mediums at temperatures higher than 550 °C, operating in non-loaded or slightly-loaded conditions;

III– high-temperature steels and alloys, capable operate in loaded condition at high temperatures during certain time period and simultaneously possessing sufficient heat resistance.

1.2. Depending on their structure the steels are subdivide into classes:

martensite – are the steels with basic structure of martensite;

martensite-ferrite – are the steels containing in their structure, besides martensite, no less than 10 % of ferrite;

ferrite – are the steels having ferrite structure (without $\alpha \leftrightarrow \gamma$ transformations);

austenite-martensite – are the steels having structure of austenite and martensite, whose amount can be changed in a wide range;

austenite-ferrite – are the steels having austenite and ferrite structure (ferrite more than 10 %);

austenite – are the steels having austenite structure.

The subdivision of steels into classes by structural attributes is conditional and is made depending on the basic structure, obtained after cooling of steels in the air after high-temperature heating. Therefore structural deviations can not serve as the reason of steel rejection.

1.3. Depending on their chemical composition the alloys are subdivided into classes by basic contained element:

alloys on iron-nickel basis;

alloys on nickel basis.

GRADES AND CHEMICAL COMPOSITION

2.1. Grades and chemical composition of steels and alloys shall correspond to those specified in tab. 1. Composition of steels and alloys in case of application of special methods of melting and remelting shall correspond to the norms of tab. 1, unless other mass fraction of elements is stipulated in standards or specifications for metal products. The names of special methods of melting and remelting are specified in note 7 of tab. 1.

The mass fraction of sulfur in steels, obtained by a method of electroslag remelting, shall not exceed 0.015 %, except for steels of grades 10Х11Н23Т3МР (ЭП33), 03Х16Н15М3 (ЭИ844) and 03Х16Н15М3Б (ЭИ844Б), whose sulfur mass fraction shall not exceed the norms specified in tab. 1 or established by agreement between the parties.

(Amended Wording, Amendment No. 5).

2.2. The chemical composition deviations from the norms specified in tab. 1 are allowed in finished products.

Maximum deviations shall not exceed those specified in tab. 2, unless other deviations including those for the elements not specified in tab. 2, are stipulated in standards or specifications for finished products.

2.3. In steels and alloys not alloyed by titanium there is allowed titanium in amount of no more than 0.2 %, in steels of grades 03Х18Н11 and 03Х17Н14М3 - no more than 0.05 %, and in steels of grades 12Х18Н9, 08Х18Н10 and 17Х18Н9 - no more than 0.5 %, unless other titanium mass fraction is stipulated in standards or specifications for separate kinds of steels and alloys.

By agreement between the manufacturer and the customer titanium mass fraction in steels of grades 03Х23Н6, 03Х22Н6М2, 09Х15Н8Ю1, 07Х16Н6 and 08Х17Н5М3 shall not exceed 0.05 %.

2.4. Residual copper mass fraction in steels not alloyed by copper shall be of no more than 0.30 %.

By agreement between the manufacturer and the customer the allowed residual mass fraction of copper in steels of grades 08Х18Н10Т, 08Х18Н12Т, 12Х18Н9Т, 12Х18Н10Т, 12Х18Н12Т, 12Х18Н9 and 17Х18Н9 may be of no more than 0.40 %.

For steel of grade 10Х14АГ15 the residual mass fraction of copper shall not exceed 0.6 %.

2.5.In chromic steels with chromium mass fraction up to 20 %, not alloyed by nickel, there is allowed the residual nickel up to 0.6 %, with chromium mass fraction more than 20 % - up to 1 %, and in chromomanganese austenite steels - up to 2 %.

2.6.In chromonickel and chromic steels, not alloyed by tungsten and vanadium, the allowed residual mass fraction of tungsten and vanadium is no more than 0.2 % of each. In steels of grades 05Х18Н10Т, 08Х18Н10Т, 17Х18Н9, 12Х18Н9, 12Х18Н9Т, 12Х18Н10Т and 12Х18Н12Т the residual mass fraction of molybdenum shall not exceed 0.5 %; for the enterprises of aviation industry the mass fraction of residual molybdenum in steels of grades 05Х18Н10Т, 08Х18Н10Т, 12Х18Н9, 12Х18Н9Т, 12Х18Н10Т and 12Х18Н12Т shall not to exceed 0.3 %. In others steels, not alloyed by molybdenum, the mass fraction of residual molybdenum shall not exceed 0.3 %.

At the customer's request the steels of grades 05Х18Н10Т, 08Х18Н10Т, 12Х18Н9, 17Х18Н9, 12Х18Н9Т, 12Х18Н10Т and 12Х18Н12Т shall be produced with residual molybdenum of no more than 0.3 %, and steels of grades 05Х18Н10Т, 03Х18Н11, 03Х23Н6, 08Х18Н12Б, 08Х18Н12Т and 08Х18Н10Т - no more than 0.1 %.

2.6.1. In alloys on nickel and iron-nickel bases, not alloyed by titanium, aluminum, niobium, vanadium, molybdenum, tungsten, cobalt or copper, the mass fraction of the listed residual elements shall not exceed the norms specified in tab. 3.

2.3 to 2.6.1. **(Amended Wording, Amendment No. 5).**

2.6.2. **(Removed, Amendment No. 5).**

2.7. In steels and alloys, alloyed by tungsten, the allowed mass fraction of residual molybdenum is up to 0.3 %. By agreement between the parties there is allowed the higher mass fraction of molybdenum on condition of corresponding reduction of tungsten on the basis of its replacement with molybdenum in the ratio of 2:1. In alloy ХН60ВТ (ЭИ868) the allowed residual mass fraction of molybdenum is no more than 1.5 %. In alloy ХН38ВТ the allowed residual mass fraction of molybdenum is no more 0.8 %.

(Amended Wording, Amendment Nos. 3 and 5).

Table 1

Number of grade	Grades of steels and alloys		Mass fraction of elements, %						
	New designation	Old designation	Carbon	Silicon	Manganese	Chromium	Nickel	Titanium	Aluminum
STEELS									
1. Steels of martensite class									
1-5	40Х9С2	4Х9С2	0.35 to 0.45	2.0 to 3.0	No more than 0.8	8.0 to 10.0	—	—	—
1-6	40Х10С2М	4Х10С2М, ЭИ107	0.35 to 0.45	1.9 to 2.6	No more than 0.8	9.0 to 10.5	—	—	—
1-7	15Х11МФ	1Х11МФ	0.12 to 0.19	No more than 0.5	No more than 0.7	10.0 to 11.5	—	—	—
1-8	18Х11МНФБ	2Х11МФБН, ЭП291	0.15 to 0.21	No more than 0.6	0.6 to 1.0	10.0 to 11.5	0.5 to 1.0	—	—
1-9	20Х12ВНМФ	2Х12ВНМФ, ЭП428	0.17 to 0.23	No more than 0.6	0.5 to 0.9	10.5 to 12.5	0.5 to 0.9	—	—
1-10	11Х11Н2В2МФ	Х12Н2ВМФ, ЭИ962	0.09 to 0.13	No more than 0.6	No more than 0.6	10.5 to 12.0	1.5 to 1.8	—	—
1-11	16Х11Н2В2МФ	2Х12Н2ВМФ, ЭИ962А	0.14 to 0.18	No more than 0.6	No more than 0.6	10.5 to 12.0	1.4 to 1.8	—	—
1-12	20Х13	2Х13	0.16 to 0.25	No more than 0.8	No more than 0.8	12.0 to 14.0	—	—	—

Continuation of tab. 1

Number of grade	Grades of steels and alloys		Mass fraction of elements, %								Groups		
	New designation	Old designation	Tungsten	Molybdenum	Niobium	Vanadium	Iron	Sulfur (No more than)	Phosphorus (No more than)	elements	I corrosion-proof	II heat-resisting	III high-temperature
STEELS													
1. Steels of martensite class													
1-5	40Х9С2	4Х9С2	—	—	—	—	Base	0.025	0.030	—	—	++	+
1-6	40Х10С2М	4Х10С2М, ЭИ107	—	0.7 to 0.9	—	—	Base	0.025	0.030	—	—	++	+
1-7	15Х11МФ	1Х11МФ	—	0.6 to 0.8	—	0.25 to 0.40	Base	0.025	0.030	—	—	—	+
1-8	18Х11МНФБ	2Х11МФБН, ЭП291	—	0.8 to 1.1	0.20 to 0.45	0.20 to 0.40	Base	0.025	0.030	—	—	—	+
1-9	20Х12ВНМФ	2Х12ВНМФ, ЭП428	0.7 to 1.1	0.5 to 0.7		0.15 to 0.30	Base	0.025	0.030	—	—	—	+
1-10	11Х11Н2В2МФ	Х12Н2ВМФ, ЭИ692	1.6 to 2.0	0.35 to 0.50	—	0.18 to 0.30	Base	0.025	0.030	—	—	—	+
1-11	16Х11Н2В2МФ	2Х12Н2ВМФ, ЭИ962А	1.6 to 2.0	0.35 to 0.50	—	0.18 to 0.30	Base	0.025	0.030	—	—	—	+
1-12	20Х13	2Х13	—	—	—	—	Base	0.025	0.030	—	++	—	+

Continuation of tab. 1

Number of grade	Grades of steels and alloys		Mass fraction of elements, %						
	New designation	Old designation	Carbon	Silicon	Manganese	Chromium	Nickel	Titanium	Aluminum
1-13	30Х13	3Х13	0.26 to 0.35	No more than 0.8	No more than 0.8	12.0 to 14.0	—	—	—
1-14	40Х13	4Х13	0.36 to 0.45	No more than 0.8	No more than 0.8	12.0 to 14.0	—	—	—
1-15	30Х13Н7С2	3Х13Н7С2, ЭИ72	0.25 to 0.34	2.0 to 3.0	No more than 0.8	12.0 to 14.0	6.0 to 7.5	—	—
1-16	13Х14Н3В2ФР	Х14НВФР, ЭИ736,	0.10 to 0.16	No more than 0.6	No more than 0.6	13.0 to 15.0	2.8 to 3.4	No more than 0.05	—
1-17	25Х13Н2	2Х14Н2, ЭИ474	0.2 to 0.3	No more than 0.5	0.8 to 1.2	12.0 to 14.0	1.5 to 2.0	—	—
1-18	20Х17Н2	2Х17Н2	0.17 to 0.25	No more than 0.8	No more than 0.8	16.0 to 18.0	1.5 to 2.5	—	—
1-19	95Х18	9Х18, ЭИ229	0.9 to 1.0	No more than 0.8	No more than 0.8	17.0 to 19.0	—	—	—
1-20	09Х16Н4Б	ЭП56	0.08 to 0.12	No more than 0.6	No more than 0.5	15.0 to 16.5	4.0 to 4.5	—	—
1-21	13Х11Н2В2МФ	1Х12Н2ВМФ, ЭИ961	0.10 to 0.16	No more than 0.6	No more than 0.6	10.5 to 12.0	1.50 to 1.80	—	—
1-22	07Х16Н4Б	—	0.05 to 0.10	No more than 0.6	0.2 to 0.5	15.0 to 16.5	3.5 to 4.5	—	—
1-23	65Х13	—	0.60 to 0.70	0.2 to 0.5	0.25 to 0.80	12.0 to 14.0	No more than 0.5	—	—

Continuation of tab. 1

Number of grade	Grades of steels and alloys		Mass fraction of elements, %								Groups		
	New designation	Old designation	Tungsten	Molybdenum	Niobium	Vanadium	Iron	Sulfur	Phosphorus	Other elements	I corrosion-proof	II heat-resisting	III high-temperature
								No more than					
1-13	30Х13	3Х13	—	—	-	—	Base	0.025	0.030	—	+	—	—
1-14	40Х13	4Х13	—	—	—	—	Base	0.025	0.030	—	+	—	—
1-15	30Х13Н7С2	3Х13Н7С2, ЭИ72	—	—	—	—	Base	0.025	0.030	—	—	+	—
1-16	13Х14Н3В2ФР	Х14НВФР, ЭИ736	1.6 to 2.2	—	—	0.18 to 0.28	Base	0.025	0.030	Boron, no more than 0.004	—	—	+
1-17	25Х13Н2	2Х14Н2, ЭИ474	—	—	—	—	Base	0.15-0.25	0.08-0.15	—	+	—	—
1-18	20Х17Н2	2Х17Н2	—	—	—	—	Base	0.025	0.035	—	+	—	—
1-19	95Х18	9Х18, ЭИ229	—	—	—	—	Base	0.025	0.030	—	+	—	—
1-20	09Х16Н4Б	ЭП56	—	—	0.05 to 0.15	—	Base	0.015	0.030	—	++	—	—
1-21	13Х11Н2В2МФ	1Х12Н2ВМФ, ЭИ961	1.60 to 2.00	0.35 to 0.50	—	0.18 to 0.30	Base	0.025	0.030	—	—	—	+
1-22	07Х16Н4Б	—	—	—	0.20 to 0.40	—	Base	0.020	0.025	—	++	—	—
1-23	65Х13	—	—	—	—	—	Base	0.025	0.030	—	++	—	—

Continuation of tab. 1

Number of grade	Grades of steels and alloys		Mass fraction of elements, %						
	New designation	Old, designation	Carbon	Silicon	Manganese	Chromium	Nickel	Titanium	Aluminum
2. Steels of martensite-ferrite class									
2-2	15Х12ВНМФ	1Х12ВНМФ, ЭИ802	0.12 to 0.18	No more than 0.4	0.5 to 0.9	11.0 to 13.0	0.4 to 0.8	—	—
2-3	18Х12ВМБФР	2Х12ВМБФР, ЭИ993	0.15 to 0.22	No more than 0.5	No more than 0.5	11.0 to 13.0	—	—	—
2-4	12Х13	1Х13	0.09 to 0.15	No more than 0.8	No more than 0.8	12.0 to 14.0	—	—	—
2-5	14Х17Н2	1Х17Н2, ЭИ268	0.11 to 0.17	No more than 0.8	No more than 0.8	16.0 to 18.0	1.5 to 2.5	—	—
3. Steels of ferrite class									
3-1	10Х13СЮ	1Х12СЮ, ЭИ404	0.07 to 0.12	1.2 to 2.0	No more than 0.8	12.0 to 14.0	—	—	1.0 to 1.8
3-2	08Х13	0Х13, ЭИ496	No more than 0.08	No more than 0.8	No more than 0.8	12.0 to 14.0	—	—	—
3-3	12Х17	Х17	No more than 0.12	No more than 0.8	No more than 0.8	16.0 to 18.0	—	—	—
3-4	08Х17Т	0Х17Т, ЭИ645	No more than 0.08	No more than 0.8	No more than 0.8	16.0 to 18.0	—	5·C to 0.80	—
3-5	15Х18СЮ	Х18СЮ, ЭИ484	No more than 0.15	1.0 to 1.5	No more than 0.8	17.0 to 20.0	—	—	0.7 to 1.2
3-6	15Х25Т	Х25Т, ЭИ439	No more than 0.15	No more than 1.0	No more than 0.8	24.0 to 27.0	—	5·C to 0.90	—
3-7	15Х28	Х28, ЭИ349	No more than 0.15	No more than 1.0	No more than 0.8	27.0 to 30.0	—	—	—

Continuation of tab. 1

Number of grade	Grades of steels and alloys		Mass fraction of elements, %								Groups		
	New designation	Old designation	Tungsten	Molybdenum	Niobium	Vanadium	Iron	Sulfur (No more than)	Phosphorus (No more than)	Other elements	I corrosion-proof	II heat-resisting	III high-temperature
2. Steels of martensite-ferrite class													
2-2	15Х12ВНМФ	1Х12ВНМФ, ЭИ802	0.7 to 1.1	0.5 to 07		0.15 to 0.30	Base	0.025	0.030	—	—	—	+
2-3	18Х12ВМБФР	2Х12ВМБФР, ЭИ993	0.4 to 0.7	0.4 to 0.6	0.2 to	0.15 to 0.30	Base	0.025	0.030	Boron, no more 0.003	—	—	+
2-4	12Х13	1Х13	—	—	—	—	Base	0.025	0.030	—	++	+	+
2-5	14Х17Н2	1Х17Н2, ЭИ268	—	—	—	—	Base	0.025	0.030	—	++	—	+
3. Steels of ferrite class													
3-1	10Х13СЮ	1Х12СЮ, ЭИ404	—	—	—	—	Base	0.025	0.030	—	—	+	—
3-2	08Х13	0Х13, ЭИ496	—	—	—	—	Base	0.025	0.030	—	+	—	+
3-3	12Х17	Х17	—	—	—	—	Base	0.025	0.035	—	++	+	—
3-4	08Х17Т	0Х17Т, ЭИ645	—	—	—	—	Base	0.025	0.035	—	+	++	—
3-5	15Х18СЮ	Х18СЮ, ЭИ484	—	—	—	—	Base	0.025	0.035	—	—	+	—
3-6	15Х25Т	Х25Т, ЭИ439	—	—	—	—	Base	0.025	0.035	—	+	++	—
3-7	15Х28	Х28, ЭИ349	—	—	—	—	Base	0.025	0.035	—	+	++	—

Continuation of tab. 1

Number of grade	Grades of steels and alloys		Mass fraction of elements, %						
	New designation	Old, designation	Carbon	Silicon	Manganese	Chromium	Nickel	Titanium	Aluminum
3-8	08Х18Т1	0Х18Т1	No more than 0.08	No more than 0.8	No more than 0.7	17.0 to 19.0	—	0.6 to 1.0	—
3-9	08Х1 8Тч	ДИ-77	No more than 0.08	No more than 0.8	No more than 0.8	17.0 to 19.0	—	5·C to 0.60	No more 0.1
4. Steels of austenite-martensite class									
4-1	20Х13Н4Г9	2Х13Н4Г9, ЭИ100	0.15 to 0.30	No more than 0.8	8.0 to 10.0	12.0 to 14.0	3.7 to 4.7	—	—
4-2	09Х15Н8Ю1	Х15Н9Ю, ЭИ904	No more than 0.09	No more than 0.8	No more than 0.8	14.0 to 16.0	7.0 to 9.4	—	0.7 to
4-3	07Х16Н6	Х16Н6, ЭП288	0.05 to 0.09	No more than 0.8	No more than 0.8	15.5 to 17.5	5.0 to 8.0	—	
4-4	09Х17Н7Ю	0Х17Н7Ю	No more than 0.09	No more than 0.8	No more than 0.8	16.0 to 17.5	7.0 to 8.0	—	0.5 to
4-5	09Х17Н7Ю1	0Х17Н7Ю1	No more than 0.09	No more than 0.8	No more than 0.8	16.5 to 18.0	6.5 to 7.5	—	0.7 to
4-6	08Х17Н5М3	Х17Н5М3, ЭИ925	0.06 to 0.10	No more than 0.8	No more than 0.8	16.0 to 17.5	4.5 to 5.5	—	—
4-7	08Х17Н6Т	ДИ-21	No more than 0.08	No more than 0.8	No more than 0.8	16.5 to 18.0	5.5 to 6.5	0.15 to	—
5. Steels of austenite-ferrite class									
5-1	08Х20Н14С2	0Х20Н14С2, ЭИ732	No more than 0.08	2.0 to 3.0	No more than 1.5	19.0 to 22.0	12.0 to 15.0	—	—
5-2	20Х20Н14С2	Х20Н14С2, ЭИ211	No more than 0.20	2.0 to 3.0	No more than 1.5	19.0 to 22.0	12.0 to 15.0	—	—

Continuation of tab.

Number of grade	Grades of steels and alloys		Mass fraction of elements, %								Groups		
	New designation	Old designation	Tungsten	Molybdenum	Niobium	Vanadium	Iron	Sulfur (No more than)	Phosphorus (No more than)	Other elements	I corrosion-proof	II heat-resisting	III high-temperature
3-8	08Х18Т1	0Х18Т1	—	—	—	—	Base	0.025	0.035	—	+	++	—
3-9	08Х1 8Тч	ДИ-77	—	—	—	—	Base	0.025	0.035	Cerium, no more 0.1 (cal) Calcium, no more 0.05(cal)	+	—	—
4. Steels of austenite-martensite class													
4-1	20Х13Н4Г9	2Х13Н4Г9, ЭИ100	—	—	—	—	Base	0.025	0.050	—	+	—	—
4-2	09Х15Н8Ю1	Х15Н9Ю, ЭИ904	—	—	—	—	Base	0.025	0.035	—	+	—	—
4-3	07Х16Н6	Х16Н6, ЭП288	—	—	—	_	Base	0.020	0.035	—	+	—	—
4-4	09Х17Н7Ю	0Х17Н7Ю	—	—	—	—	Base	0.020	0.030	—	+	—	—
4-5	09Х17Н7Ю1	0Х17Н7Ю1			—	—	Base	0.025	0.035	—	+	—	—
4-6	08Х17Н5М3	Х17Н5М3, ЭИ925	—	3.0 to 3.5	—	—	Base	0.020	0.035	—	+	—	—
4-7	08Х17Н6Т	ДИ-21	—	—	—	—	Base	0.020	0.035	Boron, no more 0.003	+	—	—
5. Steels of austenite-ferrite class													
5-1	08Х20Н14С2	0Х20Н14С2, ЭИ732	—	—	—	—	Base	0.025	0.035	—	—	+	—
5-2	20Х20Н14С2	Х20Н14С2, ЭИ211	—	—	—	—	Base	0.025	0.035	—	—	+	—

Continuation of tab. 1

Number of grade	Grades of steels and alloys		Mass fraction of elements, %						
	New designation	Old designation	Carbon	Silicon	Manganese	Chromium	Nickel	Titanium	Aluminum
5-3	08Х22Н6Т	0Х22Н5Т, ЭП53	No more than 0.08	No more than 0.8	No more than 0.8	21.0 to 23.0	5.3 to 6.3	5·С to 0.65	—
5-4	12Х21Н5Т	1Х21Н5Т, ЭИ811	0.09 to 0.14	No more than 0.8	No more than 0.8	20.0 to 22.0	4.8 to 5.8	0.25 to 0.50	No more than 0.08
5-5	08Х21Н6М2Т	0Х21Н6М2Т, ЭП54	No more than 0.08	No more than 0.8	No more than 0.8	20.0 to 22.0	5.5 to 6.5	0.20 to 0.40	—
5-6	20Х23Н13	Х23Н13, ЭИ319	No more than 0.20	No more than 1.0	No more than 2.0	22.0 to 25.0	12.0 to 15.0	—	—
5-7	08Х18Г8Н2Т	0Х18Г8Н2Т, КО - 3	No more than 0.08	No more than 0.8	7.0 to 9.0	17.0 to 19.0	1.8 to 2.8	020 to 0.50	—
5-8	15Х18Н12С4ТЮ	ЭИ654	0.12 to 0.17	3.8 to 4.5	0.5 to 1.0	17.0 to 19.0	11.0 to 13.0	0.4 to 0.7	0.13 to 0.35
5-9	О3Х23Н6	—	No more than 0.030	No more than 0.4	1.0 to 2.0	22.0 to 24.0	5.3 to 6.3	—	—
5-10	О3Х22Н6М2	—	No more than 0.030	No more than 0.4	1.0 to 2.0	21.0 to 23.0	5.5 to 6.5	—	—
6. Steels of austenite class									
6-1	08Х10Н20Т2	0Х10Н20Т2	No more than 0.08	No more than 0.8	No more than 2.0	10.0 to 12.0	18.0 to 20.0	1.5 to 2.5	No more than 1.0
6-2	10Х1Ш20Т3Р	Х12Н20Т3Р, ЭИ696	No more than 0.10	No more than 1.0	No more than 1.0	10.0 to 12.5	18.0 to 21.0	2.6 to 3.2	No more than 0.8
6-3	10Х11Н23Т3МР	Х12Н22Т3МР, ЭП33	No more than 0.10	No more than 0.6	No more than 0.6	10.0 to 12.5	21.0 to 25.0	2.6 to 3.2	No more than 0.8
6-4	37Х12Н8Г8МФБ	4Х12Н8Г8МФБ ЭИ481	0.34 to 0.40	0.3 to 0.8	7.5 to 9.5	11.5 to 13.5	7.0 to 9.0	—	—

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Number of grade	Grades of steels and alloys		Mass fraction of elements, %								Groups		
	New designation	Old designation	Tungsten	Molybdenum	Niobium	Vanadium	Iron	Sulfur	Phosphorus	Other elements	I corrosion-proof	II heat-resisting	III high-temperature
								No more than					
5-3	08Х22Н6Т	0Х22Н5Т, ЭП53	—	—	—	—	Base	0.025	0.035	—	+	—	—
5-4	12Х21Н5Т	1Х21Н5Т, ЭИ811	—	—	—	—	Base	0.025	0.035	—	+	—	—
5-5	08Х21Н6М2Т	0Х21Н6М2Т, ЭП54	—	1.8 to 2.5	—	—	Base	0.025	0.035	—	+	—	—
5-6	20Х23Н13	Х23Н13, ЭИ319	—	—	—	—	Base	0.025	0.035	—	—	+	—
5-7	08Х18Г8Н2Т	0Х18Г8Н2Т, КО-3	—	—	—	—	Base	0.025	0.035	—	+	—	—
5-8	15Х18Н12С4ТЮ	ЭИ654	—	—	—	—	Base	0.030	0.035	—	+	—	—
5-9	03Х23Н6	—	—	—	—	—	Base	0.020	0.035	—	++	—	—
5-10	03Х22Н6М2	—	—	1.8 to 2.5	—	—	Base	0.020	0.035	—	+ +	—	—
6. Steels of austenite class													
6-1	08Х10Н20Т2	0Х10Н20Т2	—	—	—	to	Base	0.030	0.035	—	+	—	—
6-2	10Х11Н20Т3Р	Х12Н20Т3Р, ЭИ696					Base	0.020	0.035	Boron 0.008 to 0.02	—	—	+
6-3	10Х11Н23Т3МР	Х12Н22Т3МР, ЭП33	—	1.0 to 1.6	—	—	Base	0.010	0.025	Boron no more 0.02	—	—	+
6-4	37Х12Н8Г8МФБ	4Х12Н8Г8МФБ, ЭИ481	—	1.1 to 1.4	0.25 to 0.45	1.3 to 1.6	Base	0.030	0.035	—	—	—	+

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Number of grade	Grades of steels and alloys		Mass fraction of elements, %						
	New designation	Old designation	Carbon	Silicon	Manganese	Chromium	Nickel	Titanium	Aluminum
6-6	10Х14П4Н4Т	Х14П4Н3Т, ЭИ711	No more than 0.10	No more than 0.8	13.0 to 15.0	13.0 to 15.0	2.8 to 4.5	5·(C to 0.02) to 0.6	—
6-7	10Х14АГ15	Х14АГ15, ДИ-13	No more than 0.10	No more than 0.8	14.5 to 16.5	13.0 to 15.0	—	—	—
6-8	45Х14Н14В2М	4Х14Н14В2М ЭИ69	0.40 to 0.50	No more than 0.8	No more than 0.7	13.0 to 15.0	13.0 to 15.0	—	—
6-10	09Х14Н19В2БР	1Х14Н18В2БР, ЭИ695Р	0.07 to 0.12	No more than 0.6	No more than 2.0	13.0 to 15.0	18.0 to 20.0	—	—
6-11	09Х14Н19В2БР1	1Х14Н18В2БР1 ЭИ726	0.07 to 0.12	No more than 0.6	No more than 2.0	13.0 to 15.0	18.0 to 20.0	—	—
6-12	40Х15Н7Г7Ф2МС	4Х15Н7Г7Ф2МС ЭИ388	0.38 to 0.47	0.9 to 1.4	6.0 to 8.0	14.0 to 16.0	6.0 to 8.0	—	—
6-13	08Х16Н13М2Б	1Х16Н13М2Б, ЭИ680	0.06 to 0.12	No more than 0.8	No more than 1.0	15.0 to 17.0	12.5 to 14.5	—	—
6-14	08Х15Н24В4ТР	Х15Н24В4Т, ЭП164	No more than 0.08	No more than 0.6	0.5 to 1.0	14.0 to 16.0	22.0 to 25.0	1.4 to 1.8	—
6-16	03Х16Н15М3Б	00Х16Н15М3Б, ЭИ844Б	No more than 0.03	No more than 0.6	No more than 0.8	15.0 to 17.0	14.0 to 16.0	—	—
6-17	09Х16Н15М3Б	Х16Н15М3Б, ЭИ847	No more than 0.09	No more than 0.8	No more than 0.8	15.0 to 17.0	14.0 to 16.0	—	—

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Number of grade	Grades of steels and alloys		Mass fraction of elements, %								Groups		
	New designation	Old designation	Tungsten	Molybdenum	Niobium	Vanadium	Iron	Sulfur (No more than)	Phosphorus (No more than)	Other elements	I corrosion-proof	II heat-resisting	III high-temperature
6-6	10Х14Г14Н4Т	Х14Г14Н3Т, ЭИ711	—	—	—	—	Base	0.020	0.035		+	—	—
6-7	10Х14АГ15	Х14АГ15, ДИ-13	—	—	—	—	Base	0.030	0.045	Nitrogen 0.15 to 0.25	+	—	—
6-8	45Х14Н14В2М	4Х14Н14В2М, ЭИ69	2.0 to 2.8	0.25 to 0.40	—	—	Base	0.020	0.035	—	—	—	+
6-10	09Х14Н19В2БР	1Х14Н18В2БР, ЭИ695Р	2.0 to 2.8	—	0.9 to 1.3	—	Base	0.020	0.035	Boron, no more than 0.005; cerium, no more than 0.02	—	—	+
6-11	09Х14Н19В2БР1	1Х14Н18В2БР1 ЭИ726	2.0 to 2.8	—	0.9 to 1.3	—	Base	0.020	0.035	Boron, no more than 0.03; cerium, no more than 0.02	—	—	+
6-12	40Х15Н7Г7Ф2МС	4Х15Н7Г7Ф2МС, ЭИ388	—	0.65 to 0.95	—	1.5 to 1.9	Base	0.020	0.035	—	—	—	+
6-13	08Х16Н13М2Б	1Х16Н13М2Б, ЭИ680	—	2.0 to 2.5	0.9 to 1.3	—	Base	0.020	0.035	—	—	—	+
6-14	08Х15Н24В4ТР	Х15Н24В4Т, ЭП164	4.0 to 5.0	—	—	—	Base	0.020	0.035	Boron, no more than 0.005; cerium, no more than 0.03	—	—	+
6-16	03Х16Н15М3Б	00Х16Н15М3Б, ЭИ844Б	—	2.5 to 3.0	0.25 to 0.50	—	Base	0.015	0.020	—	+	—	—
6-17	09Х16Н15М3Б	Х16Н15М3Б, ЭИ847	—	2.5 to 3.0	0.6 to 0.9	—	Base	0.020	0.035	—	—	—	+

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Number of grade	Grades of steels and alloys		Mass fraction of elements, %						
	New designation	Old designation	Carbon	Silicon	Manganese	Chromium	Nickel	Titanium	Aluminum
6-19	12Х17Г9АН4	Х17Г9АН4, ЭИ878	No more than 0.12	No more than 0.8	8.0 to 10.5	16.0 to 18.0	3.5 to 4.5	—	—
6-20	03Х17Н14М3	000Х17Н13М2	No more than 0.030	No more than 0.4	1.0 to 2.0	16.8 to 18.3	13.5 to 15.0	—	—
6-21	08Х17Н13М2Т	0Х17Н13М2Т	No more than 0.08	No more than 0.8	No more than 2.0	16.0 to 18.0	12.0 to 14.0	5·С to 0.7	—
6-22	10Х17Н13М2Т	Х17Н13М2Т, ЭИ448	No more than 0.10	No more than 0.8	No more than 2.0	16.0 to 18.0	12.0 to 14.0	5·С to 0.7	—
6-23	10Х17Н13М3Т	Х17Н13М3Т, ЭИ432	No more than 0.10	No more than 0.8	No more than 2.0	16.0 to 18.0	12.0 to 14.0	5·С to 0.7	—
6-24	08Х17Н15М3Т	0Х17Н16М3Т, ЭИ580	No more than 0.08	No more than 0.8	No more than 2.0	16.0 to 18.0	14.0 to 16.0	0.3 to 0.6	—
6-25	12Х18Н9	Х18Н9	No more than 0.12	No more than 0.8	No more than 2.0	17.0 to 19.0	8.0 to 10.0	—	—
6-26	17Х18Н9	2Х18Н9	0.13 to 0.21	No more than 0.8	No more than 2.0	17.0 to 19.0	8.0 to 10.0	—	—
6-27	12Х18Н9Т	Х18Н9Т	No more than 0.12	No more than 0.8	No more than 2.0	17.0 to 19.0	8.0 to 9.5	5·С to 0.8	—
6-28	04Х18Н10	00Х18Н10, ЭИ842, ЭП550	No more than 0.04	No more than 0.8	No more than 2.0	17.0 to 19.0	9.0 to 11.0	—	—
6-29	08Х18Н10	0Х18Н10	No more than 0.08	No more than 0.8	No more than 2.0	17.0 to 19.0	9.0 to 11.0	—	—
6-30	08Х18Н10Т	ОХ18Н10Т, ЭИ914	No more than 0.08	No more than 0.8	No more than 2.0	17.0 to 19.0	9.0 to 11.0	5·С to 0.8	—

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Number of grade	Grades of steels and alloys		Mass fraction of elements, %								Groups		
	New designation	Old designation	Tungsten	Molybdenum	Niobium	Vanadium	Iron	Sulfur	Phosphorus	Other elements	I corrosion-proof	II heat-resisting	III high-temperature
								No more than					
6-19	12Х17Г9АН4	Х17Г9АН4, ЭИ878		—		—	Base	0.020	0.035	Nitrogen 0.15 to 0.25	+	—	—
6-20	03Х17Н14М3	000Х17Н13М2	—	2.2 to 2.8	—	—	Base	0.020	0.030	—	+	—	—
6-21	08Х17Н13М2Т	0Х17Н13М2Т	—	2.0 to 3.0	—	—	Base	0.020	0.035	—	+	—	—
6-22	10Х17Н13М2Т	Х17Н13М2Т, ЭИ448	—	2.0 to 3.0	—	—	Base	0.020	0.035	—	+	—	—
6-23	10Х17Н13М3Т	Х17Н13М3Т, ЭИ432	—	3.0 to 4.0	—	—	Base	0.020	0.035	—	+	—	—
6-24	08Х17Н15М3Т	0Х17Н16М3Т, ЭИ580	—	3.0 to 4.0	—	—	Base	0.020	0.035	—	+	—	—
6-25	12Х18Н9	Х18Н9	—	—	—	—	Base	0.020	0.035	—	+ +	+	—
6-26	17Х18Н9	2Х18Н9	—	—.	—	—	Base	0.020	0.035	—	+	—	—
6-27	12Х18Н9Т	Х18Н9Т	—	—	—	—	Base	0.020	0.035	—	++	+	+
6-28	04Х18Н10	00Х18Н10, ЭИ842, ЭП550	—	—	—	—	Base	0.020	0.030	—	+	—	—
6-29	08Х18Н10	0Х18Н10	—	—	—	—	Base	0.020	0.035	—	++	+	—
6-30	08Х18Н10Т	0Х18Н10Т, ЭИ914	—	—	—	—	Base	0.020	0.035	—	++	+	—

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Number of grade	Grades of steels and alloys		Mass fraction of elements, %						
	New designation	Old designation	Carbon	Silicon	Manganese	Chromium	Nickel	Titanium	Aluminum
6-31	12Х18Н10Т	Х18Н10Т	No more than 0.12	No more than 0.8	No more than 2.0	17.0 to 19.0	9.0 to 11.0	5·С to 0.8	—
6-32	12Х18Н10Е	Х18Н10Е, ЭП47	No more than 0.12	No more than 0.8	No more than 2.0	17.0 to 19.0	9.0 to 11.0	—	—
6-33	03Х18Н11	000Х18Н11	No more than 0.030	No more than 0.8	No more than 0.7 to 2.0	17.0 to 19.0	10.5 to 12.5	—	—
6-34	06Х18Н11	0Х18Н11, ЭИ684	No more than 0.06	No more than 0.8	No more than 2.0	17.0 to 19.0	10.0 to 12.0	—	—
6-35	03Х18Н12	000Х18Н12	No more than 0.030	No more than 0.4	No more than 0.4	17.0 to 19.0	11.5 to 13.0	No more than 0.005	—
6-36	08Х18Н12Т	0Х18Н12Т	No more than 0.08	No more than 0.8	No more than 2.0	17.0 to 19.0	11.0 to 13.0	5·С to 0.6	—
6-37	12Х18Н12Т	Х18Н12Т	No more than 0.12	No more than 0.8	No more than 2.0	17.0 to 19.0	11.0 to 13.0	5·С to 0.7	—
6-38	08Х18Н12Б	0Х18Н12Б, ЭИ402	No more than 0.08	No more than 0.8	No more than 2.0	17.0 to 19.0	11.0 to 13.0	—	—
6-39	31Х19Н9МВБТ	3Х19Н9МВБТ, ЭИ572	0.28 to 0.35	No more than 0.8.	0.8 to 1.5	18.0 to 20.0	8.0 to 10.0	0.2 to 0.5	—
6-40	36Х18Н25С2	4Х18Н25С2	0.32 to 0.40	2.0 to 3.0	No more than 1.5	17.0 to 19.0	23.0 to 26.0	—	—
6-41	55Х20Г9АН4	5Х20Н4АГ9, ЭИ303	0.50 to 0.60	No more than 0.45	8.0 to 10.0	20.0 to 22.0	3.5 to 4.5	—	—
6-42	07Х21Г7АН5	Х21Г7АН5, ЭП222	No more than 0.07	No more than 0.7	6.0 to 7.5	19.5 to 21.0	5.0 to 6.0	—	—
6-43	03Х21Н21М4ГБ	00Х20Н20М4Б ЗИ35	No more than 0.030	No more than 0.6	1.8 to 2.5	20.0 to 22.0	20.0 to 22.0	—	—

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Number of grade	Grades of steels and alloys		Mass fraction of elements, %								Groups		
	New designation	Old designation	Tungsten	Molybdenum	Niobium	Vanadium	Iron	Sulfur	Phosphorus	Other elements	I corrosion-proof	II heat-resisting	III high-temperature
								No more than					
6-31	12Х18Н10Т	Х18Н10Т	—	—	—	—	Base	0.020	0.035	—	+ +	+	+
6-32	12Х18Н10Е	Х18Н10Е, ЭП47	—	—	—	—	Base	0.020	0.035	Selenium 0.18 to 0.35	+	—	—
6-33	03Х18Н11	000Х18Н11	—	—	—	—	Base	0.020	0.030	—	+	—	—
6-34	06Х18Н11	0Х18Н11, ЭИ684	—	—	—	—	Base	0.020	0.035	—	+	—	—
6-35	03Х18Н12	000Х18Н12	—	—	—	—	Base	0.020	0.030	—	+	—	—
6-36	08Х18Н12Т	0Х18Н12Т	—	—	—	—	Base	0.020	0.035	—	+	—	—
6-37	12Х18Н12Т	Х18Н12Т	—	—	—	—	Base	0.020	0.035	—	+ +	+	+
6-38	08Х18Н12Б	0Х18Н12Б, ЭИ402	—	—	10·С to 1.1	—	Base	0.020	0.035	—	+	—	—
6-39	31Х19Н9МВБТ	3Х19Н9МВБТ, ЭИ572	1.0 to 1.5	1.0 to 1.5	0.2 to 0.5	—	Base	0.020	0.035	—	—	—	+
6-40	36Х18Н25С2	4Х18Н25С2	—	—	—	—	Base	0.020	0.035	—	—	+	—
6-41	55Х20Г9АН4	5Х20Н4АГ9, ЭП303	—	—	—	—	Base	0.030	0.040	Nitrogen 0.30 to 0.60	—	+	+
6-42	07Х21Г7АН5	Х21Г7АН5, ЭП222	—	—	—	—	Base	0.030	0.030	Nitrogen 0.15 to 0.25	+	—	—
6-43	03Х21Н21М4ГБ	00Х20Н20М4Б, ЭИ35	—	3.4 to 3.7	С·15 to 0.8	—	Base	0.020	0.030	—	+	—	—

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Number of grade	Grades of steels and alloys		Mass fraction of elements, %						
	New designation	Old designation	Carbon	Silicon	Manganese	Chromium	Nickel	Titanium	Aluminum
6-44	45Х22Н4М3	4Х22Н4М3, ЭП48	0.40 to 0.50	0.1 to 1.0	0.85 to 1.25	21.0 to 23.0	4.0 to 5.0	—	—
6-45	10Х23Н18	0Х23Н18	No more than 0.10	No more than 1.0	No more than 2.0	22.0 to 25.0	17.0 to 20.0	—	—
6-46	20Х23Н18	Х23Н18, ЭИ417	No more than 0.20	No more than 1.0	No more than 2.0	22.0 to 25.0	17.0 to 20.0	—	—
6-47	20Х25Н20С2	Х25Н20С2, ЭИ283	No more than 0.20	2.0 to 3.0	No more than 1.5	24.0 to 27.0	18.0 to 21.0	—	—
6-48	12Х25Н16Г7АР	Х25Н16Г7АР, ЭИ835	No more than 0.12	No more than 1.0	5.0 to 7.0	23.0 to 26.0	15.0 to 18.0	—	—
6-49	10Х11Н20Т2Р	Х12Н20Т2Р, ЭИ696А	No more than 0.10	No more than 1.0	No more than 1.0	10.0 to 12.5	18.0 to 21.0	2.3 to 2.8	No more than 0.8
6-51	03Х18Н10Т	00Х18Н10Т	No more than 0.030	No more than 0.8	1.0 to 2.0	17.0 to 18.5	9.5 to 11.0	5C to 0.4	—
6-52	05Х18Н10Т	0Х18Н10Т	No more than 0.05	No more than 0.8	1.0 to 2.0	17.0 to 18.5	9.0 to 10.5	5C to 0.6	—
			ALLOYS						
			7. Alloys on iron-nickel basis						
7-1	ХН35ВТ	ЭИ612	No more than 0.12	No more than 0.6	1.0 to 2.0	14.0 to 16.0	34.0 to 38.0	1.1 to 1.5	—
7-2	ХН35ВТЮ	ЭИ787	No more than 0.08	No more than 0.6	No more than 0.6	14.0 to 16.0	33.0 to 37.0	2.4 to 3.2	0.7 to 1.4
7-3	ХН32Т	Х20Н32Т, ЭП670	No more than 0.05	No more than 0.7	No more than 0.7	19.0 to 22.0	30.0 to 34.0	0.25 to	No more than 0.5
7-4	ХН38ВТ	ЭИ703	0.06 to 0.12	No more than 0.8	No more than 0.7	20.0 to 23.0	35.0 to 39.0	0.7 to 1.2	No more than 0.5

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Number of grade	Grades of steels and alloys		Mass fraction of elements, %								Groups		
	New designation	Old designation	Tungsten	Molybdenum	Niobium	Vanadium	Iron	Sulfur (No more than)	Phosphorus (No more than)	Other elements	I corrosion-proof	II heat-resisting	III high-temperature
6-44	45Х22Н4М3	4Х22Н4М3, ЭП48	—	2.5 to 3.0	—	—	Base	0.030	0.035	—	—	+	+
6-45	10Х23Н18	0Х23Н18	—	—	—	—	Base	0.020	0.035		—	++	+
6-46	20Х23Н18	Х23Н18, ЭИ417	—	—	—	—	Base	0.020	0.035	—	—	++	+
6-47	20Х25Н20С2	Х25Н20С2, ЭИ283	—	—	—	—	Base	0.020	0.035	—	—	+	—
6-48	12Х25Н16Г7АР	Х25Н16Г7АР, ЭИ835	—	—	—	—	Base	0.020	0.035	Nitrogen 0.3.0 to 0.45; Boron, no more 0.010	—	++	+
6-49	10Х11Н20Т2Р	Х12Н20Т2Р. ЭИ696А	—	—	—	—	Base	0.020	0.030	Boron, no more 0.008	—	—	+
6-51	03Х18Н10Т	00Х18Н10Т	—	—	—	—	Base	0.020	0.035	—	++	+	—
6-52	05Х18Н10Т	0Х18Н10Т	—	—	—	—	Base	0.020	0.035	—	++	+	—
			ALLOYS										
			7. Alloys on iron-nickel basis										
7-1	ХН35ВТ	ЭИ612	2.8 to 3.5	—	—	—	Base	0.020	0.030	—	—	—	+
7-2	ХН35ВТЮ	ЭИ787	2.8 to 3.5	—	—	—	Base	0.020	0.030	Boron, no more 0.020	—	—	+
7-3	ХН32Т	Х20Н32Т, ЭП670	—	—	—	—	Base	0.020	0.030	—	—	—	+
7-4	ХН38ВТ	ЭИ703	2.8 to 3.5	—	—	—	Base	0.020	0.030	Cerium, no more 0.05	—	++	+

Continuation of tab. 1

Number of grade	Grades of steels and alloys		Mass fraction of elements, %						
	New designation	Old designation	Carbon	Silicon	Manganese	Chromium	Nickel	Titanium	Aluminum
7-5	ХН28ВМАБ	Х21Н28В5М3БАР, ЭП126	No more than 0.10	No more than 0.6	No more than 1.5	19.0 to 22.0	25.0 to 30.0	—	—
7-6	06ХН28МДТ	0Х23Н28М3Д3Т, ЭИ943	No more than 0.06	No more than 0.8	No more than 0.8	22.0 to 25.0	26.0 to 29.0	0.5 to 0.9	—
7-7	03ХН28МДТ	000Х23Н28М3Д3Т ЭП516	No more than 0.030	No more than 0.8	No more than 0.8	22.0 to 25.0	26.0 to 29.0	0.5 to 0.9	—
7-8	06ХН28МТ	0Х23Н28М2Т, ЭИ628	No more than 0.06	No more than 0.8	No more than 0.8	22.0 to 25.0	26.0 to 29.0	0.40 to 0.70	—
7-9	ХН45Ю	ЭП747	No more than 0.10	No more than 1.0	No more than 1.0	15.0 to 17.0	44.0 to 46.0	—	2.9 to 3.9
8. Alloys on nickel basis									
8-1	Н70МФВ	ЭП814А	No more than 0.02	No more than 0.10	No more than 0.5	No more than 0.3	Base	No more than 0.15	—
8-2	ХН65МВ	0ХI5Н65М16В ЭП567	No more than 0.03	No more than 0.15	No more than 1.0	14.5 to 16.5	Base	—	—
8-3	ХН60ВТ	ЭИ868	No more than 0.10	No more than 0.8	No more than 0.5	23.5 to 26.5	Base	0.3 to 0.7	No more than 0.5
8-4	ХН60Ю	ЭИ559А	No more than 0.10	No more than 0.8	No more than 0.3	15.0 to 18.0	55.0 to 58.0	—	2.6 to 3.5
8-5	ХН70Ю	ЭИ652	No more than 0.10	No more than 0.8	No more than 0.3	26.0 to 29.0	Base	—	2.8 to 3.5

Continuation of tab. 1

Number of grade	Grades of steels and alloys		Mass fraction of elements, %								Groups		
	New designation	Old designation	Tungsten	Molybdenum	Niobium	Vanadium	Iron	Sulfur (No more than)	Phosphorus (No more than)	Other elements	I corrosion-proof	II heat-resisting	III high-temperature
7-5	ХН28ВМАБ	Х21Н28В5М3БАР, ЭП126	4.8 to 6.0	2.8 to 3.5	0.7 to 1.3	—	Base	0.020	0.020	Boron, no more 0.005; Nitrogen, 0.15 to 0.30	—	+	—
7-6	06ХН28МДТ	0Х23Н28М3Д3Т, ЭИ943	—	2.5 to 3.0	—	—	Base	0.020	0.035	Copper 2.5 to 3.5	+	—	—
7-7	03ХН28МДТ	000Х23Н28М3Д3Т, ЭП516	—	2.5 to 3.0	—	—	Base	0.020	0.035	Copper 2.5 to 3.5	+	—	—
7-8	06ХН28МТ	0Х23Н28М2Т, ЭИ628	—	1.80 to 2.50	—	—	Base	0.020	0.035	—	+	—	—
7-9	ХН45Ю	ЭП747	—	—	—	—	Base	0.020	0.025	Barium, no more 0.10; Cerium, no more 0.03	—	+	+
						8. Alloys on nickel basis							
8-1	Н70МФВ	ЭП814А	0.10 to 0.45	25.0 to 27.0	—	1.4 to 1.7	No more than 0.8	0.012	0.015	—	+	—	—
8-2	ХН65МВ	0Х15Н65М16В, ЭП567	3.0 to 4.5	15.0 to 17.0	—	—	No more than 1.0	0.012	0.015	—	+	—	—
8-3	ХН60ВТ	ЭИ868	13.0 to 16.0	—	—	—	No more than 4.0	0.013	0.013	—	—	+	++
8-4	ХН60Ю	ЭИ559А	—	—	—	—	Base	0.020	0.020	Barium, no more 0.10; Cerium, no more 0.03	—	++	+
8-5	ХН70Ю	ЭИ652	—	—	—	—	No more than 1.0	0.012	0.015	Barium, no more 0.10; Cerium, no more 0.03	—	++	+

Continuation of tab. 1

Number of grade	Grades of steels and alloys		Mass fraction of elements, %						
	New designation	Old designation	Carbon	Silicon	Manganese	Chromium	Nickel	Titanium	Aluminum
8-6	ХН78Т	ЭИ435	No more than 0.12	No more than 0.8	No more than 0.7	19.0 to 22.0	Base	0.15 to 0.35	No more than 0.15
8-7	ХН75МБТЮ	ЭИ602	No more than 0.10	No more than 0.8	No more than 0.40	19.0 to 22.0	Base	0.35 to 0.75	0.35 to 0.75
8-8	ХН80ТБЮ	ЭИ607	No more than 0.08	No more than 0.8	No more than 1.0	15.0 to 18.0	Base	1.8 to 2.3	0.5 to 1.0
8-9	ХН77ТЮР	ЭИ437Б	No more than 0.07	No more than 0.6	No more than 0.40	19.0 to 22.0	Base	2.4 to 2.8	0.6 to 1.0
8-10	ХН70ВМЮТ	ЭИ765	0.10 to 0.16	No more than 0.6	No more than 0.5	14.0 to 16.0	Base	1.0 to 1.4	1.7 to 2.2
8-11	ХН70ВМТЮ	ЭИ617	No more than 0.12	No more than 0.6	No more than 0.5	13.0 to 16.0	Base	1.8 to 2.3	1.7 to 2.3
8-12	ХН67МВТЮ	ЭП202	No more than 0.08	No more than 0.6	No more than 0.5	17.0 to 20.0	Base	2.2 to 2.8	1.0 to 1.5
8-13	ХН70МВТЮБ	ЭИ598	No more than 0.12	No more than 0.6	No more than 0.5	16.0 to 19.0	Base	1.9 to 2.8	1.0 to 1.7

Continuation of tab. 1

Number of grade	Grades of steels and alloys		Mass fraction of elements, %								Groups		
	New designation	Old designation	Tungsten	Molybdenum	Niobium	Vanadium	Iron	Sulfur	Phosphorus	Other elements	I corrosion-proof	II heat-resisting	III high-temperature
								No more than					
8-6	ХН78Т	ЭИ435	—	—	—	—	No more than 1.0	0.010	0.015	—	—	++	+
8-7	ХН75МБТЮ	ЭИ602	—	1.8 to 2.3	0.9 to 1.3	—	No more than 3.0	0.012	0.020	—	—	++	+
8-8	ХН80ТБЮ	ЭИ607	—	—	1.0 to 1.5	—	No more than 3.0	0.012	0.015	—	—	—	+
8-9	ХН77ТЮР	ЭИ437Б	—	—	—		No more than 1.0	0.007	0.015	Boron, no more than 0.01; cerium, no more than 0.02; lead, no more than 0.001	—	—	+
8-10	ХН70ВМЮТ	ЭИ765	4.0 to 6.0	3.0 to 5.0	—	—	No more than 3.0	0.012	0.015	Boron, no more than 0.01	—	—	+
8-11	ХН70ВМТЮ	ЭИ617	5.0 to 7.0	2.0 to 4.0	—	0.10 to 0.50	No more than 5.0	0.010	0.015	Boron, no more than 0.02; cerium, no more than 0.02	—	—	+
8-12	ХН67МВТЮ	ЭП202	4.0 to 5.0	4.0 to 5.0	—	—	No more than 4.0	0.010	0.015	Boron, no more than 0.01; cerium, no more than 0.01	—	—	+
8-13	ХН70МВТЮБ	ЭИ598	2.0 to 3.5	4.0 to 6.0	0.5 to 1.3	—	No more than 5.0	0.010	0.015	Boron, no more than 0.01; cerium, no more than 0.02	—	—	+

Continuation of tab. 1

Number of grade	Grades of steels and alloys		Mass fraction of elements, %						
	New designation	Old designation	Carbon	Silicon	Manganese	Chromium	Nickel	Titanium	Aluminum
8-14	ХН65МВТЮ	ЭИ893	No more than 0.05	No more than 0.6	No more than 0.5	15.0 to 17.0	Base	1.2 to 1.6	1.2 to 1.6
8-15	ХН56ВМТЮ	ЭП199	No more than 0.10	No more than 0.6	No more than 0.5	19.0 to 22.0	Base	1.1 to 1.6	2.1 to 2.6
8-16	ХН70ВМТЮФ	ЭИ826	No more than 0.12	No more than 0.6	No more than 0.5	13.0 to 16.0	Base	1.7 to 2.2	2.4 to 2.9
8-17	ХН57МТВЮ	ЭП590	No more than 0.07	No more than 0.5	No more than 0.5	17.0 to 19.0	Base	2.2 to 2.8	1.0 to 1.5
8-18	ХН55МВЮ	ХН55М6ВЮ, ЭП454	No more than 0.08	No more than 0.4	No more than 0.4	9.0 to 11.0	Base	—	4.2 to 5.0
8-19	ХН75ВМЮ	ЭИ827	No more than 0.12	No more than 0.4	No more than 0.4	9.0 to 11.0	Base	—	4.0 to 4.6
8-20	ХН62МВКЮ	ХН62ВМКЮ, ЭИ867	No more than 0.10	No more than 0.6	No more than 0.3	8.5 to 10.5	Base	—	4.2 to 4.9

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Continuation of tab. 1

Number of grade	Grades of steels and alloys		Mass fraction of elements, %								Groups		
	New designation	Old designation	Tungsten	Molybdenum	Niobium	Vanadium	Iron	Sulfur	Phosphorus	Other elements	I corrosion-proof	II heat-resisting	III high-temperature
								No more than					
8-14	ХН65ВМТЮ	ЭИ893	8.5 to 10.0	3.5 to 4.5	—	—	No more than 3.0	0.012	0.015	Boron, no more than 0.01; cerium, no more than 0.025			+
8-15	ХН65ВМТЮ	ЭП199	9.0 to 11.0	4.0 to 6.0	—	—	No more than 4.0	0.015	0.015	Boron, no more than 0.008	—	—	+
8-16	ХН70ВМТЮФ	ЭИ826	5.0 to 7.0	2.5 to 4.0	—	0.2 to 1.0	No more than 5.0	0.009	0.015.	Boron, no more than 0.015; cerium, no more than 0.020	—	—	+
8-17	ХН57МТВЮ	ЭП590	1.5 to 2.5	8.5 to 10.0	—	—	8.0 to 10.0	0.010	0.015	Boron, no more than 0.005; cerium, no more than 0.01	—	—	+
8-18	ХН55МВЮ	ХН55М6ВЮ, ЭП454	4.5 to 5.5	5.0 to 6.5	—	—	17.0 to 20.0	0.010	0.015	Boron, no more than 0.01; cerium, no more than 0.01	—	—	+
8-19	ХН75ВМЮ	ЭИ827	4.5 to 5.5	5.0 to 6.5	—	No more than 0.70	No more than 5.0	0.010	0.015	Boron, 0.01 to 0.02; cerium, no more than 0.01	—	—	+
8-20	ХН62МВКЮ	ХН62ВМКЮ, ЭИ867	4.3 to 6.0	9.0 to 11.5	—	—	No more than 4.0	0.011	0.015	Cobalt, 4.0 to 6.0; Boron, no more than 0.02; cerium no more than 0.02	—	—	+

Continuation of tab. 1

Number of grade	Grades of steels and alloys		Mass fraction of elements, %						
	New designation	Old designation	Carbon	Silicon	Manganese	Chromium	Nickel	Titanium	Aluminum
8-21	ХН56ВМКЮ	ЭП109	No more than 0.10	No more than 0.6	No more than 0.3	8.5 to 10.5	Base	—	5.4 to 6.2
8-22	ХН55ВМТКЮ	ЭИ929	0.04 to 0.10	No more than 0.5	No more than 0.5	9.0 to 12.0	Base	1.4 to 2.0	3.6 to 4.5
8-23	ХН77ТЮРУ	ЭИ437БУ	0.04 to 0.08	No more than 0.6	No more than 0.4	19.0 to 22.0	Base	2.6 to 2.9	0.7 to 1.0
8-24	ХН58В	ЭП795	No more than 0.030	No more than 0.15	No more than 1.0	39.0 to 41.0	Base	—	—
8-25	ХН65МВУ	ЭП760	No more than 0.02	No more than 0.10	No more than 1.0	14.5 to 16.5	Base	—	—

Continuation of tab. 1

Number of grade	Grades of steels and alloys		Mass fraction of elements, %								Groups		
	New designation	Old designation	Tungsten	Molybdenum	Niobium	Vanadium	Iron	Sulfur	Phosphorus	Other elements	I corrosion-proof	II heat-resisting	III high-temperature
								No more than					
8-21	ХН56ВМКЮ	ЭП109	6.0 to 7.5	6.5 to 8.0	—	—	No more than 1.5	0.010	0.015	Cobalt 11.0 to 13.0; Boron, no more than 0.02; cerium, no more than 0.02	—	—	+
8-22	ХН55ВМТКЮ	ЭП929	4.5 to 6.5	4.0 to 6.0	—	0.2 to 0.8	No more than 5.0	0.010	0.015	Cobalt 12.0 to 16.0; Boron, no more than 0.02	—	—	+
8-23	ХН77ТЮРУ	ЭИ437БУ	—	—	—	—	No more than 1.0	0.007	0.015	Boron, no more than 0.01 Cerium, no more than 0.02 Lead, no more than 0.001	—	—	+
8-24	ХН58В	ЭП795	0.5 to 1.5	—	—	—	No more than 0.8	0.012	0.015	—	+	—	—
8-25	ХН65МВУ	ЭП760	3.0 to 4.5	15.0 to 17.0	—	—	No more than 0.5	0.012	0.015	—	+	—	—

N o t e s :

1. In the first column of the table the numeral, standing prior to a dash, designates serial number of steel class (1-6) or a kind of alloys (7-8); the numerals after the dash designate serial numbers of grades in each of steel classes or kinds of alloys.

2. Chemical elements in steel grades are designated by the following letters: А - nitrogen, В - tungsten, Д - copper, М - molybdenum, Р - boron, Т - titanium, Ю - aluminum, Х - chromium, Б - niobium, Г - manganese, Е - selenium, Н - nickel, С - silicon, Ф - vanadium, К - cobalt, Ц - zirconium, ч – rare earth elements. Letter У in designation of alloy grade ХН77ТЮРУ means the difference of its chemical composition by mass fraction of carbon, titanium and aluminum from alloy grade ХН77ТЮР.

For alloy ХН65МВУ letter У means the difference by mass fraction of carbon, silicon and iron from alloy ХН65МВ.

3. The name of steel grades consists of a designation of elements and the numerals following them. The numerals, standing after the letters, specify the average content of alloying element in integer units, except for the elements present in steel in small amounts. The numerals standing before the letter designation specify average or maximal (in case of absence of the bottom limit) content of carbon in steel in the 100-th fractions of a percent. It is not allowed to put letter А (nitrogen) at the end of grade designation.

4. The name of alloy grades consists only of letter designations of elements, except for nickel, after which there are specified the numerals, designating its average content in percentage.

5. In the documentation, approved before introduction of this Standard, it is allowed to use earlier stipulated designations of steel and alloy grades. In newly developed documentation it is necessary to use the new name. If necessary the former designation may be specified in brackets.

6. Sign “+” means application of steel for the given purpose; sign “++” designates primary application if the steel has several applications.

7. Steel and alloys, obtained by special methods, is additionally designated with aid of a dash at the end of the grade name with the following letters: ВД - vacuum-arc remelting, Ш - electroslag remelting and ВИ - vacuum-induction melting, ГР – gaseous-oxygen refinement, ВО - vacuum-oxygen refinement, ПД - plasma melting with the subsequent vacuum-arc remelting, ИД - vacuum-induction melting with the subsequent vacuum-arc remelting, ШД - electroslag remelting with the subsequent vacuum-arc remelting, ПТ - plasma melting, ЭЛ – electron-beam remelting, Е - plasma-arc remelting, ИШ - vacuum-induction melting with the subsequent electroslag remelting, ИЛ - vacuum-induction melting with the subsequent electron-beam remelting, ИП - vacuum-induction melting with the subsequent plasma-arc remelting, ПШ - plasma melting with the subsequent electroslag remelting, ПЛ - plasma melting with the subsequent electron-beam remelting, ПП - plasma melting with the subsequent plasma-arc remelting, ШЛ - electroslag remelting with the subsequent electron-beam remelting, ШП - electroslag remelting with the subsequent plasma-arc remelting, СШ - processing by synthetic slag and ВП - vacuum-plasma remelting.

(Amended Wording, Amendment No. 5).

8. Amounts of boron, barium and cerium, specified in the table, are the design ones and are not determined by the chemical analysis (except for the cases, specially stipulated in the standards or specifications).

9. An alloy of grade ХН35ВТЮ (ЭИ787), when using it instead of alloys on nickel basis, is delivered with sulfur content of no more than 0.010 % and phosphorus content of no more than 0.020 %.

10. Steel of grade 55Х20Н4АГ9 (ЭП303) is allowed to be delivered with niobium in amount of 0.40 to 1.00 %; and in this case the steel shall be marked as 55Х20Н4АГ9Б (ЭП303Б).

11. An alloy of grade ХН38ВТ (ЭИ703) is allowed to be delivered with niobium in amount of 1.2 to 1.7 % instead of titanium; and in this case the steel shall be marked as ХН38ВБ (ЭИ703Б).

12. By agreement between the parties the allowed content of titanium in steel of grade 03Х18Н12-ВИ may be up to 0.008 %.

13. By agreement between the parties it is allowed to specify the chemical composition of steels and alloys.

14. By agreement between the parties the alloy of grade ЭИ893 may be delivered with carbon content of no more than 0.06 %.

15. **(Removed, Amendment No. 5).**

16. Titanium content in steel of grade 12Х18Н10Т, rolled on combination and continuous rolling mills, shall be [5 (С-0.02)] – 0.7 %, and the ratio of chromium content to nickel content shall be of no more than 1.8.

17. Maximum deviation of titanium for an alloy of grade ХН77ТЮРУ (ЭИ437БУ) shall be +0.05 %.

For an alloy of grade ХН77ТЮР the maximum deviations of titanium shall be +0.1 % and the same of aluminum shall be +0.05 %.

(Amended Wording, Amendment No. 5).

18. Letter С designates the amount of carbon in steel in the column “Titanium” of tab. 1 in the formula for determination of titanium content.

19. For an alloy of grade ХН55ВМТКЮ (ЭИ929) it is allowed the insertion of cerium up to 0.02 % by calculation.

20. In chemical composition of an alloy of grade Н70МФВ it is allowed to increase carbon mass fraction by 0.005 % and silicon mass fraction by 0.02 %.

(Amended Wording, Amendment Nos. 1, 2, 3 and 5).

21. In steel of grade 10Х13П8Д (ДИ-61) the allowed deviations of manganese content are +0.5 %, chromium content are +0.5 % and copper content are +0.2 %.

(Subsequently Inserted, Amendment No. 5).

22. By agreement between the manufacturer and the customer the allowed phosphorus mass fraction in steels of grades 12Х18Н9, 17Х18Н9, 12Х18Н9Т, 12Х18Н10Т, 12Х18Н12Т, 08Х18Н10Т and 08Х18Н12Т may be established at the rate of no more than 0.040 %.

23. Steels and alloys of grades 16Х11Н2В2МФ, 03Х16Н15М3Б, 06Х18Н11, 03Х18Н12, ХН65МВ and ХН60Ю are not allowed for application from 01.01.91 in newly developed and modernized technical equipment.

22 and 23. **(Subsequently Inserted, Amendment No. 5).**

Table 2

Name of an element	Mass fraction of elements in a grade, %	Permissible deviations, %
Carbon	Up to 0.030	+0.005
	Over 0.030 to 0.20	±0.01
	Over 0.20	±0.02
Silicon	Up to 1.0	+0.05
	Over 1.0	±0.10
Manganese	Up to 1.0	+0.04
	Over 1.0 to 2.0	±0.05
	Over 2.0 to 5.0	±0.06
	Over 5.0 to 10.0	±0.08
	Over 10.0	±0.15
Sulfur	Within the limits of norms of tab. 1	+0.005
Phosphorus	Within the limits of norms of tab. 1	+0.005
Nitrogen	Within the limits of norms of tab. 1	±0.02
Aluminum	Up to 0.2	±0.02
	Over 0.2 to 1.0	±0.05
	Over 1.0 to 5.0	±0.10
	Over 5.0	±0.15
Titanium	Up to 1.0	±0.05
	Over 1.0	±0.10
Vanadium	Within the limits of norms of tab. 1	±0.02
Niobium	Within the limits of norms of tab. 1	±0.02
Molybdenum	Up to 1.75	±0.05
	Over 1.75	±0.10
Tungsten	Up to 0.2	±0.02
	Over 0.2 to 1.0	±0.04
	Over 1.0 to 5.0	±0.05
	Over 5.0	±0.10
Chromium	Up to 10.0	±0.10
	Over 10.0 to 15.0	±0.15
	Over 15.0	±0.20

Continuation of tab. 2

Name of an element	Mass fraction of elements in a grade, %	Permissible deviations, %
Nickel	Up to 1.0	±0.04
	Over 1.0 to 2.0	±0.05
	Over 2.0 to 5.0	±0.07
	Over 5.0 to 10.0	±0.10
	Over 10.0 to 20.0	±0.15
	Over 20.0	±0.35
Copper	Up to 1.0	±0.05
	Over 1.0	±0.10

N o t e . For steel of grade 12X21H5T (No. 5-4) the allowed maximum deviations for titanium are -0.05 %, for carbon are +0.01 % and for aluminum are +0.02 %.

(Amended Wording, Amendment No. 5).

T a b l e 3

Name of an element	Maximum allowable mass fraction of residual elements in alloys, %	
	on nickel basis	on iron-nickel basis
Titanium	0.2	0.2
Aluminum	0.2	0.1
Niobium	0.2	0.1
Vanadium	0.2	0.1
Molybdenum	0.2	0.2
Tungsten	0.2	0.2
Cobalt	0.5	0.5
Copper	0.07	0.25

N o t e . In an alloy of grade XH35BTЮ the mass fraction of residual copper shall not exceed 0.15 %.

2.8. By agreement between the manufacturer and the customer there are allowed others values of mass fraction of residual elements.

It is allowed not to carry out the determination of mass fraction of residual elements, unless otherwise is specified in the order.

(Amended Wording, Amendment No. 5).

2.9. Silicon content shall not exceed 0.4 % in steel of grade 15Х28 (Х28), when it is used for welding with glass.

2.10. At the customer's request the following steels and alloys may be produced: an alloy of grade ХН77ТЮР (ЭИ437Б) with boron content of no more than 0.003 %; in this case the alloy shall be marked as ХН77ТЮ (ЭИ437А); alloys of grades ХН75МБТЮ (ЭИ602), ХН78Т (ЭИ435) and ХН77ТЮР (ЭИ437Б) with the lowered iron content against the norms specified in tab. 1, that shall be stipulated by standards or specifications for particular kinds of products;

with the narrowed limits of chemical composition, established by this Standard, that shall be stipulated by standards or specifications for particular kinds of products;

with restriction of the bottom limit of manganese content for the grades, in which manganese is normalized only for the top limit;

with the control of the contents of harmful impurities of nonferrous metals: lead, tin, antimony, bismuth and arsenic - in high-temperature alloys on nickel basis. Quality monitoring and the norms shall be established by agreement between the parties;

with determination of the contents of residual elements (titanium, copper, molybdenum, tungsten, vanadium and nickel).

2.11.Recommendations for application of steels and alloys are specified in the appendix.

2.12.Chemical composition of steels and alloys shall be determined in accordance with GOST 12344 to GOST 12365, GOST 28473, GOST 17051, GOST 24018.0 to GOST 24018.6 and GOST 17745 or by other methods, providing required accuracy of determination. Sampling for determination of chemical composition shall be carried out in accordance with GOST 7565.

(Subsequently Inserted, Amendment No. 5).

APPENDIX
Recommended

RECOMMENDATIONS FOR APPLICATION OF STEELS AND ALLOYS

Table 1

Provisional assignment of grades of corrosion-proof steels and alloys of I group

Number of grade	Grades of steels and alloys		Assignment	Note
	New designation	Old designation		
1-12 3-2 2-4	20Х13 08Х13 12Х13	2Х13 0Х13 1Х13	Elements with the increased plasticity, exposed to impact loads (valves of hydraulic presses, household goods), and also the products, exposed to effect of low-aggressive mediums (atmospheric precipitation, water solutions of salts of organic acids at room temperature, etc.)	Maximum corrosion-resistance is reached after thermal processing (temper quenching) and polishing. Steel of grade 08Х13 may be also applied after annealing
1-17	25Х13Н2	2Х14Н2, ЭИ474	The same	Possesses the best machinability
1-13 1-14	30Х13 40Х13	3Х13 4Х13	Cutting, measuring and surgical tools, springs, carburetor needles, household goods, valve plates of compressors	Steel is applied after training and low holiday with the ground and polished surface, possesses the raised(increased) hardness

Continuation of tab. 1

Number of grade	Grades of steels and alloys		Assignment	Note
	New designation	Old designation		
2-5	14Х17Н2	1Х17Н2, ЭИ268	Is applied as steel with satisfactory enough technological properties in chemical, aviation and other industries	Possesses maximum corrosion-resistance after quenching with high-temperature tempering
1-19	95Х18	9Х18, ЭИ229	Ball-bearings of high hardness for the oil equipment, superior quality knifes, bushings and other elements, exposed to strong deterioration	Steel is applied after quenching with low-temperature tempering
3-3	12Х17	Х17	Household goods and kitchen utensils, the equipment of factories of food and light industry. Steel is not recommended for manufacturing of welded structures	Is applied in annealed condition
3-4	08Х17Т	0Х17Т, ЭИ645	Is recommended as a substitute for steel of grade 12Х18Н10Т for the structures, not exposed to impact loads and for operation temperature not lower -20 °С. Is applied for the same purposes, as steel of grade 12Х17, including welded structures	Is applied as a substitute for steels of grades 12Х18Н9Т and 12Х18Н10Т
3-8	08Х18Т1	0Х18Т1	The same, as for grades 12Х17 and 08Х17Т, mainly for stamped products	The same

Continuation of tab. 1

Number of grade	Grades of steels and alloys		Assignment	Note
	New designation	Old designation		
3-9	08Х18Тч	ДИ-77	Is recommended as a substitute for steel of grade 12Х18Н10Т for manufacturing household goods and kitchen utensils, the equipment of food and light industry and other products with operation temperature up to -20 °С.	Possesses a little increased plasticity and polishing ability in comparison with steel 08Х18Т1
3-6	15Х25Т	Х25Т, ЭИ439	Is recommended as a substitute for steel of grade 12Х18Н10Т for the welded structures, not exposed to impact loads and at operation temperature not lower -20°С, for operation in more aggressive mediums in comparison with mediums for which steel of grade 08Х17Т is recommended. Pipes for heat-exchange equipment operated in aggressive mediums	Operation in temperature interval of 400 to 700 °С is not recommended
3-7	15Х28	Х28, ЭИ349	The same, and also for soldering with glass	Welded connections are inclined to intercrystalline corrosion
4-1	20Х13Н4Г9	2Х13Н4Г9, ЭИ100	Substitute of cold-rolled steel of grades 12Х18Н9 and 17Х18Н9 for strong and light structures connected by spot electric welding	Resists well to atmospheric corrosion. The welded connections, executed by other methods, are subject to intercrystalline corrosion
6-7	10Х14АГ15	Х14АГ15, ДИ-13	The same, and also for household goods and washing machines	—
6-5	10Х14Г14Н3	Х14Г14Н3, ДИ-6	The same	—

Continuation of tab. 1

Number of grade	Grades of steels and alloys		Assignment	Note
	New designation	Old designation		
4-2	09Х15Н8Ю	Х15Н9Ю, ЭИ904	Is recommended as high-strength steel for the products operating in atmospheric conditions, acetic and other salt mediums and for elastic elements	Increased strength is reached by application of tempering at temperatures of 750 ° and 850 °С
4-3	07Х16Н6	Х16Н6, ЭП288	The same. Has no delta-ferrite	—
4-6	08Х17Н5М3	Х17Н5М3, ЭИ925	The same, as steel 08Х15Н8Ю, and also for sulfuric mediums	Steel is well welded
4-7	08Х17Н6Т	ДИ-21	Is applied for wing devices, rudders, arms, ship shafts operating in sea water. Is recommended as a substitute for steels of grades 09Х17Н7Ю and 09Х17Н7Ю1	Possesses higher resistance against intercrystalline corrosion, than steels of grades 09Х17Н7Ю and 09Х17Н7Ю1
5-7	08Х18Г8Н2Т	КО-3	Is recommended as a substitute for steels of grades 12Х18Н10Т and 08Х18Н10Т for manufacturing the welded equipment operating in aggressive mediums, in chemical, food and other industries	Possesses higher strength in comparison with steel 12Х18Н10Т and 08Х18Н10Т
1-18	20Х17Н2	2Х17Н2	Is recommended as high-strength steel for hard-loaded elements operating for deterioration and impact in low-aggressive mediums	Possesses high hardness (above HRC 45)
5-3	08Х22Н6Т	0Х22Н5Т, ЭП53	Is recommended as a substitute for steels of grades 12Х18Н10Т and 08Х18Н10Т for manufacturing the welded equipment in chemical, food and other industries operating at a temperature not higher 300 °С	Possesses higher strength in comparison with steels 12Х18Н10Т and 08Х18Н10Т

Continuation of tab. 1

Number of grade	Grades of steels and alloys		Assignment	Note
	New designation	Old designation		
5-4	12Х21Н5Т	1Х21Н5Т, ЭИ811	Is applied for welded and soldered structures operating in aggressive mediums.	Steel possesses higher strength in comparison with steel 08Х22Н6Т and better ability for soldering in comparison with steel 08Х18Н10Т
5-5	08Х21Н6М2Т	0Х21Н6М2Т, ЭП54	Is recommended as a substitute of grade 10Х17Н13М2Т for manufacturing of elements and welded structures operating in mediums with increased aggression: acetic, sulfuric and phosphate mediums	Possesses higher strength in comparison with steel 10Х17Н13М2Т
6-6	10Х14Г14Н4Т	Х14Г14Н3Т, ЭИ711	Is recommended as a substitute for steel of grade 12Х18Н10Т for manufacturing the equipment operating in mediums of low aggression, and also at temperatures up to -196 °С	Possesses satisfactory resistibility to intercrystalline corrosion
6-19	12Х17Г9АН4	Х17Г9АН4, ЭИ878	For the products operating in atmospheric conditions. Is recommended as a substitute for steels of grades 12Х18Н9 and 12Х18Н10Т	—
6-18	15Х17АГ14	Х17АГ14, ЭП213	Is recommended as a substitute for steel of grade 12Х18Н9 for the products operating in mediums of low aggression. Resists well to atmospheric corrosion	—
6-22	10Х17Н13М2Т	Х17Н13М2Т, ЭИ448	Is recommended for manufacturing of welded structures operating in conditions of boiling phosphoric, sulfuric, 10 % acetic acids and sulfur mediums	—
6-23	10Х17Н13М3Т	Х17Н13М3Т, ЭИ432		

Continuation of tab. 1

Number of grade	Grades of steels and alloys		Assignment	Note
	New designation	Old designation		
6-24	08Х17Н15М3Т	0Х17Н16М3Т, ЭИ580	Is applied for the same purposes, as steel of grade 10Х17Н13М2Т	Practically does not contain ferrite phase. Possesses higher resistance against point corrosion, than steel of grade 10Х17Н13М2Т in the mediums containing ions of chlorine
6-20	03Х17Н14М3	000Х17Н13М2	Is applied for the same purposes, as steels of grades 08Х17Н15М3Т and 10Х17Н13М2Т	Possesses higher resistance against intercrystalline and knife-line corrosion, than steels of grades 08Х17Н15Н3Т and 10Х17Н13М2Т
6-15	03Х16Н15М3	00Х16Н15М3, ЭИ844	Is applied for the same purposes, as steels of grades 08Х17Н15М3Т and 10Х17Н13М2Т	Possesses higher stability against point corrosion, than steel 03Х17Н14М3
6-16	03Х16Н15М3Б	00Х16Н15М3Б, ЭИ844Б		
5-8	15Х18Н12С4ТЮ	ЭИ654	Is recommended for the welded products operating in air and aggressive mediums, in particular for the concentrated nitric acid	Is not inclined to cracking and energized corrosion
6-1	08Х10Н20Т2	0Х10Н20Т2	Is recommended as not magnetic steel for manufacturing of large-sized elements operating in sea water.	—
6-28	04Х18Н10	00Х18Н10, ЭИ842, ЭП550	Is applied for the same purposes, as steel of grade 08Х18Н10Т and also for operation in nitric acid and sulfur mediums at increased temperatures	Possesses higher stability to intercrystalline corrosion

Continuation of tab. 1

Number of grade	Grades of steels and alloys		Assignment	Note
	New designation	Old designation		
6-33	03Х18Н11	000Х18Н11	Is applied for the same purposes, as steel of grade 08Х18Н10Т and also for operation in nitric acid and nitrate mediums at increased temperatures	The same, and with the increased stability to knife-line corrosion in comparison with steel 12Х18Н12Б
6-35	03Х18Н12	000Х18Н12	The same, and also in electronic industry	Practically does not contain ferrite phase
6-25 6-29	12Х18Н9 08Х18Н10	Х18Н9 0Х18Н10	Is applied as cold-rolled sheet and strip of increased strength for various elements and structures, welded by spot welding, and also for the products subjected to thermal processing (quenching)	The welded connections executed by other methods, except for spot welding, are inclined to intercrystalline corrosion
6-26	17Х18Н9	2Х18Н9	Is applied for the same purposes, as steel of grade 12Х18Н9	Steel of higher strength, than steel of grade 12Х18Н9
6-32	12Х18Н10Е	Х18Н10Е, ЭП47	The same	By corrosion stability is the same, as steel of grade 12Х18Н9, but possesses better machinability
6-30	08Х18Н10Т	0Х18Н10Т, ЭИ914	Is recommended for manufacturing the welded products operating in mediums of higher aggression than steels of grades 12Х18Н10Т and 12Х18Н12Т	Steel possesses the increased resistibility to intercrystalline corrosion in comparison with steels 12Х18Н10Т and 12Х18Н12Т

Continuation of tab. 1

Number of grade	Grades of steels and alloys		Assignment	Note
	New designation	Old designation		
6-31 6-27	12Х18Н10Т 12Х18Н9Т	Х18Н10Т Х18Н9Т	Is applied for manufacturing of welded equipment in different industries. Steel of grade 12Х18Н9Т is recommended to be applied as high-quality metal and hot-rolled sheet, not produced on continuous rolling mills	—
6-34	06Х18Н11	0Х18Н11, ЭИ684	Is applied for the same purposes, as steel of grade 08Х18Н10, but upon rigid restriction of ferrite phase content	Ferrite phases content is lower, than in steel of grade 08Х18Н10
6-36	08Х18Н12Т	0Х18Н12Т	Is applied for the same purposes, as steel of grade 08Х18Н10, but upon rigid restriction of ferrite phase content	Steel practically does not contain ferrite phase and possesses higher resistibility to intercrystalline corrosion
6-37	12Х18Н12Т	Х18Н12Т	Is applied for the same purposes, as steel of grade 08Х18Н10, but upon rigid restriction of ferrite phase content	Contains smaller quantity(amount) ферритной phases, than steel of grade 12Х18Н10Т
6-38	08Х18Н12Б	0Х18Н12Б, ЭИ402	Is applied for the same purposes, as steel of grade 12Х18Н12Т	Possesses the increased stability to point corrosion and higher stability, than steel 12Х18Н10Т in nitric acid

Continuation of tab. 1

Number of grade	Grades of steels and alloys		Assignment	Note
	New designation	Old designation		
6-50	10Х13Г18Д	ДИ-61	Is recommended instead of steels of grades 12Х18Н10Т and 08Х18Н10 for manufacturing of welded products of home appliances, car building, consumer goods, machines and devices of food and trade mechanical engineering, lamellar heat-exchangers	Possesses high plasticity for deep punching
7-6	06ХН28МДТ	0Х23Н28М3Д3Т, ЭИ943	For the welded structures operating at temperatures up to 80 °С in sulfuric acid of various concentration, except for 55 % acetic and phosphoric acids, in sour and sulfur mediums	—
7-7	03ХН28МДТ	000Х23Н28М3Д3Т, ЭП516	The same	Possesses the increased stability to intercrystalline and knife-line corrosion
7-8	06ХН28МТ	0Х23Н28М2Т, ЭИ628	Is recommended for manufacturing of welded structures and the units operating in mediums, less aggressive, than for steel of grade 06ХН28МДТ. In particular, in sulfuric acid of low concentration up to 20 % at a temperature not higher 60 °С, and also in conditions of effect of hot phosphoric acid	Possesses satisfactory resistibility to intercrystalline corrosion
1-20	09Х16Н4Б	1Х16Н4Б, ЭП56	Is applied for manufacturing of high-strength stamp-welded structures and elements operating in contact with aggressive mediums	Possesses maximum corrosion resistance after quenching with low-temperature tempering (up to 400 °С)

Continuation of tab. 1

Number of grade	Grades of steels and alloys		Assignment	Note
	New designation	Old designation		
6-21	08Х17Н13М2Т	0Х17Н13М2Т	Is applied to the same purposes, as steel of grade 10Х17Н13М2Т	Possesses higher stability to general and intercrystalline corrosion, than steel of grade 10Х17Н13М2Т
4-4	09Х17Н7Ю	0Х17Н7Ю	Is applied for wing devices, rudders and arms operating in sea water	Possesses maximum corrosion stability after double first tempering at 740 to 760 °С
4-5	09Х17Н7Ю1	0Х17Н7Ю1	Is applied for ship shafts operating in sea water	The same
6-42	07Х21Г7АН5	Х21Г7АН5, ЭП222	For the welded products operating at cryogenic temperatures to -253°С and in mediums of middle aggression	—
6-43	03Х21Н21М4ГБ	00Х20Н20М4Б, ЗИ35	Is recommended for manufacturing of welded structures and the units operating in conditions of effect of hot phosphoric acid with an impurity of fluoric and sulphurous compounds: sulfuric acid of low concentration at a temperature not higher than 80 °С, nitric acid at high temperature (up to 95 °С)	Steel is well welded
8-2	ХН65МВ	ЭП567	Is applied for manufacturing of welded structures operating at increased temperatures in sulfur and muriatic mediums, possessing oxidizing character, in concentrated acetic acid and other rather aggressive mediums	—

Continuation of tab. 1

Number of grade	Grades of steels and alloys		Assignment	Note
	New designation	Old designation		
8-1	Н70МФВ	ЭП814А	Is applied for manufacturing of welded structures operating at high temperatures in hydrochloric, sulfuric, phosphoric acids and other mediums of regenerative character	The alloy is steady to intercrystalline corrosion in aggressive mediums of regenerative character
8-24	ХН58В	ЭП795	Is applied for manufacturing of welded structures operating in solutions of nitric acid in presence of fluorions	The alloy is steady to intercrystalline corrosion in nitric-fluoride solutions
8-25	ХН65МВУ	ЭП760	Is applied for manufacturing of welded structures operating at increased temperatures in aggressive mediums of oxidation-reduction character (sulfuric and acetic acid, damp chlorine, chlorides, etc.).	The alloy is steady to intercrystalline corrosion in aggressive mediums
1-22	07Х16Н4Б	—	Is intended for manufacturing of hard-loaded elements of products of ship mechanical engineering, welded units, objects of atomic engineering, chemical industry	—
1-23	65Х13	—	Is intended for manufacturing of safety razor blades and kitchen knifes	—
5-9	03Х23Н6	—	Is intended for manufacturing of equipment in chemical mechanical engineering	Possesses higher strength in comparison with steels of grades 08Х18Н10Т and 05Х18Н11

Continuation of tab. 1

Number of grade	Grades of steels and alloys		Assignment	Note
	New designation	Old designation		
5-10	03Х22Н6М2	—	Is intended for manufacturing of equipment in chemical mechanical engineering	Possesses higher strength in comparison with steels of grades 10Х17Н13М2Т and 03Х17Н14М3
6-51	03Х18Н10Т	00Х18Н10Т	Is applied for manufacturing of sylphon-equalizers	Possesses higher ability to deep-drawing, than steels of grades 08Х18Н10Т and 12Х18Н10Т
6-52	05Х18Н10Т	0Х18Н10Т	The same	

(Amended Wording, Amendment Nos. 3 and 5).

Table 2

Provisional assignment of heat-resisting steels and alloys of II group

Number of grade	Grades of steels and alloys		Assignment
	New designation	Old designation	
1-5	40Х9С2	4Х9С2	Exhaust valves of automobile, tractor and diesel motors, recuperator pipes, heat exchangers, grate-bars
1-6	40Х10С2М	4Х10С2М, ЭИ107	Valves of motors
1-15	30Х13Н7С2	3Х13Н7С2, ЭИ72	Valves of automobile motors
2-1	15Х6СЮ	Х6СЮ, ЭИ428	Elements of boiler installations, pipes
2-4	12Х13	1Х13	Elements of turbines, pipes, elements of boilers
3-1	10Х13СЮ	1Х12СЮ, ЭИ404	Valves of autotractor motors, various elements
3-3	12Х17	Х17	Heat-exchangers, equipment of kitchens, etc., pipes
3-4	08Х17Т	0Х17Т, ЭИ645	The same
3-8	08Х18Т1	0Х18Т1	»
3-5	15Х18СЮ	Х18СЮ, ЭИ484	Pipes of pyrolysis installations, apparatus, elements
3-6	15Х25Т	Х25Т, ЭИ439	Apparatus, elements, covers of thermocouples, electrodes of spark fuse lighters, pipes of pyrolysis installations, heat-exchangers
3-7	15Х28	Х28, ЭИ349	Apparatus, elements, pipes of pyrolysis installations, heat-exchangers
5-1	08Х20Н14С2	0Х20Н14С2, ЭИ732	Pipes
5-2	20Х20Н14С2	Х20Н14С2, ЭИ211	Furnace conveyors, boxes for cementation
5-6	20Х23Н13	Х23Н13, ЭИ319	Pipes for pyrolysis of methane, pyrometric tubes
6-9	09Х14Н16Б	ЭИ694	Pipes of superheaters and pipelines of installations of ultrahigh pressure
6-29	08Х18Н10	0Х18Н10	Pipes, elements of furnace fitting, heat-exchangers, muffles, retorts, branch pipes and collectors of exhaust systems, electrodes of spark fuse lighters
6-25	12Х18Н9	Х18Н9	
6-30	08Х18Н10Т	0Х18Н10Т, ЭИ914	The same

The recommended maximal temperature of application for a long time (up to 10000 h)	The temperature of intensive scaling start in air medium, °C	Note
—	850	Is steady in sulfur-containing mediums
—	850	The same
—	950	»
—	800	»
—	700	—
—	950	Is steady in sulfur-containing mediums
—	900	—
—	900	—
—	900	Is steady in sulfur-containing mediums
—	1050	
—	1050	—
—	1100 to 1150	—
—	1000 to 1050	Is steady in carbonizing mediums
	1000 to 1050	The same
1000	1050	In an interval of 600 to 800 °C is inclined to embrittlement because of formation of σ phase
650	850	—
800	850	Are unstable in sulfur-containing mediums. Are applied in cases when nickelless steels can not be applied
800	850	The same

Continuation of tab. 2

Number of grade	Grades of steels and alloys		Assignment
	New designation	Old designation	
6-31	12Х18Н10Т	Х18Н10Т	Pipes, elements of furnace fitting, heat-exchangers, muffles, retorts, branch pipes and collectors of exhaust systems, electrodes of spark fuse lighters
6-27	12Х18Н9Т	Х18Н9Т	The same
6-37	12Х18Н12Т	Х18Н12Т	Pipes
6-40	36Х18Н25С2	4Х18Н25С2	Furnace conveyors and other loaded elements
6-45	10Х23Н18	0Х23Н18	Pipes and elements of installations for conversion of methane, the pyrolysis, sheet elements
6-46	20Х23Н18	Х23Н18, ЭИ417	
6-48	12Х25Н16Г7АР	Х25Н16Г7АР, ЭИ835	Elements of gas-supplying systems made of thin sheets, strips, high-quality rolled metal
6-41	55Х20Г9АН4	ЭП303	Valves of automobile motors
6-44	45Х22Н4М3	ЭП48	The same
6-47	20Х25Н20С2	Х25Н20С2, ЭИ283	Suspensions and supports in boilers, pipes of electrolysis and pyrolysis installations
7-4	ХН38ВТ	ЭИ703	Elements of gas systems
7-5	ХН28ВМАБ	ЭП126	Sheet elements of turbines
7-9	ХН45Ю	ЭП747	Elements of burning devices, covers of thermocouples, sheet and tubular elements of furnaces (for example, manufacturing of circulite, firing of ceramic tiles)
8-4	ХН60Ю	ЭИ559А	Elements of gas-supplying systems, equipment
8-7	ХН75МБТЮ	ЭИ602	The same
8-6	ХН78Т	ЭИ435	Elements of gas-supplying systems, high-quality elements, pipes
8-3	ХН60ВТ	ЭИ868	Sheet elements of a motor
8-5	ХН70Ю	ЭИ652	Elements of gas-supplying systems

The recommended maximal temperature of application for a long time (up to 10000 h)	The temperature of intensive scaling start in air medium, °C	Note
800	850	Are unstable in sulfur-containing mediums. Are applied in cases when nickelless steels can not be applied
800	850	The same
800	850	—
1000	1100	Is steady in carbonizing mediums
1000	1050	In an interval of 600 to 800 °C are inclined to embrittlement because of formation of σ phase
1050	1100	Is recommended for replacement of heat-resisting alloys on nickel basis
	950	—
—	950	—
1050	1100	In an interval of 600 to 800 °C is inclined to embrittlement because of formation of σ phase
1000	1050	Is recommended for replacement of heat-resisting alloy of grade XH78T
Term up to 1000 h 800 to 1000	1100	—
1250 to 1300	—	Is recommended for replacement of an alloy of grade XH78T
1200	More than 1250	—
1050	1100	—
1100	1150	Is not steady in sulfur-containing mediums
1000	1100	—
1200	More than 1250	Is not steady in sulfur-containing mediums

N o t e . The temperature of intensive scaling start in air medium is given roughly.

Provisional assignment of high-temperature steels and alloys of III group

Number of grade	Grades of steels and alloys		Assignment
	New designation	Old designation	
1-5	40Х9С2	4Х9С2	Valves of motors, fasteners
1-6	40Х10С2М	4Х10С2М, ЭИ107	The same
1-10	11Х11Н2В2МФ	Х12Н2ВМФ, ЭИ962	Compressor disks, blades and other loaded elements
1-21	13Х11Н2-В2МФ	1Х12Н2-ВМФ, ЭИ961	The same
1-11	16Х11Н2В2МФ	2Х12Н2ВМФ, ЭИ962А	»
1-12	20Х13	2Х13	Blades of steam turbines, valves, bolts and pipes
2-4	12Х13	1Х13	The same
1-16	13Х14Н3В2ФР	Х14НВФР, ЭИ736	High-loaded elements, including disks, shafts, coupling bolts, blades and other elements operating in conditions of increased humidity
1-7	15Х11МФ	1Х11МФ	Operating and guide blades of steam turbines
2-2	15Х12ВНМФ	1Х12ВНМФ, ЭИ802	Rotors, disks, blades, bolts
6-44	45Х22Н4М3	ЭП48	Valves of motors
6-41	55Х20Г9АН4	ЭП303	The same
2-3	18Х12ВМБФР	2Х12ВМБФР, ЭИ993	Forged pieces, turbine blades, fasteners
3-2	08Х13	0Х13, ЭИ496	Blades of steam turbines, valves, bolts and pipes
6-4	37Х12Н8Г8МФБ	4Х12Н8Г8МФБ, ЭИ481	Disks of turbines
6-2	10Х11Н20Т3Р	Х12Н20Т3Р, ЭИ696	Elements of turbines (forged units, high-quality sheets)
6-49	10Х11Н20-Т2Р	Х12Н20-Т2Р, ЭИ696А	The same
6-3	10Х11Н23Т3МР	Х12Н22Т3МР, ЭП33	Springs and elements of fasteners
1-20	09Х16Н4Б	1Х16Н4Б, ЭП56	Pipes of superheaters and pipelines of installations of ultrahigh pressure, sheet rolled metal
6-10	09Х14Н19В2БР	1Х14Н18В2БР, ЭИ695Р	The same
1-8	18Х11МНФБ	2Х11МФБН, ЭП291	High-loaded elements, blades of steam turbines, elements of valves, forged pieces of disks, rotors of steam and gas turbines

The recommended temperature of application, °C	Term of operation	The temperature of intensive scaling start, °C	Note
650	Long-term	850	—
650	The same	850	—
600	»	750	—
600	»	750	—
600	»	750	—
500	Very long	750	
500	The same	750	—
550	»	700	—
550	»	750	—
580	»	750	—
780	Long-term	950	—
850	The same	950	—
600	Very long	750	—
500	The same	750	—
650	Limited	750	—
630	Long-term	750	—
700	Limited	850	—
700	The same	850	—
700	»	850	—
650	Very long	850	—
700	The same	850	—
600	»	750	—

Continuation of tab. 3

Number of grade	Grades of steels and alloys		Assignment
	New designation	Old designation	
1-9	20Х12ВНМФ	2Х12ВНМФ, ЭП428	High-loaded elements, blades of steam turbines, elements of valves, forged pieces of disks, rotors of steam and gas turbines
6-9	09Х14Н16Б	1Х14Н16Б, ЭИ694	Pipes of superheaters and pipelines of installations of ultrahigh pressure, sheet rolled metal
6-11	09Х14Н19В2БР1	1Х14Н18В2БР1, ЭИ726	Rotors, disks and blades of turbines
6-8	45Х14Н14В2М	4Х14Н14В2М, ЭИ69	Valves of motors, forged pieces, elements of pipelines
2-5	14Х17Н2	1Х17Н2, ЭИ268	Blades, disks, shaft, bushings
6-12	40Х15Н7Г7Ф2МС	4Х15Н7Г7Ф2МС, ЭИ388	Blades of gas turbines, fasteners
6-14	08Х15Н24В4ТР	ЭП164	Blades and guide blades, fasteners, disks of gas turbines
6-13	08Х16Н13М2Б	1Х16Н13М2Б, ЭИ680	Forged pieces for disks and rotors, blades, bolts
6-17	09Х16Н15М3Б	Х16Н15М3Б, ЭИ847	Pipes of superheaters and high pressure pipelines
6-31	12Х18Н10Т	Х18Н10Т	Elements of exhaust systems, pipes, sheet and high-quality elements
6-37	12Х18Н12Т	Х18Н12Т	The same
6-27	12Х18Н9Т	Х18Н9Т	»
6-39	31Х19Н9МВБТ	ЭИ572	Rotors, disks, bolts
6-45	10Х23Н18	0Х23Н18	Pipes, fitting (under lowered loads)
6-46	20Х23Н18	Х23Н18, ЭИ417	Elements of installations in chemical and petroleum industry, gas mains, chambers of combustion (may be applied for heating elements of resistance)
6-48	12Х25Н16Г7АР	Х25Н16Г7АР, ЭИ835	Sheet and high-quality elements, operating under moderate stresses
7-1	ХН35ВТ	ЭИ612	Blades of gas turbines, disks, rotors, fasteners

The recommended temperature of application, °C	Term of operation	The temperature of intensive scaling start, °C	Note
600	Very long	750	—
650	The same	850	—
700	»	850	—
650	Long-term	850	—
400	The same	800	—
650	Limited	800	—
700	Very long	900	—
600	The same	850	—
350	»	850	—
600	»	850	—
1600	»	850	Is more stable in comparison with 12Х18Н10Т
600	»	850	—
600	»	800	—
1000	Long-term	1050	In an interval of 600 to 800 °C is inclined to embrittlement because of formation of σ phase
1000	The same	1050	The same
950	Limited	1050 to 1100	Replaces alloys ХН75МБТЮ (ЭИ602) and ХН78Т (ЭИ 435)
650	Very long	850 to 900	—

Continuation of tab. 3

Number of grade	Grades of steels and alloys		Assignment
	New designation	Old designation	
7-2	ХН35ВТЮ	ЭИ787	Disks and blades of turbines and compressors
7-4	ХН38ВТ	ЭИ703	Sheet elements operating under moderate stresses
8-4	ХН60Ю	ЭИ559А	Sheet elements of turbines operating under moderate stresses (may be applied for heating elements of resistance)
8-10	ХН70ВМЮТ	ЭИ765	Blades, fasteners
8-11	ХН70ВМТЮ	ЭИ617	Blades of turbines
7-3	ХН32Т	ЭП670	Pressure relief pipes, sheet elements of high-temperature petrochemical installations
8-8	ХН80ТБЮ	ЭИ607	Blades, fasteners of turbines
8-13	ХН70МВТЮБ	ЭИ598	Blades of turbines
8-5	ХН70Ю	ЭИ652	Sheet elements, gas mains operating under moderate stresses (may be applied for heating elements of resistance)
8-6	ХН78Т	ЭИ435	Fire tubes
8-12	ХН67МВТЮ	ЭИ202	Blades, cases, disks, sheet elements of turbines
8-7	ХН75МБТЮ	ЭИ602	Sheet elements of turbines
8-9	ХН77ТЮР	ЭИ437Б	Disks, blades if turbines
8-3	ХН60ВТ	ЭИ868	Sheet elements of turbines
8-17	ХН57МТВЮ	ЭП590	Blades, cases and other elements of turbines
8-18	ХН55МВЮ	ЭП454	Blades, disks of turbines
8-20	ХН62МВКЮ	ЭИ867	The same
8-14	ХН65ВМТЮ	ЭИ893	Blades and guide blades, fasteners of gas turbines

The recommended temperature of application, °C	Term of operation	The temperature of intensive scaling start, °C	Note
750	Limited	900	Can replace alloys ЭИ 437А and ЭИ437Б
950	The same	1050	Replaces alloy ХН78Т
1100	»	1200	—
750	Very long	1000	—
800	Long-term	1000	—
850	The same	1000	—
850	Very long	1000	—
700	The same	1050	—
850	Limited	1000	—
1100	The same	1200	—
1000	»	1100	—
800	Long-term	1000	—
850	Limited	1000	—
950	The same	1050	—
750	»	1050	—
1000	»	1100	—
850	Short-term	1000	—
900	The same	1080	—
900	Limited	1080	—
800	Long-term	1080	—
800	Very long	1000	—
800	Limited	1050	—

Termination of tab. 3

Number of grade	Grades of steels and alloys		Assignment
	New designation	Old designation	
8-15	ХН56ВМТЮ	ЭП199	High-loaded elements, unions, flanges, sheet elements
8-16	ХН70ВМТЮФ	ЭИ826	Blades of turbines
8-19	ХН75ВМЮ	ЭИ827	The same
8-21	ХН56ВМКЮ	ЭП109	»
8-22	ХН55ВМТКЮ	ЭИ929	»
8-23	ХН77ТЮРУ	ЭИ437БУ	Disks, blades of turbines

The recommended temperature of application, °C	Term of operation	The temperature of intensive scaling start, °C	Note
850	Long-term	1050	—
850	Limited	1080	—
800	Long-term	1080	—
950	Limited	1050	—
950	The same	1050	—
750	»	1050	Is produced as metal products of larger cross-sections, than alloy ЭИ437Б

N o t e s :

1. Short-term operation is conditionally understood as service life of an element up to 100 hours, limited term of operation - from 100 to 1000 hours, long-term operation - from 1000 to 10000 hours (in separate cases up to 20000 hours), very long term of operation - much more 10000 hours (usually from 50000 to 100000 hours)

2. The recommended temperature of application, term of operation and temperature of intensive scaling start are given roughly.

(Amended Wording, Amendment Nos. 1, 2 and 3).

DETAILS

1. DEVELOPED AND SUBMITTED by USSR Ministry for Ferrous Metallurgy

DEVELOPERS

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2. APPROVED AND INTRODUCED by Decree No. 2340, dated 27.12.72, of State Committee for Standards under USSR Council of Ministers

3. THE STANDARD IS DEVELOPED in view of the requirements of international standards ISO 683/XIII-85, ISO 683/XV-76, ISO 683/XVI-76 and ISO 4955-83

4. IN PLACE OF GOST 5632-61

Number of reference document referred to	Number of clause, subclause, enumeration, appendix	Number of reference document referred to	Number of clause, subclause, enumeration, appendix
GOST 7565-81	2.12	GOST 12357-84	2.12
GOST 12344-88	2.12	GOST 12358-82	2.12
GOST 12345-88	2.12	GOST 12359-81	2.12
GOST 12346-78	2.12	GOST 12360-82	2.12
GOST 12347-77	2.12	GOST 12361-82	2.12
GOST 12348-78	2.12	GOST 12362-79	2.12
GOST 12349-83	2.12	GOST 12363-79	2.12
GOST 12350-78	2.12	GOST 12364-84	2.12
GOST 12351-81	2.12	GOST 12365-84	2.12
GOST 12352-81	2.12	GOST 17051-82	2.12
GOST 12353-78	2.12	GOST 17745-90	2.12
GOST 12354-81	2.12	GOST 24018.0-90	2.12
GOST 12355-78	2.12	GOST 24018.1-80 -	2.12
GOST 12356-81	2.12	GOST 28473-90	2.12

5. Restriction of validity period is removed by decision of Interstate Council for standardization, metrology and certification (IUS 11-95)

6. REVISED EDITION (June 1997) with Amendments Nos. 1, 2, 3, 4 and 5, approved in August 1975, August 1979, June 1981, October 1986 and June 1989 (IUS {Standards Information Catalog} 9-75, 10-79, 9-81, 12-86 and 10-89)

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