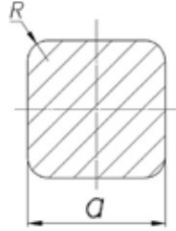
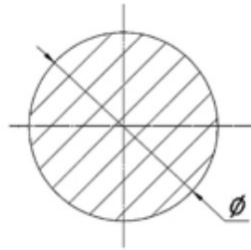


1. Cast billets of round and square section



Square side, mm	Angle curvature radius R, mm	Limit deviations for square side, mm	Cross section area, cm ²	Weight of 1m, kg
250	≤ 8±2MM	± 5,7	625,0	490,63±5kg



Round diameter, mm	Limit deviations, mm	Cross section area, cm ²	Weight of 1m, kg
400	± 6,0	1256	985,96±10kg

2. Technical requirements.

2.1. The billets shall meet the terms of present technical requirements and be manufactured in electric furnaces with refining in “ladle furnace” and treatment in vacuum degassing unit. Steel teeming for billets is made by the two-strand continuous casting machine (curved type).

2.2. Main parameters and dimensions.

2.2.1. Billets are produced of square section with rounded corners with sides 250 mm and of round section with diameter 400 mm

2.2.3. Shape, dimensions, limit deviations for them, cross section area and weight for 1 meter of length shall meet the requirements indicated in Tables 1, 2 and Pictures 1, 2.

2.2.4. Cross section area and weight of 1 m. of the billet length were calculated on nominal dimensions. While calculating weight of 1m of the billet length the density of steel 7,85 g/cm³ shall be taken.

2.2.5. Billets are produced with the length from 4 to 12 m. The precise length and Limited deviation are stipulated in specifications to the contract

2.2.6. Con-cast billets shall be cropped. Con-cast billet ends are cropped by automatic gas-cutting machines. Delivery of billets cropped with hand flame cutoff in scope of 5% of the lot weight is allowed.

2.2.7. Cutting angle shall not exceed 4% of the billet side.

2.2.8. Curvature of the billets intended for rolling shall not exceed 15mm per 1 m of the length, for forging 12 mm per 1m of the length.

- Curvature for total billet's length mustn't exceed 60mm.

- 2.2.9. Ovality of the billets with round section shall not exceed 6,5 mm.
- 2.2.10 Twist of a billet is not more than 3 degrees for 1 m of the billets, but not more than 15 degrees for total length of the billet. The length of 150mm from each butt-end must be excluded from measurement.
- 2.2.11. The rhomboidity of a billet is not more than 8 mm
- 2.2.12. Protuberance or concavity of billet side must not exceed the half of limit deviation of side dimension.

2.3. Characteristics and material requirements.

- 2.3.1. Grades and chemical composition of the steel shall to be stipulated by the parties in the specifications to the contract.
- 2.3.2. On the surface of the billets there shall not be rough fissures, longitudinal and transversal cracks.
- 2.3.3. Single small scabs, dents, rippings, rolled blisters and impurities are allowed in depth not resulting in the dimensions of the round or square billets to be out of the maximum minus deviations for the square side or round diameter from the actual dimension. On the surface of the billets rolled blisters and folds of depth not more than 2 mm without peeling are allowed.
- 2.3.4. Inadmissible defects of the billet surface must be removed by the way of shallow chipping or flame chipping of width not less than fivefold depth. The option of chipping method (shallow chipping or flame chipping) – upon the agreement with Customer.
- Depth of chipping or scaling must not exceed 8% of nominal side;
 - Depth of chipping or scaling is calculated from actual dimension of the billet.
 - Total depth of chipping or scaling on the opposite sides of one section and laying on the same axis shall not exceed the indicated values.
- 2.3.5. Upon the agreement between the Seller and the Customer it is allowed not to remove surface defects if they do not affect quality of the billet.

2.4. Marking

- 2.4.1. Marking of the billets is made as per the present technical requirements and also according to DSTU 3058 (GOST 7566).
- 2.4.2. On one butt-end surface of a single billet the heat number and steel grade are stamped with hot-marking machine. Other data are also marked if it is stated in corresponding specification.
- Stamp is circled by paint.
 - Instead of hot stamping it is allowed to use a tempilstick for stamping with caption on one of the sides of the billet or water-resist paint.
- 2.4.3. At consumer's demand, billets' butt ends opposite to the stamp are painted with the color being indicated in the specification. The butt ends shall not be painted in case of absence of such requirements in the specification.

2.5. Packing

- 2.5.1. Packing of billets is made as per DSTU 3058 (GOST 7566).
- 2.5.2. Square billets are packed in tight bundles 2 pcs in each bundle. Each bundle of billets with length 10-12m is to be tied min 4 times by steel bailing band with width up to 32mm.
- (Upon Buyer request square billets are allowed to be supplied by the piece)
Round billet Ø400 is transported with stowage by the piece.

3. Acceptance.

- 3.1. General acceptance rules – as per DSTU 3058 (GOST 7566)
- 3.2. Billets are accepted by technical control service of the manufacturer according to demands of the present technical requirements.
- 3.3. Billets are accepted by lots consisting of one steel grade, one series of heats, one dimension and one surface category (for carbon quality, high-quality and alloyed steels) supplied with quality certificate with the following information:
 - Name and trademark of manufacturer;
 - Steel Grade;
 - Heat number;
 - Chemical analysis results;
 - Billet dimensions;
 - Lot weight (kg) and quantity of billets.

4. Control methods.

- 4.1. Determining geometrical dimensions and shape of the billet is performed as per methods and with the help of measuring means and also other tools and templates, that are used at manufacturing works as well as in compliance with domestic standards of the manufacturing works country.
Geometrical dimensions and curvature control is performed at distance of not less than 150 mm from the sides of con-cast billets.
- 4.2. The method of chemical composition determining is in accordance with the methods of domestic standards of the country of the manufacturing works or other certified methods assuring the required accuracy.
- 4.3. Surface defects on billets are disclosed visually with the help of surface peeling if necessary.
- 4.4. Billet length control is performed by tapeline.
- 4.5. Section dimensions and rhombic form of billets are checked by a slide gage.
- 4.6. Curvature control in hot condition is performed visually, after cooling – with the help of cord and scale.

5. Transporting and storing.

- 5.1. Transporting and storing should be made as per DSTU 3058 (GOST 7566) with supplements.
- 5.2. The shipped lot of the marketable billets is accompanied with the quality certificate with the indication of heat number, steel grade, chemical composition, dimension, weight and, if necessary, other information upon the demand of the contracts.
- 5.3. Marketable billets are transported by all means of transport according to the valid rules of transportation, terms of loading and fastening the cargoes as per DSTU 3058 (GOST 7566).
- 5.4. Billets of square section are stored in piles on open and closed areas. Billets of round section are stored on stands.

6. Issuing of additional and special requirements of the consumer.

Additional and special requirements of the customer are drawn up as a separate technical protocol which is an integral part of the contract.

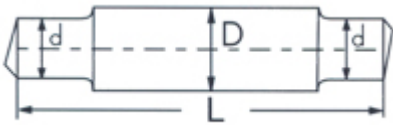
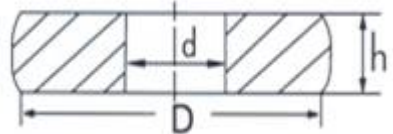

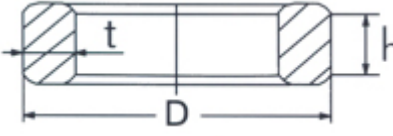
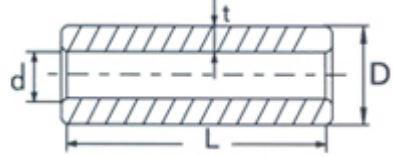
7-STEEL GRADES

Chemical composition of steel for production of commercial ingots

Steel grade	Content of chemical elements, %											
	C	Mn	Si	Cr	Ni	Mo	V	Cu	S	P	N	Ag
1	2	3	4	5	6	7	8	9	10	11	12	13
20Г	0,17-0,24	0,70-1,00	0,17-0,37	<= 0,30	<= 0,30	-	-	<= 0,30	0,035	0,035	-	-
35Г	0,32-0,40	0,70-1,00	0,17-0,37	<= 0,30	<= 0,30	-	-	<= 0,30	0,035	0,035	-	-
20X	0,17-0,23	0,50-0,80	0,17-0,37	0,70-1,00	<= 0,30	-	-	<= 0,30	0,035	0,035	-	-
40X	0,36-0,44	0,50-0,80	0,17-0,37	0,80-1,10	<= 0,30	-	-	<= 0,30	0,035	0,035	-	-
15XM	0,11-0,18	0,40-0,70	0,17-0,37	0,80-1,10	<= 0,30	0,40-0,55	-	<= 0,30	0,035	0,035	-	-
35XM	0,32-0,40	0,40-0,70	0,17-0,37	0,80-1,10	<= 0,30	0,15-0,25	-	<= 0,30	0,035	0,035	-	-
40XH	0,36-0,44	0,50-0,80	0,17-0,37	0,45-0,75	1,0-1,4	-	-	<= 0,30	0,035	0,035	-	-
50XH	0,46-0,54	0,50-0,80	0,17-0,37	0,45-0,75	1,0-1,4	-	-	<= 0,30	0,035	0,035	-	-
50X	0,46-0,54	0,50-0,80	0,17-0,37	0,80-1,10	<= 0,30	-	-	<= 0,30	0,035	0,035	-	-
65Г	0,62-0,70	0,90-1,20	0,17-0,37	<= 0,25	<= 0,30	-	-	<= 0,30	0,035	0,035	-	-
5XHM	0,50-0,60	0,50-0,80	0,10-0,40	0,50-0,80	1,40-1,80	0,15-0,30	-	<= 0,30	0,030	0,030	-	-
12XH3A	0,09-0,16	0,30-0,60	0,17-0,37	0,60-0,90	2,75-3,15	-	-	<= 0,30	0,025	0,025	-	-
40XH2MA	0,37-0,44	0,50-0,80	0,17-0,37	0,60-0,90	1,25-0,65	0,15-0,25	-	<= 0,30	0,025	0,025	-	-
10XHCД	<= 0,12	0,50-0,80	0,8-1,1	0,60-0,90	0,50-0,80	-	-	<= 0,40-0,65	0,040	0,035	0,012	0,08
15XCHД	0,12-0,18	0,40-0,70	0,40-0,70	0,60-0,90	0,30-0,60	-	-	0,20-0,40	0,040	0,035	0,012	0,08
09Г2	<= 0,12	1,4-1,8	0,17-0,37	<= 0,30	<= 0,30	-	-	<= 0,30	0,040	0,035	0,012	0,08
09Г2C	<= 0,12	1,3-1,7	0,50-0,80	<= 0,30	<= 0,30	-	-	<= 0,30	0,040	0,035	0,012	0,08
10Г2C1	<= 0,12	1,3-1,65	0,9-1,2	<= 0,30	<= 0,30	-	-	<= 0,30	0,040	0,035	0,012	0,08

8 – FORGINGS

Forgings are made with automatic forging complex on the basis of hydraulic press with load 2500 THC and forging manipulator with tonnage 20 tons .

Forging shape	Type of forging	Maximum mass of forging, t	Maximum dimensions, mm	
	Rods, rolls, bars, spindels, etc.	17,5	D L d	900 8000 300 min
	Solid discs and ones with holes (pinions, couplings, etc.)	10,0	D L d	1250 800 200 min
	Flat plates, bars, hammer heads	10,0	a b h	850 1700 300 min
	Rolled rings, bands, etc.	11,0	D h t	2400 750 300 min
	Hollow forgings	11,0	D L d t	1100 5000 250 min 200 min

Materials of forgings are carbon and alloyed steel by agreement with the Customer.