

RELIABLE STEEL SOLUTIONS FOR STRATEGIC INDUSTRIES AND PROJECTS



ZAGORSK
PIPE
PLANT

**URAL
STEEL**

WORLD-CLASS METALLURGY

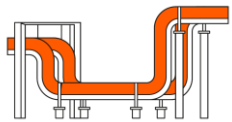


URAL STEEL MANAGEMENT COMPANY

URAL STEEL MANAGEMENT COMPANY IS CREATED TO MANAGE OPERATING ASSETS INCLUDED IN A SINGLE METALLURGICAL HOLDING (ZAGORSK PIPE PLANT AND URAL STEEL PLANT) IN 2022.

THE COMPANY PERFORMS OPERATIONS FROM THE PRODUCTION OF CAST IRON AND STEEL TO THE SUPPLY OF HI-TECH PRODUCTS.

APPLICATION OF PRODUCTS:



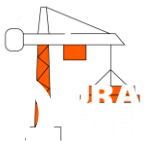
PIPELINES



OIL AND GAS INDUSTRY



BRIDGE CONSTRUCTION



CONSTRUCTION



SHIPBUILDING



MECHANICAL ENGINEERING

ZAGORSK PIPE PLANT

TOP-OF-THE-LINE PIPE PLANT IN RUSSIA BUILT WITHIN **16 MONTHS** HAS BECOME A LEADING PIPE SUPPLIER OF **GAZPROM** WITHIN 3 YEARS AFTER LAUNCHING THE NEWLY-FOUNDED PRODUCTION FACILITY CUMULATIVE PRODUCTION **EXCEEDED 3 MILLION PIPES**

URAL STEEL

A **FULL-CYCLE PLANT** THAT INCORPORATES BLAST-FURNACE, STEELMAKING, ROLLING AND OTHER PRODUCTION PROCESSES NEW SOLUTIONS FOR **PIPE AND BRIDGE CONSTRUCTION INDUSTRY** MORE THAN **100 BRIDGES** CONSTRUCTED FROM URAL STEEL PRODUCTS

KEY PROJECTS AND SALES GEOGRAPHY



OUR PROJECTS

ZAGORSK PIPE PLANT

POWER OF SIBERIA GAS PIPELINE
VOSTOK OIL
NORTH-RUSSKOYE FIELD
EUROPE — WEST CHINA TRANSPORT CORRIDOR



URAL STEEL PLANT

THE COMPANY'S STEEL HAS BEEN USED IN THE CONSTRUCTION OF THE BRIDGE TO THE RUSSKY ISLAND IN VLADIVOSTOK AND:

- BOLSHOY MOSKVORETSKY BRIDGE
- ZHIVOPISNY BRIDGE
- LUZHNITSKY METRO BRIDGE
- LUZHNIKI GRAND SPORTS ARENA
- SOCHI STADIUM FISHT
- CATHEDRAL OF CHRIST THE SAVIOR
- MOSCOW-CITY



ZPP HIGH TECHNOLOGIES



PRODUCTION

- SHEET QUALITY CONTROL IS ASSURED BY INDEPENDENT INSPECTION
 - HIGHEST PERFORMANCE IN THE INDUSTRY
 - **17 PIPES PER HOUR**
 - **200 KM OF PIPES PER MONTH**
- PRODUCTION CAPACITY BY HEAT WATERPROOF INSULATION (for medium size pipes)



LSAW, LARGE DIAMETER PIPES

- THREE-HIGH ROLLING MILL
- 508–1422 MM PIPES
- **MILL AND MAIN FACILITIES MANUFACTURERS:** LEADING EUROPEAN MANUFACTURERS



PIPE COATING

- EPOXY COATING
- 2/3LPE/PP/PUF
- INTERNAL COATING
- ANY CUSTOMER SPECIFICATIONS



EXTRA-LARGE DIAMETER



SUCCESSFULLY USED IN
STRENGTHENING ARCTIC COASTAL
AND PORT INFRASTRUCTURE.



OTHER APPLICATIONS WILL BE
POSSIBLE IN THE FUTURE.



**NO
TRANSVERSE
WELDED
JOINTS**

DIAMETER:
up to 2520 mm

LENGTH:
up to 12,000 mm

**ZPP EXTRA-LARGE DIAMETER PIPES:
SAFETY IN CRITICAL SITUATIONS**



ZPP CLADDED LARGE DIAMETER PIPES

FIRST MANUFACTURER IN RUSSIA



DIAMETER:
508–1,220 mm



WALL THICKNESS:
12–32 mm

**CLADDED LARGE
DIAMETER PIPES:**

COST-EFFECTIVE
REPLACEMENT FOR
STAINLESS STEEL PIPES

IN **2021**, ZPP BECAME THE FIRST
AND THE ONLY
ENTERPRISE IN RUSSIA THAT
EMBRACED THE PRODUCTION
TECHNOLOGY
AND SUCCESSFULLY PASSED
INTERNATIONAL CERTIFICATION

API-5LD



BI-METAL ROLLED
PRODUCTS PRODUCED
BY **URAL STEEL**



NEW RANGE OF PIPES FOR TRANSPORTATION OF HYDROGEN

PROMISING DIRECTION

INTERNATIONAL
STANDARD

IN **2022**, ZPP PRODUCED AN EXPERIMENTAL BATCH OF PIPES FOR THE TRANSPORTATION OF HYDROGEN.

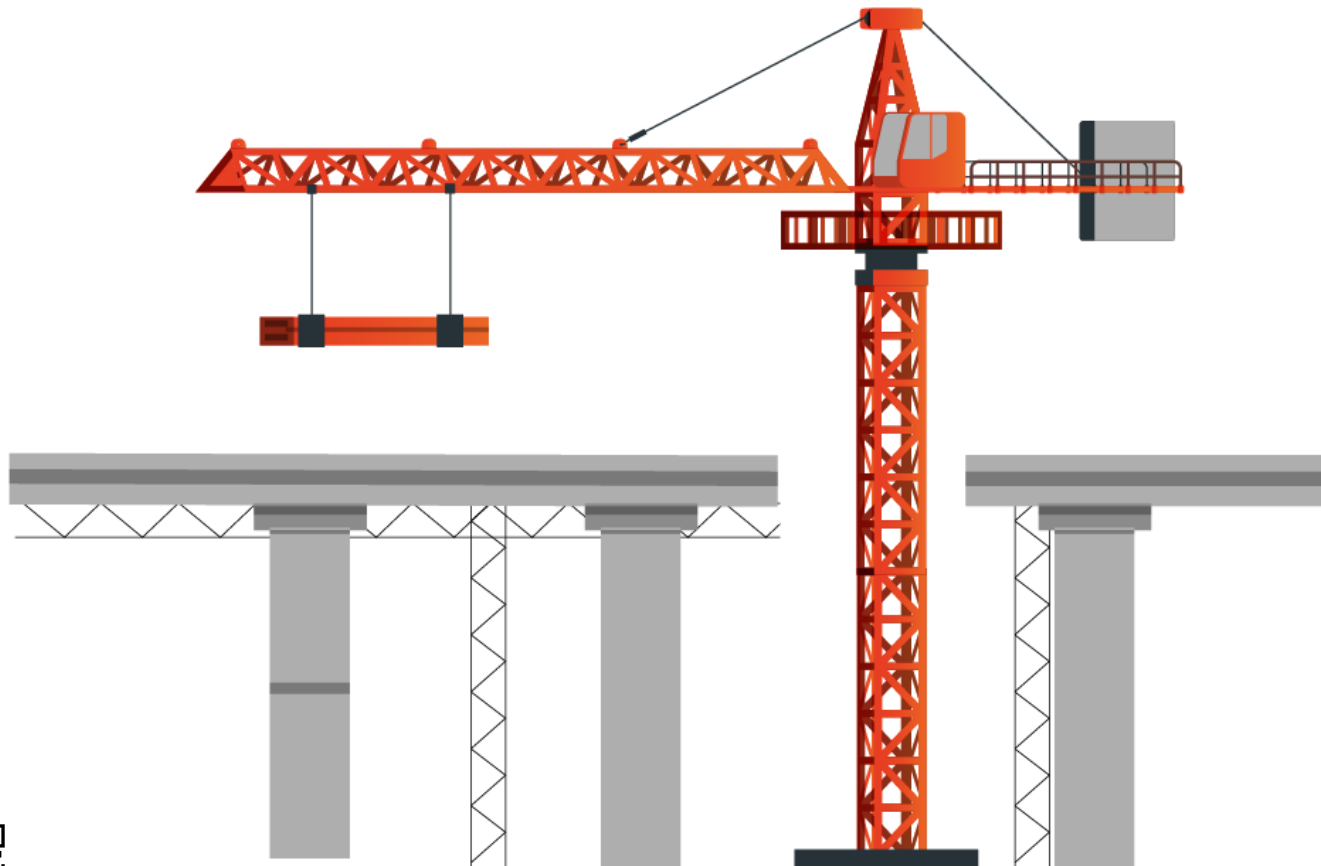
THEY CONFORM TO ASME B 31.12, THE ONLY INTERNATIONAL STANDARD THAT REGULATES REQUIREMENTS FOR PIPES INTENDED FOR THE TRANSPORTATION OF HYDROGEN.

GUARANTEED QUALITY



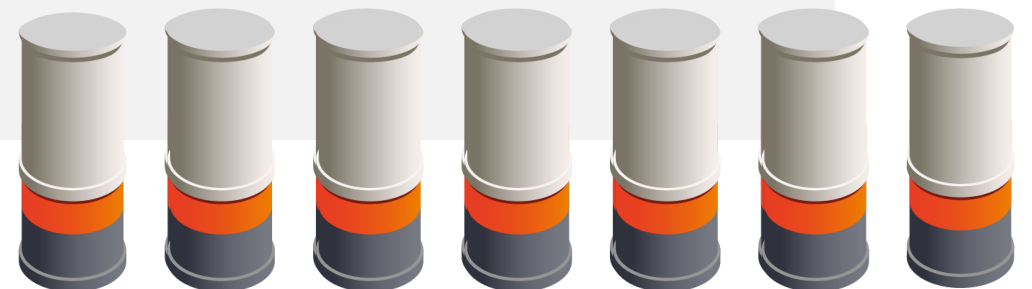
PILES FOR BRIDGES AND OVERPASSES

HIGH QUALITY
(USE OF HIGH-STRENGTH STRUCTURAL STEEL
GRADES C440-C540 AS PER GOST 27772-2015)
AND COMPLIANCE WITH INTERNATIONAL STANDARDS.



AREAS OF APPLICATION:

CONSTRUCTION OF BRIDGES
CONSTRUCTION OF HIGHWAYS
CONSTRUCTION OF PASSAGES



URAL STEEL CAPABILITIES



LARGEST PLANT

- **5 MAIN PROCESS STAGES:** SINTERING, COKE AND BY-PRODUCT, BLAST-FURNACE, STEELMAKING AND ROLLING
- **MORE THAN 100 GRADES OF CARBON AND ALLOY STEELS**

HIGH PERFORMANCE

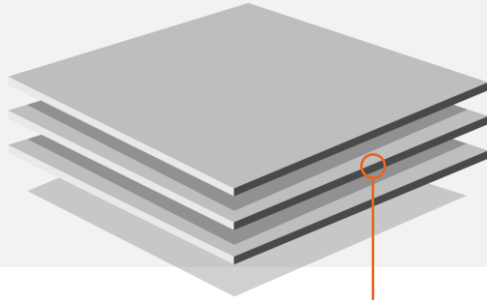
- **CAST IRON: 2.4 MILLION TONNES PER YEAR**
- **CONTINUOUSLY CAST STEEL BILLET, ROUND AND RECTANGULAR: 1.5 MILLION TONNES PER YEAR**
- **ROLLED PRODUCTS: 900 THOUSAND TONNES PER YEAR**
- **HEAT-TREATED ROLLED PRODUCTS: UP TO 80 MILLION TONS PER YEAR**

MAJOR INFRASTRUCTURE PROJECTS

- **MORE THAN 100 BRIDGES** CONSTRUCTED FROM URAL STEEL PRODUCTS
- **DOZENS** OF OBJECTS CONSTRUCTED FROM STRUCTURAL STEEL FOR CONSTRUCTION
- **HIGH QUALITY** STEELS FOR STRATEGIC OIL AND GAS PIPELINES



ROLLED SHEET



THICKNESS:
8–50 mm

WIDTH:
1,500–2,500 mm

LENGTH:
4,500–12,000 mm

SUPPLY CONDITION:

hot rolled, controlled rolling, thermomechanical treatment, hardening and tempering, normalization, high-temperature tempering

PIG CAST IRON

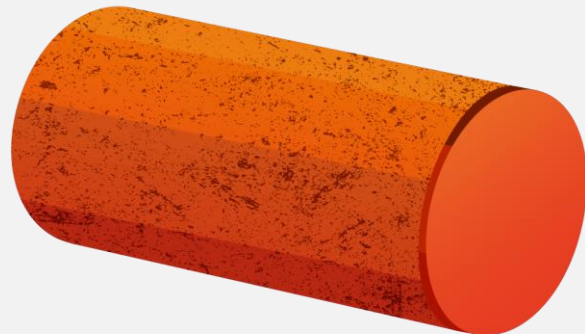


PIG WEIGHT:
18 kg

DIMENSIONS:
200x150x150 mm

SHIPMENT:
in bulk

CONCAST BLANKS

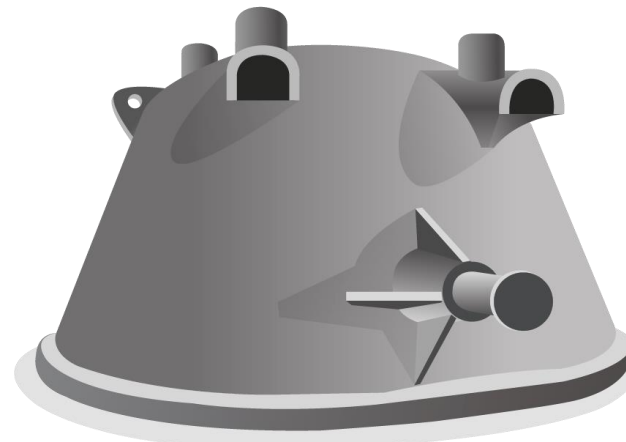


RODS Ø
455, 540, 600 mm

BARS:
300x330 mm

LENGTH:
up to 9,000 mm

SHAPED CASTING

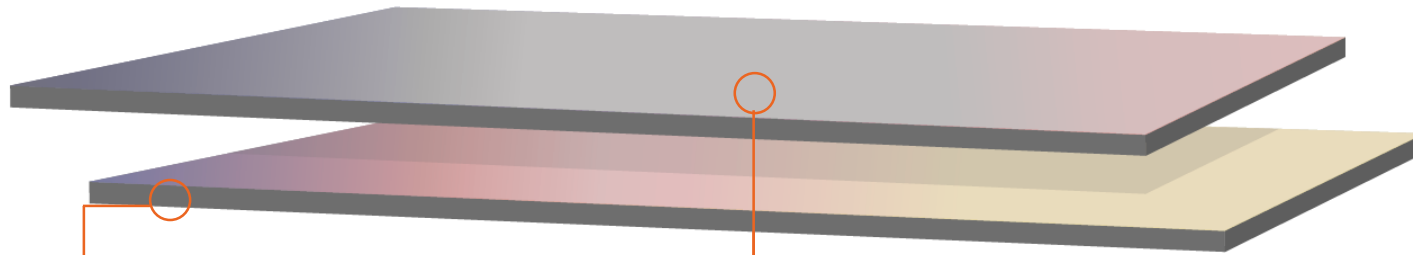


HEAVY CASTING:
up to 100 tonnes

SMALL CASTING:
up to 6 tonnes

MATERIAL:
steel, cast iron





STRIPS

PIPE SIZE RANGE:

thickness: 8–30 mm
width: 1,500–2,500 mm
length: 4,500–12,200 mm

STEEL GRADES:

steels X42–X70 and K48–K65,
09Г2ФБ(K56), 20, P235TR1, 10Г2ФБЮ,
12Г2СБ, 13Г1С-У, 17Г1С-У, 09Г2С,
14ХГС, P355NH, S355J2H, GR.BM,
GRBMO

REGULATORY DOCUMENTS:

API 5L, TU 14-1-1950-2004,
TU 14-1-5477-2004, TU 14-1-5493-2004,
TU 14-1-5511-2005

CORROSION-RESISTANT STRIPS

PIPE SIZE RANGE:

thickness: 8–50 mm
width: 1,500–2,500 mm
length: 4,500–12,200 mm

STEEL GRADES:

09ГСФ, 13ХФА, 08ГБФ-У, steel
class K50–K65

CORROSIVE CHARACTERISTICS:

- CLR, CTR, CSR hydrogen cracking
- resistant to sulphide stress cracking
- corrosion rate in simulative CO₂- and H₂S-environments ≤ 0.50 mm/year

ROLLED PRODUCTS FOR STEEL STRUCTURES AND TANKS

PIPE SIZE RANGE:

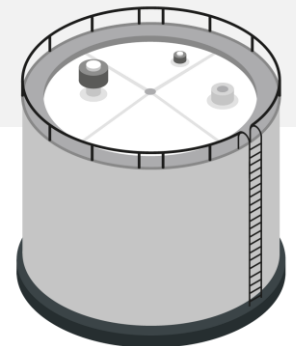
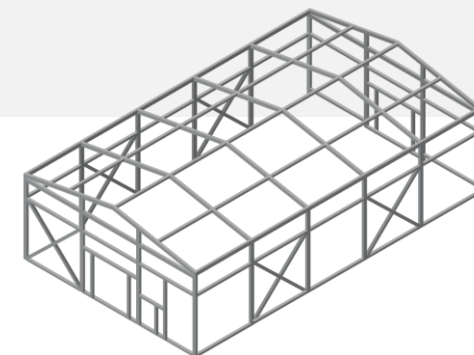
thickness: 8–50 mm width: 1,500–2,500 mm
length: 4,500–12,000 mm.

STEEL GRADES:

- 3сн as per GOST 380
- 09Г2С, 17Г1С, 14Г2АФ, etc. as per GOST 19281
- C345, C355, C390, C440, etc. as per GOST 27772

ADDITIONAL REQUIREMENTS:

- resistance and area reduction in Z-direction
- impact strength at up to -70 °C
- yield to tensile strength ratio
- elongation at temperatures up to 600 °C



HIGH-STRENGTH STEEL

GRADE	STANDARD	YIELD STRENGTH σ_T , N/MM ²	ULTIMATE TENSILE STRENGTH σ_B , N/MM ²	RELATIVE ELONGATION δ_5 , %
			not less or within	
C590	GOST 27772	590	685–845	15
12ГН2МФАЮ (BC-1)	TU 14-1-5241	590–785	690–880	14
14ХГ2САФД	TU 14-1-5241	C 50/60: 490–735 C 50/60: 590–835 C 70/80: 685–930	590–835 685–930 780–1,030	16 14 14
17ХГН2МФБТ	TU 14-1-5447	950	1,050	11
12ХГН2МА	TU 14-1-5446	690	790	16
690	STO US	690	770–940	14
350	STO US	850	1,050 (hardness not less than 310-370 NV)	11
400	STO US	950	1,150 (hardness not less than 370-430HB)	10



WEATHERING STEEL 14XГНДЦ

ANALOGUE OF COR-TEN



The main application is **unpainted steel bridges**. In Russia, **12 bridges** are made of steel 14XГНДЦ, **1 bridge** — under construction, **10 bridges** — designed.

14XГНДЦ is used for the manufacture of **power transmission towers, railway cars, containers**, as well as **in architecture** for building facades, sculptures, and small architectural forms.

In car building: **turn-around cars** for the transportation of fossil materials from quarries.



COST EFFECTIVENESS

The cost of products made of 14XГНДЦ without painting is **10–15% lower** than the cost of painted products made of traditional steels. The life-cycle costs are **reduced by 30%**, as no regular repainting is required.



GEOMETRIC DIMENSION:

- length range from 8 to 50 mm
- width range from 1,500 to 2,500 mm
- length range from 4,500 to 12,000 mm



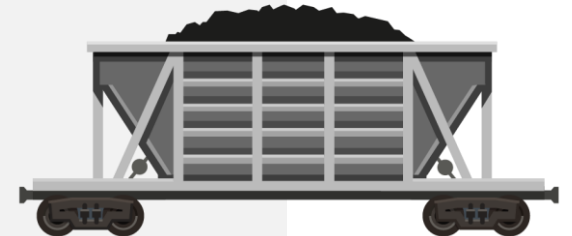
STRENGTH CLASS OF ROLLED PRODUCTS:

Steel 14XГНДЦ provides strength classes standard for bridge steel: **C345, C390**.



FERRUM BC, ST. PETERSBURG

TEAMS OF URAL STEEL JSC, BARDIN TSNIICHERMET, WERE AWARDED THE GOLD MEDAL OF METAL-EXPO INTERNATIONAL EXHIBITION WINNER



MARINE GRADE WEATHERING STEEL 06ГНЗМД

The new 06ГНЗМД steel is based on the Japanese SMA490W-MOD steel, **without the limitations of 14ХГНДЦ**. It was developed together with Institute Giprostroymost JSC and VNIIZhT JSC. It is used in the construction of bridges across the seas.

Research was carried out to develop a system for doping new steel containing ~3.0% of nickel and production modes that provide the required **corrosion resistance when operating in the maritime zone**. During the research, a steel grade was obtained that can not only last the entire service life without additional protection, but also withstand harsh climatic conditions, including **regions with operating temperatures below -50 °C**.

THE USE OF WEATHERING STEEL 14ХГНДЦ IS RESTRICTED BY UNPAINTED STRUCTURES:

in maritime zone:
minimum 500 m away from the coastline as per the standards

if conditions for the formation of a protective film and/or the use of saline solutions for surface cleaning are violated.



STEEL GRADE	SHEET THICKNESS, MM	$\sigma_{0,2}$, MPa	σ_B , MPa	δ_5 , %	TEST TEMPERATURE, °C	IMPACT STRENGTH, J/CM ²
SMA490W-MOD (prototype product)	6–100	355	490–610	21	0	KCU -70°C ≥ 29 KCV -40°C ≥ 29
06ГНЗМД	8–50	345	490–685	21	-70	KCU ≥ 29 KCV ≥ 29
		390	530–685	19	-40	



CRYOGENIC STEEL 0H6 and 0H6ДМБ

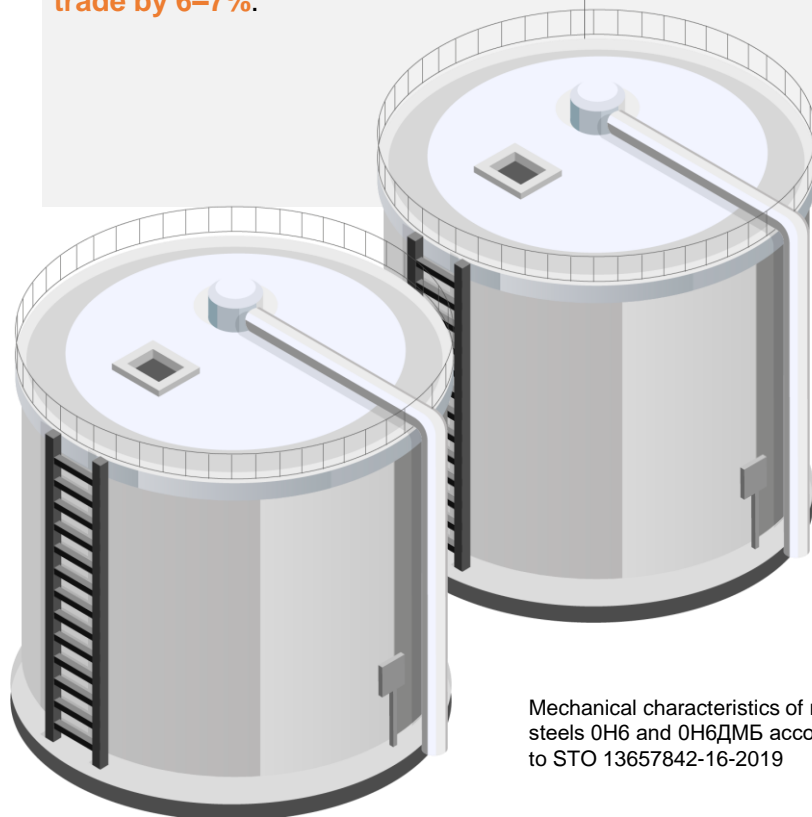
Currently the global LNG market is **380 million** tonnes per year.

According to all forecasts of leading analysts, the LNG market **will grow until 2050** under any scenarios of carbon-free development of the global economy. Pipeline gas trade is growing by about 1% from year to year, **LNG trade by 6–7%**.

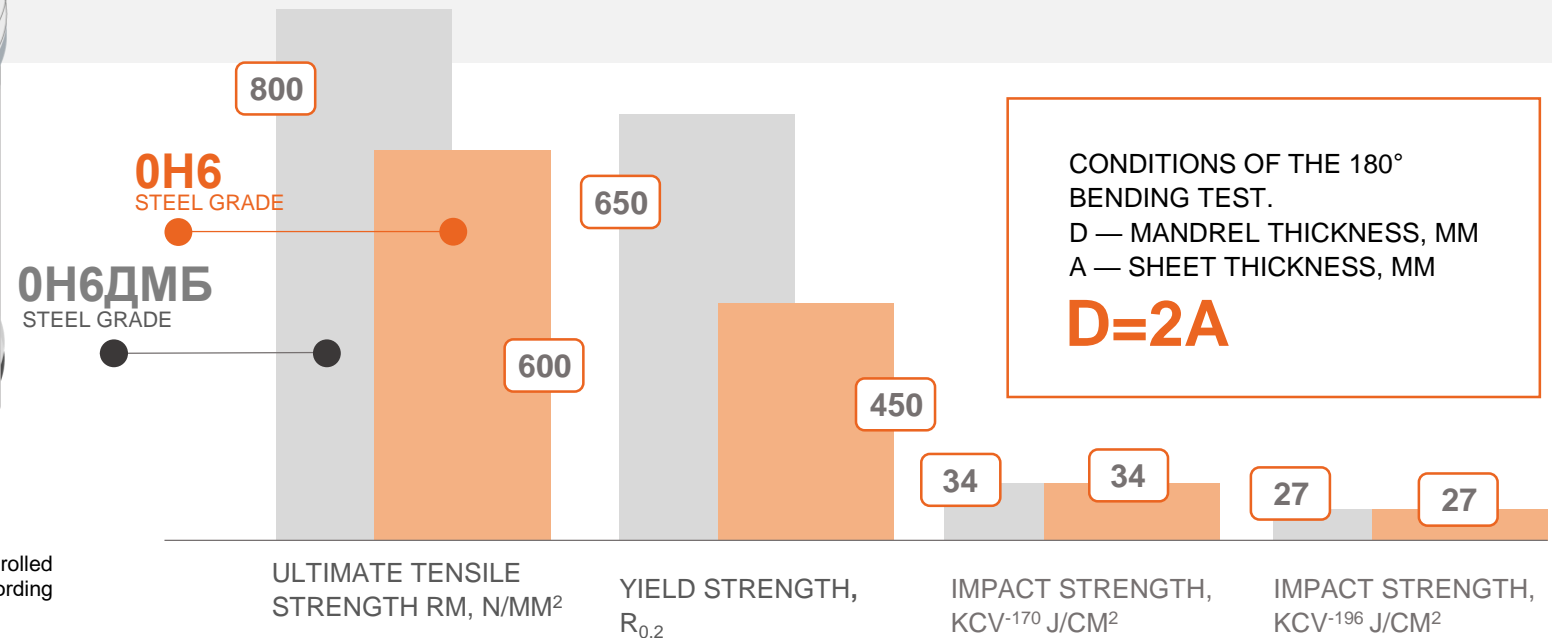
In world practice, the following cryogenic materials are used: ferritic steel (about 9% ni); stainless steel type **10x18H10T**; alloy (36% ni) with low coefficient of linear expansion (invar).

In domestic practice, **steel 0H9** was developed and tested. The level of mechanical properties of this steel met the requirements of the astm a 353: **$\sigma_y \geq 550 \text{ n/mm}^2$** **$\sigma_u \geq 685 \text{ n/mm}^2$** , **$\delta_5 \geq 15\%$** , cold resistance **$k_{CV-196} \geq 30 \text{ j/cm}^2$**

Ural Steel has developed **cost-effective alloy steel** with full range of mechanical and physical-chemical properties: cryogenic steel grades 0H6 and 0H6ДМБ. The use of these grades is reasonable because of **the lower price of rolled products** and significantly **higher strength characteristics** in comparison with austenitic stainless steel.



Mechanical characteristics of rolled steels 0H6 and 0H6ДМБ according to STO 13657842-16-2019



FIRE-RESISTANT STEEL — 06МБФ

CERTAIN REQUIREMENTS FOR FIRE-RESISTANT STEEL:

- The yield strength at **600–700 °C** shall not be lower than **0.6** of the yield strength at room temperature.
- The limit state of the structure for the loss of load-bearing capacity (R) shall comply with the project.

THE INNOVATIVE DEVELOPMENT OF URAL STEEL JSC ALLOWS THIS STEEL TO BE USED AS BUILDING STRUCTURES WITHOUT APPLYING THE NECESSARY PROTECTIVE FIRE-RESISTANT COATING:

- The yield strength of 06МБФ (C345) at 600 °C is **1.5-2.0 times higher** in comparison with 09Г2С (C345).
- Given the high cost of the fire-resistant material and the time-consuming work on application of coating, the new steel has a significant economic effect.
- The limit state of the structure for the loss of load-bearing capacity (R) for 09Г2С is **23 minutes**, and in the case of 06МБФ without fire-resistant coating — **29 minutes**. The fire resistance of the new steel is **25%** higher than that of the base steel (09Г2С). When using 06МБФ **with a half protective layer**, the R parameter is **61 minutes**.



STEEL GRADE	MECHANICAL PROPERTIES OF STEEL				
	+20 °C			+600 °C	
	Ultimate tensile strength	Yield strength	Relative elongation	Ultimate tensile strength	Yield strength
		minimum			minimum
N/mm ²		%	N/mm ²		
06МБФ	490–670	345	21	240–420	200



STEEL FOR BRIDGE CONSTRUCTION

ROLLED PRODUCTS MANUFACTURED BY URAL STEEL JSC FOR BRIDGE CONSTRUCTION COMPLY WITH THE REQUIREMENTS OF STANDARDS:

- GOST 6713
- STO 13657842-1-2009
- SP 35.13330.2017 BRIDGES AND PIPES

COMPLETED PROJECTS:

- BUGRINSKY BRIDGE IN NOVOSIBIRSK
- RECONSTRUCTION OF AGRYZ — DRUZHININO VIADUCT
- OTKRITIE BANK ARENA STADIUM, MOSCOW;
- ROAD BRIDGE BETWEEN RUSSIA AND CHINA IN BLAGOVESHCHENSK

UNDER CONSTRUCTION:

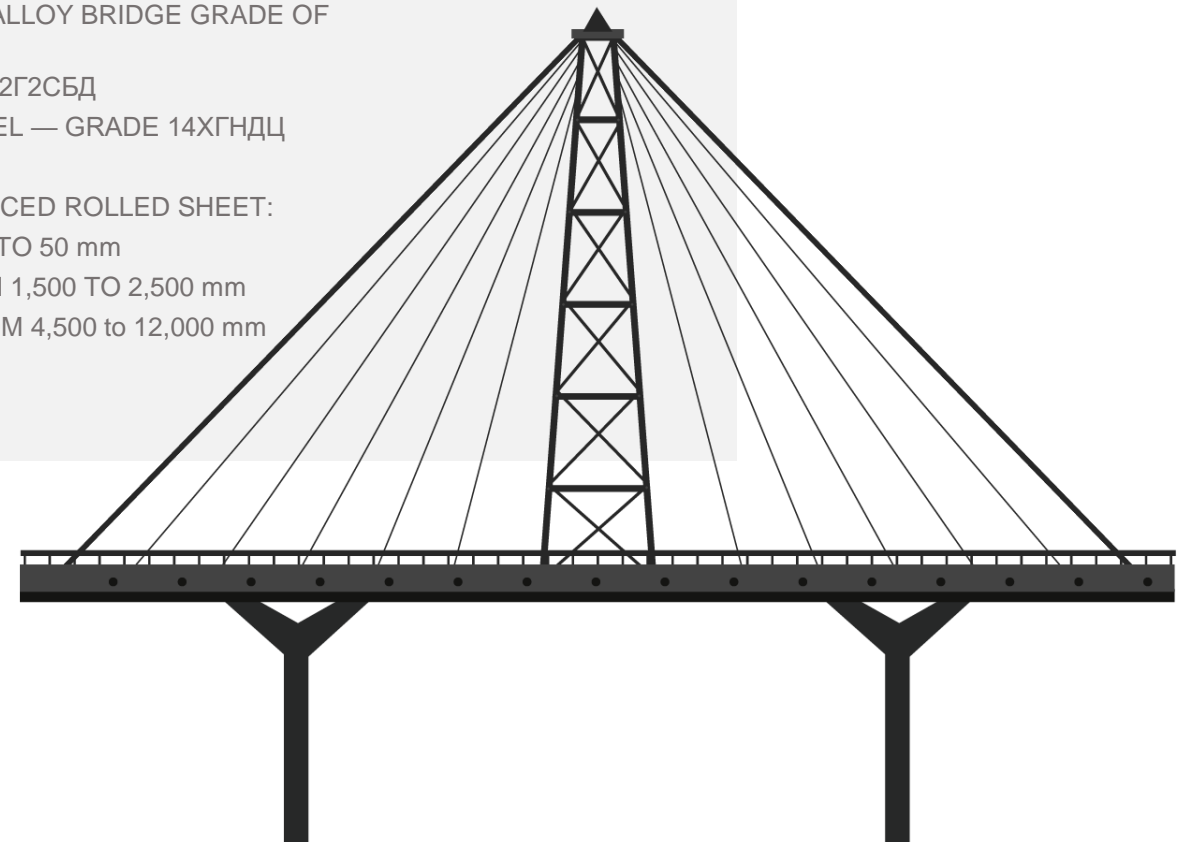
- HIGHWAY M12 MOSCOW-KAZAN
- BRIDGE ACROSS THE VOLGA NEAR TOGLIATTI
- BRIDGE ACROSS THE TVERTSA RIVER ON THE HIGHWAY M11

PRODUCED STEEL GRADES:

- TRADITIONAL BRIDGE 10XCHД, 15XCHД
- EXCLUSIVE BRIDGE GRADES MANUFACTURED BY URAL STEEL JSC: 10XCHДА, 15XCHДА according to STO 1365784-1-2009
- COST-EFFECTIVE ALLOY BRIDGE GRADE OF CLASS A
- STRENGTH C345: 12Г2СБД
- WEATHERING STEEL — GRADE 14ХГНДЦ

SIZE RANGE OF PRODUCED ROLLED SHEET:

- THICKNESS FROM 8 TO 50 mm
- WIDTH RANGE FROM 1,500 TO 2,500 mm
- LENGTH RANGE FROM 4,500 to 12,000 mm

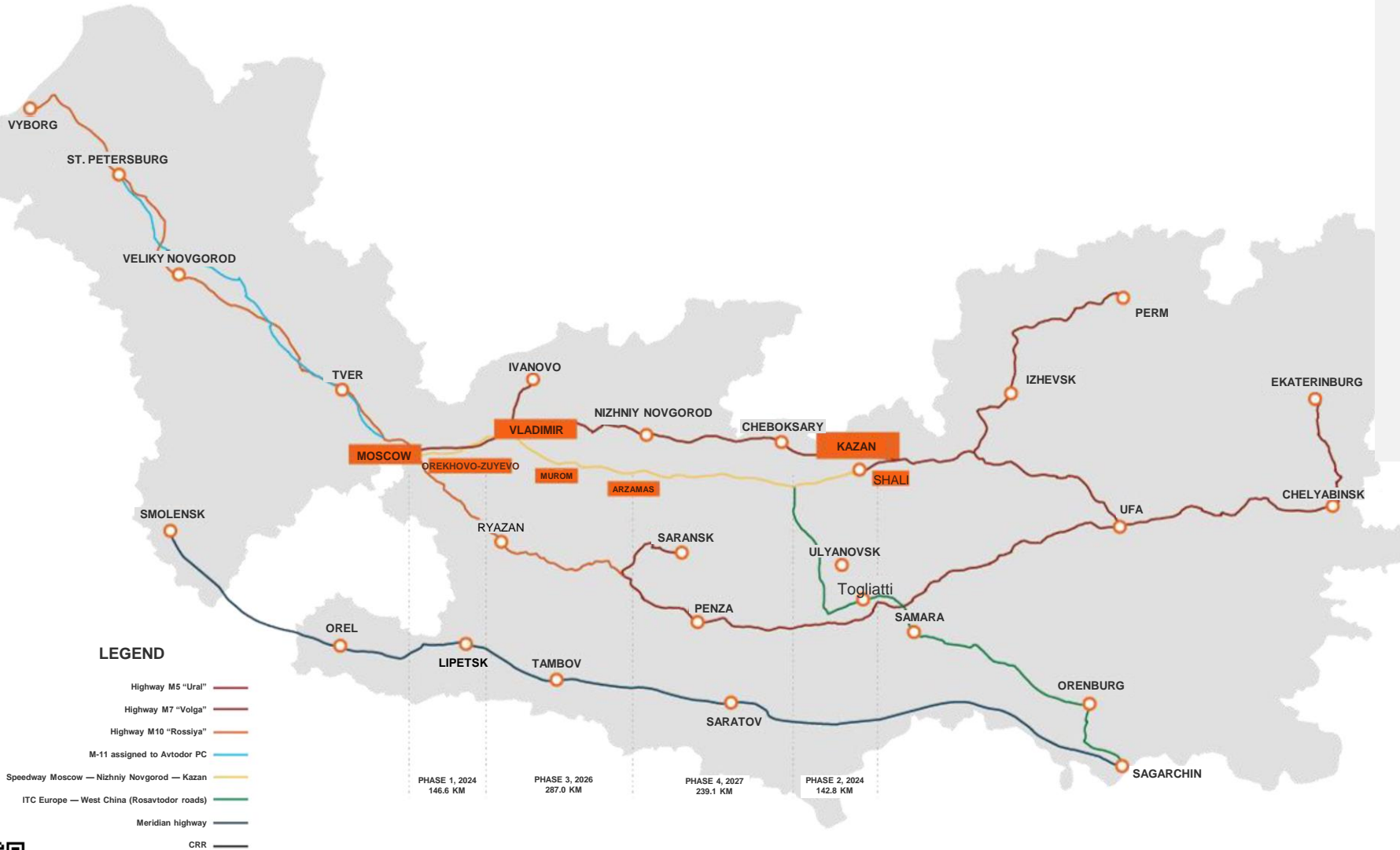


STEEL FOR BRIDGE CONSTRUCTION

**PROJECT WITH THE USE OF
BRIDGE ROLLED PRODUCTS
MANUFACTURED BY URAL STEEL
JSC: SPEEDWAY MOSCOW-KAZAN**

THE TOTAL LENGTH OF THE NEW
HIGHWAY MOSCOW-KAZAN WILL BE
794 KM, INCLUDING BALASHIKHA
AND NOGINSK BYPASSES.

COMPLETE READINESS OF THE
ENTIRE HIGHWAY — 2027



BIMETAL ROLLED PRODUCTS

ADVANTAGES OF BIMETAL ROLLED PRODUCTS:

- **performance characteristics** (wear resistance, corrosion resistance, resistance in aggressive environments) are **3–6 times higher** than those of carbon steel analogues
- **mechanical strength is higher** than that of stainless steel analogues, the possibility of reducing weight
- **cost is lower** than that of the stainless steel analogues

Ural Steel JSC has the capacity to produce bimetal sheets **by batch rolling**. 100% of the sheet area is subject to automated ultrasonic continuity testing in accordance with the requirements of classes 0, 1, 2 as per GOST 22727; U1, U2 as per ISO 10893. The value of the **bonding strength between layers is 2.5–3 times higher than the standard**.

The use of bimetal rolled products can lead the stainless steel replacement (LNG, gas chemistry, chemicals, nuclear power plants) or as an alternative to ferrous steel to reduce the cost of pipeline repairs.

BIMETAL is a double-layered steel consisting of the base layer (usually ordinary strip or structural steel) and cladding layer made of stainless steel.

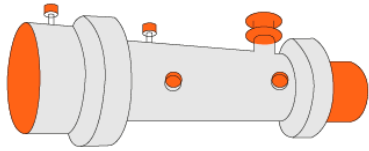


PURPOSE OF BIMETAL ROLLED PRODUCTS	APPLICATION AREA	EXAMPLES OF APPLICATION
ANTIFRICTION	Mechanical engineering	Friction bearings, elements of brake systems
CORROSION RESISTANCE	Shipbuilding	Icebreakers
	Nuclear-power engineering	Cooling system tanks
	Oil and gas industry	Pipelines
	Chemical industry	Containers, tanks
WEAR RESISTANCE	Agricultural machinery	Soil treatment equipment
	Heavy engineering and automobile industry	Excavator buckets, vehicle bodies (dump trucks)
ELECTRICAL ENGINEERING	Electronics	Conductors and parts of contact devices

The volume of bimetal consumption in the world is at the level of 180 thousand tonnes with the potential to grow to 260 thousand tonnes by 2025.



BIMETALS FOR PRODUCTION LINE FACILITIES



HEAT EXCHANGERS

OPERATING CONDITIONS:

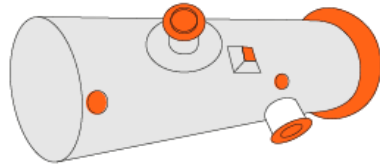
pressure — from 1.6 to 16.0 MPa;
temperature — from -40 to 400 °C

MEDIUM COMPOSITION:

water steam up to 2.3%, hydrocarbons, air, H₂S from 1.3 to 9.8%

CORE MATERIAL:

09Г2С+12Х18Н10Т(Б), thickness from 12 to 50 mm



GAS SEPARATORS

- gas-liquid separation

OPERATING CONDITIONS:

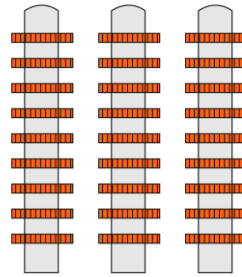
pressure — up to 10 MPa;
temperature — from -21 to 70 °C

MEDIUM COMPOSITION:

hydrocarbons, methanol, etc.

CORE MATERIAL:

base layer: steel Cт3, 09Г2С, 16ГС, 12ХМ, clad layer: 08Х13, 08Х18Н10Т, 10Х17Н13(15)М2(3)Т, 08Х22Н6Т, etc., thickness range: from 8 to 30 mm



RECTIFICATION COLUMNS

- liquid mixtures separation

OPERATING CONDITIONS:

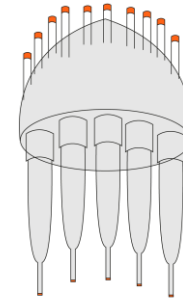
pressure — up to 3.4 MPa;
temperature — up to 380 °C

MEDIUM COMPOSITION:

hydrocarbons, water steam, fluid catalytic cracking products (up to 2% H₂S)

CORE MATERIAL:

double-layered steel 09Г2С+08Х13, thickness from 12 to 50 mm



REACTORS

- chemical reactions

CORE MATERIAL:

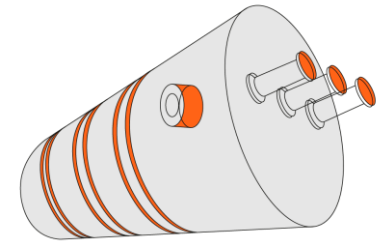
09Г2С+08(12)Х18Н10Т(Б), thickness from 45 to 70 mm
12ХМ (10Х2М1А, 15Х5М) + 08(12)12Х18Н10Т(Б), thickness range: from 50 to 120 mm

OPERATING CONDITIONS:

pressure — up to 1.6 MPa;
temperature — from 100 to 450 °C

MEDIUM COMPOSITION:

hydrocarbons, methanol, 0.3% H₂SO₄ in catalyst, etc.



COKE DRUMS

- production of petroleum coke lumps from black oil

CORE MATERIAL:

12ХМ+08Х13, thickness range from 30 to 50 mm

OPERATING CONDITIONS:

pressure — up to 0.6 MPa;
temperature — up to 500 °C

MEDIUM COMPOSITION:

tar, cracked residue, sulphur 1.5% wt., coke, petroleum products vapours, water steam



Contacts

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ZAGORSK
PIPE
PLANT

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