

# PRODUCT CATALOGUE



TULA METAL ROLLING PLANT



# TULA METAL ROLLING PLANT

Tula Metal Rolling Plant offers a wide range of high-quality reinforcement bars of classic, screw threaded, four-row (innovative) sections, anchor systems, couplings and nuts. Along with the above, we are the only company in Eurasia that uses a unique resource-saving technology for the production of rolled products from rails that have served their time. Highly efficient production technology allows the company to confidently position itself in the Russian market for recycling secondary resources.

## TODAY:

- We are using innovative and non-standard production technologies.
- We are applying creative thinking of management.



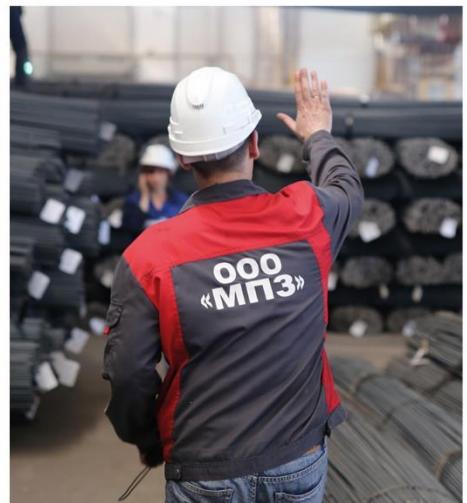
## OUR STANDARD:

- We guarantee the quality of our products, because we have implemented the ISO 9000: 2015 quality management system.
- We offer a competitive price on the market, because we use resource-saving production technology.



## OUR MISSION:

- We create the future today.
- We give a second life to steel.



# PLANT START-UP



*Tula Metal Rolling Plant has been operating since 2007. The company's development strategy is aimed at finding and developing new technological and technical product solutions. Throughout its activity, our company has been closely cooperating with leading Russian scientific organizations, such as NIIZHB named after A. A. Gvozdev, VNIIZhT, VostNII and TsNIIS.*

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The operated investment project is one of the four implemented in recent years at the industrial site of the Proletarsky district of the Tula. All this became possible within the framework of the concluded cooperation agreement between the capital investor and the government of the Tula region. The production quantity is up to 15,000 tons per month of end-use products - reinforcing steel and special steel sections.

The products of our plant are used in such areas as metro construction, mining, road, industrial and civil construction. Our partners are Russian and foreign companies such as Russian Railways, SUEK, PERI, DOKA, Minova and others.

During its production activities, the Tula Metal Rolling Plant has established itself as a reliable manufacturer and supplier of high-quality rolled steel and products.



## TYPES OF TMPZ PRODUCTS:

- **Reinforcing steel (round) bars** - 8...40 mm;
- **Screw threaded rebars** - 14...40 mm;
- **Square bars** - 12...30 mm;
- **Hexagon bars** - 12...32 mm;
- **Strips** - width 30...100 mm, thickness 4...12 mm;
- **Rolled shapes** - up to 100 mm width;
- **Gauged bars** - 10...40 mm.

## TMPZ TODAY

Currently, the company's management is considering two concepts:

- construction of own steel-smelting production - both the classic version with a continuous casting machine, and new, very interesting options for discrete foundry production are possible here;
- development towards a deeper processing of the obtained rolled metal into the finished products and, accordingly, an increase in surplus value, for example, the production of balls, cyppebs, parts of rotary bodies.

According to this concept, a holding is created on a single industrial site, each enterprise of which operates some kind of its own process and is independently represented on the market. At the same time, the holding's management has the opportunity at any time to put together a more complex technological chain as if from "puzzles" in order to promptly satisfy a more complex market request. Considering that logistics costs at one industrial site are minimized, this concept of business organization is competitive.



# ROLLING PRODUCTION



The Tula Metal Rolling Plant includes a small section mill 300 supplied by a group of Russian companies.

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## PRIMARY TECHNICAL AND ECONOMIC INDICATORS OF THE MILL

### Mill size

- Rebars (Round) - 8...40 mm;
- Screw threaded rebars - 14...40 mm;
- Square bars - 12...30 mm;
- Hexagon bars - 12...32 mm;
- Strips - width 30...100 mm,  
thickness 4...12 mm;
- Strips - width 30...100 mm,  
thickness 4...12 mm;
- Gauged bars - 10...40 mm.

### Stock material

- Square 125 mm, length up to 6000 mm;
- Rail R65, R50, length - 4500...5700 mm.

### Hourly productivity

- Square billet - up to 40 t/h;
- Rail blank- up to 25 t/h.

## SUMMARY OF MAIN MECHANICAL EQUIPMENT

### 1. Heating furnace

To heat the billets, a continuous walking hearth furnace is installed in the mill. Billet loading and discharging are carried out by furnace roller tables.

#### Data summary of the furnace:

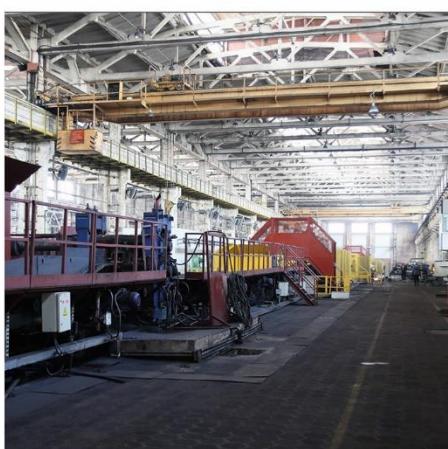
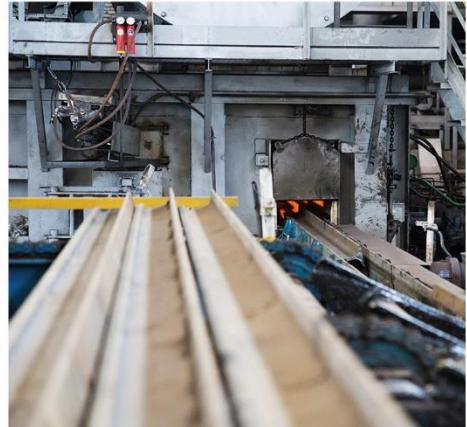
- **Furnace hearth size and area:**  
length (m) x width (m) = area (m<sup>2</sup>), 24x6.4=153.6
- **Heated billet size and cross section:**  
section, mm, - 125x125, Rail P65, P50;  
length, mm - 4500...6000;  
weight, kg - 250...700.
- **Heating temperature, deg. Celsius:**  
when charging - cold charging;  
when discharging - 1230 ... 1250.
- **Fuel - Natural Gas.**

### 2. Three-high cogging mill train 530

It consists of a three-high stand, an inlet roller table, a tilting table, an outlet roller table, and a flying shear. Metal rolling - reversible. Automatic and manual control from control panel No. 1.

#### Data summary of three-high stand 530:

- roll body diameter, mm - 450...530;
- roll body length, mm - 1200;
- roll force, kN (t) - no more than 2,500 (250);
- roll torque, kNm (tm) - no more than 380 (38);
- type of bearings - rolling bearings;
- electric drive power, kW - 1100.





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## SUMMARY OF MAIN MECHANICAL EQUIPMENT

### 3. Intermediate train 400

It consists of four lines of working stands with a roll diameter of 400 and flying shear. The location of the stands is horizontal. Rolling is carried out with 90° turn of the rolled stock and with minimal tension in the spaces between stands. Control of speed modes is automatic from the control panel No. 2. Stand 400 is designed for reducing rolled products with horizontal rolls.



#### Data summary of stand 400:

- roll body diameter, mm - 350...400;
- roll body length, mm - 650;
- roll force, kN (t) - no more than 800 (80);
- roll torque, kNm (tm) - no more than 32 (3.2);
- type of bearings - rolling bearings;
- electric drive power, kW - 560.



## 4. Finishing train 350

It consists of six lines of working stands with a roll diameter of 350 and flying shear. The location of the stands is horizontal. Rolling is carried out with 90° turn of the rolled stock and without tension in the spaces between stands. Control of speed modes is automatic from the control panel No. 2. Stand 350 is designed for reducing rolled products with horizontal rolls.

### Data summary of stand 350:

- roll body diameter, mm - 310...350;
- roll body length, mm - 650;
- roll force, kN (t) - no more than 400 (40);
- roll torque, kNm (tm) - no more than 25 (2.5);
- type of bearings - rolling bearings;
- electric drive power, kW - 560.

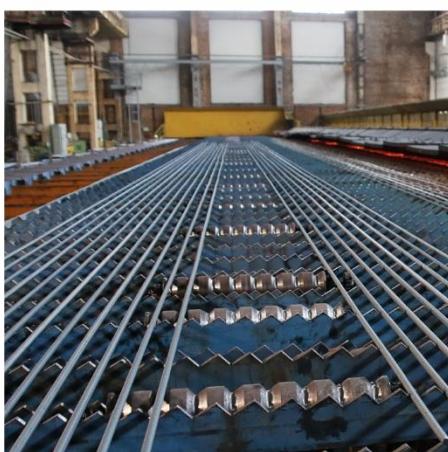
## 5. Rake-type cooling bed

It is intended for piece-by-piece acceptance of hot rolled products coming from the flying shear of the finishing train, alignment of the rear ends of the rolled stock on the leveling roller table, transportation and natural cooling of the bars on the rack sections, laying the bars in a flat package on the outlet roller table and transporting the package to the 250t cold shears.

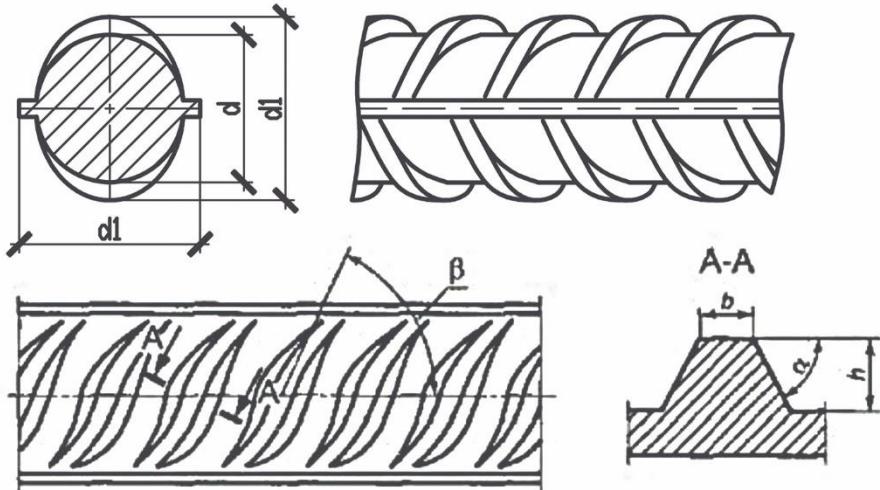
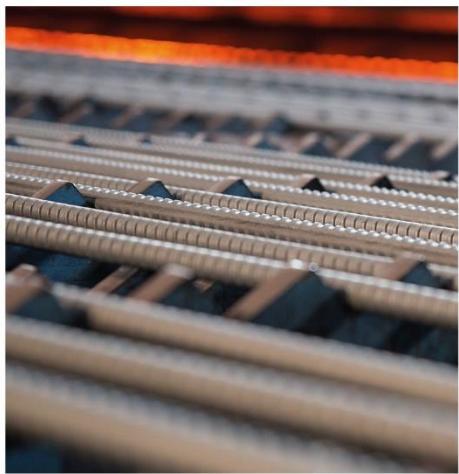
### Data summary of the rake-type cooling bed:

- cooling rack width (theoretical length of the received bar), m - 60;
- cooling rack length  
(distance between the axes of the inlet and outlet roller tables), m - 10;
- step of the rack-and-pinion stepping system, mm - 80;
- speed of acceptance of rolled bars, m/sec, no more than - 11;
- temperature of the received rolled products, deg. C, no more than - 1200;
- temperature of rolled products on the outlet roller table, deg. C, no more than - 200.

On the basis of the above technical capabilities, the specialists of Tula Metal Rolling Plant are ready to master any rolled section at the request of the Customer.



# REINFORCING BARS



The assortment of the mill includes rebar of a die-rolled section in accordance with GOST 34028-2016 and Specifications, manufactured by hot rolling. Reinforcing steel is used for reinforcing concrete structures for various purposes. At present, the mill has mastered the production of rebar with a diameter of 8-40 mm. Output production completely conforms to all regulatory documentation requirements for this product.

The development strategy of the Tula Metal Rolling Plant is aimed at finding and developing new technological and technical product solutions. Throughout its activity, our company has been closely cooperating with leading Russian scientific organizations, such as NIIZHB named after A. A. Gvozdev, All-Russian Research Institute of Railway Transport, Scientific Center of VostNII for Safety in Mining Industry, Research Institute of

Transport Construction, Central Research Institute of Building Structures named after V. A. Kucherenko.

At the end of 2021, the TMPZ team was awarded the prize named after B. S. Stechkin, by decree of the Governor of the Tula region, for the development of natural and technical sciences, the development and implementation of technologies, equipment and materials.

## STEEL CHEMISTRY AND GEOMETRY TABLES::

Steel Grade	Element Mass Percentage, %							
	Carbon	Manganese	Silicon	Vanadium	Titanium	Chromium	Sulfur	Phosphorus no more than
St3	0,14-0,22	0,4-0,65	0,05-0,17	-	-	0,30	0,050	0,040
25G2S	0,20-0,29	1,20-1,60	0,60-0,90	-	-	0,30	0,045	0,040
35GS	0,30-0,37	0,80-1,20	0,60-0,90	-	-	0,30	0,045	0,040
Steel 76	0,74-0,84	0,75-1,25	0,18-0,55	-	-	-	0,045	0,035

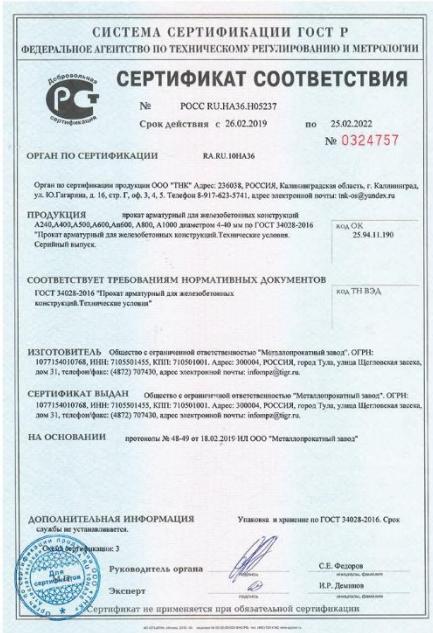
Nominal Dia., mm	Nominal cross-sectional area, mm <sup>2</sup>	Weight of 1 meter of rolled length		
		Nominal, kg	Limit deviation, %	
			OM1	OM2
8	50,3	0,395	±8,0	-2,0 -8,0
9	63,6	0,499		
10	78,5	0,617	±6,0	-1,0
11	95,0	0,746		-6,0
12	113,1	0,888		
14	153,9	1,208		
16	201,1	1,578		
18	254,4	1,998		
20	314,2	2,466		
22	380,1	2,984		
25	490,9	3,853		
28	615,8	4,834		
32	804,3	6,313		
36	1017,9	7,990		
40	1256,6	9,865		

## DOCUMENTATION:

Certificate of Conformity with  
GOST No. ROSS RU.HA36.H05237

Certificate of Conformity with  
TU No. ROSS RU.HA.36.H05240

NIIZhB recommendations for the use of  
A500 rebars according to Specifications



Изменение № 3-9/6, 15.04.2014 г.

На № 517/06 от 14 апреля 2014 г.

Генеральному директору

ООО «Металлопрокатный завод»

Ернову Ю.Л.

Уважаемый Юрий Львович!

ПРИЛОЖЕНИЕ к изменению № 1445/3-17-13/КБ от 21.10.2013г. проведены для Вас комплексные исследования арматурного профилактического марки ВОС изложенного по ТУ 0933-313-36554501-2014. Установлено, что арматурный профиль соответствует требованиям ГОСТ Р 5781-82 х сталь марки ВОС, а по механическим свойствам не соответствует требованиям, предъявляемым к арматуре класса А600 по ГОСТ 5782, но может быть использован как арматура класса А500 по ГОСТ 5782. По результатам испытаний сварных соединений эта арматура признана неисカリаемой и поэтому ее следует применять без сварки. Т.е.стыковать с помощью механических соединений, а крестовые соединения выполнять с помощью винтов.

Установлена высокая стойкость этого профиля против коррозионного растрескивания и еще ряд других преимуществ, поэтому эту арматуру допускается применять в качестве промышленных профилей обычной или направляемой формовки.

По избавлению возможности перепутывания этой арматуры со свариваемой классе А500С по ГОСТ Р 52544 необходимо обеспечить ей специальную простоту маркировку, например, буквой «R» + рельсовая или «R» рельса» и т.п.

По условиям применения в железобетоне никаких специальных ограничений кроме указанного выше запрещения применять сварку и недопущения изгиба более чем на 45° нет.



Директор института

А.Н.Давидов

# SCREW THREADED REBARS



## SCREW THREADED REBAR APPLICATIONS

Screw threaded rebar differs from the usual one in that the protrusions of its die-rolled section serve not only for adhesion to concrete, but also form a screw thread along the entire length of the rods in order to screw in different types of screw fasteners - nuts, couplings, anchor nuts, etc.

Thus, the reinforcing bar turns into a long threaded stud (up to 12 m according to the transportation conditions), which opens up great

opportunities for the use of screw threaded rebars in construction.

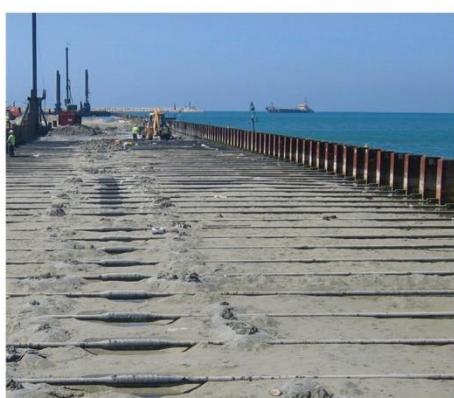
In the 70-80s of the last century, NIIZhB, in cooperation with institutes and enterprises of ferrous metallurgy, developed and introduced screw threaded reinforcing steel into construction. Unlike conventional reinforcement, the die-rolled section of screw threaded rebars serves not only for adhesion to concrete, but also plays the role of a trapezoidal thread.

Such reinforcement can be joined along the length and anchored using couplings, nuts, locknuts, anchor nuts. The possibility of using screw joints for joining rebars instead of welding and, at the same time, the increased price of screw threaded steel, compared to conventional reinforcement, determined the following main areas of its possible application:



- in monolithic structures of special facilities in the form of non-tensioned reinforcement of class A500C, where, for a number of reasons, welding is not used (industrial flue pipes, cooling towers, etc.);
- as high-strength reinforcement due to the possibility of its joining without softening during welding (ground anchors, prestressed reinforcement of long prefabricated structures);
- as tie rods for fixing formwork in the production of monolithic structures;
- as ground and rock anchors in mine and tunnel construction;
- as tie rods for various kinds of restoration and repair work.

Separately, VNIIZhB provided recommendations on the use of screw threaded rebars in reinforced concrete structures, which is of constant interest to construction organizations.

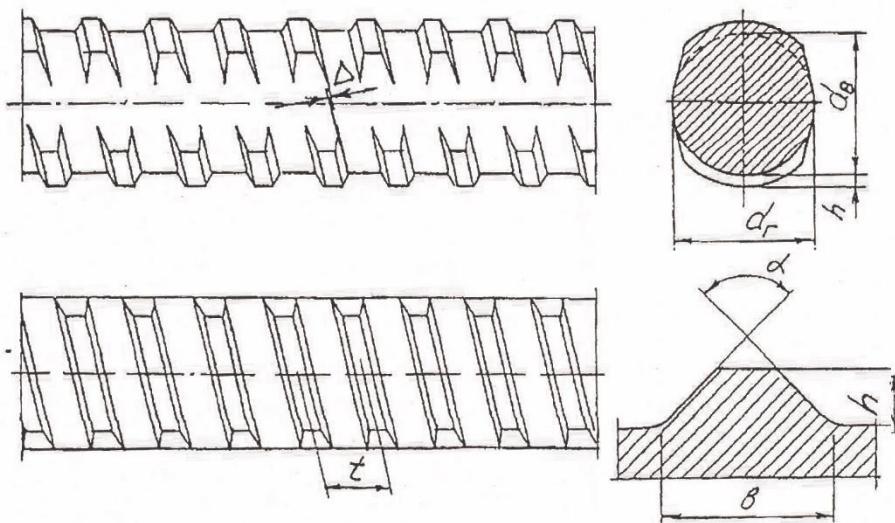


# SCREW THREADED REBARS



The assortment of the mill includes rolled sectioned hot-rolled screw threaded rebars intended for screw joints of structures in the mining and metallurgical, construction and engineering industries.

Tula Metal Rolling Plant is ready to supply rolled screw threaded rebars with the parameters described below to consumers.



## TYPES AND DIMENSIONS OF ROLLED SCREW THREADED REBARS

Section number (nominal Ø of rolled products, dB)	Die-rolled section parameters										$\Delta$ mm	$\alpha$ deg.		
	$d_B$ mm		$h$ mm		$d_r$ mm		$t$ mm							
	nom.	dev.	nom.	dev.	nom.	dev.	nom.	dev.						
14	13,5	+0,1 -0,2	0,6	$\pm 0,1$	13,0	+0,2 -0,3	4		1,5					
15	14,8	+0,2 -0,1	1,2	+0,2 -0,1	14,6	+0,2 -0,4	10		4,8		90°			
16	15,9	+0,15 -0,25	1,0	+0,1 -0,2	15,7	+0,2 -0,6	7		3,8					
18	17,4	$\pm 0,35$	1,4		17,1	+0,3 -0,6	7		4,5					
20	19,3		1,3	$\pm 0,2$	19,0	+0,4 -0,6	8		4,5					
22	21,3		1,3		20,8		8		4,5	$\pm 0,2$	80°			
25	24,3		1,8	+0,5 -0,15	23,8		14		6,5					
26,5	26,3	$\pm 0,4$	1,7		25,8		13		6,2					
32	31,6		1,9	$\pm 0,2$	31,2		16		7,4					
36	35,6		2,0		35,2	+0,6 -0,8	18		8,4					
40	39,6		2,2		39,2		20		9,4					

## STEEL CHEMICAL COMPOSITION:

Steel Grade	Element Mass Percentage, %							
	Carbon	Manganese	Silicon	Vanadium	Titanium	Chromium	Sulfur	Phosphorus
	no more than							
St3	0,14-0,22	0,4-0,65	0,05-0,17	-	-	0,30	0,050	0,040
25G2S	0,20-0,29	1,20-1,60	0,60-0,90	-	-	0,30	0,045	0,040
35GS	0,30-0,37	0,80-1,20	0,60-0,90	-	-	0,30	0,045	0,040
Steel 76	0,74-0,84	0,75-1,25	0,18-0,55	-	-	-	0,045	0,035

## MECHANICAL PROPERTIES:

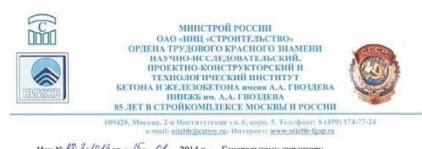
Plasticity category	Rolled product class	Electric heating temperature, °C	Yield strength $\sigma_T (\sigma_{o,2})$ , N/mm²	Ultimate tensile strength $\sigma_B$ , N/mm²	Ratio of actual values $\sigma_B/\sigma_T, (\sigma_{o,2})$	Relative elongation, %		
						$\sigma_s$	$\sigma_p$	$\sigma_{max}$
Standard	A400	-	390	590	-	16,0	-	5,0
	A500	-	500	600	1,05	14,0	2,0	2,5
	A600	-	600	700	1,05	12,0	2,0	2,5
	A800	400	800	1000	-	8,0	2,0	2,5
	A1000	450	1000	1250	-	7,0	2,0	2,5

## DOCUMENTATION:

Certificate of Conformity with  
TU No. ROSS RU.HB.61.H08053

Quality System Conformity  
Certificate No. ROSS RU.CK01.K00093

NIIZhB recommendations on the use of a  
screw threaded bar as reinforcement



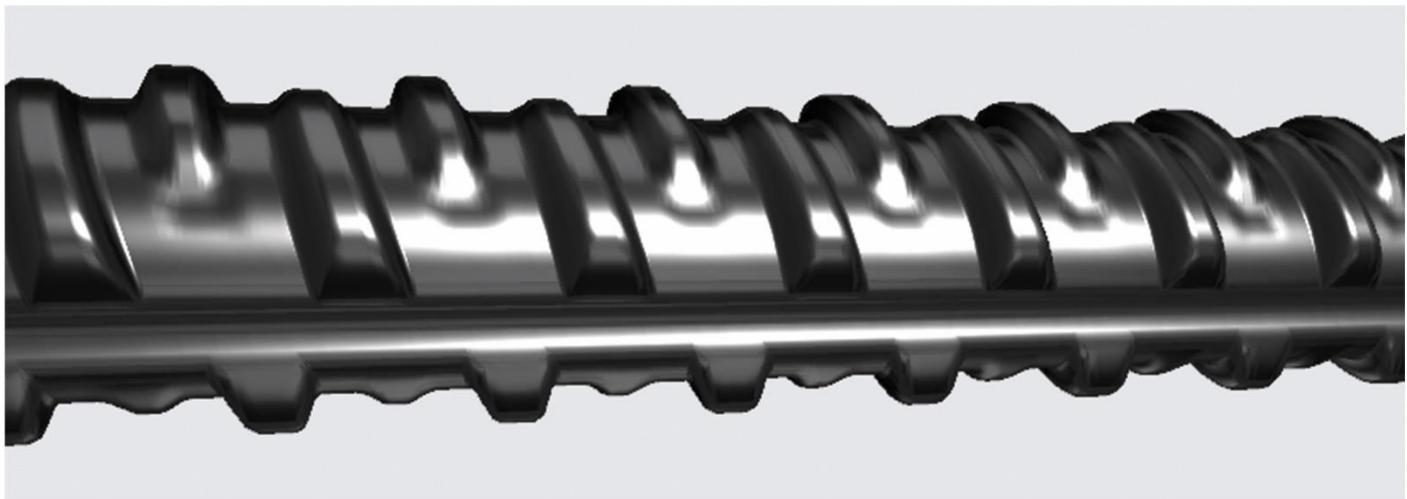
По результатам испытаний выполненных НИИЖБ им. А.А. Гвоздева горячекатаного проката винтового профиля из рельсового передела по ТУ 0950-003-8393664-2013 и горячекатаного арматурного проката класса A500 из рельсового передела по ТУ 0933-313-36554501-2014 установлено, что прокат имеют одинаковые механические свойства и химический состав и отличаются только видом периодического профиля. Европейские и отечественные нормы проектирования не учитывают вид периодического профиля, регламентируется лишь его наличие или отсутствие.

На основании этого допускается применение проката с винтовым профилем из рельсового передела по ТУ 0950-003-8393664-2013 наряду и взамен арматурного проката класса A500 из рельсового передела с серпиновым профилем ТУ 0933-313-36554501-2014 при условии запрещения применять сварку и выполнять изгиб более чем на 45°.

Директор  
НИИЖБ им. А.А. Гвоздева, д.т.н.  
А.Н. Давидюк

Постановление  
Зас. заседания коллегии НИИЖБ  
Тел. (499) 174-74-98

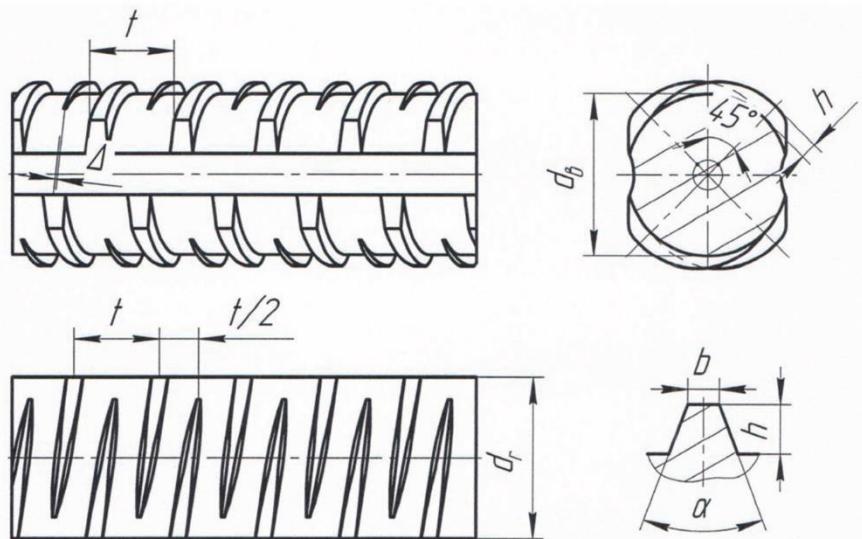
# FOUR-ROW SCREW THREADED REBARS



Four-row threaded rebar is the result of a joint project of the NIIZhB named after A.A. Gvozdev and the Tula Metal Rolling Plant. This reinforcement allows for high efficiency of design and construction of reinforced concrete structures. The new generation reinforcement allows to save up to 30% the amount of reinforcement in reinforced concrete structures, reduces the time of joining the reinforcement from 2 to 10 times. It increases the safety and efficiency of operation of construction sites.

Four-row reinforcement differs from the usual one in the absence of longitudinal ribs and the arrangement of transverse ribs, the latter arranged in four rows. Also, the difference lies in the double-start thread along the entire length, which provides a twofold increase in the speed of screwing fasteners: couplings, anchor nuts.

Tula Metal Rolling Plant produces four-row screw threaded rebars with a diameter of 10-40 mm



## PARAMETERS OF THE FOUR-ROW SECTION:

Nominal diameter	$d_{B'}$ , mm		$[d_1-d_2]$		$d_{R'}$ , mm		$h$ , mm		$t$ , mm		$\alpha$ deg.	$f_r$ min	Weight of 1 l.m.			
	Nominal	Limit deviation	Ovality of rolled products, no more	Nominal	Limit deviation		Nominal	Admissible deviation, %								
10	9,5	0,3	0,6	9,1	+0,4 -0,4	1,0	+0,4 -0,3	8,0	0,2	52-55	0,075	0,9	0,617	+6	-1	
12	11,5			11,1		1,1		10,0					1	0,888	-6	-6
14	13,5			13,1		1,2		11,0					1,2	1,208		
16	15,5			15,0		1,3		13,0					1,4	1,578	+5	+1
18	17,4			17,0		1,4		14,0					1,6	1,998	-5	-5
20	19,3			18,9		1,5		15,0					1,8	2,466		
22	21,3	0,4	0,8	20,8	+0,5 -0,5	1,6	+0,4 -0,3	16,0	0,25	0,25	0,075	1,9	2,984			
25	24,3			23,7		1,8		18,0					2,2	3,853		
28	27,2			26,7		2,0		20,0					2,5	4,834	+4	-1
32	31,2			30,5		2,3		23,0					2,8	6,313	-4	-4,5
36	34,9			34,3		2,6		26,0					3,2	7,99		
40	38,7			38,0		2,8		28,0					3,6	9,865		

## DOCUMENTATION:

Certificate of Conformity with  
TU No. ROSS RU.HB61.H23416



Certificate of Conformity  
with QMS No. ROSS RU.CK01.K00093



NIIZhB recommendations on the use of  
a screw threaded bar as reinforcement



Уважаемый Юрий Львов!

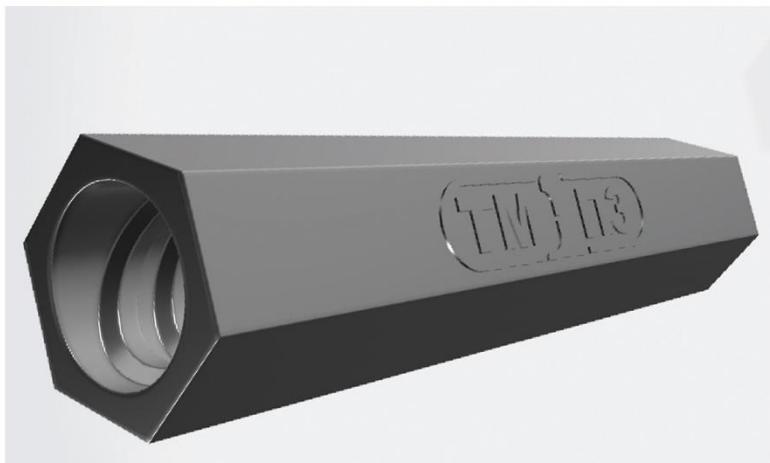
По результатам испытаний выполненных НИИЖБ им. А.А. Гвоздева горячекатаного профиля винтового профиля из рельсового передела по ТУ 0950-003-83936644-2013 и горячекатаного арматурного профилей класса A500 из рельсового передела по ТУ 0933-313-36554501-2014 установлено, что оба профиля имеют одинаковые механические свойства и химический состав и отличаются только видом периодического профиля. Европейские и отечественные нормы проектирования не учитывают вид периодического профиля, регламентируется лишь его наименование или отсутствие.

На основании этого допускается применение профилей с винтовым профилем из рельсового передела ТУ 0950-003-83936644-2013 наряду и взамен арматурного профилей класса A500 из рельсового передела с серпинидным профилем по ТУ 0933-313-36554501-2014 при условии запрещения применять спарки и выполнять изгиб более чем на 45°.

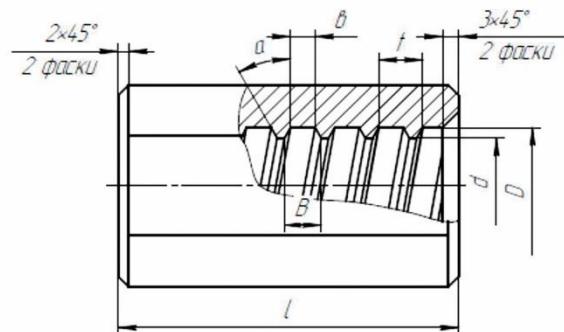
Директор  
НИИЖБ им. А.А. Гвоздева, д.т.н.  
А.Н. Давидюк

Полное:  
Зас. лаб. архитектуры Магдина С.А.  
Тел. (999) 174-74-98

# CONNECTING ELEMENTS FOR SCREW THREADED REBARS



Connecting elements (couplings, locknuts, anchor nuts) are supplied by the Tula Metal Rolling Plant complete with rebars. They are made by cutting a standard hexagonal steel billet (GOST 2879-2006). It is possible to supply products made of a round steel billet, as well as by hot stamping and precision casting in compliance with the conditions for meeting the quality requirements of products obtained by metal cutting.



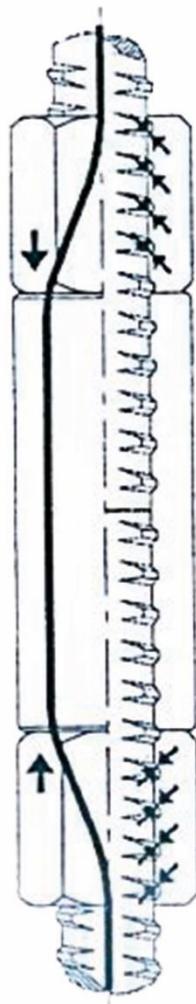
## DIMENSIONS OF THE HEXAGONAL COUPLING:

Coupling	Coupling width across flats, mm	d, mm		D, mm not less		Nominal diameter of rebars, mm	f, mm limit deviation ±0,1 mm	l, mm limit deviation ±3 mm	Weight
		Nominal size	Limit deviation	Nominal size	Limit deviation				
MS 16	30	16,1	+0,1	20	+0,1	16	13/6,5	120	362
MS 18	30	18,2		22		18	14/7	140	480
MS 20	32	20,1		24,1		20	15/7,5	140	512
MS 22	36	22,3		26,3		22	16/8	160	940
MS 25	36	25,3		29,9		25	18/9	160	970
MS 28	46	28,4		33,2		28	20/10	180	1088
MS 32	50	32,4		38,2		32	23/11,5	180	1922
MS 36	55	36,3		44		36	26/13	200	1978
MS 40	60	40,1		46,7		40	28/14	210	2143

All connecting elements produced by the Tula Metal Rolling Plant undergo quality control in accordance with the regulatory documentation requirements for the release of these products. The geometric parameters of the couplings and locknuts are checked with measuring instruments of the required accuracy. Tensile tests of samples of mechanical joints are carried out in accordance with the provisions of GOST 12004-2005, and the deformability of coupling joints is checked in accordance with GOST 34227-2017 "Mechanical rebar splices for rebars in concrete constructions. Test methods".

## DIMENSIONS OF LONG LOCKNUT:

Nominal diameter of rebars, mm	16	18	20	22	25	28	32	36	40
Locknut width across flats, mm	28	28	30	34	38	40	50	52	57
Locknut length, mm	30	40	40	40	40	45	45	45	50
Tightening torque for stretched joints, Nm	350	1000	1500	1800	1800	2000	2400	2700	2900
Tightening torque for compressed joints, Nm	350	350	350	350	350	350	350	350	350
Symbol	GKu16	GKu18	GKu20	GKu22	GKu25	GKu28	GKu32	GKu36	GKu40

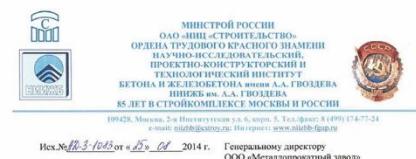
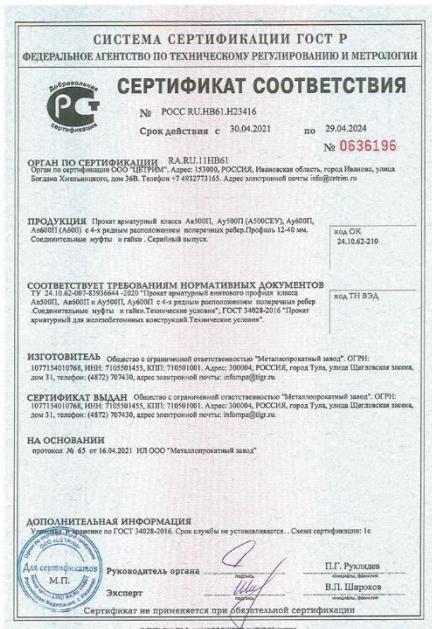


## DOCUMENTATION:

Certificate of Conformity with  
TU No. ROSS RU.HB61.H23416

Certificate of Conformity with  
TU No. ROSS RU.TcK01.K00093

NIIZhB recommendations on the use of a  
screw threaded bar as reinforcement



Уважаемый Юрий Львович!

По результатам испытаний выполненных НИИЖБ им. А. Гвоздева горячекатаного профиля винтового профиля из рельсового передела по ТУ 0950-003-83936644-2013 и горячекатаного арматурного профиля класса А500 из рельсового передела по ТУ 0933-313-36554501-2014 установлено, что оба профиля имеют одинаковые механические свойства и химический состав и отличаются только видом периодического профиля. Европейские и отечественные нормы проектирования не учитывают вид периодического профиля, регламентируется лишь его наличие или отсутствие.

На основании этого допускается применение профилей с винтовым профилем из рельсового передела по ТУ 0950-003-83936644-2013 наряду и взамен арматурного профиля класса А500 из рельсового передела с серпинидным профилем по ТУ 0933-313-36554501-2014 при условии запрещения применять спираль и выполнять изгиб более чем на 45°.

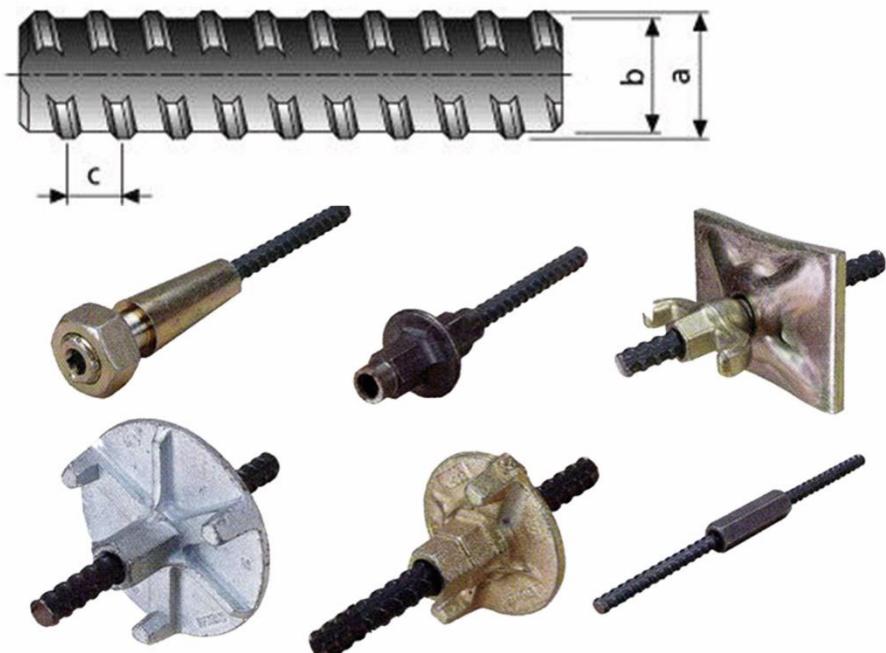
Директор  
НИИЖБ им. А. Гвоздева, д.т.н.  
А.Н. Давидюк

Полное:  
Зас. акт. архивы Магдина С.А.  
Тел. (999) 174-74-98

# PRODUCTS USING SCREW THREADED REBARS



## 1. FORMWORK TIGHTENING SCREW



The assortment of the mill includes long hot-rolled steel of screw threaded section for the manufacture of tie screws. The tightening screw is used in the installation of wall formwork, column formwork, foundations, shafts, etc. It is used in the production of monolithic reinforced concrete structures for various purposes.

The tightening screw works in tandem with the wing nuts and directly perceives the pressure of the concrete mixture. The formwork tightening screw is manufactured up to 6 meters long. The tightening screw has a diameter of 15/17 mm and a thread pitch of 10 mm. The tightening screw is fully compatible with wing nuts, swivel nuts and hex nuts.

The proposed tightening screw is manufactured by hot rolling from rail steel (low alloy steel 76). The rolled section shown below is similar to the UNI 15 VETOMAX section. Tula Metal Rolling Plant is ready to master other diameters of screw threaded rebars.

### Tightening screw specifications:

Outer diameter, a, mm	17
Thread inner diameter, b, mm	15
Thread pitch, s, mm	10
Bar width (on side flats), mm	14,7
Weight per linear meter, kg	1,39

## STEEL CHEMICAL COMPOSITION:

Steel Grade	Element Mass Percentage, %							
	Carbon	Manganese	Silicon	Vanadium	Titanium	Chromium	Sulfur	Phosphorus
						no more than		
St3	0,14-0,22	0,4-0,65	0,05-0,17	-	-	0,30	0,050	0,040
25G2S	0,20-0,29	1,20-1,60	0,60-0,90	-	-	0,30	0,045	0,040
35GS	0,30-0,37	0,80-1,20	0,60-0,90	-	-	0,30	0,045	0,040
Steel 76	0,74-0,84	0,75-1,25	0,18-0,55	-	-	-	0,045	0,035

## MECHANICAL PROPERTIES:

Plasticity category	Rolled product class	Electric heating temperature, °C	Yield strength $\sigma_T(\sigma_{0,2})$ , N/mm²	Ultimate tensile strength $\sigma_B$ , N/mm²	Ratio of actual values $\sigma_B/\sigma_T(\sigma_{0,2})$	Relative elongation, %		
						$\sigma_5$	$\sigma_p$	$\sigma_{max}$
Standard	A400	-	390	590	-	16,0	-	5,0
	A500	-	500	600	1,05	14,0	2,0	2,5
	A600	-	600	700	1,05	12,0	2,0	2,5
	A800	400	800	1000	-	8,0	2,0	2,5
	A1000	450	1000	1250	-	7,0	2,0	2,5

## DOCUMENTATION:

Certificate of Conformity with  
GOST No. ROSS RU.HB61.H08052

Certificate of Conformity with  
TU No. ROSS RU.HB61.H08053

Quality System Conformity  
Certificate No. ROSS RU.CK01.K00093



# PRODUCTS USING SCREW THREADED REBARS



## 2. ANCHOR



The assortment of the mill includes long hot-rolled steel of screw threaded section for the manufacture of anchors that are part of the roof bolting of type A-B.

Roof bolting made of screw threaded steel is designed for roof bolting the development workings with a compressive strength of coals and rocks of at least 10 and 25 MPa, the sides of workings - at least 6 and 20 MPa with a chemical method of fixing the anchor rod in the borehole.

Currently, Tula Metal Rolling Plant is ready to supply anchors for roof bolting with the parameters described below.

### Anchor specifications:

An example of

a symbol for an anchor is A16/19x8V(K)-1500, where:

- A - anchor;
- 16/19 - bar diameter / external thread diameter, mm;
- 9 - thread pitch;
- V(K) - screw threaded section (K - with an oblique cut);
- 1500 - anchor length, mm

### ANCHOR DIMENSIONS:

Standard size	A15/17x10V	A16/19x9V	A20/23x11V	A22/25x8V	A22/25x12V	A25/28x14V
Ultimate tension of the bar, kN (t), not less than	150 (15)	160 (16)	250 (25)	300 (30)	300 (30)	390 (39)
Bar diameter, mm	15	16	20	22	22	25
Thread outer diameter, mm	17	19	23	25	25	28
Thread pitch, mm	10	9	11	8	12	14

## STEEL CHEMICAL COMPOSITION:

Steel Grade	Element Mass Percentage, %							
	Carbon	Manganese	Silicon	Vanadium	Titanium	Chromium	Sulfur	Phosphorus
						no more than		
St3	0,14-0,22	0,4-0,65	0,05-0,17	-	-	0,30	0,050	0,040
25G2S	0,20-0,29	1,20-1,60	0,60-0,90	-	-	0,30	0,045	0,040
35GS	0,30-0,37	0,80-1,20	0,60-0,90	-	-	0,30	0,045	0,040
Steel 76	0,74-0,84	0,75-1,25	0,18-0,55	-	-	-	0,045	0,035

## MECHANICAL PROPERTIES:

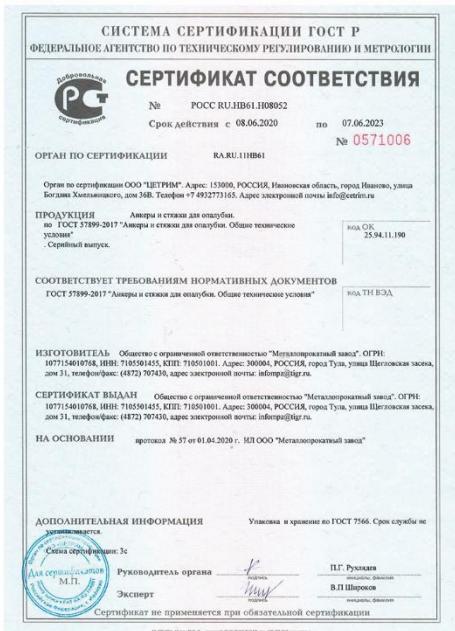
Plasticity category	Rolled product class	Electric heating temperature, °C	Yield strength $\sigma_T(\sigma_{0,2})$ , N/mm²	Ultimate tensile strength $\sigma_B$ , N/mm²	Ratio of actual values $\sigma_B/\sigma_T(\sigma_{0,2})$	Relative elongation, %		
						$\sigma_s$	$\sigma_p$	$\sigma_{max}$
Standard	A400	-	390	590	-	16,0	-	5,0
	A500	-	500	600	1,05	14,0	2,0	2,5
	A600	-	600	700	1,05	12,0	2,0	2,5
	A800	400	800	1000	-	8,0	2,0	2,5
	A1000	450	1000	1250	-	7,0	2,0	2,5

## DOCUMENTATION:

Certificate of Conformity with  
GOST No. ROSS RU.HB61.H08052

Certificate of Conformity with  
TU No. ROSS RU HB61.N08053

Quality System Conformity  
Certificate No. ROSS RU TsK.01.K00093

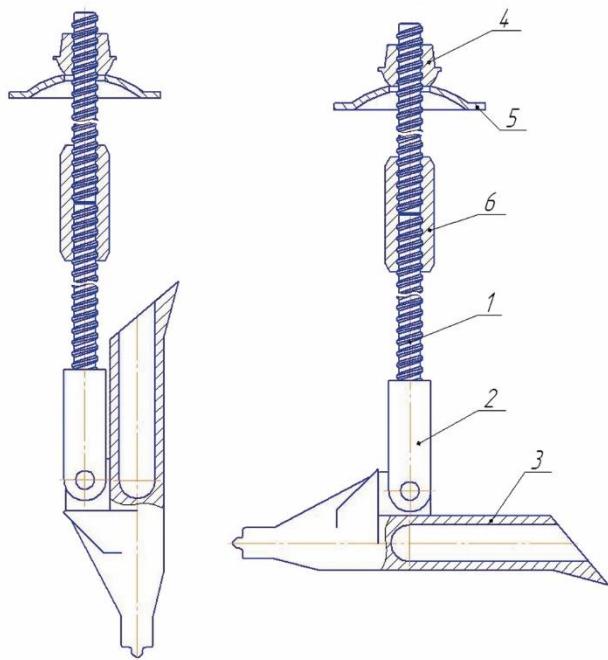


### 3. SELF-EXPANDING GROUND ANCHOR



In 2016, the specialists of the Tula Metal Rolling Plant duly agreed with Russian Railways OJSC and put into effect Specifications 3142-006-83936644-2016 for the "Self-expanding anchor AS-ZhD series". Field and acceptance tests were carried out with a positive result, on the basis of which the production of a self-expanding anchor was launched.

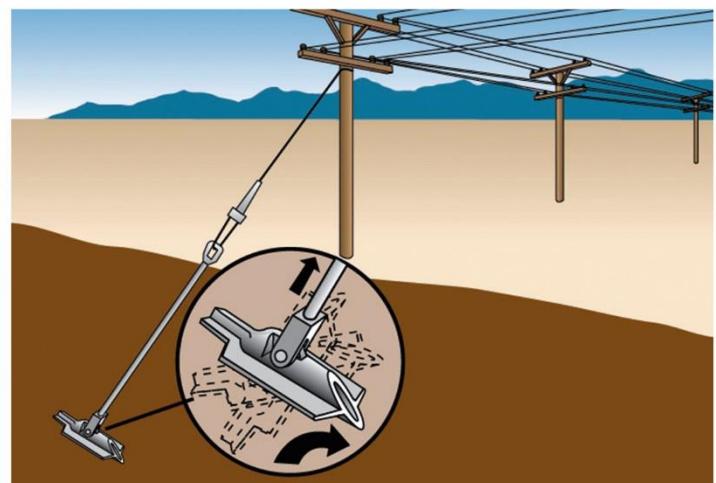
The main advantages of an anchor bolt with a self-expanding anchor are high speed and ease of installation. The installation of anchor bolts does not require the destruction of soils and slopes, the digging of pits, and the construction of foundations. The cost of installation work is reduced due to the absence of drilling, concreting and excavation costs.



#### MAKE-UP OF ANCHOR BOLT:

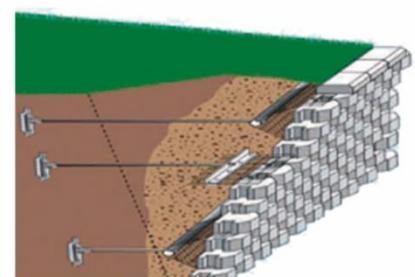
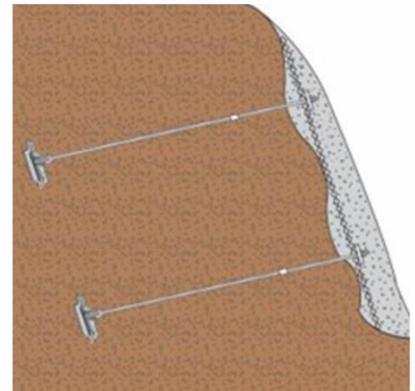
The self-expanding anchor and link are made of steel grade 40ХЛ according to GOST 977-88 or other steel grades with strength properties not lower than those of steel grade 40ХЛ. Anchor and link belong to the castings of the first group according to GOST 977-88. Casting accuracy is 9-0-0-9 according to GOST R 53464-2009.

- 1. Screw;
- 2. Link;
- 3. Anchor;
- 4. Nut spherical;
- 5. Washer hemispherical;
- 6. Coupling.



## ANCHOR APPLICATION:

- Fastening utility facilities;
- Fastening walls of trenches and pits;
- Fastening sheet piles;
- Fastening retaining walls and sides of deep pits;
- Engineering protection of networks on rough and mountainous terrain;
- Soil stabilization, anti-landslide and anti-avalanche protection;
- Strengthening slopes of roads and railways;
- Gabion fastening;
- Planting and securing trees;
- Underwater and surface structures;
- Coastal strengthening;
- Fastening of high-rise structures;
- Fastening of hardscaping.



## ANCHOR DIMENSIONS:

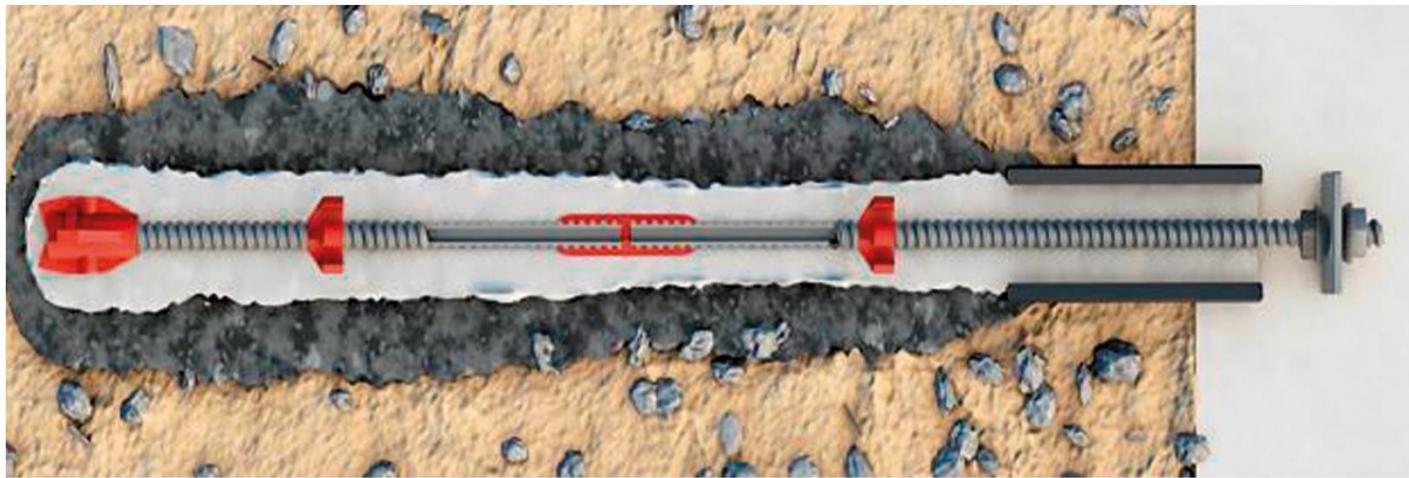
Name	Anchor size, mm (length x width)	Bearing surface area, cm <sup>2</sup>	Diameter of rod, mm	Length of rod, m
Anchor AS-ZhD-1	360 x 180	560	20	2 - 12
Anchor AS-ZhD-2	360 x 100	330	20	2 - 12
Anchor AS-ZhD-3	295 x 89	219	16	2 - 12
Anchor AS-ZhD-4	205,5 x 65	110	16	2 - 12



# DRILL-INJECTION ANCHOR



The Tula Metal Rolling Plant produces Drill Injection Anchor Systems, consisting of screw threaded anchor rods (VbASh) and components. The rods are manufactured in accordance with the Specifications 25.94.11-012-83936644-2021 with a length of 1 to 4 meters with a left-hand thread according to ISO 10208. These rods can significantly improve the adhesion of the injected mortar compared to smooth pipes. Depending on the type of rod, drill bits with a diameter of 35 - 100 mm are used. The rods are assembled into a single rod using couplings with a length of 125 - 250 mm.



## DIMENSIONS OF ANCHOR ROD:

No.	Name of anchor rod, type	Outside Diameter, mm	Inner Diameter, mm	Cross Sectional Area, mm <sup>2</sup>	Load of plastic yield, kN	Maximum load, kN	Yield strength, N/mm <sup>2</sup>	Weight of a rod per running meter, kg
1	VbASh 200 - 25	25	14	290	150	200	690	2,1
2	VbASh 190 - 30	30	16	375	130	190	560	3,9
3	VbASh 275 - 30	30	14	422	220	275	585	4,3
4	VbASh 320 - 30	30	11	481	260	320	625	4,8
5	VbASh 220 - 32	32	22	340	180	220	650	2,9
6	VbASh 280 - 32	32	18,5	430	230	280	650	3,5
7	VbASh 360 - 32	32	15	520	280	360	690	4,2
8	VbASh 370 - 38	38	26,5	582	290	370	720	4,4
9	VbASh 500 - 38	38	16	770	400	500	650	6
10	VbASh 540 - 40	40	20	760	425	540	590	5,8
11	VbASh 660 - 40	40	16	925	525	660	590	7,2
12	VbASh 930 - 52	52	26	1340	730	930	585	12,5

## MAKE-UP OF DRILL-INJECTION ANCHOR:

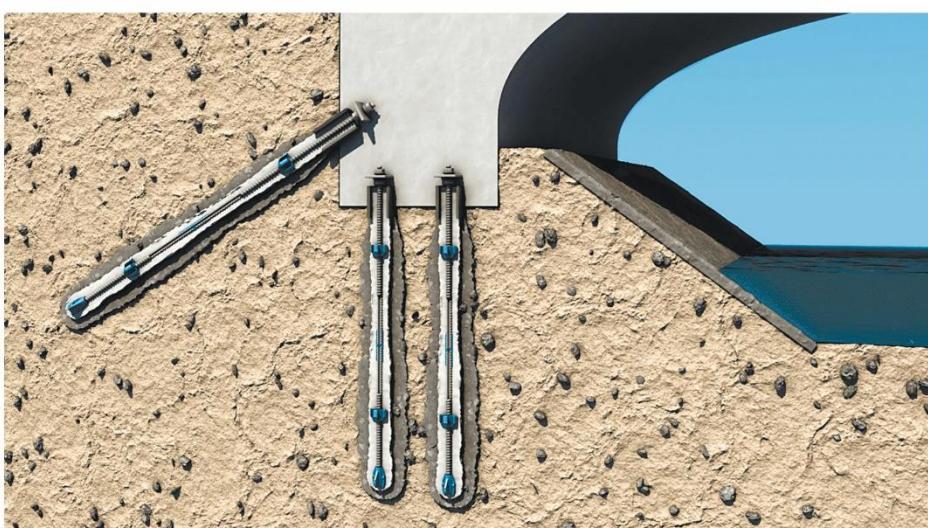
In the technology of drill-injection anchors, hollow tubular elements with a knurled wave surface are used as rods, providing high-quality contact between the tubular element and the cement stone. The construction of micropiles, anchor piles and soil dowels consists in drilling a well with flushing to the design depth and sequentially injecting a thick cement mortar.

The drill-injection anchor is made-up of:

- Nut spherical;
- Base plate;
- Coupling;
- Centralizer;
- Drill-injection coupling;
- Drill bit.

## BENEFITS:

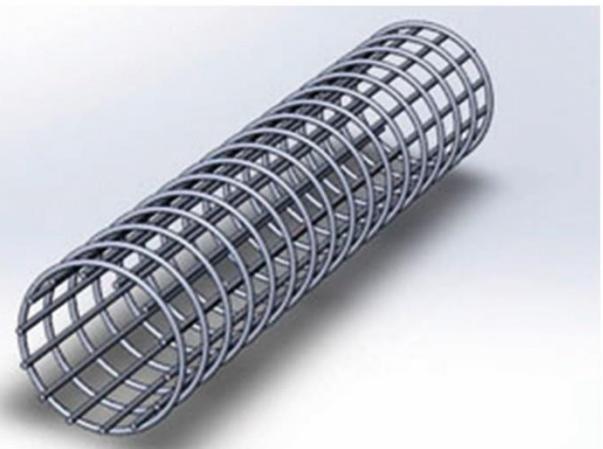
- Small dimensions of drilling equipment (mobility, work in confined spaces);
- Small vibration during the performance of work;
- Small deformation values (stability and stiffness of structures)
- Adaptation to any load pattern;
- Use as piles with compressive and tensile loads;
- Versatility: one technology for all types of soil;
- Anti-corrosion protection with a cement layer (thread geometry);
- Suitability of the system for dynamic loads;
- System operation guarantee: up to 100 years.



# REINFORCING CAGES FOR ONSHORE PUMPING STATIONS



Reinforcing cage for piles is a structure made of metal corrugated and smooth hot-rolled reinforcing bars, VR-1 wire, corrugated and smooth coiled rebars. To date, the Tula Metal Rolling Plant manufactures spatial and flat reinforcing cages of any complexity and size. In fact, the possibilities of manufacturing are limited only by the wishes of the customer and logistics to construction sites. Reinforcing cages are used in the construction of buildings for any purpose: residential, public or industrial buildings.



# ADVANTAGES OF USING REINFORCEMENT CAGES MADE OF FOUR-ROW SCREW THREADED REBARS:

## TIME:

Increasing labor productivity, reducing the time and cost of construction by reducing the time of docking one node (from 2-4 hours to 0.5-1 hour).

## SAFETY:

Increasing the safety of production (there is no welding procedure, no electrical equipment is used).

## WORKFORCE:

Reducing the need for highly qualified workers (a welder certified according to the 1st level of the National Agency for Welding Control (NAWC) is replaced by a worker of a lower qualification - a rebar fitter).

## PREPARATION:

No special preparation (drying) of electrodes for welding is required.

## WEATHER CONDITIONS:

Climatic conditions do not affect the work schedule. Works are carried out without the use of welding equipment.

# DOCUMENTATION:

Specifications for four-row screw threaded rebars

Certificate of Conformity with GOST R ISO 9001-2015



Дата введения в действие с 17 января 2020 года

РАЗРАБОТАНО:  
Начальник отдела  
ИИЭКБ им. А.А.Гвоздева  
АО «НИЦ «Строительство»  
И.Н.Тихонов  
04.01.2020 г.

РАЗРАБОТАНО:  
Заместитель генерального директора  
ООО «МПЗ»  
Н.В.Кузьменко  
14 января 2020 г.

Москва, 2020 г.



# STEEL STRUCTURES



Tula Metal Rolling Plant has been providing a range of services for the design, manufacture and installation of steel structures since 2007. Currently, the plant has over a thousand completed projects. The company pays great attention to the development of technologies - production processes are constantly being improved. Due to this, the volume of products produced is growing every year. TMPZ employees are distinguished by high professionalism and responsibility, which is confirmed by the company's Certificate of Conformity of the Quality Management System ISO 9001:2015.

## DESIGN OF STEEL STRUCTURES

When designing, specialists use the high-precision, specialized Tekla structures software product, which allows taking into account all the nuances of the future project, speeding up the design process and obtaining an accurate 3D model containing complete data on the volume of materials and scheduling necessary for the construction and operation of the future product.

As soon as possible, the design department will analyze and develop documentation. The range of design services includes:

- Development of the project concept;
- Visualization of the project on the layout;
- Calculation of the cost of work and materials.



## MANUFACTURE AND INSTALLATION OF STEEL STRUCTURES

All work on the manufacture and installation of steel structures is carried out strictly according to the state standards of the Russian Federation (GOST). When checking the quality of welded parts, the latest equipment is used - X-ray and ultrasonic scanning devices that recognize the slightest violations in the welds, information about which is contained in the plant's specifications. The accumulated experience of specialists and high technological equipment allow us to confidently cope with the installation of structures of any complexity.

Tula Metal Rolling Plant specializes in the manufacture and installation of steel structures of the following types:

- Production buildings;
- Warehouse complexes;
- Athletic facilities;
- Bridge structures;
- Transport facilities;
- Shopping and entertainment centers;
- Agricultural buildings.

## DISMANTLING OF BUILDINGS, FACILITIES AND EQUIPMENT

The company provides a full range of services for the dismantling of buildings and structures according to a strictly approved scheme and established regulations in the field of this type of activity. Dismantling services include:

- Development of design and permit documentation;
- Mechanized and manual dismantling of buildings;
- Recycling and disposal of construction waste.

When carrying out dismantling works, TMPZ uses all the necessary special equipment, including: excavators with various attachments, dismantling equipment, crushing and screening plants, dump trucks and loaders.





PRODUCT CATALOGUE

[www.tulampz.ru](http://www.tulampz.ru)

Office:  
Moscow, Sadovaya-Spasskaya str., 21/1  
+7 (495) 419-00-78  
[info@tigk.ru](mailto:info@tigk.ru)

Production facility:  
Tula, Shcheglovskaya zaseka str., 31, bldg. 1  
+7 (4872) 70-74-30  
[infompz@tigk.ru](mailto:infompz@tigk.ru)