ORDNANCE FACTORY PROJECT, HYDERABAD.

FINAL TRANSLATION SHEET FOR DRAWINGS

Description of Item : GOST 5632 - 72

Drawing No. :

Sheet No. :

Date Typed : 12/11/88

Date Verified :

Copy - 7

# HIGH ~~HIGHLY~~ ALLOYED STEELS AND CORROSION PROOF HEAT RESISTING AND HEAT TREATED ALLOYS GRADES AND TECHNICAL REQUIREMENTS

Name of Typist : K.DURGA LAXMI

Name of Verifier

K. F.7-83-10,000 GOST 5632-72 OFPH/DC-2

# ORDNANCE FACTORY PROJECT, HYDERABAD.

## FINAL TRANSLATION SHEET FOR DRAWINGS

Description of Item : GOST 5632-72. Steels, Heat-

Drawing No. : Resisting and Alloys, Wrought

Sheet No. : 2 Checked and Date Verified :

The present standard deals with deformable steels and alloys on iron, iron-nickel and nickel bases, meant for working in corrosion - active media and at high temperatures.

Alloys, content of iron in which exceeds 45% but the total content of alloying elements is at least 10%, calculated as per the upper limit with content of one of the elements at least 8% as per the lower limit, belong to high alloyed steels. Steels whose

Alloys, whose basic structure is composed of solid chrome solution and other alloying elements in iron-nickel base, (with Total content of nickel and iron exceeds 65% at an approximate ratio of the nickel to iron 1:15) belong to alloys of iron-nickel base. Alloys, whose basic structure is composed of solid chrome solution and other alloying elements of nickel base (with content of nickel at least 55%) belong to nickel base alloys.

Requirements recommended by CP on standardization PC4-70 are incorporated in the standard.

### I. CLASSIFICATION

1.1 Depending upon the basic properties the steels and alloys are classified into the following groups:-

I. Corrosion resistant (stainless) steels and alloys, possessing resistance to electro-chemical and chemical corrosion (atmospheric, soil alkaline, acidic. salt) intercrystalline corrosion, stress corrosion and etc.

II. Oxidation-resistant (resistant to scaling) steels

Cont...3/-

Name of Typist : K.DURGA LAXMI Name of Verifier

Signature of Typist : Signature of Verifier :

and alloys possessing resistance to chemical destruction of surface in gaseous media at temperatures above 550°C working at no-load and low-load state.

III Heat resistant steels and alloys, capable of working under loads at high temperatures for a specific period and with process possessing sufficient oxidation - resistance.

1.2 Depending upon the structure steels are divided into the following classes:

| | | |
|---|---|---|
| Martensitic | - | Steels with basic structure of martensite. |
| Martensit-ferritic | - | Steels containing in their structure apart from Martensite at least 10% Ferrite. |
| Ferritic | - | Steels, having structure of ferrite (without a $\gtrless \gamma$ transformations.). |
| Austenite - Martensitic | - | Steels having structure of Austenite and Martensite, quantity of which may be varied in wide range. |
| Austenite - Ferritic | - | Steels, having structure of Austenite and Ferrite. (Ferrite more than 10% ) |
| Austenite | - | Steels having structure of Austenite. |

Contd....4/-

Classification of steels into classes as per the structural signs is conventional and it has been done depending upon the basic structure, obtained by cooling the steels in air after subjecting them to high-temperature heating. Therefore, the structural deviation cannot be the reason for their rejection.

1.3 Depending upon the chemical composition the alloys are divided into classes as per the basic constituent;

Alloys of iron-nickel base.

alloys of nickel base.

## 2. GRADES AND TECHNICAL REQUIREMENTS

2.1 Grades and chemical composition of the steels and alloys should correspond to the ones stipulated in Table 1. Composition of the steels and alloys, obtained by electroslag (ШЛ), vaccum-arc remelting (ВД) and vaccum induction melting ( ВИ) processes should correspond to the norms specified in Table 1. if no other content of elements are stipulated in the standards or the specifications on metal production. Sulpher content in steels, obtained through electroslag remelting method should not exceed 0.015% excepting the steels of grades 10х11Н23Т3МР (ЭП33), 03х16Н15М3 (ЭИ844) 03х16Н15М3Б (ЭИ844Б), sulphur content of which should not exceed the norms, specified in Table 1 or set by both the parties through mutual agreement.

2.2. Deviations of chemical composition from the norms, specified in Table 1 are allowed in finished product.

Contd....5/-

# FINAL TRANSLATION SHEET FOR DRAWINGS

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Limit deviations should not exceed the ones, specified in Table 2, if no other deviations incidentally as also for the elements , not specified in Table 2, are not stipulated in the standards or specifications on finished products.

2.3 Steels and alloys, not alloyed with titanium may be allowed to contain titanium not exceeding 0.2% and steels of grades 12x18H9 (X18H9), 08x18H10(0x18H10), 17x18H9 (2x18H9) not exceeding 0.5 % if no other titanium content is stipulated in the standards or specifications on various grades of of steels and alloys.

If agreed upon by both the parties, ~~cement~~ content of titanium should not exceed 0.05% in steels of grades 03x1811(000x18H11) 03x16H15M3(00x16H15M3), 0x17H14M2(000 x 17H13M2) 09x15H8 (x15H9 to), 07x16H6(x16H6). 08x17H5M3 (x17H5M3).

2.4 The residual content of copper is limited in steels and alloys, not alloyed by copper: in steels - not exceeding 0.30% in alloys of iron-nickel base - not exceeding 0.25% in alloys on nickel base nor exceeding 0.07%.

2.5 Content of residual copper may be upto 0.6% in steels, not alloyed with nickel.

2.6 Residual molybdenum not exceeding 0.3% tungsten and vanadium not exceeding 0.2% each may be allowed in chrome-nickel alloy steels, if no other content of these elements is stipulated in the stardard or the specifications.

2.6.1 The residual content of molybdenum should not exceed 0.1% in steel of grades 03x18H11(000x18H11), 08x18H12T (0x18H12T), 08x18H12 (08x18H12).

Cont....6/-

Name of Typist : _____ Name of Verifier _____

Signature of Typist : Signature of Verifier :

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2.6.2 Steels of grade Ofx18H10T (Ox18H10T) is supplied with residual molybdenum not exceeding 0.1% on customer's demand.

2.7 Residual molybdenum upto 0.3% may be allowed in steels and alloys, alloyed with tungsten. A higher content of molybdenum is allowed, provided the content of tungsten is correspondingly reduced upon agreement between the parties. The rate of substitution of tungsten with molybdenum should be in 2:1 ratio. Residual content of molybdenum not exceeding 1.5% is permitted in alloy XH6OBT (ЭИ868).

2.8 Content of residual elements (aluminium, molybdenum titanium, vanadium and copper) need not be determined.

2.9 Content of silicon should not exceed 0.4% in steel of grade 15x28 (x28) when used for welding with glass.

TABLE 1

Таблица 1

| Grade number / Номер марки | Марки сталей и сплавов Grades of Steels and Alloys: New designation / Новое обозначение | Old designation / Старое обозначение | Содержание элементов % Contents of elements: Carbon / Углерод | Silicon / Кремний | Manganese / Марганец | Chromium / Хром | Nickel / Никель | Titanium / Титан | Aluminium / Алюминий |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | |
| | **СТАЛИ STEELS** | | | | | | | | |
| | 1. Стали мартенситного класса 1. Steels of martensitic class | | | | | | | | |
| 1—1 | 15Х5 | Х5 | Не более 0,15 | Не более 0,5 | Не более 0,5 | 4,5—6,0 | — | — | — |
| 1—2 | 15Х5М | Х5М | Не более 0,15 | Не более 0,5 | Не более 0,5 | 4,5—6,0 | — | — | — |
| 1—3 | 15Х5ВФ | Х5ВФ | Не более 0,15 | 0,3—0,6 | Не более 0,5 | 4,5—6,0 | — | — | — |
| 1—4 | 12Х8ВФ | 1Х8ВФ | 0,08—0,15 | Не более 0,6 | Не более 0,5 | 7,0—8,5 | — | — | — |
| 1—5 | 40Х9С2 | 4Х9С2 | 0,35—0,45 | 2,0—3,0 | Не более 0,8 | 8,0—10,0 | — | — | — |
| 1—6 | 40Х10С2М | 4Х10С2М, ЭИ107 | 0,35—0,45 | 1,9—2,6 | Не более 0,8 | 9,0—10,5 | — | — | — |
| 1—7 | 15Х11МФ | 1Х11МФ | 0,12—0,19 | Не более 0,5 | Не более 0,7 | 10,0—11,5 | — | — | — |
| 1—8 | 18Х11МНФБ | 2Х11МФБН, ЭП291 | 0,15—0,21 | Не более 0,6 | 0,6—1,0 | 10,0—11,5 | 0,5—1,0 | — | — |
| 1—9 | 20Х12ВНМФ | 2Х12ВНМФ, ЭП428 | 0,17—0,23 | Не более 0,6 | 0,5—0,9 | 10,5—12,5 | 0,5—0,9 | — | — |
| 1—10 | 11Х11Н2В2МФ | 1Х12Н2ВМФ ЭИ962 | 0,09—0,13 | Не более 0,6 | Не более 0,6 | 10,5—12,0 | 1,5—1,8 | — | — |
| 1—11 | 16Х11Н2В2МФ | 2Х12Н2ВМФ, ЭИ962А | 0,14—0,18 | Не более 0,6 | Не более 0,6 | 10,5—12,0 | 1,4—1,8 | — | — |
| 1—12 | 20Х13 | 2Х13 | 0,16—0,25 | Не более 0,8 | Не более 0,8 | 12,0—14,0 | — | — | — |

1 (1) Grades of steels and alloys (2) Contents of elements, % (3) Continuation / Продолжение

| Номер марки (4) Grade Number | Марки сталей и сплавов: Новое обозначение (5) New designation | Марки сталей и сплавов: Старое обозначение (6) Old designation | Содержание элементов, %: Вольфрам Tungsten (7) | Молибден Molybdenum (8) | Ниобий Niobium (9) | Ванадий Vanadium (10) | Кобальт Cobalt (11) | Сера Sulphur, Not more than (12) | Фосфор Phosphorus, Not more than (13) | Прочие элементы Other elements (14) | Группы стойкости: I Коррозионная (15) | II Окалиностойкая (16) | III Жаропрочная (17) | Heat-resistant groups |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 Steels of martensitic class (18) | | I. Стали мартенситного класса (19) | | | | | | | | | | | |
| 1—1 | 15Х5 | Х5 | — | — | — | — | — | 0,025 | 0,030 | — | — | + | + | + |
| 1—2 | 15Х5М | Х5М, ЭИ754 | — | 0,45—0,60 | — | — | — | 0,025 | 0,030 | — | — | + | + | + |
| 1—3 | 15Х5ВФ | Х5ВФ | 0,4—0,7 | — | — | 0,4—0,6 | — | 0,025 | 0,030 | — | — | + | + | + |
| 1—4 | 40Х9С2 | 4Х9С2, ЭИ107 | — | — | — | — | — | 0,025 | 0,030 | — | — | + | + | + |
| 1—5 | 40Х10С2М | 4Х10С2М, ЭИ107 | — | 0,7—0,9 | — | — | — | 0,025 | 0,030 | — | — | + | + | + |
| 1—6 | 15Х11МФ | 1Х11МФ | — | 0,6—0,8 | — | 0,25—0,40 | — | 0,025 | 0,030 | — | — | + | + | + |
| 1—7 | 18Х11МНФБ | 2Х11МФБН, ЭП291 | — | 0,8—1,1 | 0,20—0,45 | 0,20—0,40 | — | 0,025 | 0,030 | — | — | + | + | + |
| 1—8 | 20Х12ВНМФ | 2Х12ВНМФ, ЭП428 | 0,7—1,1 | 0,5—0,7 | — | 0,15—0,30 | — | 0,025 | 0,030 | — | — | + | + | + |
| 1—9 | 11Х11Н2В2МФ | Х12Н2ВМФ, ЭИ962 | 1,6—2,0 | 0,35—0,50 | — | 0,18—0,30 | — | 0,025 | 0,030 | — | — | + | + | + |
| 1—10 | 15Х11Н2В2МФ | 2Х12Н2ВМФ, ЭИ962А | 1,6—2,0 | 0,35—0,50 | — | 0,18—0,30 | — | 0,025 | 0,030 | — | — | + | + | + |
| 1—11 | 20Х13 | 2Х13 | — | — | — | — | — | 0,025 | 0,030 | — | — | + | + | + |

(20) (21) (22) * Base

Grades of steels and alloys

Continuation

Продолжение

| Grades No. / Номер марки | Марки сталей и сплавов: New designation / Новое обозначение | Old designation / Старое обозначение | Содержание элементов, Contents of elements, %: Carbon / Углерод | Silicon / Кремний | Manganese / Марганец | Chromium / Хром | Nickel / Никель | Titanium / Титан | Aluminium / Алюминий |
|---|---|---|---|---|---|---|---|---|---|
| | | | | * not more than | | | | | |
| 1—13 | 30Х13 | 3Х13, ЭИ278 | 0,26—0,35 | Не более * 0,8 | Не более * 0,8 | 12,0—14,0 | — | — | — |
| 1—14 | 40Х13 | 4Х13 | 0,36—0,45 | Не более * 0,8 | Не более * 0,8 | 12,0—14,0 | — | — | — |
| 1—15 | 80Х13Н7С2 | 3Х13Н7С2, ЭИ172 | 0,25—0,34 | 2,0—3,0 | Не более * 0,8 | 12,0—14,0 | 6,0—7,5 | — | — |
| 1—16 | 18Х14Н3В2ФР | Х14НВФР, ЭИ736 | 0,10—0,16 | Не более * 0,6 | Не более * 0,6 | 13,0—15,0 | 2,8—3,4 | Не более * 0,05 | — |
| 1—17 | 25Х13Н2 | 2Х14Н2, ЭИ474 | 0,2—0,3 | Не более * 0,5 | 0,8—1,2 | 12,0—14,0 | 1,5—2,0 | — | — |
| 1—18 | 20Х17Н2 | 2Х17Н2 | 0,17—0,25 | Не более * 0,8 | Не более * 0,8 | 16,0—18,0 | 1,5—2,5 | — | — |
| 1—19 | 95Х18 | 9Х18, ЭИ229 | 0,9—1,0 | Не более * 0,8 | Не более * 0,8 | 17,0—19,0 | — | — | — |
| 1—20 | 09Х16Н4Б | 1Х16Н4Б, ЭП56 | 0,05—0,13 | Не более * 0,6 | Не более * 0,5 | 15,0—17,0 | 3,5—4,5 | — | — |
| | | 2. Стали мартенситно-ферритного класса 2. Steels of martensite ferritic class | | | | | | | |
| 2—1 | 15Х5СЮ | Х5СЮ, ЭИ428 | Не более * 0,15 | 1,2—1,8 | Не более * 0,6 | 5,5—7,0 | — | — | 0,7—1,1 |
| 2—2 | 15Х12ВНМФ | 1Х12ВНМФ, ЭИ802 | 0,12—0,18 | Не более * 0,4 | 0,5—0,9 | 11,0—13,0 | 0,4—0,8 | — | — |
| 2—3 | 18Х12ВМБФР | 0Х12ВМБФР, ЭИ993 | 0,15—0,22 | Не более * 0,5 | Не более * 0,5 | 11,0—13,0 | — | — | — |
| 2—4 | 12Х13 | 1Х13 | 0,09—0,15 | Не более * 0,8 | Не более * 0,8 | 12,0—14,0 | — | — | — |

Grades of steels and alloys — Contents of elements, % — Continued — Продолжение

| Grade No. | Марки сталей и сплавов: Номер марки | Новое обозначение | Старое обозначение | Содержание элементов, %: Вольфрам Tungsten | Молибден Molybdenum | Ниобий Niobium | Ванадий Vanadium | Железо Iron | Сера Sulphur, не более not more than | Фосфор Phosphorus, не более not more than | Прочие элементы | Группы Groups: Коррозионностойкая Corrosion resistant | Жаростойкая Oxidation resistant | Жаропрочная Heat-resistant |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1—13 | 30Х13 | 3Х13 | | — | — | — | — | Осн. Base | 0,025 | 0,030 | — | + | + | + |
| 1—14 | 40Х13 | 4Х13 | | — | — | — | — | Осн. | 0,025 | 0,030 | — | + | + | + |
| 1—15 | 30Х13Н7С2 | 3Х13Н7С2, ЭИ72 | | — | — | — | — | Осн. | 0,025 | 0,030 | — | — | — | + |
| 1—16 | 13Х14Н3В2ФР | Х14НВФР, ЭИ736 | | 1,6—2,2 | — | — | 0,18—0,28 | Осн. | 0,025 | 0,030 | Бор не более 0,004 | + | + | + |
| 1—17 | 25Х13Н2 | 2Х14Н2, ЭИ474 | | — | — | — | — | Осн. | 0,15—0,25 | 0,08—0,15 | Boron not more than 0,004 | + | + | + |
| 1—18 | 20Х17Н2 | 2Х17Н2 | | — | — | — | — | Осн. | 0,025 | 0,035 | — | + | + | + |
| 1—19 | 95Х18 | 9Х18, ЭИ229 | | — | — | — | — | Осн. | 0,025 | 0,030 | — | + | + | + |
| 1—20 | 09Х16Н4Б | 1Х16Н4Б, ЭП56 | | — | — | 0,05—0,20 | — | Осн. | 0,025 | 0,030 | — | + | + | + |
| | 2. Стали мартенсито-ферритного класса — 2. Steels of martensite-ferritic class | | | | | | | | | | | | | |
| 2—1 | 15Х6СЮ | Х6СЮ, ЭИ428 | | — | — | — | — | Осн. | 0,025 | 0,030 | — | — | — | + |
| 2—2 | 16Х12ВНМФ | 1Х12ВНМФ, ЭИ802 | | 0,7—1,1 | 0,5—0,7 | — | 0,15—0,30 | Осн. | 0,025 | 0,030 | — | + | + | + |
| 2—3 | 18Х12ВМБФР | 2Х12ВМБФР, ЭИ993 | | 0,4—0,7 | 0,4—0,6 | 0,2—0,4 | 0,15—0,30 | Осн. | 0,025 | 0,030 | Бор не более 0,003 | + | + | + |
| 2—4 | 12Х13 | 1Х13 | | — | — | — | — | Осн. | 0,025 | 0,030 | Boron not more than 0,003 | + | + | + |

ГОСТ 5632—72 Стр. 7

Продолжение

Grades and steels and alloys / Марки сталей и сплавов

Content of elements % / Содержание элементов, %

| Grade No. / Номер марки | New designation / Новое обозначение | Old designation / Старое обозначение | Carbon / Углерод | Silicon / Кремний | Manganese / Марганец | Chromium / Хром | Nickel / Никель | Titanium / Титан | Aluminium / Алюминий |
|---|---|---|---|---|---|---|---|---|---|
| 2—5 | 14Х17Н2 | 1Х17Н2, ЭИ268 | not more than 0,11—0,17 | Не более 0,8 | Не более 0,8 | 16,0—18,0 | 1,5—2,5 | — | — |
| | | | 3. Стали ферритного класса / 3. Steels of ferritic cla | | | | | | 1,0—1,8 |
| 3—1 | 10Х13СЮ | 1Х12СЮ ЭИ404 | 0,07—0,12 | 1,2—2,0 | Не более 0,8 | 12,0—14,0 | — | — | — |
| 3—2 | 08Х13 | 0Х13, ЭИ496 | Не более 0,08 | Не более 0,8 | Не более 0,8 | 12,0—14,0 | — | — | — |
| 3—3 | 12Х17 | Х17 | Не более 0,12 | Не более 0,8 | Не более 0,8 | 16,0—18,0 | — | 5 С—0,80 | — |
| 3—4 | 08Х17Т | 0Х17Т, ЭИ645 | Не более 0,08 | Не более 0,8 | Не более 0,8 | 16,0—18,0 | — | — | 0,7—1,2 |
| 3—5 | 15Х18СЮ | Х18СЮ, ЭИ484 | Не более 0,15 | 1,0—1,5 | Не более 0,8 | 17,0—20,0 | — | 5 С—0,90 | — |
| 3—6 | 15Х25Т | Х25Т, ЭИ439 | Не более 0,15 | Не более 1,0 | Не более 0,8 | 24,0—27,0 | — | — | — |
| 3—7 | 15Х28 | Х28, ЭИ349 | Не более 0,15 | Не более 1,0 | Не более 0,8 | 27,0—30,0 | — | — | — |
| | | | 4. Стали аустенитно-мартенситного класса / 4. Steels of Austenitic-Martensitic class. | | | | | | |
| 4—1 | 20Х13Н4Г9 | 2Х13Н4Г9, ЭИ100 | 0,15—0,30 | Не более 0,8 | 8,0—10,0 | 12,0—14,0 | 3,7—4,7 | — | 0,7—1,3 |
| 4—2 | 09Х15Н8Ю | Х15Н9Ю, ЭИ904 | Не более 0,09 | Не более 0,8 | Не более 0,8 | 14,0—16,0 | 7,0—8,4 | — | — |
| 4—3 | 07Х16Н6 | Х16Н6, ЭП288 | 0,05—0,09 | Не более 0,8 | Не более 0,8 | 15,5—17,5 | 5,0—8,0 | — | — |

Продолжение

| Номер марки | Марки стали | Старое обозначение | Состав стали | Группа стали | Основа | Углерод | Кремний | Марганец | Хром | Никель | Молибден | Вольфрам | Ванадий | Ниобий | Титан | Алюминий | Бор | Сера | Фосфор | Прочие элементы | Содержание ферритной фазы | Коррозионностойкая | Жаростойкая | Жаропрочная | Термическая обработка |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2—5 | 14Х17Н2 | 1Х17Н2, ЭИ268 | | | Осн. | 0,025 | 0,030 | | | | | | | | | | | | | | | | | | |
| 3. Стали ферритного класса — Steels of ferritic class | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3—1 | 10Х13СЮ | 1Х12СЮ | | | Осн. | 0,025 | 0,030 | | | | | | | | | | | | | | | | | | |
| 3—2 | 08Х13 | 0Х13, ЭИ496 | | | Осн. | 0,025 | 0,030 | | | | | | | | | | | | | | | | | | |
| 3—3 | 12Х17 | Х17, ЭИ32 | | | Осн. | 0,025 | 0,035 | | | | | | | | | | | | | | | | | | |
| 3—4 | 08Х17Т | 0Х17Т, ЭИ645 | | | Осн. | 0,025 | 0,035 | | | | | | | | | | | | | | | | | | |
| 3—5 | 15Х18СЮ | Х18СЮ, ЭИ484 | | | Осн. | 0,025 | 0,035 | | | | | | | | | | | | | | | | | | |
| 3—6 | 15Х25Т | Х25Т, ЭИ439 | | | Осн. | 0,025 | 0,035 | | | | | | | | | | | | | | | | | | |
| 3—7 | 15Х28 | Х28, ЭИ349 | | | Осн. | 0,025 | 0,035 | | | | | | | | | | | | | | | | | | |
| 4. Стали аустенито-мартенситного класса — Steels of austenite-martensite class | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4—1 | 20Х13Н4ГР | 2Х13Н4Г9, ЭИ100 | | | Осн. | 0,025 | 0,050 | | | | | | | | | | | | | | | | | | |
| 4—2 | 09Х15Н8КО | Х15Н8СЮ, ЭИ904 | | | Осн. | 0,025 | 0,035 | | | | | | | | | | | | | | | | | | |
| 4—3 | 07Х16Н6 | Х16Н6, ЭП288 | | | Осн. | 0,020 | 0,035 | | | | | | | | | | | | | | | | | | |

Grades of Steels and alloys. Content of element, % (1) Continued
Продолжение

| Grade No. / Номер марки | Марки сталей и сплавов (2) | | Содержание элементов, % (7) | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | New Designation / Новое обозначение (5) | Old designation / Старое обозначение (6) | Carbon / Углерод (7) | Silicon / Кремний (8) | Manganese / Марганец (9) | Chromium / Хром (10) | Nickel / Никель (11) | Titanium / Титан (12) | Aluminium / Алюминий (13) |
| | | | (14) *Not more than | | | | | | |
| 4—4 | 09Х17Н7Ю | 0Х17Н7Ю | Не более 0,09 | Не более 0,8 | Не более 0,8 | 16,0—17,5 | 7,0—8,0 | — | 0,5—0,8 |
| 4—5 | 09Х17Н7Ю1 | 0Х17Н7Ю1 | Не более 0,09 | Не более 0,8 | Не более 0,8 | 16,5—18,0 | 6,6—7,5 | — | 0,7—1,1 |
| 4—6 | 08Х17Н5М3 | Х17Н5М3, ЭИ925 | 0,06—0,10 | Не более 0,8 | Не более 0,8 | 16,0—17,5 | 4,5—5,5 | — | — |
| | 15. Стали аустенито-ферритного класса 5 Steels of Austenitoferritic class | | | | | | | | |
| 5—1 | 08Х20Н14С2 | 0Х20Н14С2, ЭИ732 | Не более 0,08 | 2,0—3,0 | Не более 1,5 | 19,0—22,0 | 12,0—15,0 | — | — |
| 5—2 | 20Х20Н14С2 | Х20Н14С2, ЭИ211 | Не более 0,20 | 2,0—3,0 | Не более 1,5 | 19,0—22,0 | 12,0—15,0 | — | — |
| 5—3 | 08Х22Н6Т | 0Х22Н5Т, ЭП53 | Не более 0,08 | Не более 0,8 | Не более 0,8 | 21,0—23,0 | 5,3—6,3 | 5·С—0,65 | — |
| 5—4 | 12Х21Н5Т | 1Х21Н5Т, ЭИ811 | 0,09—0,14 | Не более 0,8 | Не более 0,6 | 20,0—22,0 | 4,8—5,8 | 0,25—0,50 | Не более 0,03 |
| 5—5 | 08Х21Н6М2Т | 0Х21Н6М2Т, ЭП54 | Не более 0,08 | Не более 0,8 | Не более 0,8 | 20,0—22,0 | 5,5—6,5 | 0,20—0,40 | — |
| 5—6 | 20Х23Н13 | Х23Н13, ЭИ319 | Не более 0,20 | Не более 1,0 | Не более 2,0 | 22,0—25,0 | 12,0—15,0 | — | — |
| 5—7 | 08Х18Г8Н2Т | 0Х18Г8Н2Т, КО-3 | Не более 0,08 | Не более 0,8 | 7,0—9,0 | 17,0—19,0 | 1,8—2,8 | 0,20—0,50 | — |
| 5—8 | 15Х18Н12С4ТЮ | ЭИ654 | 0,12—0,17 | 3,8—4,5 | 0,5—1,0 | 17,0—19,0 | 11,0—13,0 | 0,4—0,7 | 0,13—0,35 |

5. Стали аустенито-ферритного класса
Steels of austenitic-ferritic class

| Номер марки Grade No. | Марки сталей и сплавов Grades of steels and alloys | | Содержание элементов, % Content of elements, % | | | | | | | | | | Группа Group | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Новое обозначение New designation | Старое обозначение Old designation | Бор Boron | Молибден Molybdenum | Ниобий Niobium | Ванадий Vanadium | Железо Iron | Сера Sulphur, not more | Фосфор Phosphorus, not more | Прочие элементы Other elements | Сопротивление коррозионное Corrosion resistance | | | Жаростойкая Heat resistant |
| | | | | | | | | | | | | | | |
| 5—1 | 08Х20Н14С2 | 0Х20Н14С2, ЭИ732 | — | — | — | — | Осн. Base | 0,025 | 0,035 | — | + | + | — | — |
| 5—2 | 20Х20Н14С2 | Х20Н14С2, ЭИ211 | — | — | — | — | Осн. Base | 0,025 | 0,035 | — | + | + | — | — |
| 5—3 | 08Х22Н6Т | 0Х22Н5Т, ЭП53 | — | — | — | — | Осн. Base | 0,025 | 0,035 | — | + | + | — | — |
| 5—4 | 12Х21Н5Т | 1Х21Н5Т, ЭИ811 | — | — | — | — | Осн. Base | 0,025 | 0,035 | — | + | + | — | — |
| 5—5 | 08Х21Н6М2Т | 0Х21Н6М2Т, ЭП54 | — | 1,8—2,5 | — | — | Осн. Base | 0,025 | 0,035 | — | + | + | — | — |
| 5—6 | 20Х23Н13 | Х23Н13, ЭИ319 | — | — | — | — | Осн. Base | 0,025 | 0,035 | — | + | + | — | — |
| 5—7 | 08Х18Г8Н2Т | 0Х18Г8Н2Т, КО-3 | — | — | — | — | Осн. Base | 0,025 | 0,035 | — | + | + | — | — |
| 5—8 | 15Х18Н12С4ТЮ | ЭИ654 | — | — | — | — | Осн. Base | 0,030 | 0,035 | — | + | + | — | — |

Continued
Продолжение

| Номер марки | Марки сталей и сплавов | | Содержание элементов, % | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Новое обозначение | Старое обозначение | Углерод | Кремний | Марганец | Хром | Никель | Титан | Алюминий | |
| | Grades of steels and alloys | | Contents of elements, % | | | | | | | |
| | New designation | Old designation | Carbon | Silicon | Manganese | Chromium | Nickel | Titanium | Aluminium | |
| | 6. Стали аустенитного класса | | 6 Steels of austenite class | | | | | | | |
| 6—1 | 08Х10Н20Т2 | 0Х10Н20Т2 | Не более 0,08 | Не более 0,8 | Не более 2,0 | 10,0—12,0 | 18,0—20,0 | 1,5—2,5 | Не более 1,0 | |
| 6—2 | 10Х11Н20Т3Р | Инконель-718, ЭИ696 | Не более 0,10 | Не более 0,8 | Не более 1,0 | 10,0—12,5 | 18,0—21,0 | 2,6—3,2 | Не более 0,8 | |
| 6—3 | 10Х11Н23Т3МР | Х12Н22Т3МР, ЭП33 | Не более 0,10 | Не более 0,6 | Не более 0,6 | 10,0—12,5 | 21,0—25,0 | 2,6—3,2 | Не более 0,8 | |
| 6—4 | 37Х12Н8Г8МФБ | 4Х12Н8Г8МФБ, ЭИ481 | 0,34—0,40 | 0,3—0,8 | 7,5—9,5 | 11,5—13,5 | 7,0—9,0 | — | — | |
| 6—5 | 10Х14Г14Н3 | Х14Г14Н3, ДИ-6 | 0,09—0,14 | Не более 0,7 | 13,0—15,0 | 12,5—14,0 | 2,8—3,5 | — | — | |
| 6—6 | 10Х14Г14Н4Т | Х14Г14Н3Т, ЭИ711 | Не более 0,10 | Не более 0,8 | 13,0—15,0 | 13,0—15,0 | 2,8—4,5 | 5·(С—0,02) —0,6 | — | |
| 6—7 | 10Х14АГ15 | Х14АГ15, ДИ-13 | Не более 0,10 | Не более 0,8 | 14,5—16,5 | 13,0—15,0 | — | — | — | |
| 6—8 | 45Х14Н14В2М | 4Х14Н14В2М, ЭИ69 | 0,40—0,50 | Не более 0,8 | Не более 0,7 | 13,0—15,0 | 13,0—15,0 | — | — | |
| 6—9 | 09Х14Н16Б | 1Х14Н16Б, ЭИ694 | 0,07—0,12 | Не более 0,6 | 1,0—2,0 | 13,0—15,0 | 14,0—17,0 | — | — | |
| 6—10 | 09Х14Н19В2БР | 1Х14Н18В2БР, ЭИ695Р | 0,07—0,12 | Не более 0,6 | Не более 2,0 | 13,0—15,0 | 18,0—20,0 | — | — | |

*not more than

1. Grades of steels and alloys. 2. Contents of elements, %. Continued. Продолжение

| Grade No. / Номер марки | Марки сталей и сплавов: New designation / Новое обозначение | Old designation / Старое обозначение | Содержание элементов, %: Вольфрам Tungsten | Молибден Molybdenum | Ниобий Niobium | Ванадий Vanadium | Железо Iron | Сера Sulphur, not more than / Не более | Фосфор Phosphorus, not more than / Не более | Прочие элементы Other elements | Группы: аустенитная austenitic | аустенитно-ферритная austenitic-ferritic | ферритная ferritic | мартенситная martensitic |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 6 Steels of austenite class / 6. Стали аустенитного класса | | | | | | | | | | | | | | |
| 6—1 | 08Х10Н20Т2 | 0Х10Н20Т2 | — | — | — | — | Осн. | 0,030 | 0,035 | — | + | — | — | — |
| 6—2 | 10Х11Н20Т3Р | Х12Н20Т3Р, ЭИ696 | — | — | — | — | Осн. | 0,020 | 0,035 | Бор 0,003—0,020 | + | — | — | — |
| 6—3 | 10Х11Н23Т3МР | Х12Н22Т3МР, ЭИ33 | — | 1,0—1,5 | — | — | Осн. | 0,010 | 0,035 | Бор не более 0,02 | + | — | — | — |
| 6—4 | 37Х12Н8Г8МФБ | 4Х12Н8Г8МФБ, ЭИ481 | — | 1,1—1,4 | 0,25—0,45 | 1,25—1,55 | Осн. | 0,030 | 0,035 | — | + | — | — | — |
| 6—5 | 10Х14Г14Н3 | Х14Г14Н3, ДИ-6 | — | — | — | — | Осн. | 0,020 | 0,035 | — | + | — | — | — |
| 6—6 | 10Х14Г14Н4Т | Х14Г14Н3Т, ЭИ711 | — | — | — | — | Осн. | 0,020 | 0,035 | — | + | — | — | — |
| 6—7 | 10Х14АГ15 | Х14АГ15, ДИ-13 | — | — | — | — | Осн. | 0,030 | 0,045 | Азот 0,15—0,25 | + | — | — | — |
| 6—8 | 45Х14Н14В2М | 4Х14Н14В2М, ЭИ69 | 2,0—2,8 | 0,25—0,40 | — | — | Осн. | 0,020 | 0,035 | — | + | — | — | — |
| 6—9 | 09Х14Н16Б | 1Х14Н16Б, ЭИ694 | — | — | 0,9—1,3 | — | Осн. | 0,020 | 0,035 | — | + | — | — | — |
| 6—10 | 09Х14Н19В2БР | 1Х14Н18В2БР, ЭИ695Р | 2,0—2,8 | — | 0,9—1,3 | — | Осн. | 0,020 | 0,035 | Бор не более 0,005; церий не более 0,02 Boron not more than 0.005 cerium not more than 0,02 | + | — | — | — |

Boron 0,003 – 0.020
Boron not more than 0.00
Micro 0.15 0.35

Grades of steels and alloys — Content of elements % — Continued — Продолжение

| Номер марки Grade No. | Марки сталей и сплавов: Новое обозначение New designation | Марки сталей и сплавов: Старое обозначение Old designation | Содержание элементов: Вольфрам Tungsten | Молибден Molybdenum | Ниобий Niobium | Ванадий Vanadium | Железо Iron | Сера Sulphur, не более not more than | Фосфор Phosphorus, не более not more than | Прочие элементы Other elements | Группы: Коррозионностойкая Corrosion resistant | Жаропрочная Heat resistant | Жаростойкая Scale resistant |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 6—11 | 09Х14Н19В2БР1 | 1Х14Н16В2БР1, ЭИ726 | 2,0—2,8 | — | 0,9—1,3 | — | Осн. * base | 0,020 | 0,035 | Бор не более 0,025; церий не более 0,02 | — | + | + |
| 6—12 | 40Х15Н7Г7Ф2МС | 4Х15Н7Г7Ф2МС, ЭИ388 | — | 0,65—0,95 | — | 1,5—1,9 | Осн. | 0,020 | 0,035 | — | — | + | — |
| 6—13 | 08Х16Н13М2Б | 1Х16Н13М2Б, ЭИ680 | — | 2,0—2,5 | 0,9—1,3 | — | Осн. | 0,020 | 0,035 | — | — | + | + |
| 6—14 | 08Х15Н24В4ТР | Х15Н24В4Т, ЭП164 | 4,0—5,0 | — | — | — | Осн. | 0,020 | 0,035 | Бор не более 0,005; церий не более 0,025 | — | — | + |
| 6—15 | 03Х16Н15М3 | 00Х16Н15М3, ЭИ844 | — | 2,5—3,0 | — | — | Осн. | 0,015 | 0,020 | — | + | — | — |
| 6—16 | 03Х16Н15М3Б | 00Х16Н15М3Б, ЭИ844Б | — | 2,5—3,0 | 0,25—0,50 | — | Осн. | 0,015 | 0,020 | — | + | — | — |
| 6—17 | 09Х16Н15М3Б | Х16Н15М3Б, ЭИ847 | — | 2,5—3,0 | 0,6—0,9 | — | Осн. | 0,020 | 0,035 | Nitrogen 0,25—0,37 | + | — | + |
| 6—18 | 15Х17АГ14 | Х17АГ14, ЭП213 | — | — | — | — | Осн. | 0,020 | 0,035 | Nitrogen 0,15—0,25 | + | — | + |
| 6—19 | 12Х17Г9АН4 | Х17Г9АН4, ЭИ878 | — | — | — | — | Осн. | 0,020 | 0,035 | Азот 0,25—0,37 | + | — | + |
| 6—20 | 03Х17Н14М2 | 00Х17Н13М2 | — | 2,0—2,8 | — | — | Осн. | 0,020 | 0,035 | Азот 0,15—0,25 | + | — | + |
| 6—21 | 08Х17Н13М2Т | 0Х17Н13М2Т | — | 2,0—3,0 | — | — | Осн. | 0,020 | 0,035 | — | + | — | + |

Grades of steels and alloys — Contents of elements, % — Продолжение

| Номер марки / Grade No. | Марки сталей и сплавов / Grades of steels and alloys: New designation — Новое обозначение | Old designation — Старое обозначение | Содержание элементов, %: Carbon — Углерод | Silicon — Кремний | Manganese — Марганец | Chromium — Хром | Nickel — Никель | Titanium — Титан | Aluminium — Алюминий |
|---|---|---|---|---|---|---|---|---|---|
| | | | * not more than | | | | | | |
| 6—22 | 10Х17Н13М2Т | Х17Н13М2Т, ЭИ448 | Не более 0,10 | Не более 0,8 | Не более 2,0 | 16,0—18,0 | 12,0—14,0 | 5·С—0,7 | — |
| 6—23 | 10Х17Н13М3Т | Х17Н13М3Т, ЭИ432 | Не более 0,10 | Не более 0,8 | Не более 2,0 | 16,0—18,0 | 12,0—14,0 | 5·С—0,7 | — |
| 6—24 | 08Х17Н15М3Т | 0Х17Н16М3Т, ЭИ580 | Не более 0,08 | Не более 0,8 | Не более 2,0 | 16,0—18,0 | 14,0—16,0 | 0,3—0,6 | — |
| 6—25 | 12Х18Н9 | Х18Н9 | Не более 0,12 | Не более 0,8 | Не более 2,0 | 17,0—19,0 | 8,0—10,0 | — | — |
| 6—26 | 17Х18Н9 | 2Х18Н9 | 0,13—0,21 | Не более 0,8 | Не более 2,0 | 17,0—19,0 | 8,0—10,0 | — | — |
| 6—27 | 12Х18Н9Т | Х18Н9Т | Не более 0,12 | Не более 0,8 | Не более 2,0 | 17,0—19,0 | 8,0—9,5 | 5·С—0,8 | — |
| 6—28 | 04Х18Н10 | 00Х18Н10, ЭИ842, ЭП550 | Не более 0,04 | Не более 0,8 | Не более 2,0 | 17,0—19,0 | 9,0—11,0 | — | — |
| 6—29 | 08Х18Н10 | 0Х18Н10 | Не более 0,08 | Не более 0,8 | Не более 2,0 | 17,0—19,0 | 9,0—11,0 | — | — |
| 6—30 | 08Х18Н10Т | 0Х18Н10Т, ЭИ914 | Не более 0,08 | Не более 0,8 | Не более 2,0 | 17,0—19,0 | 9,0—11,0 | 5·С—0,7 | — |
| 6—31 | 12Х18Н10Т | Х18Н10Т | Не более 0,12 | Не более 0,8 | Не более 2,0 | 17,0—19,0 | 9,0—11,0 | 5·С—0,8 | — |
| 6—32 | 12Х18Н10Е | Х18Н10Е, ЭП47 | Не более 0,12 | Не более 0,8 | Не более 2,0 | 17,0—19,0 | 9,0—11,0 | — | — |
| 6—33 | 03Х18Н11 | 000Х18Н11 | Не более 0,03 | Не более 0,8 | Не более 2,0 | 17,0—19,0 | 10,5—12,5 | — | — |
| 6—34 | 06Х18Н11 | 0Х18Н11, ЭИ684 | Не более 0,06 | Не более 0,8 | Не более 2,0 | 17,0—19,0 | 10,0—12,0 | — | — |

Grades of steel and alloys. Content of elements, %

Продолжение

| Grade No. | Марки сталей и сплавов | | Содержание элементов, % | | | | | | | | Группы | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Новое обозначение | Старое обозначение | Вольфрам Tungsten | Молибден Molybdenum | Ниобий Niobium | Ванадий Vanadium | Железо Iron | Сера Sulphur | Фосфор Phosphorous | Прочие элементы Other elements | Коррозионностойкие Corrosion resistant | Жаростойкие Oxidation resistant | Жаропрочные Heat resistant III |
| | New designation | Old designation | | | | | | Не более not more | | | | | |
| 6—22 | 10Х17Н13М2Т | Х17Н13М2Т, ЭИ448 | — | 2,0—3,0 | — | — | Осн. Base | 0,020 | 0,035 | — | + | + | + |
| 6—23 | 10Х17Н13М3Т | Х17Н13М3Т, ЭИ432 | — | 3,0—4,0 | — | — | Осн. | 0,020 | 0,035 | — | + | + | + |
| 6—24 | 08Х17Н15М3Т | 0Х17Н15М3Т, ЭИ580 | — | 3,0—4,0 | — | — | Осн. | 0,020 | 0,035 | — | + | + | + |
| 6—25 | 12Х18Н9 | Х18Н9, ЭЯ1 | — | — | — | — | Осн. | 0,020 | 0,035 | — | + | + | + |
| 6—26 | 17Х18Н9 | 2Х18Н9, ЭЯ2 | — | — | — | — | Осн. | 0,020 | 0,035 | — | + | + | + |
| 6—27 | 12Х18Н9Т | Х18Н9Т, ЭЯТ | — | — | — | — | Осн. | 0,020 | 0,035 | — | + | + | + |
| 6—28 | 04Х18Н10 | 00Х18Н10, ЭИ842, ЭП560 | — | — | — | — | Осн. | 0,020 | 0,035 | — | + | + | + |
| 6—29 | 08Х18Н10 | 0Х18Н10, ЭЯ5 | — | — | — | — | Осн. | 0,020 | 0,035 | — | + | + | + |
| 6—30 | 08Х18Н10Т | 0Х18Н10Т, ЭИ914 | — | — | — | — | Осн. | 0,020 | 0,035 | — | + | + | + |
| 6—31 | 12Х18Н10Т | Х18Н10Т, ЭЯТ | — | — | — | — | Осн. | 0,020 | 0,035 | Селен Selenium 0,18—0,35 | + | + | + |
| 6—32 | 12Х18Н10Е | Х18Н10Е, ЭП47, ЭИ478 | — | — | — | — | Осн. | 0,020 | 0,035 | — | + | + | + |
| 6—33 | 03Х18Н11 | 000Х18Н11 | — | — | — | — | Осн. | 0,020 | 0,035 | — | + | + | + |
| 6—34 | 06Х18Н11 | 0Х18Н11, ЭИ684 | — | — | — | — | Осн. | 0,020 | 0,035 | — | + | + | + |

Grades of steels and alloys — Content of elements, % (not more than) — Continued — Продолжение

| Grade No. / Номер марки | Марки сталей и сплавов: New designation / Новое обозначение | Old designation / Старое обозначение | Содержание элементов, %: Carbon / Углерод | Silicon / Кремний | Manganese / Марганец | Chromium / Хром | Nickel / Никель | Titanium / Титан | Aluminium / Алюминий |
|---|---|---|---|---|---|---|---|---|---|
| 6—35 | 03Х18Н12 | 000Х18Н12 | Не более 0,03 | Не более 0,4 | Не более 0,4 | 17,0—19,0 | 11,5—13,0 | Не более 0,005 | — |
| 6—36 | 08Х18Н12Т | 0Х18Н12Т | Не более 0,08 | Не более 0,8 | Не более 2,0 | 17,0—19,0 | 11,0—13,0 | 5·С—0,6 | — |
| 6—37 | 12Х18Н12Т | Х18Н12Т | Не более 0,12 | Не более 0,8 | Не более 2,0 | 17,0—19,0 | 11,0—13,0 | 5·С—0,7 | — |
| 6—38 | 08Х18Н12Б | 0Х18Н12Б, ЭИ402 | Не более 0,08 | Не более 0,8 | Не более 2,0 | 17,0—19,0 | 11,0—13,0 | — | — |
| 6—39 | 31Х19Н9МВБТ | Х19Н11Б, 3Х19Н9МВБТ, ЭИ572 | 0,28—0,36 | Не более 0,8 | 0,8—1,5 | 18,0—20,0 | 8,0—10,0 | 0,2—0,5 | — |
| 6—40 | 36Х18Н25С2 | 4Х18Н25С2, ЭИ319 | 0,32—0,40 | 2,0—3,0 | Не более 1,5 | 17,0—19,0 | 23,0—26,0 | — | — |
| 6—41 | 55Х20Г9АН4 | 5Х20Н4АГ9, ЭП303 | 0,50—0,60 | Не более 0,45 | 8,0—10,0 | 20,0—22,0 | 3,5—4,5 | — | — |
| 6—42 | 07Х21Г7АН5 | Х21Г7АН5, ЭП222 | Не более 0,07 | Не более 0,7 | 6,0—7,5 | 19,5—21,0 | 5,0—6,0 | — | — |
| 6—43 | 03Х21Н21М4ГБ | 00Х20Н20М4Б, ЭИ35 | Не более 0,03 | Не более 0,6 | 1,8—2,5 | 20,0—22,0 | 20,0—22,0 | — | — |
| 6—44 | 45Х22Н4М3 | 4Х22Н4М3, ЭП48 | 0,40—0,50 | — | 0,85—1,25 | 21,0—23,0 | 4,0—5,0 | — | — |
| 6—45 | 10Х23Н18 | 0Х23Н18 | Не более 0,10 | Не более 1,0 | Не более 2,0 | 22,0—25,0 | 17,0—20,0 | — | — |
| 6—46 | 20Х23Н18 | Х23Н18, ЭИ417 | Не более 0,20 | Не более 1,0 | Не более 2,0 | 22,0—25,0 | 17,0—20,0 | — | — |
| 6—47 | 20Х25Н20С2 | Х25Н20С2, ЭИ283 | Не более 0,20 | 2,0—3,0 | Не более 1,5 | 24,0—27,0 | 18,0—21,0 | — | — |

Grades of steels and alloys — Contents of elements — Продолжение — Continued

| Номер марки Grade No. | Марки сталей и сплавов: Новое обозначение New designation | Старое обозначение Old designation | Содержание элементов, %: Вольфрам Tungsten | Молибден Molybdenum | Ниобий Niobium | Ванадий Vanadium | Железо Iron | Сера Sulphur, не более not more | Фосфор Phosphorous, не более not more | Прочие элементы Other elements | Группы: I | II | III |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 6—35 | 03Х18Н12 | 000Х18Н12 | — | — | — | — | Осн. Base | 0,020 | 0,030 | — | — | — | — |
| 6—36 | 08Х18Н12Т | 0Х18Н12Т | — | — | — | — | Осн. | 0,020 | 0,035 | — | — | — | + |
| 6—37 | 12Х18Н12Т | Х18Н12Т | — | — | — | — | Осн. | 0,020 | 0,035 | — | — | — | + |
| 6—38 | 08Х18Н12Б | 0Х18Н12Б, ЭИ402 | — | — | 10·С—1,1 | — | Осн. | 0,020 | 0,035 | — | — | — | + |
| 6—39 | 31Х19Н9МВБТ | 3Х19Н9МВБТ, ЭИ572 | 1,0—1,5 | 1,0—1,5 | 0,2—0,5 | — | Осн. | 0,020 | 0,035 | — | — | — | + |
| 6—40 | 36Х18Н25С2 | 4Х18Н25С2 | — | — | — | — | Осн. | 0,020 | 0,035 | — | — | + | — |
| 6—41 | 55Х20Г9АН4 | 5Х20Н4АГ9, ЭП303 | — | — | — | — | Осн. | 0,030 | 0,040 | Азот Nitrogen 0,30—0,60 | — | + | + |
| 6—42 | 07Х21Г7АН5 | Х21Г7АН5, ЭП222 | — | — | — | — | Осн. | 0,030 | 0,030 | Азот Nitrogen 0,15—0,25 | + | — | — |
| 6—43 | 03Х21Н21М4ГБ | 00Х20Н20М4Б, ЭИ35 | — | 3,4—3,7 | С·15—0,8 | — | Осн. | 0,020 | 0,030 | — | + | — | — |
| 6—44 | 45Х22Н4М3 | 4Х22Н4М3, ЭП48 | — | 2,5—3,0 | — | — | Осн. | 0,030 | 0,035 | — | — | + | + |
| 6—45 | 10Х23Н18 | 0Х23Н18 | — | — | — | — | Осн. | 0,020 | 0,035 | — | — | + | + |
| 6—46 | 20Х23Н18 | Х23Н18, ЭИ417 | — | — | — | — | Осн. | 0,020 | 0,035 | — | — | + | + |
| 6—47 | 20Х25Н20С2 | Х25Н20С2, ЭИ283 | — | — | — | — | Осн. | 0,020 | 0,035 | — | — | + | — |

ГОСТ 5632—72 Стр. 19

— 2.2 —

Grade of steels and alloys — Content of elements, % — Продолжение — Continued

| Номер марки Grade No. | Марки сталей и сплавов: Новое обозначение New designation | Старое обозначение Old designation | Содержание элементов, %: Углерод Carbon | Кремний Silicon | Марганец Manganese | Хром Chromium | Никель Nickel | Титан Titanium | Алюминий Aluminium |
|---|---|---|---|---|---|---|---|---|---|
| 6—48 | 12Х25Н16Г7АР | Х25Н16Г7АР ЭИ835 | Не более 0,12 | Не более 1,0 | 5,0—7,0 | 23,0—26,0 | 15,0—18,0 | — | — |

* not more than

## СПЛАВЫ ALLOYS

### 7. Сплавы на железоникелевой основе 7 Alloys on iron-nickel base

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 7—1 | ХН35ВТ | ЭИ612 | Не более 0,12 | Не более 0,6 | 1,0—2,0 | 14,0—16,0 | 34,0—38,0 | 1,1—1,5 | — |
| 7—2 | ХН35ВТЮ | ЭИ787 | Не более 0,08 | Не более 0,6 | Не более 0,6 | 14,0—16,0 | 33,0—37,0 | 2,4—3,2 | 0,7—1,4 |
| 7—3 | ХН32Т | Х20Н32Т, ЭП670 | Не более 0,05 | Не более 0,7 | Не более 0,7 | 19,0—22,0 | 30,0—34,0 | 0,25—0,60 | Не более 0,5 |
| 7—4 | ХН38ВТ | ЭИ703 | 0,06—0,12 | Не более 0,8 | Не более 0,7 | 20,0—23,0 | 35,0—39,0 | 0,7—1,2 | Не более 0,5 |
| 7—5 | ХН28ВМАБ | Х21Н28В5М3БАР, ЭП425 | Не более 0,10 | Не более 0,6 | Не более 1,5 | 19,0—22,0 | 25,0—30,0 | — | — |
| 7—6 | 06ХН28МДТ | 0Х23Н28М3Д3Т, ЭИ943 | Не более 0,06 | Не более 0,8 | Не более 0,8 | 22,0—25,0 | 26,0—29,0 | 0,5—0,9 | — |
| 7—7 | 03ХН28МДТ | 030Х23Н28М3Д3Т ЭП516 | Не более 0,03 | Не более 0,8 | Не более 0,8 | 22,0—25,0 | 26,0—29,0 | 0,5—0,9 | — |

Продолжение

| Номер марки Grade No. | Марки сталей и сплавов: Новое обозначение New designation | Старое обозначение Old designation | Содержание элементов, %: Вольфрам Tungsten | Молибден Molybdenum | Ниобий Niobium | Ванадий Vanadium | Железо Iron | Сера Сера not more than | Фосфор Фосфор not more than | Прочие элементы Other elements | Группа: Жаростойкости Heat resistant | Жаропрочности Heat resistant | Коррозионностойкая Corrosion resistant |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 6—48 | 12Х25Н16Г7АР | Х25Н16Г7АР, ЭИ835 | — | — | — | — | Осн. | 0,020 | 0,035 | Азот 0,30—0,45; бор не более 0,010 | — | + | + |

## СПЛАВЫ ALLOYS

7. Сплавы на железоникелевой основе 7. Alloys on iron-nickel base

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7—1 | ХН35ВТ | ЭИ612 | 2,8—3,5 | — | — | — | Осн. | 0,020 | 0,030 | — | — | + | + |
| 7—2 | ХН35ВТЮ | ЭИ787 | 2,8—3,5 | — | — | — | Осн. | 0,020 | 0,030 | Бор не более 0,020 | — | + | + |
| 7—3 | ХН32Т | Х20Н32Т, ЭП670 | — | — | — | — | Осн. | 0,020 | 0,030 | — | — | + | + |
| 7—4 | ХН38ВТ | ЭИ703 | 2,8—3,5 | — | — | — | Осн. | 0,020 | 0,030 | Церий не более 0,05 | — | + | + |
| 7—5 | ХН28ВМАБ | Х21Н28В5М3БАР, ЭП126 | 4,8—6,0 | 2,8—3,5 | 0,7—1,3 | — | Осн. | 0,020 | 0,020 | Бор не более 0,005; азот 0,15—0,30 | — | + | + |
| 7—6 | 06ХН28МДТ | 06Х23Н28М3Д3Т, ЭИ943 | — | 2,5—3,0 | — | — | Осн. | 0,020 | 0,035 | Медь 2,5—3,5 | — | + | + |
| 7—7 | 03ХН28МДТ | 03Х23Н28М3Д3Т, ЭП516 | — | 2,5—3,0 | — | — | Осн. | 0,020 | 0,035 | Медь 2,5—3,5 | — | + | + |

Grades of steels and alloys. Contents of elements, % (Продолжение)

Марки сталей и сплавов. Содержание элементов, %

| Grade No. | Марка New designation | Старое обозначение Old designation | Углерод Carbon | Кремний Silicon | Марганец Manganese | Хром Chromium | Никель Nickel | Титан Titanium | Алюминий Aluminium |
|---|---|---|---|---|---|---|---|---|---|
| 8 Alloys on nickel base | | | 8. Сплавы на никелевой основе | | | | | | |
| 8—1 | Н70МФ | ЭП496 | Не более 0,05 | Не более 0,2 | Не более 0,5 | Не более 0,3 | Осн. | — | — |
| 8—2 | ХН65МВ | 0Х15Н65М16В, ЭП567 | Не более 0,03 | Не более 0,15 | Не более 1,0 | 14,5—16,5 | Осн. | — | — |
| 8—3 | ХН60ВТ | ЭИ868, ХН60В | Не более 0,10 | Не более 0,6 | Не более 0,6 | 23,5—26,5 | Осн. | 0,3—0,7 | Не более 0,6 |
| 8—4 | ХН60Ю | ЭИ559А | Не более 0,10 | Не более 0,8 | Не более 0,3 | 15,0—18,0 | 55,0—58,0 | — | 2,6—3,5 |
| 8—5 | ХН70Ю | ЭИ652 | Не более 0,10 | Не более 0,8 | Не более 0,3 | 26,0—29,0 | Осн. | — | 2,8—3,5 |
| 8—6 | ХН78Т | ЭИ435 | Не более 0,12 | Не более 0,8 | Не более 0,7 | 19,0—22,0 | Осн. | 0,15—0,35 | Не более 0,15 |
| 8—7 | ХН75МБТЮ | ЭИ602 | Не более 0,10 | Не более 0,8 | Не более 0,40 | 19,0—22,0 | Осн. | 0,35—0,75 | 0,35—0,75 |
| 8—8 | ХН80ТБЮ | ЭИ607 | Не более 0,08 | Не более 0,8 | Не более 1,0 | 15,0—18,0 | Осн. | 1,8—2,3 | 0,5—1,0 |
| 8—9 | ХН77ТЮР | ЭИ437Б | Не более 0,07 | Не более 0,6 | Не более 0,40 | 19,0—22,0 | Осн. | 2,4—2,8 | 0,6—1,0 |

Grades of steels and alloys. Contents of elements, % (continued) Продолжение

| Номер марки / Grade No. | Марки сталей и сплавов: Новое обозначение / New designation | Марки сталей и сплавов: Старое обозначение / Old designation | Содержание элементов, %: Вольфрам / Tungsten | Молибден / Molybdenum | Ниобий / Niobium | Тантал / Tantalum | Железо / Iron | Сера / Sulphur, не более / not more than | Фосфор / Phosphorus, не более / not more than | Прочие элементы / Other elements | Группы: аустенитного класса / austenite class | Группы: ферритного класса / ferrite class | Группы: мартенситного класса / martensite class |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8 Alloys on nickel base. | | 8. Сплавы на никелевой основе | | | | | | | | | | | |
| 8—1 | ХН70МФ | ЭП496 | — | 25,0—29,0 | — | — | 1,4—1,7 | Не более 1,0 | 0,020 | 0,020 | — | — | — |
| 8—2 | ХН65МВ | ЭП567 | 3,0—4,5 | 15,0—17,0 | — | — | — | Не более 1,0 | 0,020 | 0,020 | — | + | — |
| 8—3 | ХН60ВТ | ЭИ868 | 13,0—16,0 | — | — | — | — | Не более 4,0 | 0,013 | 0,013 | — | + | ++ |
| 8—4 | ХН60Ю | ЭИ559А | — | — | — | — | — | Ост. | 0,020 | 0,020 | Барий не более 0,10; церий не более 0,03 | — | + | + Barium not more than 0,10 Cerium not more than 0,03 |
| 8—5 | ХН70Ю | ЭИ652 | — | — | — | — | — | Не более 1,0 | 0,012 | 0,015 | Барий не более 0,10; церий не более 0,03 | — | ++ | + Barium not more than 0,10 Cerium not more than 0,03 |
| 8—6 | ХН78Т | ЭИ435 | — | — | — | — | — | Не более 6,0 | 0,012 | 0,015 | — | — | ++ | + |
| 8—7 | ХН75МБТЮ | ЭИ602 | — | 1,8—2,3 | 0,9—1,3 | — | — | Не более 3,0 | 0,012 | 0,020 | — | — | ++ | + |
| 8—8 | ХН60ТБЮ | ЭИ607 | — | — | 1,0—1,5 | — | — | Не более 3,0 | 0,012 | 0,015 | Бор не более 0,01; церий не более 0,02 | — | — | + Boron not more than 0,01 Cerium not more than 0,02 |
| 8—9 | ХН77ТЮР | ЭИ437Б | — | — | — | — | — | Не более 4,0 | 0,007 | 0,015 | | — | — | + |

Grades of steels and alloys — Contents of elements % — (1) Continued. Продолжение

| Класс но. (1) / Номер марки (1) | Марки сталей и сплавов (2): Новое обозначение New designation (5) | Старое обозначение Old designation (6) | Содержание элементов, %: Углерод Carbon (7) | Кремний Silicon (8) | Марганец Manganese (9) | Хром Chromium (10) | Никель Nickel (11) | Титан Titanium (12) | Алюминий Aluminium (13) |
|---|---|---|---|---|---|---|---|---|---|
| 8—10 | ХН70ВМЮТ | ЭИ765 | 0,10—0,16 | Не более 0,6 | Не более 0,5 | 14,0—16,0 | Осн. | 1,0—1,4 | 1,7—2,2 |
| 8—11 | ХН70ВМТЮ | ЭИ617 | Не более 0,12 | Не более 0,6 | Не более 0,5 | 13,0—16,0 | Осн. | 1,8—2,3 | 1,7—2,3 |
| 8—12 | ХН67МВТЮ | ЭП202 | Не более 0,08 | Не более 0,6 | Не более 0,5 | 17,0—20,0 | Осн. | 2,2—2,8 | 1,0—1,5 |
| 8—13 | ХН70МВТЮБ | ЭИ598 | Не более 0,12 | Не более 0,6 | Не более 0,5 | 16,0—19,0 | Осн. | 1,9—2,8 | 1,0—1,7 |
| 8—14 | ХН65ВМТЮ | ЭИ893 | Не более 0,07 | Не более 0,6 | Не более 0,5 | 15,0—17,0 | Осн. | 1,2—1,6 | 1,2—1,6 |
| 8—15 | ХН56ВМТЮ | ЭП199 | Не более 0,10 | Не более 0,6 | Не более 0,5 | 19,0—22,0 | Осн. | 1,1—1,6 | 2,1—2,6 |
| 8—16 | ХН70ВМТЮФ | ЭИ826 | Не более 0,12 | Не более 0,6 | Не более 0,5 | 13,0—16,0 | Осн. | 1,7—2,2 | 2,4—2,9 |

Ср. с ГОСТ 5632-72

Grades of steels and alloys. Contents of elements-%

Продолжение 1 Continued

| Номер марки 5 | Марки сталей и сплавов 6 | | Содержание элементов, % 7 | | | | | | | | Группы 14 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Grade No. | New designation | Old designation | Вольфрам Tungsten 8 | Молибден Molybdenum 9 | Ниобий Niobium 10 | Ванадий Vanadium 11 | Железо Iron 12 | Сера Sulphur 13 | Фосфор Phosphorous 14 | Прочие элементы Other elements 16 | Коррозионностойкая Corrosion resistant | Жаростойкая Oxidation resistant | Жаропрочная Heat resistant |
| | Новое обозначение | Старое обозначение | | | | | | Не более not more than 15 | | | | | |
| 8—10 | ХН70ВМЮТ | ЭИ765 | 4,0—6,0 | 3,0—5,0 | — | — | Не более 3,0 | 0,012 | 0,015 | Бор не более 0,01 | — | — | + |
| 8—11 | ХН70ВМТЮ | ЭИ617 | 5,0—7,0 | 2,0—4,0 | — | 0,10—0,50 | Не более 5,0 | 0,010 | 0,015 | Бор не более 0,02; церий не более 0,02 | — | — | + |
| 8—12 | ХН67МВТЮ | ЭП202 | 4,0—5,0 | 4,0—5,0 | — | — | Не более 4,0 | 0,010 | 0,015 | Бор не более 0,01; церий не более 0,01 | — | — | + |
| 8—13 | ХН70МВТЮБ | ЭИ560 | 2,0—3,5 | 4,0—5,0 | 0,5—1,3 | — | Не более 5,0 | 0,010 | 0,015 | Бор не более 0,01; церий не более 0,01 | — | — | + |
| 8—14 | ХН65ВМТЮ | ЭИ893 | 8,5—10,0 | 3,5—4,5 | — | — | Не более 3,0 | 0,012 | 0,015 | Бор не более 0,01; церий не более 0,02 | — | — | + |
| 8—15 | ХН56ВМТЮ | ЭП199 | 9,0—11,0 | 4,0—6,0 | — | — | Не более 4,0 | 0,015 | 0,015 | Бор не более 0,01; церий не более 0,025 | — | — | + |
| 8—16 | ХН70ВМТЮФ | ЭИ826 | 5,0—7,0 | 2,5—4,0 | — | 0,2—1,0 | Не более 5,0 | 0,009 | 0,015 | Бор не более 0,008 Бор не более 0,015; церий не более 0,020 | — | — | + |

Boron not more than 0.01 Boron not more than 0.02 Cerium not more than 0.02 Cerium not more than 0.01 Boron not more than 0.01 Cerium not more than 0.02 Boron not more than 0.01 Cerium not more than 0.025 Boron not more than 0.01 Boron not more than 0.015 Cerium not more than 0.020

ГОСТ 5632—72 Стр. 25

Grades of steels and alloys — Content of elements, % — Continued — Продолжение

| Grade No. / Номер марки | Марки сталей и сплавов: New designation / Новое обозначение | Old designation / Старое обозначение | Содержание элементов, %: Carbon / Углерод | Silicon / Кремний | Manganese / Марганец | Chromium / Хром | Nickel / Никель | Titanium / Титан | Aluminium / Алюминий |
|---|---|---|---|---|---|---|---|---|---|
| | | | * not more than | | | | | | |
| 8—17 | ХН57МТВЮ | ЭП590 | Не более 0,07 | Не более 0,5 | Не более 0,5 | 17,0—19,0 | Осн. | 2,2—2,8 | 1,0—1,5 |
| 8—18 | ХН55МВЮ | ХН55М6ВЮ, ЭП454 | Не более 0,08 | Не более 0,4 | Не более 0,4 | 9,0—11,0 | Осн. | — | 4,2—5,0 |
| 8—19 | ХН75ВМЮ | ЭИ827 | Не более 0,12 | Не более 0,4 | Не более 0,4 | 9,0—11,0 | Осн. | — | 4,0—4,6 |
| 8—20 | ХН62МВКЮ | ХН62ВМКЮ, ЭИ867 | Не более 0,10 | Не более 0,6 | Не более 0,3 | 8,5—10,5 | Осн. | — | 4,2—4,9 |
| 8—21 | ХН56ВМКЮ | ЭП109 | Не более 0,10 | Не более 0,6 | Не более 0,8 | 8,5—10,5 | Осн. | — | 5,4—6,2 |
| 8—22 | ХН55ВМТКЮ | ЭИ929 | Не более 0,12 | Не более 0,5 | Не более 0,5 | 9,0—12,0 | Осн. | 1,4—2,0 | 3,6—4,5 |

Grades of steels and alloy. Consent of elements % continued

Продолжение

| Grade No. / Номер марки | New designation / Новое обозначение | Old designation / Старое обозначение | Tungsten / Вольфрам | Molybdenum / Молибден | Niobium / Ниобий | Vanadium / Ванадий | Iron / Железо | Sulphur / Сера (Not more than / Не более) | Phosphorous / Фосфор (Not more than / Не более) | Other elements / Прочие элементы (Not more than / Не более) | Groups: Corrosion resistance / коррозионностойкая | Oxidation / жаростойкая | Heat resistant / жаропрочная |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8—17 | ХН57МТВЮ | ЭП590 | 1,5—2,5 | 8,5—10,0 | — | — | 8,0—10,0 | 0,010 | 0,015 | Бор не более 0,005; церий не более 0,01 | | | |
| 8—18 | ХН55МВЮ | ХН55М6ВЮ, ЭП454 | 4,5—5,5 | 5,0—6,5 | — | — | 17,0—20,0 | 0,010 | 0,015 | Бор не более 0,01; церий не более 0,01 | | | |
| 8—19 | ХН75ВМЮ | ЭИ827 | 4,5—5,5 | 5,0—6,5 | Не более 0,70 | Не более 5,0 | | 0,010 | 0,015 | Бор 0,01—0,02; церий не более 0,01 | | | |
| 8—20 | ХН62МВКЮ | ХН62ВМКЮ, ЭИ867 | 4,3—6,0 | 9,0—11,5 | — | — | Не более 4,0 | 0,011 | 0,015 | Кобальт 4,0—6,0; бор не более 0,02; церий не более 0,02 | | | |
| 8—21 | ХН56ВМКЮ | ЭП109 | 6,0—7,5 | 6,5—8,0 | — | — | Не более 1,5 | 0,011 | 0,015 | Кобальт 11,0—13,0, бор не более 0,02; церий не более 0,02 | | | |
| 8—22 | ХН55ВМТКЮ | ЭИ929 | 4,5—6,5 | 4,0—6,0 | — | 0,2—0,8 | Не более 5,0 | 0,010 | 0,015 | Кобальт 12,0—16,0; бор не более 0,02 | | | |

Boron not more than 0.05; cerium not more than 0.01; boron not more than 0.01; cerium not more than 0.01; boron not more than 0.01; cerium not more than 0.01

Cobalt 4.0 - 6.0; boron not more than 0.02; cerium not more than 0.02

Cobalt 11.0-13.0; boron not more than 0.02; cerium not more than 0.02

Cobalt 12.0-16.0; boron not more than 0.02

ORDNANCE FACTORY [illegible]

FINAL TRANSLATION SHEET FOR DRAWINGS

Description of Item :

Drawing No. :

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Date Typed :

Date Verified :

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REMARKS;

1. In the first column of table 1, the number before the hyphan is the serial No. of class of steel (1-6) or type of alloys (7-8) ; number after hyphen are the serial number of grade in each of the class of steel or type of alloys.

2. Chemical elements in the grades of steel are symbolished as follows:

A - Nitrogen ;
- Niobium
B - Tungsten
- Manganese
- Copper;
E - Selenium
M - Molybdenum ✓
H - Nickel ✓
P - Boron ✓
C - Silicon
T - titanium ✓

Φ - Vanadium
- Aluminium
K - Cobalt
X - Chromium
- Zirconium

3. Grade of steel consists of symbols of elements followed by numbers. Numbers standing after the symbols, indicate average content of alloying element in whole numbers, except the elements, present in steel in small quantities. Numbers before the letter symbol indicate average or maximum (in the absence of lower limit) content of carbon in steel in 1/100 th fraction of percentage. It is not allowed to put symbol A (nitrogen) at the end of symbol of grade.

4. Grade of alloys consists of only symbols of elements, excepting nickel, which is followed by numbers, indicating average content in percent.

Contd...18/-

Name of Verifier

Description of Item :

Drawing No. : Date Typed :

Sheet No. : 18 Date Verified :

5. It is permitted to use the earlier established symbols of grades of steels and alloys in the technical papers. Set before incorporation of the present standard. Apply the new nomenclature in the new technical papers.

6. Sign + denotes use of steel for a given purpose, sign (++) denotes specific application, if the steels has several uses.

7. Steels and alloys, obtained by special processes, are additionally designated through a hyphen at the end of the symbol of grade: Ш -Vacuum - arc remelting, Ш-electric slag remelting, Б -vacuum - induction melting.

8. Quantity of boron, barium and cerium, indicated in the table is estimated (calculated) one, it is not determined by chemical analysis (excepting the cases, specially stipulated in standard or specifications).

9. Alloy of grade ХН35ВТ (ЭИ 787) when used in place alloys on nickel base is supplied with sulphur content not exceeding 0.010% phosphorus not exceeding 0.020%.

10. It is allowed to supply steel of grade 55х20Н4АГ 9(ЭИ with Niofium content 0.40 to 1.00% in this case the steel is marked as 55х20Н4АГ 6 (ЭИ 3035)

11. It is permitted to supply alloy of grade ХН38ВТ (ЭИ with niobium content 1.2 to 1.7% in place of titanium; in this case the alloy steel is marked ХН38ВБ (ЭИ 703Б).

12. On agreement between the parties titanium content of upto 0.003% is allowed is steel of grade 03х18Н12-ВИ.

13. On agreement between the parties, it is permitted to specify the chemical composition of steel and alloys.

Name of Verifier

Cont.....1

# ORDNANCE FACTORY PROJECT, HYDERABAD.

## FINAL TRANSLATION SHEET FOR DRAWINGS

Description of Item : ___

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14. On agreement between the parties, alloy of grade ЭИ 893 is supplied with carbon content not exceeding 0.05%.

| DESCRIPTION OF ELEMENT | MAXIMUM PERMISSIABLE CONTENT OF ELEMENTS IN GRADE, % | LIMIT DEVIATIONS (ABSOLUTE) % |
|---|---|---|
| Carbon | Upto 0.10<br>From 0.10 to 0.25<br>Above 0.25 | |
| Titanium | Upto 1.0<br>above 1.0 | |
| Sulphur | With in limits of norms given in Table 1 | |
| Phospherus | " | |
| Nitrogen | " | |
| Vanadium | 2 | |
| Niobium | Upto 5.0<br>Above 5.0 | |
| Molybdenum | Upto 5.0<br>Above 5.0 | |
| Aluminium | Upto 5.0<br>Above 5.0 | |
| Tungsten | Upto 5.0<br>Above 5.0 | |

4.10 Steels and alloys are produced as per the customer requirements: Alloy of grade ХН77ТЮР (ЭИ 437Б) with boron content not more than 0.003% ; in this case the alloy is marked ХН77ТЮ( (ЭИ 437А ); alloys of grades ХН75МБТЮ (ЭИ 602) ХН78Т

Cont.....21/-

Name of Typist : _____ Name of Verifier

ORDNANCE FACTORY PROJECT, HYDERABAD.

FINAL TRANSLATION SHEET FOR DRAWINGS

Description of Item :

Drawing No. :

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( ЭИ 435 ) and ХН77ТЮР ( ЭИ 437Б ) with lower iron content against the norms, given in table 1, which is stipulated by the standards or specification for various types of products.

With curtailed limits of chemical composition, let by the present standard, which is stipulated by the standard or specifications for various types of products.

With limitation of lower limit of manganese content for grades, in which manganese content is set as per the upper limit.

With checking of content of harmful admixtures of ferrous metals: lead, tin antimony, bismuth and arsenic in heat-resistant alloys on nickel base . Methods of check and norms are set as per the agreement between the parties.

With determination of content of residual elements ( titanium, copper, molybdenum, tungsten, vanadium and nickel)

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

RECOMMENDED APPENDIX FOR GOST 5632-72

RECOMMANDATIONS ON APPLICATION OF STEELS AND ALLOYS

TABLE - I

Provisional designation of grades of corrosion - resistant steels and alloys of group - I

| Grade No. | Grades of steels and alloys | | Purpose | Remarks |
|---|---|---|---|---|
| | New designation | Old designation | | |
| 1-12<br>3-2<br>2-4 | 20X13<br>08X13<br>12X18 | 2X13<br>0X13<br>1X13 | Parts with high plasticity, subjected to impact loads (valves of hydraulic press, house hold articles) and also items, subjected to reaction of low-corrosive media (atmospheric precipitations, aqueous solutions of salts of organic acids at room temperature and etc.) | High-corrosion - resistance is achived by heat-treatment (hardening with tempering) and polishing. Steel of grade 08x13 may be used after annealing. |
| 1-17 | 25X13H2 | 2X14H2<br>ЭЙ474 | Same | Possesses better machining quality on machines. |
| 1-13<br>1-14 | 30X13<br>40X13 | 3X13<br>4X13 | Cutting measuring and surgical tools springs, carburator jetpins, house hold items, compression valve plates. | The steel is used after hardening and low tempering with ground and polished surface, possesses increased hardness. |

Continuation

| Grade No. | Grades of steels and alloys: New designation | Grades of steels and alloys: Old designation | Application | Remarks |
|---|---|---|---|---|
| 2 - 5 | 14X17H2 | 1X17H2<br>ЭИ268 | Used as steel with sufficiently satisfactory technological properties in chemical aviation and other industries. | Possesses greater corrosion - resistance after hardening along with high tempering. |
| 1-19 | 95X18 | 95X18<br>ЭИ229 | Ball bearings of high hardness for petroleum industrial equipment, high quality shears bushes and other parts, subjected to high wear and tear. | Steel is used after hardening along with low tempering. |
| 1 - 3 | 12X17 | X17 | House hold items and utensils, food and light industrial equipments.<br>Steel is not recommended for manufacture of welded structures. | Used in annealed state. |
| 3 - 4 | 08X17T | 0X17T<br>ЭИ645 | Recommanded as an alternate for steel of grade 12X18H10T for structural not subjected to reaction of impact loads and at operating temperature not below - 20°C. Used for the same purpose as steel of grade 12x17 incidentally for welded structures too. | Used as an alternate of steel of grades 12x18H T and 12x18H 10T. |

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Continuation

| Grade No. | Grades of steels and alloys: New designation | Grades of steels and alloys: Old designation | Purpose | Remarks |
|---|---|---|---|---|
| 3 - 6 | 15X25T | X25T<br>ЭИ439 | Recommended as an alternate for steel of grade 12x18H10T for welded structures, which are not subjected to reaction of impact loads at operating temperature not below 20°C for working in higher corrosion media in comparision to the media for which steel of grade 08x17T is recommended. Pipes for heat-exchanging equipment, working in corrosion media. | Not recommended for use in the temperature range of 400 to 700°C. |
| 3 - 7 | 15X28 | X28, ЭИ849 | - Same - for joinings with glass | The welded joints are prone to intercrystalline corrosion. |
| 4 - 1 | 20X13H4Г9 | 2X13H4Г9<br>ЭИ100 | Alternate of cold-rolled steel of grade 12X18H9 for strong and light structures joined by precision electric welding (electric spot welding). | Possesses good resistance to atmospheric corrosion. Welded joints, made by other methods are prone to intercrystalline corrosion. |
| 6 - 7 | 10X14AГ15 | X14AГ15<br>ЭИ-13 | - Same - for household items and also washing machines. | - |
| 6 - 5 | 10X14Г14H3 | X14Г14H3<br>ЭИ6 | - Same - | - |
| 4 - 2 | 09X15HBIO | X15H9Ю<br>ЭИ904 | Recommended as high strength steel for items working in atmospheric conditions, acetic and other saline media and also for resilient components | Increased strength is obtained by tempering at temperatures 750° and 180°C |
| 4 - 3 | 07X16H6<br>ЭИ288 | X16H6<br>ЭИ288 | - Same - Does not possess delta-ferrite. | - |

Continuation

| Grade No. | Grades of steels and alloys: New designation | Grades of steels and alloys: Old designation | Purpose | Remarks |
|---|---|---|---|---|
| 4 - 6 | 08Х17Н5М3 | Х17Н5М3<br>ЭИ925 | Used for the same purpose as steel 08х15НВ and for sulphuric acid media. | Steel welds well. |
| 5 - 7 | 08Х18Г8Н2Т | КО-3 | Recommended as alternate for steel of grades 12х18Н10Т and 08Х18Н10Т for manufacture of welding equipment, working in corrosive media, in chemical, food and other industries | Possesses higher strength compared to steel 12х18Н10Т and 08Х18Н10Т. |
| 1 -18 | 20Х17Н2 | 2Х17Н2 | Recommended as high strength steel for high-load parts, working on friction and [illegible] | Possesses high hardness (above HRC 45) |
| 5 - 3 | 08Х22Н6Т | 0Х22Н5Т<br>ЭП 63 | Recommended as alternate of steel of grades 12х18Н10Т and 08х18Н10Т for manufacture of welding equipment in chemical, food and other industries, working at temperature not above 300°С | Possesses higher strength compared to steel 12х18Н10Т and 08Х18Н10Т |
| 5- 4 | 12Х21Н5Т | 1Х21Н5Т<br>ЭИ811 | Used for welded and brazed structures, working in corrosive media. | Possess higher strength compared to steel 08х22Н6Т and welds well compared to steel 08х18Н10Т |
| 5 - 5 | 08Х21Н6М2Т | 0Х21Н$_6$М2Т<br>ЭП 154 | Recommended as alternate of grade 10х17Н13М2Т for manufacture of parts and welded structures, working in high corrosive media: acetic, suphuric and phosphoric acids. | Possesses higher strength compared to steel 10х17Н13М2Т. |

Continuation

| Grade No. | Grades of steels and alloys: New designation | Grades of steels and alloys: Old designation | Purpose | Remarks |
|---|---|---|---|---|
| 6 - 6 | 10Х14Г14Н4Т | Х14Г14Н3Т ЭИ 711 | Recommended as alternate of steel of grade 12x18H10T for manufacture of equipment, working in low corrosive media and temperature upto - 196°C | Possesses satisfactory resistance to intercrystalline corrosion. |
| 6 -19 | 12Х17Г9АН4 | Х17Г9АН4 ЭИ 878 | Used for items, working in atmospheric conditions. Recommended as alternate for steel of grades 12x18H9 and 12x18H10T. | - |
| 6 -18 | 15Х17АГ14 | Х17АГ14 ЭП 213 | Recommended as alternate of steel of grade 12x18H9 for items, working in low corrosive media. Possesses good resistance to atmospheric corrosion. | - |
| 6 - 22 | 10Х17Н13М2Т | Х17Н13М2Т ЭИ448 | Recommended for manufacture of welded structures, working in the conditions, of boiling phosphoric sulphuric, 10% acetic acids and sulphuric acid media. | - |
| 6 - 23 | 10Х17Н13М3Т | Х17Н13М3Т ЭИ 432 | -do- | - |
| 6 - 24 | 08Х17Н15М3Т | 0Х17Н16М3Т ЭИ 580 | Used for the same purpose as steel of grade 10x17H13M2T. | Practically does not contain ferrite phase. Possesses greater resistance to point corrosion than steel of grade 10x17H13M2T in the media, containing ionsof chlorine. |
| 6 - 20 | 03Х17Н14М2 | 00Х17Н13М2 | Used for the same purpose as steel of grades 08x17H15M3T and 10x17H13M2T | Posses higher resistance to intercrystalline and knifeline corrosion than steel of grades 08x17H15M3T and 10x17H13M2T |

Continuation

| Grade No. | Grades of steels and alloys: New designation | Grades of steels and alloys: Old designation | Purpose | Remarks |
|---|---|---|---|---|
| 6-15 | 03X16H15M3 | 00X16H15M3<br>ЭИ 844 | Recommended for the same purpose as steel of grades 08x17H15M3T and 10x17H13M2T | Possesses higher resistance to pointed corrosion than steel 03x17H13M2. |
| 6-16 | 03X16H15M3S | 00X16H15M3S<br>ЭИ 844 | -do- | -do- |
| 5-8 | 15X18H12C4T10 | ЭИ654 | Recommended for welded items, working in air and corrosive media in particular for concentrated nitric acid. | Which is not prone to formation of cracks and corrosion under stress. |
| 6-1 | 08X10H20T2 | 0X10H20T2 | Recommanded as demagnetized steel for manufacture of parts of large dimensions, working in sea water. | - |
| 6-28 | 04X18H10 | 00X18H10<br>ЭИ 842<br>ЭП 550 | Used for the same purpose as steel of grade 08x18H10T and also for working in nitric acid and nitric acid media at higher temperature. | Possesses higher resistance to intercrystalline corrosion. |
| 6-33 | 03X18H11 | 000X18H11 | -do- | -do- And also with increase resistance to knife-line corrosion compared to steel 12x18H12 |
| 6-35 | 03X18H12 | 000X18H12 | -do- And also in Electronic industry | Practically does not contain ferrite phase. |
| 6-25<br>6-29 | 12X18H9<br>08X18H10 | X18H9<br>0X18H10 | Used as cold-rolled sheet and strips of high strength for various parts and structures, welded by spot welding as well as for items subjected to heat-treatment (hardening). | Welded joints, made by other methods, except by spot welding are prone to intercrystalline corrosion. |

| Grade No. | Grades of steels and alloys. New designation | Grades of steels and alloys. Old designation | Purpose | Remarks |
|---|---|---|---|---|
| 6-26 | 17X16H9 | 2X16H9 | Used for the same purpose as steel of grade 12x18H9 | Steel of higher strength than steel of grade 12x18H9 |
| 6-32 | 12X18H10E | X18H10E ЭП 47 | -do- | The same as steel of grade 12x18H9 with respect to resistance to corrosion, but possesses better machining qualities on machines. |
| 6-30 | 08X18H10T | 0X18H10T ЭИ 914 | Recommended for manufacture of welded items working in higher corrosive media than steel of grades 12x18H9T and 12x18H12T | Steel possesses increased resistance to intercrystalline corrosion compared to steel 12x18H9T. |
| 6-31<br>6-27 | 12X18H10T<br>12X18H9T | X18H10T<br>X18H9T | Used for manufacture of welding equipment in various branches of industry. Steel of grade 12x18H9T is recommended, for use as assorted metal and hot-rolled sheet, which is not manufactured on continuous rolling mills. | - |
| 6-34 | 06X18H11 | 0X18H11 ЭИ 684 | Used for the same purpose as steel of grade 08x18H10 with strict limitation content of ferritic phase. | Content of ferritic phase is lower than in steel of grade 08x18H10 |
| 6-36 | 08X15H12T | 0X18H12T | -do- | Steel practically does not contain ferritic phase and possesses higher resistance to intercrystalline corrosion. |

Continuation

| Grade No. | Grades of steels and alloys: New designation | Grades of steels and alloys: Old designation | Purpose | Remarks |
|---|---|---|---|---|
| 6-37 | 12х18Н12Т | Х18Н12Т | Used for the same purpose as steel of grade 09х18Н10 with strict limitation of content of ferritic phase. | Contains less quantity of ferritic ph than steel of grade 12х18Н10Т. |
| 6-38 | 08х18Н12Б | 0Х18Н12Б ЭИ 402 | Used for the same purpose as steel of grade 12х18Н12Т. | Possesses increased resistance to pointed corrosion and a higher stability than steel 12х18Н10Т in nitric acid. |
| 7-6 | 06ХН28МДТ | 0Х23Н28М3Д3Т ЭИ943 | For welded structures, working at temperatures upto 80° in sulphuric acid of various concentrations, excepting 85% acetic and phosphoric acids in acidic and sulphuric acid media. | - |
| 7-7 | 03Н28МДТ | 000Х23Н28М3Д3Т ЭИ516 | -do- | Possesses increased resistance to intercrystalline and pitting corrosion. |
| 1-20 | 09Х16Н4 | 1Х16Н4 ЭП 56 | Used for manufacture of high-strength forged and welded structures and parts, working in contact with corrosive media. | Possesses maximum corrosion-resistance (not hardening with low tempering (upto 40°-80° |

Continuation

| Grade No. | Grades of steels and alloys. New designation | Grades of steels and alloys. Old designation | Purpose | Remarks |
|---|---|---|---|---|
| 6-21 | 08X17H13M2T | 0X17H13M2T | Used for the same purpose as steel of grade 10x17H13M2T | Possesses a higher resistance to general and intercrystalline corrosion than steel of grade 10x17H13M2T |
| 4-4 | 09X17H710 | 0X17H710 | Used for wing-shaped devices, steering and brack ts, working in sea water. | Possesses maximum corrosion-resistance after. |
| 4-5 | 09X17H7101 | 0X17H7101 | Used for ship shafts, working in sea water | -do- |
| 6-42 | 0721⌐7AH5 | X21 7AH5<br>ЭП 222 | For welded items, working at cryogenic temperatures upto - 253°C and in medium corrossive media. | - |
| 6-43 | 03X21H2⓪M4⌐6 | 00X20H20M16<br>ЭИ 35 | Recommended for manufacture of welded structures and units, working under action of hot phosphoric acid mixed with fluoride and sulphite compounds: sulphuric acid of low concentrationsend temperature not above 80°C nitric acid at high temperature (upto 95°C) | Steel welds well. |

Continuation

| Grade No. | Grades of steelsand alloys | | Purpose | Remarks |
|---|---|---|---|---|
| | New designation | Old designation | | |
| B-2 | XH65MB | ЭИ567 | Used for manufacture of welded structures working at high temperatures in hydrochloric, sulphuric, phosphoric acids and other media of reducing characteristic. | - |
| B-1 | H70MΦ | ЭИ496 | Used for manufacture of welded structures, working at high temperatures in hydrochloric, sulphuric, phosphoric acids and other media of reducing characteristic. | Alloy is adequately stable to intercrystalline corrosion in corrosive media. |

## [illegible] OF OXIDATION-RESISTANCE STEELS AND ALLOYS OF GROUP II

| Grade No. | Grades of steels and alloys: New designation | Old designation | Purpose |
|---|---|---|---|
| 1-1 | 15Х5 | Х5 | Pipes |
| 1-5 | 40Х9С2 | 4Х9С2 | Outlet (exhaust) valves of automobiles, tractors and diesel motors pipes for regenerators, heat exchanges gratings. |
| 1-6 | 40Х10С2М | 4Х10С2М ЭИ107 | Motor valves |
| 1-15 | 30Х13Н7С2 | 3Х13Н7С2 ЭИ72 | Valves of automobile motors |
| 2-1 | 15Х6СЮ | Х6СЮ, ЭИ428 | Parts of boiler installations, pipes. |
| 2-4 | 12Х13 | 1Х13 | Turbine parts, pipes, boiler parts |
| 3-1 | 10Х13СЮ | 1Х13СЮ ЭИ404 | Valves of tractor motors, various parts. |
| 3-3 | 12Х17 | Х17 | Heat exchanges, kitchen ware and etc. tubes. |
| 3-4 | 08Х17Т | 0Х17Т ЭИ645 | -do- |
| 3-5 | 15Х18СЮ | Х18СЮ ЭИ484 | Pipes of kyrolysis installations, apparatus, parts. |
| 3-6 | 15Х25Т | Х25Т ЭИ439 | Apparatus, parts, thermocouple case, electrodes of spark plugs, pipes of kyrolysis installations, heat exchanges. |
| 3-7 | 15Х28 | Х28, ЭИ349 | Apparatus, parts, pipes of kyrolysis installations, heat exchangers. |
| 5-1 | 08Х20Н14С2 | 0Х20Н14С2 ЭИ732 | Pipes |
| 5-2 | 20Х20Н14С2 | Х20Н14С2 ЭИ211 | Furnace conveyors, cases for case hardening. |
| 5-6 | 20Х23Н13 | Х23Н13 ЭИ319 | Pipes for pyrolysis of methane, pyrometric pipes. |
| 6-9 | 09Х14Н16Б | ЭИ694 | Precheater pipes and pipelines of super-high-pressure installations. |

| (1) | (2) | (3) | (4) |
|---|---|---|---|
| 6-29<br>6-25 | 08X18H10<br>12X18H9 | 0X18H10<br>X18H9 | Pipes furnace parts, heat-exchangers of mufflers, retorts, branch pipes and collectors of exhaust systems, electrodes of spark plugs. |
| 6-30 | 08X18H10T | 0X18H10T<br>ЗИ914 | -do- |
| 6-31 | 12X18H10T | X18H10T | -do- |
| 6-27 | 12X18H9T | X18H9T | -do- |

TABLE - 2

| Max. recommended temp. of use for long-period (upto 1000 hours) | Starting temp. of oxide formation in air medium °C | Remarks |
|---|---|---|
| 600-650 | - | - |
| - | 850 | Stable in sulphur-containing media. |
| - | 850 | -do- |
| - | 950 | -do- |
| - | 800 | -do- |
| - | 700 | - |
| - | 950 | Stable in sulphur-containing media. |
| - | 900 | - |
| - | 900 | - |
| - | 1050 | Stable in sulphur-containing media. |
| - | 1050 | - |
| - | 1100-1150 | - |
| - | 1000-1050 | Stable in carborizing media. |
| - | 1000-1050 | -do- |
| 1090 | 1050 | Liable to embrittlement due to formation of in the temperature range of 600 to 800°C. |
| 650 | 850 | - |
| 800 | 850 | Unstable in sulphur-containing media. It is used when nickeleless steels can not be used. |
| 800 | 850 | -do- |
| 800 | 850 | -do- |
| 800 | 850 | -do- |

| Grade No. | Grades of steels and alloys: New designation | Grades of steels and alloys: Old designation | Purpose |
|---|---|---|---|
| 6-37 | 12X18H12T | X18H12T | Pipes |
| 6-40 | 36X18H25C2 | 4X18H25C2 | Furnace conveyors and other loaded parts. |
| 6-45 | 10X23H18 | 0X23H18 | Pipes and parts of installations for conversion of methane. pyrolysis, sheets parts. |
| 6-46 | 20X23H18 | X23H18 ЭИ417 | |
| 6-48 | 12X25H16Г7AP | X25H16Г7AP ЭИ835 | Parts of gas pipe systems manufactured from sheets, strips assorted rolled stock. |
| 6-41 ** | 45X22H4M3 | ЭИ303 | Automobile motor valves. |
| 6-47 | 20X25H20C2 | X25H20C2 ЭИ283 | Suspensions and supports in boilers, pipes of electrolysis and kyrolysis installations. |
| 7-4 | XH38BT | ЭИ703 | Parts of gas systems. |
| 7-5 | XH28BMA | ЭИ126 | Sheet parts of turbines. |
| 8-4 | XH60Ю | ЭИ559A | Parts of gas pipeline systems, apparatus. |
| 8-7 | XH75MBTЮ | ЭИ602 | -do- |
| 8-6 | XH78T | ЭИ435 | Parts of gas pipeline systems, standard parts, pipes. |
| 8-3 | XH60BT | ЭИ868 | Sheet parts of engine parts of gas pipeline systems. |
| 8-5 | XH70Ю | ЭИ652 | |

Notes: Starting temperature of oxide formation is given approximately.

PURPOSE OF HEAT RESISTANT STEELS AND ALLOYS OF GROUP III

| Grade No. | Grades of steels and alloys: New designation | Grades of steels and alloys: Old designation | Purpose |
|---|---|---|---|
| 1-2 | 15X5M | X5M | For bodies and internal components of equipment used in petroleum refining industries and cracking pipes, pump parts slide valves.. fasteners. |
| 1-3 | 15X15BФ | X5BФ | |
| 1-4 | 12X8BФ | 1X8BФ | Furnace pipes, apparatus and petroleum industry connections. |
| 1-5 | 40X9C2 | 4X9C2 | Motor valves, fasteners. |
| ** 6-44 | 45X22H4M3 | ЭИ48 | Automobile motor valves. |

Continuation

| Max. recommended temp. of use for long-periods (upto 10000 hrs.) | Starting temp. of oxide formation in air medium C° | Remarks |
|---|---|---|
| 800 | 850 | - |
| 1000 | 1100 | Stable in carbonizing media. |
| 1000 | 1050 | Liable to embrittlement due to formation of phase in the temp. range of 600-800°C. |
| 1050 | 1100 | Recommended for replacement of oxidation-resistant alloys on nickel base. |
| - | 950 | - |
| - | 950 | - |
| 1050 | 1100 | Prone to embrittlement due to formation of phase in the temp. range of 600 to 800°C. |
| 1000 | 1050 | Recommended for substituting oxidation resistant; alloy of grade XH78T. |
| Срок до 1000 800-1000 | | - |
| 1200 | Более 1250 | - |
| 1050 | 1100 | - |
| 1100 | 1150 | Unstable in sulphur-containing media. |
| 1000 | 1100 | - |
| 1200 | Более 1250 | Unstable in sulphur-contai ning media. |

TABLE - 3

| Recommended temp °C | Service period | Starting temp.of oxide formation°C | Remarks |
|---|---|---|---|
| 600 | Very long | 650 | - |
| 500 | Long | 650 | - |
| 650 | Long | 850 | - |

| Grade No. | Grades of steels and alloys: New designation | Grades of steels and alloys: Old designation | Purpose |
|---|---|---|---|
| 1-6 | 40X10C2M | 4X10C2M ЭИ107 | Motor valves, fasteners. |
| 1-10 | 11X11H2B2M | X12H2BMФ ЭИ962 | Compressor discs, blades and other loaded parts. |
| 1-11 | 16X11H2B2M | 2X12H2BMФ ЭИ 962A | -do- |
| 1-12 | 20X13 | 2X13 | Steamturbine blades, valves, bolts and pipes. |
| 2-4 | 12X13 | 1X13 | -do- |
| 1-16 | 13X14H3B2ФР | X14HBФР ЭИ736 | Highly loaded parts, including discs, shafts, tightening bolts, blades and other parts, working in conditions of increased humidity. |
| 1-7 | 15X11MФ | 1X11MФ | Working and guide blades of steam turnines. |
| 2-2 | 15X12BHMФ | 1X12BHMФ ЭИ802 | Rotors, discs, blades, bolts. |
| 6-44 | 45X22H4M3 | ЭП8 | Motor valves. |
| 6-41 | 55X20 9AH4 | ЭП 303 | -do- |
| 2-3 | 18X12BMБФР | 2X12BMБФР ЭИ993 | Forgings, turbine blades. |
| 3-2 | 08X13 | 0X13, ЭИ496 | Steam turbine blades, valves, bolts and pipes. |
| 6-4 | 37X12H8Ф8M | 4X12H8Г3MФ ЭИ481 | Turbine discs. |
| 6-2 | 10X11H20T3P | X12H20T3P ЭИ 696 | Turbine parts (forgings, assorted sheet) |
| 6-3 | 10X11H23T3MP | X12H22T3MP ЭП 33 | Springs and fasteners. |
| 1-20 | 09X16H45 | 1X16H45 ЭИ 56 | Preheater pipesand pipelines of super high pressure installations, short rollings. |
| 6-10 | 09X14H19 2 P | 1X14H19B2 P ЭИ695P | -do- |
| 1-8 | 18X11MH | 2X11MФH, ЭИ 291 | Highly-loaded parts, steam turbine blades parts of valves, forgings of discs and steam and gas turbine rotors. |
| 1-9 | 20X12BHM | 2X12BHM ЭИ428 | -do- |
| 6-9 | 09X14H16 | 1X14H16 ЭИ 694 | Preheater pipesand pipelines of super high pressure installations, sheet rollings. |
| 6-11 | 09X14H19B2 PI | 1X14H18B2S ЭИ P1 ЭИ 726 | Rotors, discs and blades of turbines. |
| 6-8 | 45X14H14B2M | 4X14H14B2M ЭИ 69 | Motor valves, forgings, pipeline parts. |
| 2-5 | 14X17H2 | 1X17H2, ЭИ 268 | Working blades, discs, shafts bushings. |

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Continuation

| (1) | (2) | (3) | (4) |
|---|---|---|---|
| 650 | Long | 850 | - |
| 600 | Long- | 750 | - |
| 600 | Long | 750 | - |
| 500 | Very long | 750 | - |
| 500 | -do- | 750 | - |
| 550 | -do- | 700 | - |
| 550 | -do- | 750 | - |
| 580 | -do- | 750 | - |
| 780 | Long | 950 | - |
| 850 | Long | 950 | - |
| 600 | Very long | 750 | - |
| 500 | -do- | 750 | - |
| 650 | Limited | 750 | - |
| 630 | Long | 750 | - |
| 700 | Limited | 850 | - |
| 700 | -do- | 850 | - |
| 650 | Very long | 850 | - |
| 700 | -do- | 850 | - |
| 600 | -do- | 750 | - |
| 600 | -do- | 750 | - |
| 650 | Very long | 850 | - |
| 700 | -do- | 850 | - |
| 650 | Long | 850 | - |
| 400 | Long | 800 | - |

| Grade No. | Grades of steels and alloys: New designation | Grades of steels and alloys: Old designation | Purpose |
|---|---|---|---|
| 6-12 | 40Х15Н 7 2МС | 4Х15Н7Г7Ф2МС ЭИ388 | Gasturbine blades, fasteners. |
| 6-14 | 08Х15Н24В4ТР | ЭИ164 | Working and guide blades, fasteners, discs of gas turbine. |
| 6-31 | 08Х16Н13М2 | 1Х16Н13М2 ЭИ680 | Forgings for discs and rotors blades, bolts. |
| 6-17 | 09Х16Н15М3 | Х16Н15М3 ЭИ847 | Pipes of preheaters, high pressure pipelines. |
| 6-31 | 12Х18Н10Т | Х18Н10Т | Parts of exhaust systems, pipes, sheet and assorted parts. |
| 6-37 | 12Х18Н12Т | Х18Н12Т | -do- |
| 6-27 | 12Х18Н9Т | Х18Н9Т | -do- |
| 6-39 | 31Х19Н9МВ Т | ЭИ572 | Rotors, discs, bolts. |
| 6-45 | 10Х23Н18 | 0Х23Н18 | Pipes, sheathings (at moderate loads). |
| 6-46 | 20Х23Н18 | Х23Н18,ЭИ417 | Parts of chemical and oil installations, gas pipelines combustion chambers (may be used for heating elements of resistors). |
| 6-48 | 12Х25Н16 7АР | Х25Н16Г7АР ЭИ 835 | Sheet and assorted parts, working at moderate loads (stress). |
| 7-1 | ХН35ВТ | ЭИ 612 | Gas turnine blades, discs, rotors, fasteners. |
| 7-2 | ХН35ВТЮ | ЭИ 787 | Discs and blades of turbines and compressors. |
| 7-4 | ХН38ВТ | ЭИ 703 | Sheet parts working at moderate loads (stress). |
| 8-4 | ХН60Ю | ЭИ 559А | Sheet parts of turbines, working at moderate loads (may be used for heating elementsof resistors.) |
| 8-10 | ХН70ВМ10Т | ЭИ 765 | Blades fasteners. |
| 8-11 | ХН70ВМТЮ | ЭИ 617 | Turbine blades. |
| 7-3 | ХН32Т | ЭИ 670 | Gas pipelines, sheet parts of high temperature oil refining installations. |
| 8-8 | ХН50Т ЮО | ЭИ607 | Blades fasteners of turbines. |
| 8-13 | ХН70МВТЮ | ЭИ 598 | Turbine blades. |

| (1) | (2) | (3) | (4) |
|---|---|---|---|
| 650 | Limited | 800 | - |
| 700 | Very long | 900 | - |
| 600 | -do- | 850 | - |
| 350 | -do- | 850 | - |
| 600 | -do- | 850 | - |
| 600 | -do- | 850 | More stable in operation compened to 12x18H10T. |
| 600 | -do- | 850 | - |
| 600 | -do- | 800 | - |
| 1000 | Long | 1050 | Liable to embrittlement due to formation of phase. in temperature range of 600 to 800°C. |
| 1000 | -do- | 1050 | -do- |
| 950 | Limited | 1050-1100 | Substitutes alloys XH75M T ( 602) and XH78T ( 435) |
| 650 | Very long | 850-900 | - |
| 750 | Limited | 900 | Can replace alloys 437A and 437 |
| 950 | -do- | 1050 | Replaces alloy XH78T. |
| 1100 | -do- | 1200 | - |
| 750 | Very long | 1000 | - |
| 800 | Long | 1000 | - |
| 850 | -do- | 1000 | - |
| 850 | Very long | 1000 | - |
| 700 | -do- | 1050 | - |
| 850 | Limited | 1000 | - |

| Grade No. | Grades of steels and alloys: New Designation | Grades of steels and alloys: Old designation | Purpose |
|---|---|---|---|
| 8-5 | XH70Ю | 652 | Sheet parts. Gas pipelines, working at moderate loads (may be used for heating components of resistor). |
| 8-6 | XH78T | 435 | Blue tubes. |
| 8-12 | XH67MBTЮ | 202 | Blades, bodies, discs, sheet parts of turbines. |
| -7 | XH75M TЮ | 602 | Turbine sheet parts. |
| -9 | XH77TЮP | 437 | Discs, turbine blades. |
| 8-3 | XH60BT | 868 | Turbine sheet parts. |
| 8-17 | XH57MTBЮ | 590 | Blades bodies and other turbin pa |
| 8-18 | XH55MBЮ | 454 | Blades, turbine discs. |
| 8-20 | XH62MBKЮ | 867 | -do- |
| 8-14 | XH65BMTЮ | 893 | Working and guide blades fasten parts of gas turbine. |
| 8-15 | XH56BMTЮ | 199 | High load parts, pipe unions, fl sheet parts. |
| 8-16 | XH70BMTЮ | 826 | Turbine blades. |
| 8-19 | XH75BMЮ | 827 | -do- |
| 8-21 | XH56BMKЮ | 109 | -do- |
| 8-22 | XH55BMTФKЮ | 929 | -do- |

NOTE:

1. Service life of a part upto 100 hours comes under short-term service period, under limited service-period, from 100 to 1000 hours, under long service period from 1000 to 10000 hours (in some particular cases upto 20,000 hours) under very long service period - the time is considerably more than 100000 hours (usually from 50000 to 100000 hours).
2. The recommended operating temperature service period, starting timperature of oxide formation are approximate.

| (1) | (2) | (3) | (4) |
|---|---|---|---|
| 1100 | Limited | 1200 | - |
| 1000 | -do- | 1100 | - |
| 800 | Long | 1000 | - |
| 850 | Limited | 1000 | - |
| 950 | -do- | 1050 | - |
| 750 | -do- | 1050 | - |
| 1000 | -do- | 1100 | - |
| 850 | Short period | 1000 | - |
| 900 | -do- | 1080 | - |
| 900 | Limited | 1080 | - |
| 800 | Long | 1080 | - |
| 800 | Very long | 1000 | - |
| 800 | Limited | 1050 | - |
| 850 | Long | 1050 | - |
| 850 | Limited | 1080 | - |
| 800 | Long | 1080 | - |
| 950 | Limited | 1050 | - |
| 950 | Limited | 1050 | - |