RED OCTOBER

PRODUCTION CATALOGUE

Steel Works «Red October» has always been, and remains, a flagship of iron and steel industry. The plant is one of the largest manufacturers of quality rolled products made of special purpose steels intended for automotive and aviation industries as well as chemical, petroleum, energy engineering and oil-and-gas industries in our country.

Steel Works «Red October» had been established on April 30, 1897 by the French joint-stock Ural-Volga Steel Company on the skirts of Tsaritsyn, and in November 1898, the first open-hearth furnace has been put into operation. By 1941, ramping up its manufacturing capacity and developing new steel grades, the plant became the only metallurgical giant in the South of the country producing 9% of all steel made for defense industry of the USSR. In spite of the fact that the plant became the scene of brutal and bloody fighting in the Great Patriotic War and had been completely stopped on August 23, 1942, already by 1949 its production had surpassed prewar levels.

In the postwar period, the plant obtained its current structure and final specialization in production. The main production facilities were put into operation in the 50's – 70's. By 1986, the plant was possessed of production capacity able to provide 2 million tons of liquid steel and 1.5 million tons of rolled products per year. Its share in quality steel production was 12% in the country including 14% of stainless steels and 52% of ESR steels. Starting from 1999, the plant ramps up its production together with improvement of manufacturing facilities and development of new products.

Going forward in accordance with a new strategy, the plant achieved significant economic results and went back to the former stability.

In 2018, Steel Works «Red October» celebrated its 120th anniversary.

Today, Steel Works «Red October» produces about 900 of unique grades of special purpose steel and over 500 shapes of rolled products. Its share in the Russian market of stainless steel production is about 30% and the products are exported to 30 countries worldwide.

Applicable quality management system (QMS) is in accordance with ISO 9001:2015

Steel Works «Red October» have the following certificates:

- Recognition Certificate for Manufacturer of rolled bars products of hull structural steel of normal and high strength, rolled products of stainless steel issued by the Russian Maritime Register of Shipping;
- Approval of Manufacturer Certificate of round bars for machinery application made of carbon, carbon-manganese and austenitic stainless steels issued by the Classification Society Det Norske Veritas (Norway);
- Approval of Material Manufacturers issued by the Classification Society Germanischer Lloyd (Germany).

In addition, Steel Works «Red October» has extended the certificate of compliance with AD 2000-Merkblatt W0 and Directive 2014/68/EU.This document issued by the Certification Body TÜV SÜD certifies that the enterprise has facilities permitting appropriate manufacturing and inspection in compliance with the current technical standards and operates the quality system which guarantees that manufacturing and inspection of the products are in conformity with the technical rules and standards.

Steel Works «Red October» has developed and systematically realizes the longterm environmental program implemented in accordance with ISO 14001:2015.

Starting from 2012, Steel Works «Red October» continues the step-by-step reequipping and improvement in manufacturing processes.

Now, Steel Works «Red October» is the only manufacturer of special purpose steels in the South Federal District and dominates this market sector in Russia and the near abroad countries.

Type of product	Steel grade	Notes
1	2	3
Plate 5-20mm sheared edge 21-100mm Mill edge	304, X5CrNi1810(1.4301), X45Cr13(1.3541), AISI 1020-AISI 1060, SAE 1020-SAE1060, 18NiCrMo5, CK15, CK35, C45, C35, St37.2, CK60, DD11, C15mod, 060A17, 070M20, 20MnCrS5, 20MnCr5, S335JO, St52.3, F130DEN, A350 (LF2), S335J2G3, A105, S275JR, 150M28, 150M36, SAE6150, 420, 100Cr6, 1.3505, H13, 9260, Z12C13.	AISI 310, AISI 321, 316L, 304L, 316, 304
Bloom Sq. 200-360 мм	304L, X2CrNi189(1.4306), 304, X5CrNi1810(1.4301), X45Cr13(1.3541), X20Cr13(1.4021). T31502(O2), 4140, 4142, 709M40, 4340, 817M40, 40CrMo4, 16MnCr5, 30CrNiMo8, 35CrNiMo6, 39CrNiMo3, 18NiCrMo5, S335JO, St52.3, F130DEN, A350 (LF2), S335J2G3, 100Cr6, 1.3505, A105, S275JR, S235JR, S235JRG2, 150M28, 150M36, 38CrMoAl, SNCM439, AISI 1020-AISI 1060, SAE 1020-SAE1060, CK15, CK35, C45, C35, St37.2, CK60, DD11, C15mod, 060A17, 070M20.	
Round bars peeled Dia. 65-330mm peeled	4140, 4142, 709M40, 4340, 817M40, 18NiCrMo5, S335JO, St52.3, F130DEN, A350 (LF2), S335J2G3, CK15, CK35, C45, C35, St37.2, CK60, DD11, C15mod, 060A17, 070M20, 30CrNiMo8, 35CrNiMo6, 39CrNiMo3, 1.3505, A105, S275JR, AISI 1020-AISI 1060, SAE 1020-SAE1060, S235JR, S235JRG2, 150M28, 150M36, 38CrMoAl, SNCM439.	
Dia. 65-200mm peeled	T31502(O2), X45Cr13(1.3541), X20Cr13(1.4021), 1.2344, 1.2343, H13, SK2, 1.2714, 1.2842, 1.2311, 1.2328, 100Cr6.	
Dia. 70-200mm peeled	304L, X2CrNi189(1.4306), 304, X5CrNi1810(1.4301)	

For info: in the table1 the type of steel grades, delivered in its range size, is indicated.

DIMENSIONS OF BLOOM

Side, mm	Bending corner radius, R	Side tolerances, mm
180	25	+/-5
190 200 210 220	25 30 30 35	+/-6
240 250 260	35 35 40	+/-7
280 300	40 45	+/-8
320 360	50 50	+/-10

Reducing and enlarging bending corner radiuse is not considered as defects.

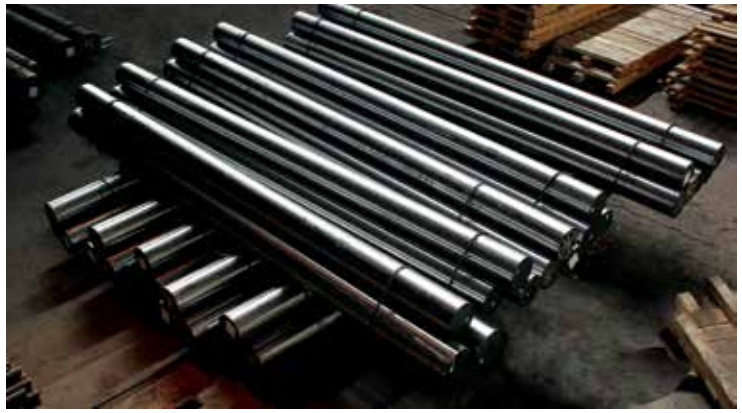
DIMENSIONS OF BILLET

Side, mm	Bending corner radius, R	Side tolerances, mm
80	12	+/-2,0
100	15	+/-2,4
120 125	18	+/-2,7
130 140 150	21	+/-3,2
160 180	25	+/-3,9

It is possible to produce other sizes while agreement if the order is not less then 1000MT and the requirements of quality are the same.

Surface quality of blooms and billets		
Surface quality	Surface characteristic Surface must be free from:	Permissible surface defects
Without etching with defects removed	Seams, tears, cracks, folds	Marks, ripples, scratches in depth not exceeding 1/2 of the sum of thickness limiting deviations, rolled impurities and blisters in depth not more than 1,0 mm for billets in section 100 mm and over and 0,5 mm – for billets of smaller section.

HOT ROLLED PEELED BARS



Diameter, mm	65	65 - 100	105- 200	201- 320
Diameter tolerances, mm	-0/+1,0	-0/+1,0	-0/+2,0	-0/+3,0

Notes:

1. Bars of intermediate diameters are produced with tolerance as smaller sizes.

2. Out-of-roundness shall not exceed 50% of the sum of limiting deviations. The curvature of bars is not exceeded 3 mm for 1 m of length. The cutting angle of bars up to 30 mm in diameter is not regulated, over 30 up to 100 mm in diameter it shall be 5 mm and 0,05d for the bars 110-320 mm in diameter.

3. Surface quality. After peeling the removal of defects by abrasive grinding is permissible. Peeling and further grinding shall not exceed the diameter tolerances. The defects of mechanical origin (handling marks, hairlines, scratches and etc.) with depth not exceeding 0,3 mm for diameter up to 40 mm and 0,5 mm for diameter over 40 mm are permissible without grinding.

Technical requirements

The verification of macrostructure of round bars up to 260 mm in diameter is carried out in its section and over 260 mm in diameter using the reforged squares 140 mm.

LENGTH RANGE OF PEELED BARS

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Diameter,		Dia. tolerance, mm	Length, mm	Optimal length, mm
inch	mm			
3,0	76,2	+1,19/ – 0	5000 – 6200	5400 – 6200
3,25	82,55		5000 – 6200	5700 – 6200
3,50	88,9		5000 – 6200	5200 – 6200
3,75	95,25	+1,58/ – 0	5000 – 6200	5500 – 6200
4,0	101,6		4800 – 6200	4900 – 6200
4,25	107,95		4800 – 6200	4900 – 6200
4,50	114,30		4800 – 6200	4900 – 6200
4,75	120,65	+1,98/ – 0	4800 – 6200	4900 – 6200
5,0	127,0		4800 – 6200	4900 – 6200
5,25	133,35		4800 – 6200	4900 – 6200
5,50	139,70		4800 – 6200	4900 – 6300
5,75	146,05	+3,175/ – 0	4800-6200	4900 – 6200
6,0	152,4		4800-6200	4900 – 6200
6,25	158,75		4800-6200	4900 – 6200
6,50	165,10		4800-6200	4900 – 6200
6,75	171,45	+ 3,968/ – 0	4800-6200	4900 – 6200
7,0	177,80		4800-6200	4900 – 6200
7,25	184,15		4800-6200	4900 – 6200
7,50	190,50		4800-6200	4900 – 6200
7,75	196,85		4800-6200	4900 – 6200

Diameter,		Dia. tolerance, mm	Length, mm	Optimal length, mm
inch	mm			
8,0	203,2	+ 3,968/ – 0	4800-6200	4900 – 6200
8,25	209,55	+3,968/ – 0	4800-6200	4900 – 6200
8,50	215,90	+4,76/ – 0	4800-6200	4900-6200
8,75	222,25		4800-6200	4900-6200
9,0	228,6		4600-6200	4900-6200
9,25	234,95		4600-6200	4500-6200
9,50	241,3		4000-6200	4000-6200
9,75	247,65	+6,35/ – 0	4000 – 6200	4900 – 6200
10,0	254,00		4800 – 6200	4900 – 6200
10,25	260,35	+7,93/ – 0	4500 – 6200	4900 – 6200
10,50	266,70		4600 – 6200	4900 – 6200
10,75	273,05		4600 – 6200	4600 – 6200
11,0	279,40		4600 – 6200	4600 – 6200
11,25	285,75		4000 – 6200	4300 – 6200
11,50	292,10		3500 – 6200	4000 – 6200
11,75	298,45		3500 – 6200	3800 – 6200
12,0	304,80		3500 – 6200	3800 – 6200
12,25	311,15		3500 – 6200	3500 – 6200
12,50	317,50		3500 – 6200	3500 – 6200

LENGTH RANGE OF HOT-ROLLED/PEELED ROUNDS

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Hot-rolled/peeled rounds, mm	Length , m	Rational length (rolling to equal parts), m
85 / 76	5000-6200	5,46 (7e.p.)
90 / 82		5,68 (6e.p.)
95 / 88		5,20 (6e.p.)
100 / 95		5,5 (5 e.p.)
110 / 101,6	4800-6200	5,8 (4 e.p.)
115 / 107,9		5,66(6e.p.)
120 / 114		5,1 (6e.p.)
125 / 120,6		5,6 (5e.p.)
135 / 127,0		6,00(4e.p.)
140 / 133,3		5,5 (4e.p.)
145 / 139,7		5,2 (4e.p.)
155 / 146		6,10 (3e.p.)
165 / 152	4800-6200	5,46 (3e.p.)
170 / 158		5,0 (3e.p.)
175 / 165	4600-6200	4,5 (3e.p.)
180 / 171	4800-6200	6,2 (2e.p.)
190 / 177		6,10 (2e.p.)
195 / 184		5,8 (2e.p.)
200 / 190		5,4 (2e.p.)
210 / 196		6,3 (3e.p.)

Hot-rolled/peeled rounds, mm	Length , m	Rational length (rolling to equal parts), m
220 / 203	4800-6200	6,0 (3e.p.)
220 / 209		6,0 (3e.p.)
225 / 215,9		5,7 (3e.p.)
240 / 222,2		5,1 (3e.p.)
240 / 228,6	4600-6200	5,1 (3e.p.)
250 / 234,9		4,6 (3e.p.)
250 / 241	4000-6200	4,6 (3e.p.)
260 / 247		6,2 (2e.p.)
270 / 254	4800-6200	6,01 (2e.p.)
270 / 260	4500-6200	6,01 (2e.p.)
280 / 266	4600-6200	5,55 (2e.p.)
290 / 273		5,2 (2e.p.)
290 / 279		5,2 (2e.p.)
300 / 285	4000-6200	5,2 (2e.p)
310 / 292	3500-6200	4,56(2e.p.)
310 / 298		4,56(2e.p.)
315 / 304		4,42(2e.p.)
330 / 311	3500-6200	4,0 (2e.p.)
330 / 317		4,0 (2e.p.)

LENGTH RANGE OF PEELED BARS

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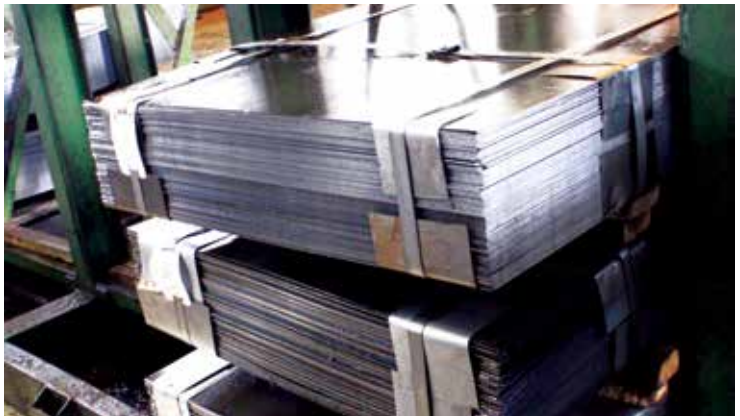
№	Shape	Dimensions of hot-rolled/ peeled bar, mm	Mass of 1 running meter, kg	Approximate whole length before cutting, m	Optimal cutting for peeling, m
1	round	350/340	755	7,15	3,58
2	round	340/330	712	7,58	3,79
3	round	330/320	671	8,05	4,02
4	round	320/315	631	8,56	4,28
5	round	320/310	631	8,56	4,28
6	round	310/300	592	9,12	4,56
7	round	300/290	555	9,74	4,87
8	round	290/280	518	10,42	5,21
9	round	280/270	483	11,18	5,59
10	round	280/265	483	11,18	5,59
11	round	270/260	449	12,02	6,01
12	round	260/250	417	12,96	4,30
13	round	250/240	385	14,02	4,67
14	round	250/235	385	14,02	4,67
15	round	240/230	355	15,21	5,07
16	round	235/225	340	15,87	5,29
17	round	230/220	326	16,57	5,52
18	round	220/210	298	18,11	6,04
19	round	220/205	298	18,11	6,04
20	round	210/200	272	19,87	4,97
21	round	205/195	259	20,82	5,21
22	round	200/190	246	10,95	5,48
23	round	190/185	222	12,14	6,07
24	round	185/180	211	12,80	4,30
25	round	180/175	200	13,52	4,50
26	round	175/170	189	14,31	4,77

№	Shape	Dimensions of hot-rolled/ peeled bar, mm	Mass of 1 running meter, kg	Approximate whole length before cutting, m	Optimal cutting for peeling, m
27	round	170/165	178	15,16	5,05
28	round	165/160	168	16,09	5,36
29	round	160/155	158	17,12	5,71
30	round	155/150	148	18,24	6,08
31	round	150/145	139	19,47	4,87
32	round	145/140	130	20,84	5,21
33	round	140/135	121	22,35	5,59
34	round	135/130	112	24,04	6,01
35	round	130/125	104	25,93	5,19
36	round	125/120	96	28,04	5,61
37	round	120/115	89	30,43	6,09
38	round	115/110	81	33,13	5,52
39	round	110/105	75	22,80	4,56
40	round	105/100	68	25,02	5,00
41	round	100/95	62	27,59	5,52
42	round	95/90	56	30,57	6,11
43	round	90/85	50	34,06	5,68
44	round	85/80	45	38,18	5,45
45	round	80/75	39	43,11	5,39
46	round	75/70	35	49,04	6,13
47	round	70/68	30	56,30	5,63
48	round	68/65	28	45,62	4,56
49	round	65/63	26	49,93	4,99
50	round	63/60	24	53,15	5,32
51	round	60/58	22	58,60	5,86
52	round	58/56	21	62,71	5,23
53	round	56/54	19	67,27	5,61
54	round	54/52	18	72,35	6,03

CAPABILITY FOR ROLLING OF CARBON, STRUCTURAL AND STAINLESS PLATES ON MILL “2000”



Dimensions of plates		
Thickness, mm	Width, mm	Length, mm
CARBON, STRUCTURAL STEELS		
4	1200	5000-6000
4	1400	5500-6000
5	1200	5000-6000
5	1400	4500-5000
5	1400	5000-6000
5	1500	4200-4600
5	1500	4500-5000
5,5	1200	4000-4500
5,5	1200	5000-6000
5,5	1400	4000-4500
5,5	1400	4500-5000
5,5	1500	3800-4300
6	1200	4000-4500
6	1200	5000-5500
6	1400	4000-4500
6	1500	6000
6,5	1200	4200-4400
6,5	1400	5600
6,5	1500	5300
7	1200	3200-3500
7	1200	4000-4500
7	1200	4800-5300
7	1400	5000-6000
7	1500	5000-5500
8	1200	3600-4500
8	1400	3000-3500
8	1500	6000
9	1500	6000
10	1200	2500-3000

Dimensions of plates		
Thickness, mm	Width, mm	Length, mm
CARBON, STRUCTURAL STEELS		
10	1200	2500-3000
10	1200	3600-4300
10	1400	4800-5000
10	1500	6000
12	1200	3000-3500
12	1400	5200-5600
12	1500	6000
14	1200	3100-3500
14	1400	4600-5300
14	1500	6000
14	1200	4600-5500
14	1500	6000
15	1500	6000
16	1200	4600-5500
16	1400	4000-5000
16	1500	6000
18	1200	4100-4800
18	1400	3000-4100
18	1500	6000
20	1200	3200-3700
20	1200	3700-4500
20	1400	3000-3700
20	1500	6000
24	1500	5000-6000
25	1500	5000-6000
30	1200	2800-3500
40	1200	2100-2600
50	1000	3500-4000
60	800-1000	2100-3300
70	700-800	2000-2500

Dimensions of plates		
Thickness, mm	Width, mm	Length, mm
CARBON, STRUCTURAL STEELS		
80	600-700	2000-2500
90	700	2000-2400
STAINLESS STEELS		
5	1200	4200-4700
5	1500	5500-6000
6	1200	5500-6000
6	1400	5500-6000
6	1500	5000-6000
8	1200	4100-4500
8	1400	5500-6000
8	1500	5500-6000
9	1500	5000-6000
10	1400	5500-6000
10	1500	5500-6000
12	1200-1400	5000-6000
12	1500	5500-6000
14	1200	5000-5500
14	1400	4000-4500
14	1500	5000-5500
15	1500	4000-4500
16	1200	4200-4700
16	1400	3500-4000
16	1500	4000-4500
18	1200	3500-4000
18	1400	3000-3500
20	1200	3200-3500
20	1400	2700-3100
20	1500	3500-4000
22	1500	3000-3500

Dimensions of plates		
Thickness, mm	**Width, mm**	**Length, mm**
STAINLESS STEELS		
24	1200-1300	3500-4000
25	1200-1300	3500-4000
30	1000	2800-3500
30	1100-1200	3000-3500
36	1000-1100	2700-3200
40	1000	2200-2500
40	1000-1100	2500-3000
50	900-1000	2200-2500
60	900-1000	2000-2400
70	700-800	1800-2200
70	800-900	1900-2200
80	700-800	1900-2200

Note:

1. Capability to roll plates in fi xed dimensions: 6-20x1500x6000 mm, 1 inch = 25,4 mm.

2. Tolerances for plates of 5-35 mm in thickness.

Thickness of rolled section (plate), mm	Limiting deviations in thickness for width given from 1000 up to 1500 mm	
	Increased accuracy of rolling	Normal accuracy of rolling
5,0 – 7,5	not delivered	+0,25 -0,60
7,5 – 10,0	+0,20 -0,80	+0,30 -0,80
10,0 – 12,0		
12,0 – 25,0	not delivered	+0,20 -0,80
25,0 – 30,0	not delivered	+0,20 -0,90
30,0 – 35,0	not delivered	+0,30 -1,10

3. Tolerances for plates 40 mm and over +3,0/-1,0 mm in thickness.

4. Plates are delivered with normal flat-ness which is in conformity to the standard not more than 12 mm per 1 m of length.

5. Tolerances on width

Width of plate, mm	Thickness of plate, mm	Size tolerances for width of plate, mm
Up to 1500	≥3,9 ≤ 16	+10
All widths	≥16 ≤ 60	+25
	≥60 ≤ 100	+50

6. Length tolerance

Length of plates, mm	Thickness of plate, mm	Size tolerances for length of plate, mm
Up to 2000>2000 till 6000	>3,9 to 16	+10 +25
Up to 3000>3000 till 6000	>16 to 60	+15 +25
All lengths	>60 to 100	+50

SURFACE QUALITY OF PLATES

STAINLESS STEEL ACCORDING TO GOST 7350-77			
Condition of material	**Surface characteristic**	**Permissible surface defects**	**Maximum depth of defect location**
Hot-rolled, heat treated, etched or after bright annealing	Mat silver or bright, free from blisters, bulges, skins, cracks, calx and overpickling	Ripples, scratches, marks, hairlines, rolled marks and voids	1/2 of the sum of limit deviations for thickness
Hot-rolled, heat treated, etched or after bright annealing	Mat silver or bright, free from blisters, bulges, skins, cracks, calx and overpickling	Ripples, scratches, marks, hairlines, rolled marks and voids	The sum of limit deviations for thickness

CARBON STEEL		
Condition of material	**Permissible surface defects**	**Maximum depth of defect location**
Hot-rolled, heat treated or non-treated	Ripples, hairlines and other local defects which do not exceed the size tolerances	1/2 of the sum of limit deviations for thickness

The verification of macrostructure is carried out on cutting section.

ADDITIONAL REQUIREMENTS

Upon customer's request, the rolled products may be supplied in heat treated condition (annealing (+A), (FP-annealing (+FP), TH-annealing (+TH), temper annealing), normalization (+N), quenching and tempering (+QT), quenching and tempering with stress relieving (+QT+SR) or without heat treatment.
Round bars with diameter from 70 to 340 mm may be supplied with ground surface (Ra ≤ 6,3 μm).

Steel grade	Standard	Chemical Composition, %											Equivalent GOST
		C	Si	Mn	P max	S max	Cr	Mo	Ni	V	N	Other	
STAINLESS STEEL													
316L 1.4404 X2CrNiMo17-12-2	ASTM A276 DIN17440 DIN EN10272	max 0,03	max 1,0	max 2,0	0,045	0,03	16,5-18,5	2,0-2,5	10,0-13,0		max 0,11		03X17H12M2 (GOST 5632-2014)
304L 1.4307 1.4301	ASTM A479 DIN17440 DIN EN 10272	max 0,03	max 1,0	max 2,0	0,04	0,03	18,0-19,5		8,0-10,0		max 0,10		03X18H10 (GOST 5632-2014)
304	ASTM A276	max 0,08	max 1,0	max 2,0	0,045	0,03	18,0-19,0		8,0-10,5		max 0,10		08X18H10 (GOST 5632-2014)
X39Cr13 1.4031	DIN EN 10088-3	0,36-0,42	max 1,0	max 1,0	0,040	0,030	12,5-14,5						40X13 (GOST 5632-2014)
420 X20Cr13	ASTM A276 DIN17440 DIN EN 10088-3	0,16-0,25	max 1,0	max 1,0 max 1,5	0,040	0,030	12,0-14,0						20X13 (GOST 5632-2014)

Steel grade	Standard	Chemical Composition, %											Equivalent GOST
		C	Si	Mn	P max	S max	Cr	Mo	Ni	V	N	Other	
TOOL STEEL													
H11 1.2343	AISI DIN17350	0,33-0,43	0,80-1,25	0,20-0,60	0,030	0,030	4,75-5,50	1,1-1,6		0,3-0,6			4Х5МФС (GOST 5950-2000)
H13 1.2344	AISI DIN17350	0,32-0,45	0,80-1,25	0,20-0,60	0,030	0,030	4,75-5,50	1,1-1,75		0,8-1,20			4Х5МФ1С (GOST 5950-2000)
1.2713	DIN17350	0,5-0,6	0,1-0,4	0,65-0,.95	0,030	0,030	0,6-0,8	0,25-0,35	1,5-1,8	0,07- 0,12			5ХН2МФ
1.1525	DIN17350	0,75-0,85	0,1-0,25	0,1-0,25	0,020	0,020							У8А (GOST 1435-99) 9Г2Ф (GOST 5950-2000)
02 1.2842	DIN17350	0,85-0,95	max 0,50	1,40-1,80	0,030	0,030	max 0,50	max 0,30		0,10- 0,30			
CARBON STEEL													
1018	ASTM A29/ A29M	0,15-0,20	Upon agreement	0,60-0,90	0,040	0,050							15 (GOST 1050-2013)
1020	ASTM A29/ A29M	0,18-0,23	Upon agreement	0,30-0,60	0,040	0,050							20 (GOST 1050-2013)
1040	ASTM A29/ A29M	0,37-0,44	Upon agreement	0,60-0,90	0,040	0,050							40 (GOST 1050-2013)
1045	ASTM A29/ A29M	0,43-0,50	Upon agreement	0,60-0,90	0,040	0,050							45 (GOST 1050-2013)
S25C	JIS G4051	0,22-0,28	0,15-0,35	0,30-0,60	0,030	0,035	max 0,20		max 0,20				25 (GOST 1050-2013)
S45C	JIS G4051	0,42-0,48	0,15-0,35	0,60-0,90	0,030	0,035	max 0,20		max 0,20				45 (GOST 1050-2013)

Steel grade	Standard	Chemical Composition, %											Equivalent GOST
		C	Si	Mn	P max	S max	Cr	Mo	Ni	V	N	Other	
CARBON STEEL													
25C(S25C)	JIS G4051	0,22-0,28	0,15-0,35	0,30-0,60	0,030	0,035	max 0,29		max 0,29				25 (GOST 1050-2013)
45C(S45C)	JIS G4051	0,42-0,48	0,15-0,35	0,60-0,90	0,030	0,035	max 0,29		max 0,29				45 (GOST 1050-2013)
St50-2	DIN 17100	max 0,30	max 0,30	max 0,20-0,50	0,050	0,050							30 (GOST 1050-2013)
St37-2	DIN 17100	max 0,22	max 0,30	max 0,20-0,50	0,050	0,050							15 (GOST 1050-2013)
C35	DIN 17200 DIN EN 10083-2	0,32-0,39 0,32-0,39	0,15-0,35 max 0,40	0,50-0,80 0,50-0,80	0,045	0,045							35 (GOST 1050-2013)
C45	DIN 17200 DIN EN 10083-2	0,42-0,50	0,15-0,35	0,50-0,80	0,045	0,045							45 (GOST 1050-2013)
CK15	DIN 17200	0,12-0,18	0,15-0,35	0,30-0,60	0,035	0,035							15 (GOST 1050-2013)
CK35	DIN 17200	0,32-0,39	max 0,40	0,50-0,80	0,035	0,030							35 (GOST 1050-2013)
CK45	DIN 17200	0,42-0,50	max 0,40	0,50-0,80	0,035	0,030							45 (GOST 1050-2013)
CK60	DIN 17200	0,57-0,65	max 0,40	0,60-0,90	0,035	0,035							60 (GOST 1050-2013)

Steel grade	Standard	Chemical Composition, %											Equivalent GOST
		C	Si	Mn	P max	S max	Cr	Mo	Ni	V	N	Other	
C60E	DIN EN 10083-2	0,57-0,65	max 0,40	0,60-0,90	0,035	0,035	max 0,40	max 0,10	max 0,40				60 (GOST 1050-2013)
1C22	DIN EN 10083-2	0,17-0,24	max 0,40	0,40-0,60	0,045	0,045	max 0,40	max 0,10	max 0,40				20 (GOST 1050-2013)
1C35	DIN EN 10083-2	0,32-0,39	max 0,40	0,50-0,80	0,045	0,045	max 0,40	max 0,10	max 0,40				35 (GOST 1050-2013)
1C45	DIN EN 10083-2	0,42-0,50	max 0,40	0,50-0,80	0,045	0,045	max 0,40	max 0,10	max 0,40				45 (GOST 1050-2013)
1C60	DIN EN 10083-2	0,57-0,65	max 0,40	0,60-0,90	0,045	0,045	max 0,40	max 0,10	max 0,40				60 (GOST 1050-2013)
060A17	BS 970 part 1	0,15-0,20	0,15-0,35	0,50-0,70	0,030	0,010-0,025	max 0,20	max 0,07	max 0,29				15-20 (GOST 1050-2013)
070M20	BS 970 part 1	0,16-0,24	0,10-0,40	0,50-0,90	0,035	0,035							20Г (GOST 4543-2016)
070M55	BS 970 part 1	0,50-0,60	0,10-0,40	0,50-0,90	0,035	0,035							55 (GOST 1050-2013)
080A22	BS 970 part 1	0,20-0,25	0,10-0,40	0,70-0,90	0,030	0,10-0,025	max 0,29	max 0,07	max 0,29				20Г-25Г (GOST 4543-2016)
080M40	BS 970 part 1	0,36-0,44	0,10-0,40	0,60-1,10	0,035	0,035							40Г (GOST 4543-2016)

Steel grade	Standard	Chemical Composition, %											Equivalent GOST
		C	Si	Mn	P max	S max	Cr	Mo	Ni	V	N	Other	
CARBON STEEL													
SAE1018	SAE	0,15-0,20	max 0,35	0,60-0,90	0,040	0,050							20Г (GOST 4543-2016)
SAE1020 AISI1020	SAE AISI	0,18-0,23	max 0,35	0,30-0,60	0,040	0,050							20 (GOST 1050-2013)
SAE1040	SAE	0,37-0,44	max 0,35	0,60-0,90	0,040	0,050							40 (GOST 1050-2013)
SAE1045 AISI1045	SAE AISI	0,43-0,50	max 0,35	0,60-0,90	0,040	0,050							45 (GOST 1050-2013)
C22E	DIN EN 10083-2	0,17-0,24	max 0,40	0,40-0,70	0,035	0,035	max 0,40	max 0,10	max 0,40				20 (GOST 1050-2013)
C35E	DIN EN 10083-2	0,32-0,39	max 0,40	0,50-0,80	0,035	0,035	max 0,40		max 0,40				35 (GOST 1050-2013)
C45E	DIN EN 10083-2	0,42-0,50	max 0,40	0,50-0,80	0,035	0,035	max 0,40	max 0,10	max 0,40				45 (GOST 1050-2013)
F130DEN	UNE	0,20-0,25	0,13-0,32	1,30-1,70	0,040	0,040	0,15-0,25	max 0,07	max 0,29	max 0,02			20Г2 (GOST 10702-2016)
DD11	EN 10111 EN 10027	0,08-0,12 0,08-0,12	0,15-0,30 0,15-0,30	0,40-0,60 0,40-0,60	0,040 0,040	0,040 0,040	max 0,29 max 0,29		max 0,29 max 0,29				10 (GOST 1050-2013)
2C22	EN 10083-1	0,17-0,24	max 0,40	0,40-0,70	0,035	0,035	max 0,40	max 0,10	max 0,40				20-25 (GOST 1050-2013)
2C35	EN 10083-1	0,32-0,39	max 0,40	0,50-0,80	0,035	0,035	max 0,40	max 0,10	max 0,40				35 (GOST 1050-2013)
2C45	EN 10083-1	0,42-0,50	max 0,40	0,50-0,80	0,035	0,035	max 0,40	max 0,10	max 0,40				45 (GOST 1050-2013)

Steel grade	Standard	Chemical Composition, %											Equivalent GOST
		C	Si	Mn	P max	S max	Cr	Mo	Ni	V	N	Other	
3C45	EN 10083-1	0,42-0,50	max 0,40	0,50-0,80	0,035	0,020-0,040	max 0,40	max 0,10	max 0,40				45 (GOST 1050-2013)
C15mod	DIN EN 10084	0,10-0,17	0,20-0,35	0,40-0,65	0,045	0,045	max 0,29		max 0,29				15 (GOST 1050-2013)
ALLOY STEEL													
42CrMo4	DIN 17200 DIN EN 10083-1	0,38-0,45 0,38-0,45	0,15-0,40 0,15-0,40	0,60-0,90 0,60-0,90	0,035 0,035	0,035 0,035	0,90-1,20 0,90-1,20	0,15-0,30 0,15-0,30					38ХМ (GOST4543-2016)
42CrMoS4	DIN 17200 DIN EN 10083-3-2006	0,38-0,45 0,38-0,45	max 0,40 max 0,40	0,60-0,90 0,60-0,90	0,035 0,035	0,020-0,035 0,020-0,035	0,90-1,20 0,90-1,20	0,15-0,30 0,15-0,30					38ХМ (GOST 4543-2016)
16MnCrS5	DIN 17210 EN 10084	0,14-0,19 0,14-0,19	0,15-0,40 max 0,40	1,00-1,30 1,00-1,30	0,035 0,035	0,02-0,035 0,020-0,040	0,80-1,10 0,80-1,10						18ХГ (GOST 4543-2016)
17CrNiMo6 (1.6587)	DIN 17210	0,15-0,20	0,15-0,40	0,40-0,60	0,035	0,035	1,5-1,8	0,25-0,35	1,4-1,7				20Х2Н2М
20MnCrS5	DIN 17210	0,17-0,22	0,15-0,40	1,10-1,40	0,035	0,020-0,035	1,00-1,30						18ХГ (GOST 4543-2016)
X45NiCrMo4 (1.2767)	DIN 17350	0,40-0,50	0,10-0,40	0,15-0,45	0,030	0,030	1,20-1,50	0,15-0,35	3,80-4,30				45Х2Н4М
St52-3	DIN 17100	max 0,20	max 0,55	max 1,60	0,040	0,040							20Г2 (GOST 10702-2016)
34CrNiMo6 (1.6582)	DIN EN 10083-3-2006	0,30-0,38	max 0,40	0,50-0,80	0,035	0,035	1,30-1,70	0,15-0,30	1,30-1,70				38Х2Н2М
30CrNiMo8 (1.6580)	DIN EN 10083-3-2006	0,26-0,34	max 0,40	0,30-0,60	0,035	0,035	1,80-2,20	0,30-0,50	1,80-2,20				30Х2Н2М

Steel grade	Standard	Chemical Composition, %											Equivalent GOST
		C	Si	Mn	P max	S max	Cr	Mo	Ni	V	N	Other	
ALLOY STEEL													
36NiCrMo16 (1.6773)	DIN EN 10083-3-2006	0,32-0,39	max 0,40	0,30-0,60	0,030	0,025	1,60-2,00	0,25-0,45	3,60-4,10				35ХН4М
25CrMoS4 (1.7213)	DIN EN 10083-3-2006 DIN 17200	0,22-0,29 0,22-0,29	max 0,40 max 0,40	0,60-0,90 0,60-0,90	0,035 0,035	0,020-0,040 0,020-0,040	0,90-1,20 0,90-1,20	0,15-0,30 0,15-0,30					25ХГМ (GOST 4543-2016)
4340	ASTM A29/ A29M	0,38-0,43	0,15-0,35	0,60-0,80	0,035	0,04	0,70-0,90	0,20-0,30	1,65-2,0				40ХН2М (GOST 4543-2016)
8620	ASTM A29/ A29M	0,18-0,23	0,15-0,35	0,70-0,90	0,035	0,04	0,40-0,60	0,15-0,25	0,40-0,70				20ХГНМ (GOST 4543-2016)
A105	UNS	0,18-0,22	0,10-0,30	0,60-1,05	0,035	0,035	max 0,29	max 0,07	max 0,29				20Г (GOST 4543-2016)
A350 (LF2)	UNS	max 0,30	0,1-0,30	max 1,35	0,035	0,040							15Г (GOST 4543-2016) 20Г2 (GOST 10702-2016)
S235JR	EN 10025	max 0,20	max 0,40	max 1,40	0,045	0,045							
S235JRG2	EN 10025	max 0,20	max 0,40	max 1,40	0,045	0,045							15Г (GOST 4543-2016)
S275JR	EN 10025	max 0,22	max 0,40	max 1,5	0,045	0,045							20Г (GOST 4543-2016)
S275J0	EN 10025	max 0,20	max 0,40	max 1,50	0,040	0,040							20Г (GOST 4543-2016)
S335J0	EN 10025	max 0,22	max 0,40	max 1,60	0,040	0,040							20Г (GOST 4543-2016)

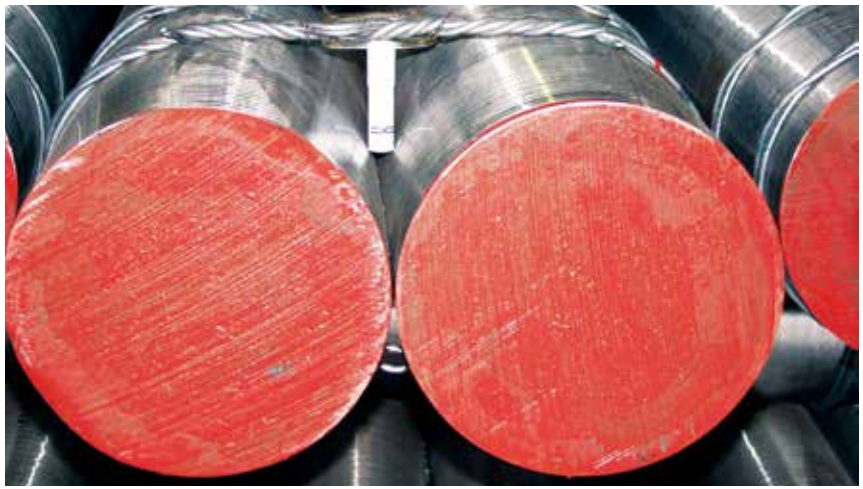
Steel grade	Standard	Chemical Composition, %											Equivalent GOST
		C	Si	Mn	P max	S max	Cr	Mo	Ni	V	N	Other	
S335J2G3	EN 10025	max 0,22	max 0,55	max 1,60	0,035	0,035							20Г2 (GOST 4543-2016)
18CrMo4 (1.7243)	DIN EN 10084	0,15- 0,21	max 0,40	0,60- 0,90	0,035	0,035	0,90-1,20	0,15-0,25					20ХГНМ (GOST 4543-2016)
20NiCrMoS2-2 (1.6526)	DIN EN 10084	0,17-0,23	max 0,40	0,65-0,95	0,035	0,020-0,040	0,35-0,70	0,15-0,25	0,40-0,70				20ХГНМ
16MnCrB5 (1.7160)	DIN EN 10084	0,13-0,18	max 0,40	1,00-1,30	0,025	0,020-0,035	0,80-1,10	max 0,08	max 0,30				15ХГР
15028	BS 970 part 1	0,24-0,32	0,10-0,40	1,30-1,70	0,035	0,035							30Г2 (GOST 4543-2016)
15036	BS 970 part 1	0,32-0,40	0,10-0,40	1,30-1,70	0,035	0,035							35Г2 (GOST 4543-2016)
65513	BS 970 part 3	0,10-0,16	0,10-0,35	0,35-0,60	0,035	0,035	0,70-1,00	max 0,15	3,00-3,75				15ХН3М
70940	BS 970 part 2	0,36-0,44	max 0,35	0,70-1,00	0,040	0,050	0,90-1,20	0,25-0,35					40ХГМ
81740	BS 970 part 2	0,36-0,44	0,10-0,35	0,45-0,70	0,035	0,035	1,00-1,40	0,20-0,35	1,30-1,70				40ХН2М (GOST 4543-2016)
SCM440	JIS G4105	0,38-0,43	0,15-0,35	0,60-0,85	0,03	0,03	0,90-1,2	0,15-0,30	0,25				40ХГМ
SACM645	JIS G4202	0,40-0,50	0,15-0,50	0,60	0,030	0,030	1,30-1,70	0,15-0,30					45Х2МЮ
SAE4140 AISI4140	SAE AISI	0,38-0,43	0,15-0,35	0,75-1,00	0,035	0,040	0,80-1,10	0,15-0,25					40ХГМ
SAE4340 AISI4340	SAE AISI	0,38-0,43	0,15-0,35	0,60-0,80	0,035	0,040	0,70-0,90	0,20-0,30	1,65-2,00				40ХН2М (GOST 4543-2016)

Steel grade	Standard	Chemical Composition, %											Equivalent GOST
		C	Si	Mn	P max	S max	Cr	Mo	Ni	V	N	Other	
ALLOY STEEL													
SAE6150	SAE	0,48-0,53	0,15-0,35	0,70-0,90	0,035	0,040	0,80-1,10			≥0,15			50ХГ
SAE8620 AISI8620	SAE AISI	0,18-0,23	0,15-0,35	0,70-0,90	0,035	0,040	0,40-0,60	0,15-0,25	0,40-0,70				20ХГНМ (GOST 4543-2016)
30CrMo4	UNI 7845-78	0,27-0,34	0,15-0,35	0,40-0,70	0,035	0,035	0,80-1,10	0,15-0,25					30ХМ (GOST 4543-2016)
18NiCrMo5	UNI 7846-78	0,15-0,21	0,15-0,40	0,60-0,90	0,035	0,035	0,70-1,00	0,15-0,25	1,21-1,50				20ХГНМ (GOST 4543-2016)
39NiCrMo3	UNI	0,3-0,43	0,1-0,40	0,5-0,80	0,035	0,035	0,60-0,90	0,15-0,30	0,70-1,00				40ХНМ
38CrMoAl	GB 3077 GB 3078	0,35-0,42	0,20-0,45	0,3-0,6	0,035	0,035	1,35-1,65	0,15-0,25	max 0,3				38Х2МЮА (GOST 4543-2016)
ОС	GOST	0,45-0,55	0,15-0,35	0,60-0,90	0,030	0,030	max 0,29		max 0,29				45Г (GOST 4543-2016)
Z12C13	AFNOR	0,08-0,15	max 1,00	max 1,00	0,040	0,030	11,5-13,5		max (0,50)				12Х13 (GOST 5632-2014)
Ti52		0,14-0,20	0,15-0,40	1,20-1,50	0,025	0,025	max 0,29	max 0,07	max 0,29				15Г2
AISI4145mod		0,43-0,48	0,15-0,35	0,85-1,20	0,025	0,025	0,90-1,20	0,25-0,35	max 0,30	max 0,05			40ХГМ

Steel grade	Standard	Chemical Composition, %											Equivalent GOST
		C	Si	Mn	P max	S max	Cr	Mo	Ni	V	N	Other	
BALL-BEARING STEEL													
100Cr6	DIN 180683-17	0,90-1,05 0,95-1,10	0,15-0,35 0,15-0,35	0,25-0,45 0,25-0,45	0,030	0,025	1,35-1,65 1,35-1,65		max 0,30			Cu 0,30	ШХ-15 (GOST 801-78)
100CrMn6 (1.3520)	DIN 180683-17	0,90-1,05	0,50-0,70	1,00-1,20	0,030	0,025	1,40-1,65		max 0,30			Cu 0,30	ШХ15СГ (GOST 801-78)
LAMINATED SPRING STEEL													
65Si7 9260	ASTM A322	0,56-0,64	1,8-2,0	0,75-1,0	0,035	0,04							60С2 (GOST 14959-2016)
C67 1064	ASTM A713	0,60-0,70	0,17-0,37	0,50-0,80	0,04	0,05							65 (GOST 1050-2013)
C67	DIN17221	0,47-0,72	0,15-0,35	0,60-0,90	0,045	0,045							70 (GOST 1050-2013)
50CrV4	DIN17221	0,47-0,55	0,15-0,40	0,70-1,1	0,035	0,035	0,90-1,2						50ХГФА (GOST 14959-2016)
40Mn4 38Si7	DIN17200 DIN17221	0,36-0,44 0,35-0,42	0,25-0,50 1,5-1,8	0,80-1,10 0,5-0,80	0,035 0,045	0,035 0,045							40Г (GOST 4543-2016) 70Г (GOST 14959-2016)

GOSTs not specified in the production range table are not represented by similar grades in Russian GOSTs, and production is implemented in specific steel grades.

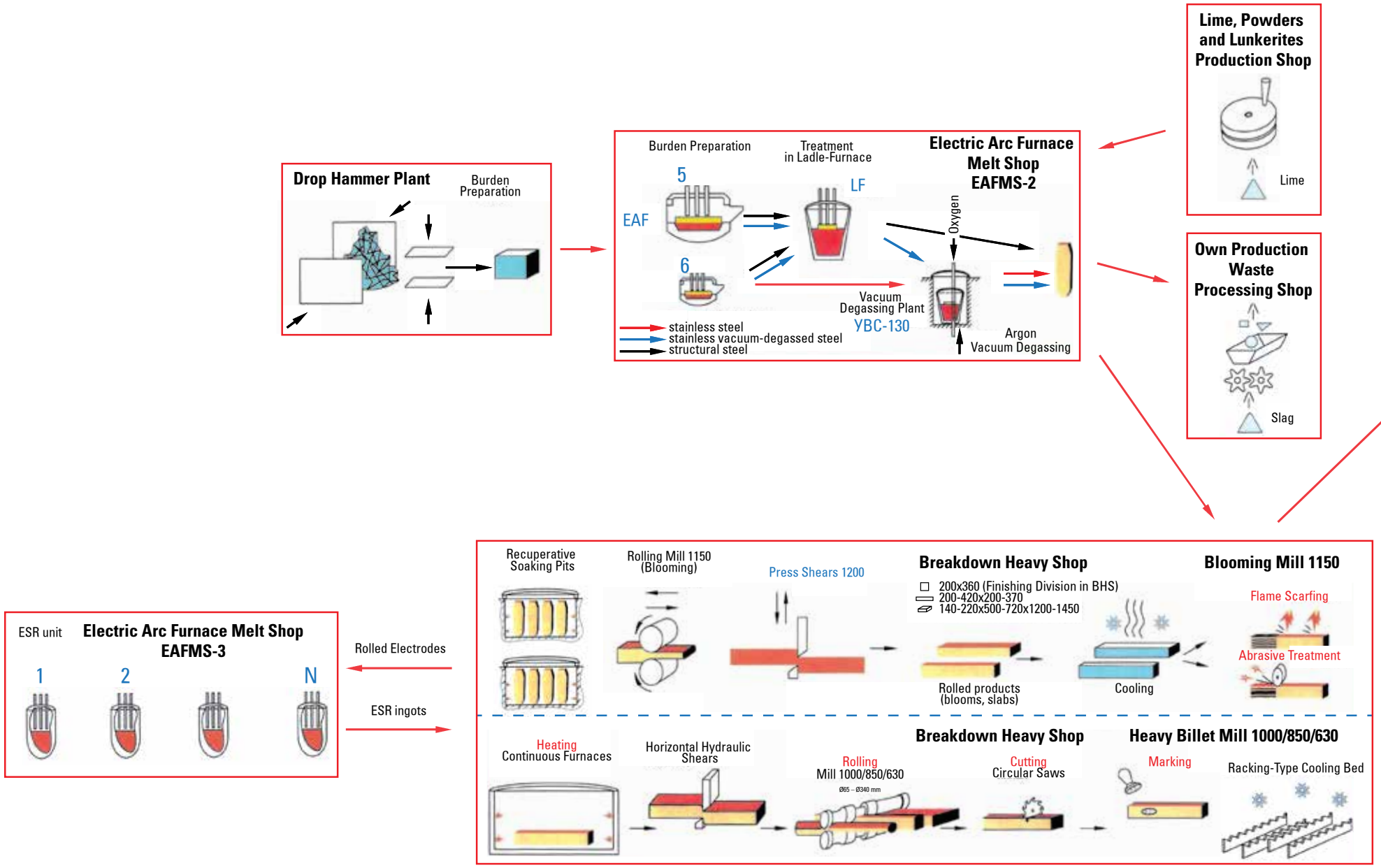
Round billets can be manufactured on forging hammers in the forging department.

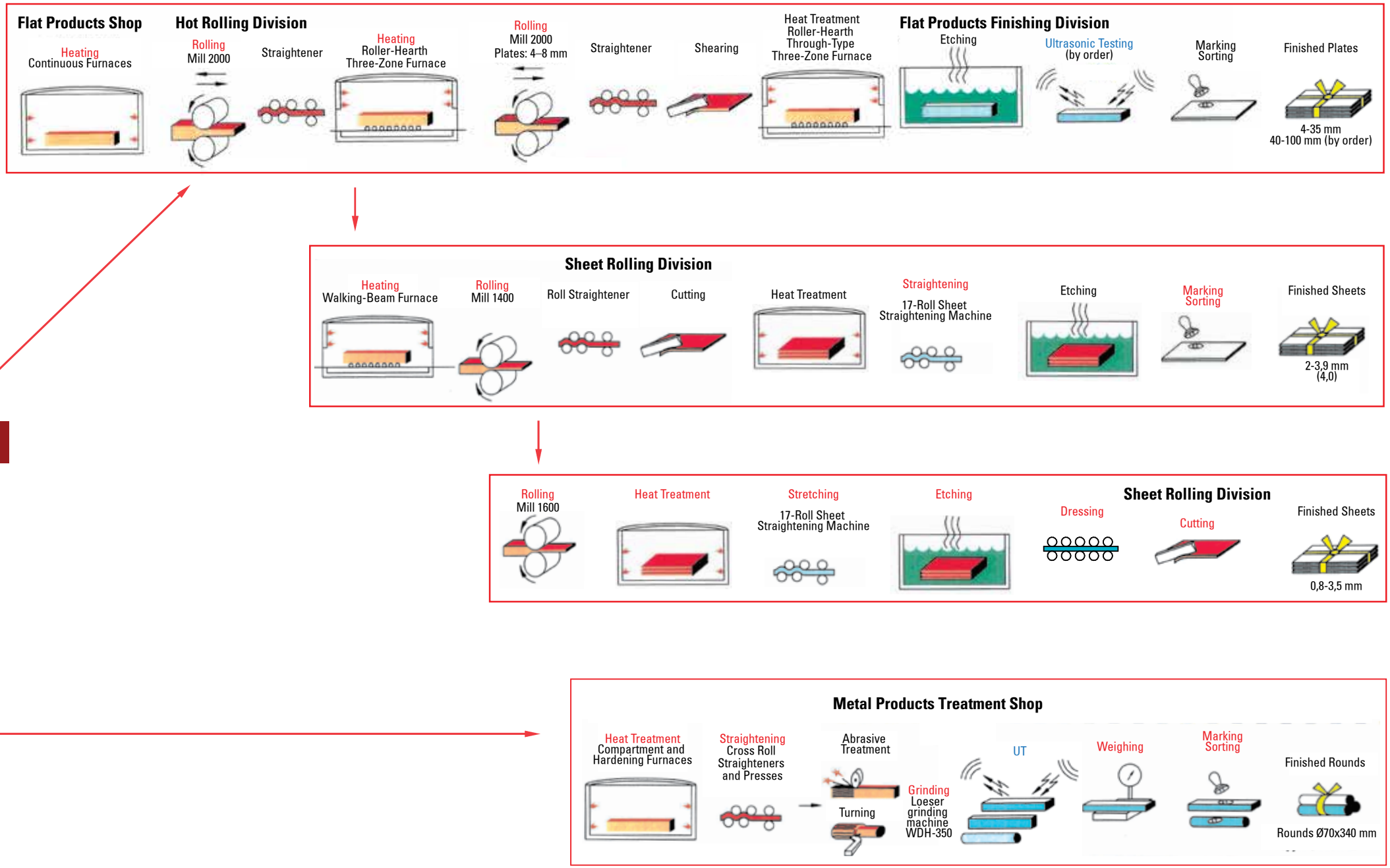


STEEL GRADES

ASSORTMENT	STEEL GRADE
Steel grades	09Г2С
	S355J2
Low carbon steel	20-45
	C45E
Structural carbon steel	20Х-40Х
	20-30ХГСА
	15ХМ
	16-20MnCrS5
	16-20MnCr5
	42CrMoS4
Nickel-containing alloy steel	12ХН2
	20Х2Н4А
	0ХН1М
	0ХН3М
	38Х2МЮА
	45ХН2МФ
	34CrNiMo6
	17NiCrMoS6-4
	18CrNiMo7-6
	30CrNiMo8
	39NiCrMo3
Stainless steel	30Х13
	14Х17Н2
	12Х18Н9Т
	304/1.4301

PROCESS LAYOUT AT BY STEEL WORKS «RED OCTOBER»




Flat Products Shop
Heating
Continuous Furnaces
Hot Rolling Division
Rolling
Mill 2000
Straightener
Heating
Roller-Hearth
Three-Zone Furnace
Rolling
Mill 2000
Plates: 4–8 mm
Straightener
Shearing
Heat Treatment
Roller-Hearth
Through-Type
Three-Zone Furnace
Flat Products Finishing Division
Etching
Ultrasonic Testing
(by order)
Marking
Sorting
Finished Plates
4-35 mm
40-100 mm (by order)
Sheet Rolling Division
Heating
Walking-Beam Furnace
Rolling
Mill 1400
Roll Straightener
Cutting
Heat Treatment
Straightening
17-Roll Sheet
Straightening Machine
Etching
Marking
Sorting
Finished Sheets
2-3,9 mm
(4,0)
Rolling
Mill 1600
Heat Treatment
Stretching
17-Roll Sheet
Straightening Machine
Etching
Sheet Rolling Division
Dressing
Cutting
Finished Sheets
0,8-3,5 mm
Metal Products Treatment Shop
Heat Treatment
Compartment and
Hardening Furnaces
Straightening
Cross Roll
Straighteners
and Presses
Abrasive
Treatment
Turning
Grinding
Loeser
grinding
machine
WDH-350
UT
Weighing
Marking
Sorting
Finished Rounds
Rounds Ø70x340 mm

CONTENTS

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