



**ТЕМПЕРИЛОДЖИСТИК СЕООД**  
**TEMPERI LOGISTICS LTD**



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## **Ferrous metallurgy of Ukraine**



**2023**

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## **Introduction**

*In Ukraine, ferrous metallurgy is one of the leading industries. The mining and metallurgical complex accounts for a quarter of the country's industrial production, providing a tenth of GDP and about a third of all foreign exchange earnings.*

*Today about 80% of Ukraine's metallurgical production is exported, which makes the Ukrainian mining and metallurgical complex unique in the world, as in major countries with developed metallurgy situation is diametrically opposite - for metal companies of Japan, the U.S., the main is the domestic market.*

*In Ukraine, there are five big players in the field of metallurgy. They are the largest private company Metinvest, ArcelorMittal Kryvyi Rih, DCH, Interpipe, and Ferrexpo.*

*Metinvest alone provides jobs for over 80,000 people and helps generate 8 percent of the country's GDP.*

*The two Mariupol-based enterprises of the Metinvest group: Azovstal and Ilyich metallurgical plants in Mariupol. Ilyich metallurgical plant, which was destroyed in 2022, accounted for about 40% of Ukrainian steel production, resulting in a more than 30% decline in Ukrainian GDP in 2022.*

*Earlier, in 2014-2015, several metallurgical enterprises were lost: Alchevsk Metallurgical Plant, Enakievo Steel Plant, and Donetskstal.*

*Compared to the pre-war period, the workload of steel mills in 2022 decreased by an average of 85%, and mining enterprises - by 75-80%.*

*The decline in steel production in Ukraine is estimated almost four times in 2022 compared to 2021. In 2022, Ukrainian enterprises produced 6.3 million tons of steel - only 30% of the 2021 figure.*

*In 9M2012, Metinvest's iron and steel output decreased by 65% and 62% YoY, respectively, compared to the same period last year. At the same time, Kametstal (Dnipropetrovsk region) production volumes partially compensated for the stoppage of Mariupol facilities. Meanwhile, ArcelorMittal Kryvyi Rih's production capacities were no more than 20-25% loaded during 2022, and the company's output fell fivefold. For example, ore extraction was 11.6 million tons instead of the planned 26.4 million tons, and iron production was 1.6 million tons instead of the planned 5.6 million tons, steel production was 1.2 million tons instead of the planned 5.1 million tons.*

*Given the decline in production, the situation in metallurgical exports is disappointing. In 2021, ferrous metals were the most powerful item in the structure of Ukrainian foreign trade - \$13.95 billion (+81.4% compared to 2020). Then ferrous metals accounted for 20.5% of total export revenues.*

*In 2022, revenues from exports of ferrous metals decreased to \$4.533 billion (-67.5% compared to 2021), and the share in the structure of exports decreased from 20.5% to 10.26%.*

<b>Product Type</b>	<b>Export in kind</b>	<b>Export in monetary terms</b>
<i>iron-ore raw materials (iron ore)</i>	<i>23,98 million tons (-56%)</i>	<i>\$2,91 billion (-57,8%)</i>
<i>semi-finished metal products</i>	<i>1,9 million tons (-72%)</i>	<i>\$1,2 billion (-70,9%)</i>
<i>flat-rolled steel</i>	<i>1,63 million tons (-73%)</i>	<i>\$1,35 billion (-73,5%)</i>
<i>pig iron</i>	<i>1,32 million tons (-59%)</i>	<i>\$639 billion (-61,1%)</i>

*Since the beginning of the war, due to the blocking of seaports, the geography of exports has noticeably changed - if earlier Ukraine supplied about a third of the products of the Mining and Metallurgical Complex to the EU countries, then in 2022 - more than 60%.*

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*Mining and metallurgy, more than other sectors of the Ukrainian economy, depends on export opportunities - Ukraine sold about 60% of mining products and 80% of metal on foreign markets. About 70% of metallurgy products were sent abroad through seaports.*

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*Ukraine loses more than \$630 million of foreign exchange earnings each month due to its inability to export MMC products through ports. In annual terms, we are talking about an additional \$8 billion in foreign currency revenues to Ukraine.*

*In peaceful and relatively peaceful years the capacity of the domestic metal market in Ukraine averaged around 5 million tons a year. In 2022, because of the war, this figure dropped to 2 million tons.*

*Ukrainian ferrous metallurgy is concentrated in four regions of the country: Donetsk, Dnipropetrovsk, Luhansk, and Zaporizhzhia.*

*The review continues the series of publications on the iron and steel industry in Eastern Europe: 60 pages examine the 20 largest enterprises of the Ukrainian metallurgical complex.*

## 1. Metinvest Group

 **METINVEST** Metinvest is an international vertically integrated mining and metallurgical group of companies. The structure of the group includes mining and metallurgical enterprises in Ukraine, Europe, and the USA, as well as a sales network in all key regions of the world.

The Managing Company of Metinvest Group is METINVEST HOLDING LLC, a subsidiary of Metinvest B.V. (Registration Number: 24321697; address: Nassaulaan 2A, 2514JS 's-Gravenhage, the Netherlands). The main shareholders of Metinvest B.V. are SCM and SMART-HOLDING, which take part in the management on a partnership basis.

The structure of Metinvest includes the following metallurgical enterprises:

- Azovstal metallurgical plant
- Ilyich metallurgical plant
- Zaporizhstal metallurgical plant
- Metallurgical plant Kamet-Stal

The Group produces coke products, pig iron, semi-finished steel products, long products, and flat-rolled products at its facilities in Ukraine, Italy, Bulgaria, and Great Britain.

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*7.5 million tons of steel and 5.6 million tons of steel products were produced by Metinvest Group in 2019*

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### 1.1. Azovstal metallurgical plant



Azovstal Metallurgical Plant, Mariupol 2016.

It is a full-cycle enterprise: it produces coke, smelts steel, and produces flat, long, and shaped rolled products. The only Ukrainian producer of railway rails.

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*3.5 million tons of pig iron in 2019*  
*4 million tons of steel in 2019*  
*1.2 million tons of rolled products in 2019*

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**Azovstal Metallurgical Plant** includes coke-chemical production, blast furnace, and converter shops, a rolling complex comprising crimping, heavy plate, rail, and heavy section rolling shops, and a rail fasteners shop.

**Production capacities** of the plant allow producing up to 5.7 mln tons of pig iron, 5.3 mln tons of converter steel, and 4.7 mln tons of finished rolled products per year.



The mill is Ukraine's leading manufacturer of high-quality thick plates with thicknesses from 6 to 200 mm, and widths of 1500 - 3300 mm for shipbuilding, power, and special engineering, bridge construction, manufacture of large diameter pipes for main gas and oil pipelines in the northern version, and deepwater constructions. The entire volume of manufactured heavy plates undergoes 100% ultrasonic control. It is Azovstal that mastered the industrial production of heavy plates from steel of X70 and X80 strength categories. "Azovstal is Ukraine's only producer of wide gauge railroad rails and rail fasteners.

**Contacts**

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Phone: +38 (0629) 52-70-00

<https://azovstal.metinvestholding.com>

Azovstal Iron and Steel Works was founded in 1933 and destroyed in 2022.

## 1.2. Ilyich metallurgical plant PJSC

The Ilyich metallurgical plant is one of Ukraine's largest enterprises with a full metallurgical cycle. Its products are exported to more than 80 countries of the world.



**The structure of the metallurgical plant includes** a sinter plant with 12 sintering machines, a blast furnace shop consisting of four blast furnaces, a lime-burning shop, a converter shop, a rolling process as part of a sheet-rolling shop - 1700, a cold rolling shop, a rolling mill-3000, an electric pipe welding shop.

**The production capacity** of the plant allows it to produce about 3.7 million tons of converter steel, 12 million tons of sinter, more than 4.3 million tons of pig iron, and more than 5 million tons of finished steel per year.

- Sinter Plant 12 sintering machines, 12,000 thous. tons
- Blast furnace production 4 blast furnaces, 4,300 th. tons
- Steel production 3 converters, 3,700 th. tons
- Rolled steel production
- Plate rolling shop 1 700 th.
- Plate Mill 3000
- Plate Mill 4500
- Cold rolling shop
- Electric tube welding shop
- Rolling shop

Full-cycle enterprise: produces pig iron, steel, and rolled products.

The main products of the plant are flat-rolled products of carbon, low-alloy, and alloy steels for various purposes. It is Ukraine's largest producer of galvanized cold-rolled sheets.

The Ilyich metallurgical plant specializes in the production of sinter, lime, pig iron and iron products, steel ingots, rolled and cast billets, high-quality steel plates for critical steel structures, shipbuilding, oil, gas, and water pipes.

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*4.5 million tons of pig iron in 2019*  
*3.6 million tons of steel in 2019*  
*2.6 mln tons of rolled products in 2019*

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The main products of the mill are flat-rolled carbon, low-alloy, and alloy steels for various purposes, including:

- Thick plates intended for the production of pipes for main pipelines, marine vessels, pressure vessels, bridge structures, and other metal structures of critical application;
- Hot-rolled thick and thin plates and strips, including pickled ones;
- Cold-rolled, including galvanized thin strips, sheets, and sheets, including for cold stamping, corrugated steel sheet, etc;
- Electrically welded thin-walled water and gas pipes of round cross-sections and profiles of square and rectangular cross-sections.



The plant also has the technical ability to produce **semi-finished products**:

- agglomerate produced from iron ore raw materials;
- cast and rolled slabs;
- other types of semi-finished products, which, upon agreement, may be sold as commercial products.

Ilyich Iron and Steel Works of Mariupol was founded in 1897, became part of the Metinvest Group in 2010, and was partially destroyed in 2022.

#### **Contacts**

Ukraine, 69008, Zaporizhzhya City, Pivdennoye highway, 80

<https://ilyichsteel.metinvestholding.com>



### 1.3. Zaporizhstal metallurgical plant

**Zaporizhstal PJSC** is a Ukrainian metallurgical plant located in the Zavodskiy district of Zaporizhzhya, one of the city-forming enterprises. It is one of the largest metallurgical enterprises in Europe and is a part of the Metinvest group (since 2011).

The company employs 10,435 people.

**Zaporizhstal PJSC** is a full-cycle joint venture specializing in the production of hot- and cold-rolled steel, as well as steel bands, tin plates, and bent sections.

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*4.4 million tons of pig iron in 2019*  
*4 million tons of steel in 2019*  
*3.3 mln tons of rolled products in 2019*

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Zaporizhstal was founded in 1933. It is the third largest producer in Ukraine. The area of the plant is more than 550 hectares. The plant exports 70% of its production to over 60 European countries, which consume more than 15% of the country's hard currency earnings. Among the consumers are Turkey, Italy, Poland, Syria, Israel, Bulgaria, Ethiopia, and Nigeria. The Ukrainian market remains a strategic area of the company's sales policy.

Zaporizhstal Iron and Steel Works operates an Integrated management system of quality, energy efficiency, labor safety, and ecology (IMS) approved by "BUREAU VERITAS Certification Ukraine" LLC as conforming to the international standards ISO 9001, ISO 14001, OHSAS 18001 and "Technical and managerial services" LLC as conforming to the international standards ISO 50001

Production capacities of Zaporizhstal are:



- Sinter Shop (6 sintering machines),
- Blast Furnace Shop (4 blast furnaces),
- Martin Plant (7 open-hearth furnaces and 1 twin-hearth steelmaking unit),
- Preparation shop,
- Cogging Shop,
- Thin-sheet hot-rolling shop,
- Cold-rolling shop № 1,
- Cold-rolling shop No. 3.

**The sintering shop** of the plant produces the main iron-ore sinter. Almost all processes of sinter production are automated.

**Blast-furnace production** annually melts about 3.8 million tons of iron/year. The peculiarity of Zaporizhstal cast iron is its low sulfur and phosphorus content.

**The production of the open-hearth shop** is about 4.0 million tons of steel per year. The open-hearth furnaces use natural gas. Steel is purged with oxygen and argon. Molten steel is cast into ingots of up to 18.6 t weight, which are used for plate production.

**The hot-rolling shop produces** hot-rolled sheets and coils with thicknesses from 2.0 to 8.0 mm. The hot-rolling shop for thin sheets is equipped with units for supplying rolled products in sheets and coils. Continuous Thin Strip Mill "1680" with a maximum production capacity of 3,6 mln. tons a year is designed for the production of hot rolled strips with a thickness of 2,0-8,0 mm, width of 860-1500 mm, and weight of the coil up to 16 tons. More than 500 standard sizes of cold-rolled sections of carbon and low-alloyed steel grades with thicknesses from 1.0 to 8.0 mm and with profile reaming widths up to 1440 mm are produced on three-section rolling machines.



**Cold-rolling shop No.1** produces cold-rolled flat-rolled steel with thicknesses from 0.5 to 2.0 mm, widths from 850 to 1500 mm in sheets up to 4000 mm long and in coils with weights up to 16 t as well as cold-rolled strips with thicknesses from 0.2 to 2.0 mm.

Cold-rolled sheets of carbon and low-alloyed steel are produced at the Cold-rolling Shop No. 1 in the continuous four-stand mill "1680", two reversing single-stand mills "1680" and "1200", two continuous narrow-stand four-stand mills, twenty-roll mill "1700" and two continuous narrow-roll four-stand mills "450" and "650". The mill is equipped with slitting, cross-cutting, and slitting equipment providing delivery of cold-rolled steel with thicknesses from 0,2 to 2,0 mm, widths from 10 to 1500 mm, and plate lengths up to 3950 mm as well as coils with weights up to 15 t.

**Cold-rolling shop № 3** on mill "2800" produces cold-rolled plates with thicknesses from 1,5 to 5,0 mm, widths of 1000-2300 mm, and lengths up to 3500 mm of carbon steel grades. The shop has a specialized department for the production of ground and polished plates and coils. Maximum production capacity of hot-rolled steel - up to 3.6 mln. t, cold-rolled steel - 1 mln. t, cold-rolled profiles - up to 500 thous. t.

## Manufactured products

### Main products:

#### 1. Hot-rolled steel

- Hot-rolled sheet

Hot-rolled sheets are in high demand among car and machine-building enterprises.



Hot-rolled sheet 1,8, 1,9 mm  
 Hot-rolled sheet 2,0-3,9 mm  
 Hot-rolled sheet 4,0 - 8,0 mm

- Hot-rolled coil

Primarily used for the production of round and profile electric-welded pipes of small and medium diameters, as well as for subsequent cutting into sheets.

Hot-rolled coil 1.8; 1.9 mm  
 Hot-rolled coil 2,0 -3,9 mm  
 Hot-rolled coil 4,0 - 8,0 mm  
 Hot-rolled coil with slit 1,8 - 8,0 mm

- Hot-rolled sheet with lentil corrugation

Rolled steel sizes: 4,0-6,0x1000-1250x2000-4000 mm.  
 Steel grade: St 1-3 kp, ps; 08-20 kp, ps; S235JR, S235JRG2.

- Hot-rolled strip without profiling

HRKP(PS), 10KP(PS), 09G2, 09G2D, 09G2C, 65G.  
 Rolled steel sizes: 4-7h150-450h3000-6000 mm.

- Hot-rolled coil with the dissolution

Hot-rolled coils with slit 08-10KP(PS), ST1-2KP(PS); 08-10KP(PS), ST1-3KP(PS); ST 45; 65G; ST 1-3 KP (PS, SP), 08-20 KP(PS), 10-20, S235JR

- Hot-rolled steel with lentil corrugation

S235JR, S235JRG2 lentil hot-rolled steel, 08-20 KP(PS), ST 1-3 KP(PS)

- Hot-rolled sheet

Hot-rolled plate ST5PS, ST5SP, ST6SP, ST4KP, S235JR, S235JRG1, S235JRG2, S275JR, 55, 50-70G, 65G, ST0, ST1KP(PS), ST2KP(PS), ST3KP(PS), ST4PS, ST1SP, ST2SP, ST3SP, ST4SP, 09G2, 09G2D, 09G2S, 07-08GUT, 08 KP(PS), 10-20 KP(PS), 25PS, ST 10-20, 45

- Hot-rolled coil

Hot-rolled coil ST0, ST2SP, ST3SP, ST1KP(PS), ST6SP, 50-70G, 45, 55; ST5PS, ST2KP(PS), ST3KP(PS), ST4PS, ST4KP, ST4SP, 09G2, 09G2D, 09G2S; STE5SP, 08 KP(PS), S275JR, S235JRG1, S235JRG2, 20 KP(PS), 15 KP(PS), 25 PS, 10 KP(PS), ST 10-20, S235JR, ST1SP

## 2. Cold-rolled steel

Cold-rolled sheet 0,5-2 mm



Cold-rolled structural steel is used in the production of coated steel, furniture, racks, containers for fuel and lubricants, and household appliances.

#### Cold-rolled coil 0,5 -2 mm

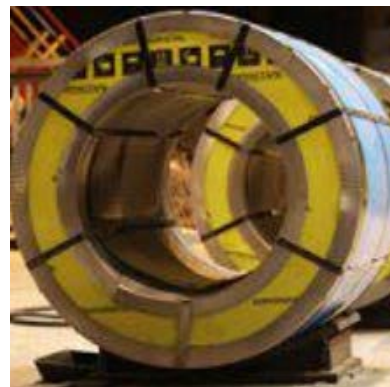
Cold-rolled structural steel is used in the production of coated steel, furniture, racks, containers for fuel and lubricants, and household appliances.

#### Cold-rolled steel sheet

Cold-rolled steel sheet for enamelware 08PS, cold-rolled steel sheet 15, 45, 20, ST2KP(PS), ST1KP(PS), ST3KP(PS), ST1SP, 65G, 15KP(PS), 10KP(PS), 07-08GSYUT, 09G2, 09G2D, 09G2S; ST2SP, 08Yu, 20KP(PS), steel 10.5PS, ST3SP, 08KP(PS).

#### Cold rolled coil

Cold-rolled coil ST1KP (PS), ST3KP(PS), ST1SP, ST1SP, ST2SP, ST3SP, 5SP, cold-rolled coil for enamelware 08PS, 08KP(PS), 08U, 10KP(PS), 15KP(PS), steel 15,10, 20; 20KP(PS).



### 3. Metal products



### 4. Commercial slabs



### 5. Pig iron



#### Related products:

##### 1. Slag

- Granulated slag
- Blast-furnace slag for general construction works (dumps and fractional)

Fraction 0-10mm, 0-40, 10-40, 10-70, 40-70.

#### Contacts for sales of non-core products:

Tel.: +38 (061) 218-29-76

E-mail: [by-products@zaporizhstal.com](mailto:by-products@zaporizhstal.com)

##### 2. Technical gases

- Liquid technical oxygen

Liquid technical oxygen is used after its gasification in gas-plasma processes of metal processing, welding, surface hardening, oxygen cutting, metallization, and other processes. Technical oxygen is widely used in the chemical industry for obtaining artificial liquid fuel, lubricating oils, some acids, ammonia fertilizers, and other products, in metallurgy - for intensification of several metallurgical processes in blast-furnace, steelmaking, and other industries.

- Oxygen gas technical

Technical gaseous oxygen is used in gas-plasma processes of metal processing, welding, surface hardening, oxygen cutting, metallization, and other processes. Technical oxygen is widely used in the chemical industry for the production of artificial liquid fuel, lubricating oils, some acids, ammonia fertilizers, and other products, in metallurgy - for intensification of several metallurgical processes in blast furnace, and steelmaking, and other industries.

- Liquid and gaseous argon

Argon is used as a protective environment for casting, arc welding, brazing, cutting, and melting of active and rare metals (titanium, zirconium, niobium, etc.) and their alloys, as well as for critical welding of other materials at the final stages of production.

Argon is also used for the treatment of liquid metal in the production of special grades of steel. Norms of physical and chemical parameters for technical gases.

- Nitrogen

Liquid technical nitrogen is used as a refrigerant and (after gasification) to create an inert atmosphere in the production, storage, and transportation of easily oxidized products, in high-temperature metalworking processes, for the preservation of closed metal vessels and pipelines, and for other purposes.

#### **Sales contacts for non-core products:**

Tel.: +38 (061) 218-29-57 E-mail: [by-products@zaporizhstal.com](mailto:by-products@zaporizhstal.com)

### **3. Chips of technological**

Chips are made by crushing wood waste and substandard wood of all types of wood on a chipper; technological chips dimensions (for reference): length - 60mm, thickness - 20mm; unit of measurement - m<sup>3</sup> (in dense measurement); the presence of bark - up to 20%; foreign impurities, large pieces of wood are not allowed in the chips; the minimum batch volume is at least 600 m<sup>3</sup> per month; wood chips are shipped in bulk by railway. transport and vehicles of the buyer.

#### **Contacts:**

Tel.: +38 (061) 218-14-36, 218-39-02, 218-10-13

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#### **Production results in 2022**

Due to the escalation of hostilities in the region since the beginning of March 2022, Metinvest Group has transferred some of the equipment of the Zaporizhstal plant to the hot conservation mode. At the end of March 2022, Zaporizhstal partially resumed the work of the cold rolling shop for the production and shipment of cold rolled coils to the European consumer. A month after the forced shutdown, the Zaporizhstal plant removed the equipment from mothballing and partially resumed production. Since April 2022, the plant has been operating at an average of 50% of its capacity, and at the end of the year, the plant had to further reduce its workload due to a shortage of electricity.

Despite the difficulties, the plant continues to work and support the country's economy, even though the production volume has decreased by half, according to the results of 2022, Zaporizhstal paid almost UAH 700 million of the local budget, which is only 25% less than in 2021.

At the end of 2022, Zaporizhstal reduced the production of rolled products by 60.4% compared to 2021, to 1.304 million tons. The volume of pig iron production decreased by 54.3% yoy. – up to 2.01 million tons, and steel – by 61.7% yoy, up to 1.49 million.

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*2.01 million tons of pig iron in 2022*  
*1.49 million tons of steel in 2022*  
*1.304 million tons of rolled products in 2022*

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#### 1.4. Metallurgical plant Kamet-Stal



**1.5.** Kamet-Stal PJSC, before 2016 - Dneprovsky Iron and Steel Works named after F.E. Dzerzhinsky, combines the coke and chemical and steelmaking assets of Metinvest Holding LLC in Kamensk (Dneprovsk region, Ukraine).



**Kametstal** produces semi-finished products (including billets for the production of oil and gas pipes), bars, and shapes. The main products are square billet (supplied to the Middle East and North African countries), wire rod (exported to the EU countries), and pig iron (key importer - the USA).



**Kametstal** is one of the largest enterprises in the industrial complex of Ukraine with a full metallurgical cycle in the production of 5600 thousand tons of sinter, 4350 thousand tons of pig iron, 3850 thousand tons of steel, and 3829 thousand tons of finished steel. It is the only Ukrainian supplier of rolled axle billets for railroad transport, Larsen sheet piles, contact rails for the subway, steel grinding balls, and billets for pipes. It also supplies Promet Steel with square billets for machining.



#### **Divisions**

The Metallurgical division operates four main production shops: sintering, blast-furnace, converter, and rolling. The coke-chemical division has five main shops: coal preparation shop, tar - processing shop, coke-oven shop, coking chemical products recovery shop, and desulfurization shop.



## Production facilities

- Sinter production:

6 sintering machines, 5 600 thousand tons



- Blast Furnace Plant:

3 blast furnaces, 4,350 thousand tons

- Steel production:

2 converters, 3,850 kt

2 "Ladle-furnace" units

6-bloom continuous casting machine

2 7-string continuous casting machines.

- Rolled steel production:

Pipe billet site:

- stand 1150,

- billet mill 900/750-3

Rail and structural section:

- stand 1050,

- billet mill 925,

- billet rolling stand 925

Bar rolling section: medium section rolling mill 400/200 (bar rolling line) and finishing group reinforcing bar

rolling mill 200 (products in coils)

Axle rolling section:

- 250 cross screw rolling mill,

- 2 ball rolling mills 30-80

**Number of employees:** 8865 persons

**Labor productivity:** 291 tons of steel per year



### Produced goods

#### Main metallurgical products:

- Rectangular continuously cast steel billet
- Square hot rolled billets
- Billet hot rolled pipes
- Commodity iron
- Round hot rolled steel
- Hot rolled equal strip angles
- Rolled wire rod
- Rolled rebar
- Grinding balls
- Axles roughing and semi-finished
- Hot rolled channels



#### By-products and coke products:

- Blast furnace slag
- Coke products: blast furnace coke, coke nut, coke breeze
- Gases and gas mixtures: oxygen, liquid argon, neon-helium mixture
- Products of tar processing: coal tar pitch, coal varnish, coal oils, A grade phenolates
- Chemical products: coal tar, ammonium sulfate, crude benzene, etc.



### Indicators:

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*Annual sales volume of steel products was about 2.6 million tons in 2021, and annual production of coke by the coke division was 477.6 thousand tons of blast-furnace coke and 517.5 thousand tons of gross coke.*

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Kametstal's axle rolling mill is the only mill in the world where axles are produced by helical rolling. In pre-war times the mill supplied axles to customers from Ukraine, Europe, and North America.

The unique axle-rolling mill recommenced operation after eight months of forced outage, having received an order to produce 3.2 thousand car axles for car manufacturers in Ukraine in May 2023.

"By the end of Q1 2023, Kametstal output increased to 448 thnd mt of pig iron by 66% compared to Q4 2022. The company's steel output increased by 96% QoQ to 491 thnd mt.

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## 2. ArcelorMittal Kryvyi Rih



PJSC "ArcelorMittal Kryvyi Rih" before 1991 - Lenin Krivorozhstal metallurgical plant, after 1991 - OJSC "Krivorozhstal", is the metallurgical plant, the largest full-cycle mining and smelting enterprise in Ukraine, located in Kryvyi Rih (Dnepropetrovsk region).

"ArcelorMittal Kryvyi Rih works as part of the international corporation ArcelorMittal.

It was founded on August 4, 1934, with 22 000 employees (as of 2022).

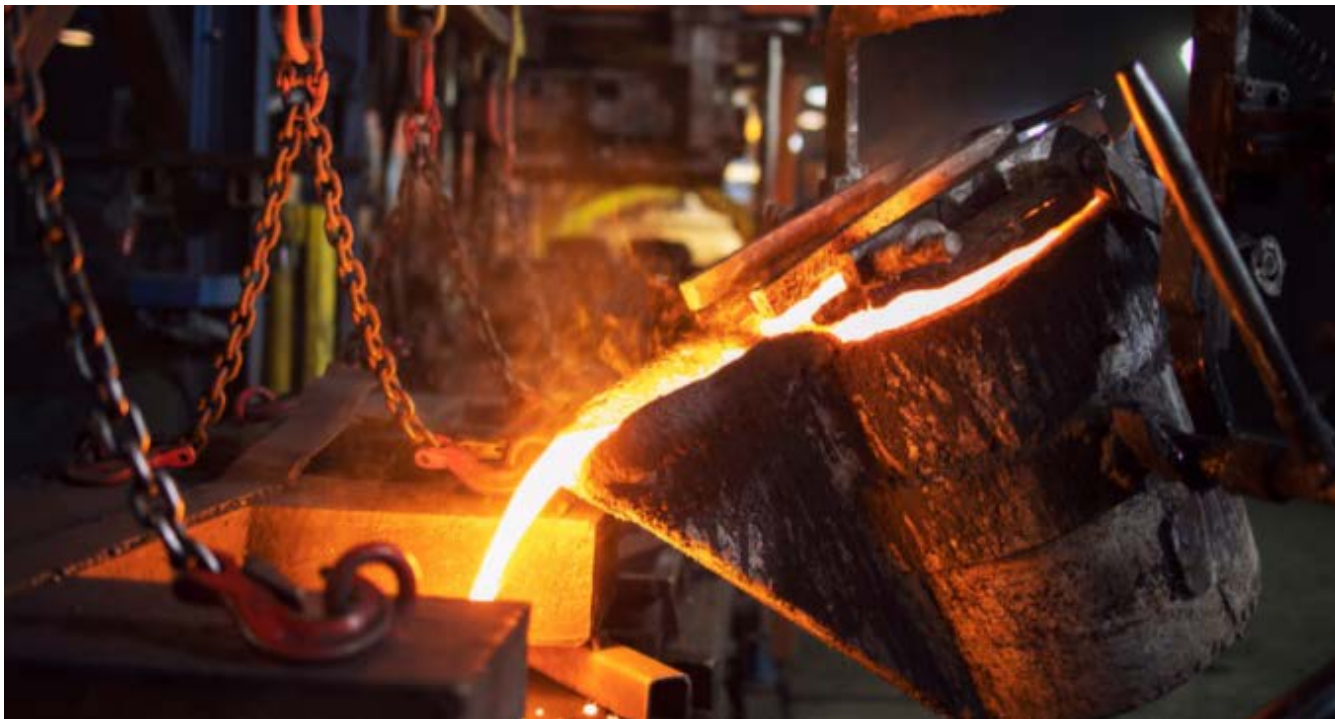
It includes the following **production** facilities: Coke and By-Products Department, Mining and Processing Department, Underground Mining Department, and Metallurgical Department. In turn, metallurgical production consists of sinter and blast furnaces, steelmaking, and rolling mills.



The company specializes in the production of reinforcing steel and wire rod from conventional and low-alloy steel grades and also produces sinter, concentrate, coke, pig iron, steel, long and shaped rolled products, and blast furnace slag.

## Production capacity

The annual production capacity of ArcelorMittal Kryvyi Rih is over 6 mln t of steel, over 5 mln t of rolled products, and over 5.5 mln t of pig iron.



Basic oxygen furnace steelmaking capacity: 6500 TTPA, Open hearth furnace steelmaking capacity: 1500 TTPA, Blast furnace capacity: 11450 TTPA. Nominal iron capacity (total): 11450 TTPA.

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*«ArcelorMittal Kryvyi Rih produced almost 5 million tons of crude steel in 2021, but operated at 20% capacity throughout 2022»*

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## Production Products

- Semifinished products
- Finished rolled products

Steel products: billet; rebar; wire rod; section; shaped products; merchant bars: rounds, squares, and strips; sinter; coke.

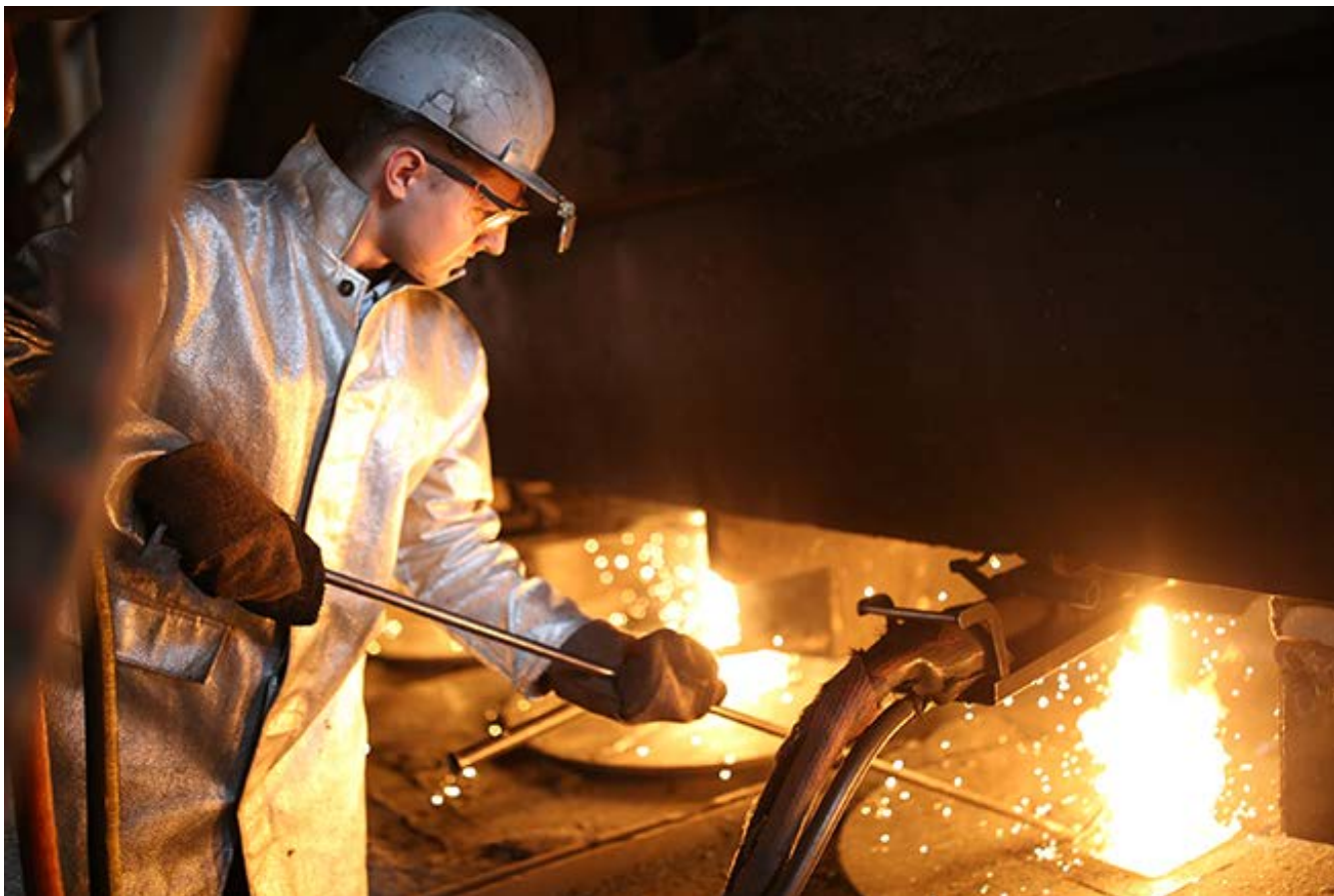
## By-products

The main by-products of steelmaking are slag, process gases, dust, and sludge. The coking process also produces several chemicals such as ammonia, sulfur, and naphtha, which are sold commercially.



## Production figures

Until 2022 ArcelorMittal Kryvyi Rih manufactured about 20-25% of Ukraine's production, 100 000 t a month, from rebar to wire rod. We exported up to 80% of our production to Turkey, Egypt, the Middle East, the Far East, and Africa by the Black Sea via a port in Mykolaev, which had a throughput of over 2 mln tons a year, with 36.000 tons in vessels. 2-5% of production was exported to Europe (due to restrictive quotas).



The war cut off the usual sales markets: Ukrainian ports closed for steel products, Europe soon removed quotas for steel products from Ukraine and ArcelorMittal Kryvyi Rih refocused on Europe and completely restructured its logistics. Now the products are exported to the Baltic States, the Czech Republic, Slovakia, Poland, and Romania: long products, rebar for construction, wire rod, etc.

### Contacts:

50095, Ukraine, Dnepropetrovsk region, Krivoy Rog, 1 Krivorozhstal str.,  
+38 (0564) 78-53-09, 99-32-33

[amkr@arcelormittal.com](mailto:amkr@arcelormittal.com)

<https://corporate.arcelormittal.com/about/making-steel>

### 3. Interpipe



**INTERPIPE**

Interpipe is an international pipe and wheel company.

The main production activities are carried out in Ukraine, the headquarters is located in the city of Dnepr. Interpipe is one of the top 10 companies in the global market of seamless pipes and the top 5 in the segment of railway products. The company supplies products (as of 2020) to 80 countries of the world through a network of sales offices located in Ukraine, Kazakhstan, Switzerland, the USA, and the UAE.



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*Steel production - 759 thousand tons, railway production - 191 thousand tons, pipe production - 464 thousand tons in 2020.*

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## Structure

The structure of Interpipe includes 5 high-tech plants. The company is divided into divisions of steel, pipe, and railroad products. This structure allows controlling the quality of products at all stages of production: from raw material procurement to delivery of finished products.

- **Interpipe Vtormet**, Dnipro, Ukraine

Harvesting and processing of scrap

- **Interpipe Steel**, Dnipro, Ukraine

Steel production

- **Interpipe Nizhnedniprovsky Pipe Rolling Plant**, Dnipro, Ukraine

Production of railroad products

- **Interpipe Nico Tube, Nikopol**, Dnipro, Ukraine

Production of seamless pipes

- **Interpipe Novomoskovsk Pipe Plant**, Novomoskovsk, Ukraine

Production of steel electrically welded pipes

### 3.1. Interpipe Vtormet



**Interpipe Vtormet** is one of the largest scrap metal processors in Ukraine. The company's production capacity provides for scrap processing in the amount of 1350 thousand tons per year. The main consumer of Interpipe Vtormet products is the new high-tech electric steelmaking complex Interpipe Steel.

The company specializes in the procurement and processing of ferrous metal scrap, preparation of metal charge, as well as the processing of waste steelmaking slag.



Interpipe Vtormet is equipped with the most modern equipment of recognized world manufacturers, allowing it to accept and process ferrous scraps of any thickness and shape.

#### Main production shops:

- shop of complex processing of scrap and waste metal (СКPLiOM);
- charge processing shop;
- production and procurement shops.

Today Interpipe Vtormet is represented in 8 regions of Ukraine by thirteen scrap collecting and processing shops with developed transportation infrastructure.

Web: <http://vtorm.interpipe.biz/>

### 3.2. Interpipe Steel



**ИНТЕРПАЙП СТАЛЬ**  
ПУЛЬС ИНТЕРПАЙП

**Interpipe Steel** is the first steel plant built from scratch in Ukraine in almost half a century with a total investment of \$1 billion, the largest electric steelmaking complex for the production of round steel billets in Eastern Europe. Interpipe Steel provides the company's pipe and wheel production with its steel billets. 700 jobs.



#### Production capacity

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*The capacity of the plant is 1.32 million tons of round steel billets with diameters from 150 to 470 mm per year.*

---

#### Plant equipment

The turnkey plant was built by Danieli, the world's leading manufacturer of metallurgical equipment.

Modern high-tech equipment is used throughout the entire ESPK process chain:

- arc steelmaking furnace,
- ladle furnace unit,
- steel vacuuming unit,
- continuous casting machines No. 1 and No. 2.



**Continuous casting machine for workpieces 1:**

Measured length billets: 6,0 - 11,7 м;

Diameter of billets: 150; 170; 210; 250; 290 mm;

5-stream, 900 thousand tons

**Continuous casting machine for workpieces 2:**

Measured length billets: 6,2 - 9,85 м;

Diameter of billets: 385; 410; 450; 470 mm;

4-stream, 840 thousand tons

**Manufactured products**

Interpipe Steel produces high-quality round steel billets that meet the requirements of the international standard ISO 14-1-235-91.

**Product characteristics:**

- Continuous cast undeformed billet from carbon and alloy steel is melted in an electric arc steelmaking furnace.
- Metal finishing is carried out on a ladle furnace unit with argon blowing, deoxidizing, vacuuming, and, if necessary, treatment with powdery reagents.
- The billet is delivered in a non-deformed state.
- The billet is delivered without mechanical surface treatment (turning and deburring).
- By the order, the billet is supplied in non-dimensional, measured and multiple measured, and lengths within the range of.



- Diameter from 150 mm to 290 mm - from 6.0 m to 11.7 m inclusive;
- Diameters from 385 mm to 470 mm - from 6.2 m to 9.85 m inclusive.
- Content in the production of continuously cast billets:
  - oxygen not more than 35 ppm;
  - nitrogen not more than 70 ppm.

### Assortment



Interpipe Steel can produce continuously cast billets from carbon and alloy steel.

Diameters: 150, 170, 210, 210, 250, 290, 290, 385, 410, 450, 470 mm.

### Main groups of steels for wheel production:

- ER6, ER7, ER8, ER9 steels for production of wheels to EN 13262 and similar steels for production of wheels to BS 5892 (part 2), IRS R 19/93, etc...;
- steel grades 2, T for production of solid rolled wheels according to GOST 10791;
- grade 2 steel for bandages according to GOST 398;
- steels of A, B, C, and grades for production of AAR M 107/208 wheels;
- steel grades B2N, B3N, B5T, and B6T, for production of streetcar bandages UIC 810-1;
- EA1N steel for axles according to EN 13261;
- OS grade steel according to GOST 4728 for axles;
- other similar steel grades for railroad rolling stock products.

### **Main groups of steels for pipe production:**

- steels for pipeline classes A, and B according to API 5L, ASTM A53, and ASTM A106 standards;
- steels for X42-X80 pipeline classes according to API 5L standards, including corrosion-resistant version;
- steels for production of casing and tubing of classes H40 to Q125 (except L80 9Cr and 13Cr) according to API 5CT standard, including C90, T95 and C110 in corrosion-resistant version;
- steels for production of pipes of S275J0H, S275J2H, S355J0H, S355J2H, S355K2H, S355NH, S355NHL classes according to EN 10210-1;
- steels for production of pipes of classes P195TR1, P195TR2, P235TR1, P235TR2, P265TR1, P265TR2 EN 10216-1;
- P195GH, P235GH, P265GH EN10216-2 grade pipe steels;
- steel grades 16Mo3, 13CrMo4-5, 10CrMo9-1 for EN 10216-2;
- steels for production of pipes of classes L210GA, L235GA, L245GA, L290GA according to EN 10208-1;
- steel for the production of pipes of class E355 according to EN 10305-1, EN 10294-1, and EN 10297-1;
- 20MnV6 grade steel according to EN 10294-1, EN 10297-1;
- steel for pipe production of classes E420J2, E460K2, E590K2 EN10297-1;
- steel grades 10, 20, 35, 45, and others according to GOST 1050;
- 09G2S, 15GF, and other steel grades according to GOST 19281;
- steel grades 18ХГТ, 32ХА, 20Х, 40Х and others according to GOST 4543;
- steels for production of casing and tubing of all strength groups according to GOST 632 and GOST 633 respectively;
- 32ХА steel for pipes for the machine-building industry;
- other steel grades for the production of rolled steel, flanges, and forgings.

### **It is planned to master:**

Alloy steel grades for flange manufacturing - 42CrMo4, 15G2;

Alloy steel grades for pipe manufacturing - 20MnS5HH, 18CrNiMo7-6;

High-carbon steel grades for wheel manufacturing - ER9 (R9T).

### **Technological scheme of billet production**

#### **Melting in an electric arc furnace**

- Foamed slag - reduction of N<sub>2</sub> content, effective phosphorus removal up to 0.015%
- Edge steel outlet - cutting off oxidized slag and reducing the amount of non-metallic inclusions
- Deoxidation of the obtained intermediate product at the arc furnace outlet
- Oxygen removal and reduction of non-metallic inclusions

#### **Steel processing in a ladle furnace**

- Maintaining an inert atmosphere under the ladle furnace vault - reducing non-metallic inclusions
- Obtaining final sulfur content - up to 0.015%
- Inert gas purging of liquid steel - removal of gases and non-metallic inclusions
- Treatment of liquid steel with calcium-filled flux cored wire - removal of non-metallic inclusions

### Processing of the melt at the vacuuming unit

- Exposure of the melt in a vacuum chamber to obtain the contents:
- Hydrogen - not more than 2.5 ppm;
- Nitrogen - not more than 70 ppm.

### Casting on a Continuous Casting Machine

- Application of full metal protection in the areas of a steel ladle, tundish, and tundish-crystallizer - reduction of non-metallic inclusions
- Electromagnetic stirring (M-EMS and F-EMS):
  - reduction in the number of inclusions, shells, gas bubbles, and pores on the surface and under the surface of the continuously cast billet.
  - formation of an equiaxed structure in the central part of the NLC
  - reduction of the central porosity of the continuous cast billet
  - reduction of liquation of carbon and alloying elements of the continuous cast billet
- Hydraulic crystallizer rocking system - reducing the depth of rocking marks and obtaining a high-quality surface of NLS



- Automatic control system for drawing, bending, and cutting modes - no cracking
- Guaranteed cut to length
- Quality control system (second level) - prevention of workpiece defects
- Continuous casting machine operator control of billet ovality at each series of melts

### Contacts:

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e-mail: [personal@ips.interpipe.biz](mailto:personal@ips.interpipe.biz)

Web: <http://interpipesteel.biz/>

### 3.3. Interpipe Nizhnedneprovsky Pipe Rolling Plant



Interpipe NPRP specializes in the production of wheels, bands, axles, and pairs for railway transport.

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*The annual output of Interpipe NTZ railroad wheels is about 600 thousand pieces.*

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#### Product portfolio:

- Solid-rolled railway wheels for locomotives, passenger and freight cars, and subway cars with diameters from 650 to 1269 mm.
- Bandages with diameter from 690 to 1260 mm.
- Axles for railroad wheelsets
- Wheelsets

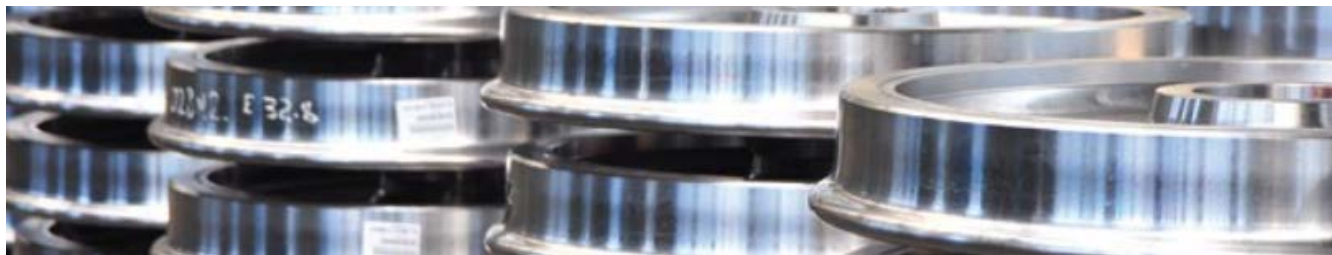


#### The company's production facilities include:

- wheel rolling line (diameter from 700 to 1262 mm)
- ring banding line (diameter from 650 to 1250 mm)
- wheelset assembly line

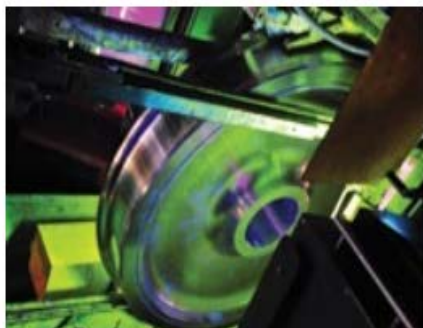
#### The company is certified for compliance with international standards:

- the environmental management system is certified according to ISO 14001 standard
- Occupational Health and Safety Management System OHSAS 18001
- wheel products meet the requirements of international and interstate standards: UIC - Merkblatt 812-3V, 812-2V, sowie DB BN 918277, AAR M 107, GOST 10791, GOST 398, DSTU



### Production facilities

- Wheel rolling shop
- Steelmaking



### Main capacities for the production of railway wheels:

- press-rolling line for the production of wheels with diameters from 650 to 1269 mm;
- press-rolling line for the production of rings and bands;
- lines for mechanical processing of wheels;
- lines for heat treatment of wheels and gangs;
- wheel shot peening lines; non-destructive inspection lines for wheels and gangs (ultrasonic, magnetic particle, and hardness testing);
- Wheel and bandage finishing lines.

### Contacts:

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<http://ntrp.interpipe.biz/>

### 3.4. Interpipe Niko Tube



**INTERPIPE**  
NIKO TUBE

Interpipe LLC Niko Tube Nikopol seamless pipe plant is one of the largest manufacturers of pipes for the oil and gas industry, special-purpose pipes for mechanical engineering and the energy industry, as well as general-purpose pipes for use in other industrial areas.



The company specializes in the production of seamless pipes according to domestic and foreign standards for the oil refining, petrochemical, aviation, and shipbuilding industries, mechanical engineering and instrumentation, oil and gas and energy industries, and general-purpose pipes used in other industries.



#### Product range:

- pipes for the oil and gas industry (diameter 42.0-340.0 mm, wall thickness 4.5-9.0 mm);
- pump-compressor smooth, with blasted-out ends and highly hermetic with threaded connections of the UPJ series;
- casing and core barrels;
- exploration;
- drilling.
- pipes for oil and gas transportation (diameter 42.0 - 426.0 mm, wall thickness 2.5 - 65.0 mm)
- pipes for mechanical engineering and energy industry (diameter 33.0-426.0 mm, wall thickness 3.0 - 65.0 mm)
- pipes for special purposes
- boiler pipes
- general purpose pipes (diameter 32.0-325.0 mm, wall thickness 2.5 - 40.0 mm)



**The production facilities of the enterprise include:**

Production site in Nikopol:

- continuous state pipe rolling machine (diameter: 32.0 to 114.3 mm, wall thickness 2.5-14.0 mm)
- Automatic state tube rolling machine (diameter: 159.0 - 325.0 mm, wall thickness: 6.0 - 40 mm)
- threaded pipe processing shop (diameter: 42.0 – 146.0 mm, wall thickness: 4.5 – 9.0 mm)

Production site in Dnipro:

- pipe rolling machine with automatic state (diameter 73 -178 mm);
- pipe rolling unit with polger condition (diameter 168 – 426 mm);
- pipe rolling machine with Assel condition (diameter from 76 to 203 mm)
- threading lines, chamfers on pipes and couplings, hydro pressure of pipes, painting, and packaging of pipes



## Certification and standardization

The enterprise is certified for compliance with the requirements of national and international standards:

- quality management system according to DSTU ISO 9001, ISO 9001, and API Specification Q1
- environmental management system according to ISO 14001
- occupational safety and health management system according to the OHSAS 18001 standard
- products are certified for compliance with international and national standards API 5CT, API 5L, EN (DIN), GOST, and TU.

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*At the end of 2022, Interpipe Niko Tube reduced pipe production by 36% yoy. – up to 393 thousand tons.*

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## Contacts:

Reception of the General Director of LLC INTERPIPE NIKO TUBE:

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Tel.: +380 67-637-54-05

e-mail: [info@nstp.interpipe.biz](mailto:info@nstp.interpipe.biz)

<http://nikotube.interpipe.biz/ru/>

### 3.5. Interpipe NMPP (Novomoskovsk Pipe Plant)



**INTERPIPE**  
NMPP

The company specializes in the production of steel electric-welded pipes manufactured by submerged arc welding, pipes welded by induction welding with high-frequency currents for main gas and oil pipelines, as well as general-purpose pipes for use in other industrial sectors.





**Product range:**

- pipes of small diameter, 21.3-114.3 mm in size, made of carbon steel grades;
- shaped pipes 17x17-100x80 mm in size made of carbon steel grades;
- medium range pipes 159-530 mm in size from carbon and low-alloy steel grades.



**The production capacity of the plant includes:**

- Mill "1020" for the production of pipes with a diameter of 1020 (1016) mm and a wall thickness of 9-15 mm by submerged arc welding;
- Mill "159-529" for the production of pipes with a diameter of 159 to 530 mm with a wall thickness of 4.5-10 mm by high-frequency welding.
- Mill "20-76" (4 stages) production of carbon pipes with a diameter of 20 to 114 mm with a wall thickness of 2-4 mm, as well as shaped pipes ranging in size from 17x17 to 100x80 mm with a wall thickness of 2-4 mm



**The company is certified for compliance with international standards:**

- quality management system meets international standards ISO 9001 and API Q1 and national standard DSTU ISO 9001
- environmental management system certified according to ISO 14001
- products are certified for compliance with national standards and standards of the CIS countries (GOST, TU), as well as foreign standards API 5L PSL 1 and 2, ASTM, EN, GOST

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*In 2022, Interpipe NMPP reduced pipe production by 67.1%*

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**Contacts:**

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<http://nmpp.interpipe.biz>

## Inerpipe Annual Indicators

At the end of 2021, Interpipe increased steel production by 28.1% compared to 2020, to 971 thousand tons. The production of railway products decreased by 9.7% y/y over the year. – up to 172.1 thousand tons, while the output of pipes increased by 32.5% yoy. – up to 614.8 thousand tons.

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*At the end of 2022, Interpipe reduced steel production by 39% compared to 2021, to 595 thousand tons. Pipe output decreased by 36% yoy. – up to 393 thousand tons, and railway products – by 51% yoy, up to 84 thousand tons.*

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### Contacts:

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Email: [info@ua.interpipe.biz](mailto:info@ua.interpipe.biz)

<https://www.interpipe.biz>

## 4. DCH Dneprovsky Metallurgical Plant



Дніпровський  
металургійний  
завод

Dniprovsky Metallurgical Plant PJSC, formerly Dnipropetrovsk Petrovsky Metallurgical Plant, is one of the largest industrial enterprises of Dnipro and Ukraine, a full-cycle metallurgical enterprise. It was founded in 1885. It employs 4.5 thousand people. The products of the enterprise are supplied to the markets of almost 50 countries of the world. Since 2018, acquired by DCH.



**DCH**  
INVESTMENT MANAGEMENT

DCH is one of the largest and most dynamically developing Ukrainian business groups with a 20-year history. The priority areas of the business group's activity at the moment are finance, industry, mining, transportation, development, production of construction materials, hotel business, etc. DCH is one of the largest and most dynamically developing Ukrainian business groups with a 20-year history.

Web: <https://dch.ua/>

### Production capacities

The plant includes a blast furnace shop, oxygen converter shop, rolling mill-550, and other shops that ensure the uninterrupted and rhythmic operation of the main metallurgical units.



Coke production: 4 batteries, 1040 thousand tons

Blast furnace production: 2 blast furnaces, 1,795 thousand tons

Steel production: 3 converters, 1230 thousand tons

Rolled steel production:

- Rolling shop No. 1: blooming mill 1050, mill 800
- Rolling shop No. 2: mill 550

The equipment makes it possible to treat the metal with liquid synthetic slags and to carry out up to 63 melts per day. The technology of melting ordinary quality carbon steels, structural, low-alloy, and alloy steels has been mastered.



## Products

Semifinished products and rolled shapes: channel, angle, rails.

The main products are square billets (supplied to Turkey and Egypt), channel, which has a wide export geography (Europe, Asia, Africa), as well as pig iron, which is exported mainly to Turkey.

### Transportation products

- Crane rails
- Mine rails
- Metro contact rail
- Tramway grooved neckless rail
- Profiles for railcar construction
- Construction products
- Special I-beam for reinforcing mine shafts
- Sections with parallel flanges
- Sections with inclined flanges
- Angles equal-shelved according to EN 10056-1:2017
- Equal-sided angles DSTU 2251:2018 (GOST 8509-93)



### Industrial products

- Profiles for the lining of drum mills
- Profiles for fastening of mine workings (mine pillars)
- Hot-rolled steel profile for plowshares

### Billet for further processing

- KSquare billets and blooms
- Pipe billets and round-rolled products
- Wheel rim profiles for motor vehicles
- Cast iron and foundry pig iron



### **Annual results**

In 2018, DMZ smelted 921 thousand tons of steel and produced 777 thousand tons of rolled products.

In 2021, Dnipro Steel increased production of rolled products by 56.9% y/y to 221.2 thousand tons compared to 2020. Steelmaking for the year increased by 54.7% y/y. - to 272.9 thousand tons and pig iron - by 69% y/y to 274.8 thousand tons. Metallurgical coke production increased by 11.2% to 483.1 thousand tons.

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*According to the results of 2022, DMZ reduced production of rolled products by 74.2% compared to 2021 - to 58.4 thousand tons, and coke - by 56.3%, to 211.3 thousand tons.*

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In June 2023. DMZ plans to significantly increase the production of rolled steel and coke products. In particular, for the first time in the last year and a half, Rolling Shop No. 2 will produce more than 5,000 tons of sections for export under U and UPE Euro standards.

**Contacts:**

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Products of coke-chemical production +38 (056) 794 84 78, 794 84 80

Site of the plant: <https://dmz-petrovka.dp.ua>

**5. PJSC "DNIPROSPETSSTAL"**

 **DNEPROSPETSSTAL** Dneprospetsstal Electrometallurgical Plant named after A. N. Kuzmin (PJSC Dneprospetsstal) is an international enterprise for the production of special steels in Zaporizhzhya. The plant was founded in 1932 and now produces more than 800 grades of steel in 1200 profile sizes.



The company produces certified metal products from stainless, tool, high-speed, bearing, alloyed, and structural steel grades, as well as heat-resistant nickel-based alloys.

### Production and production facilities

- **Steelmaking**

Steel production at Dneprospetsstal is represented by four steelmaking shops.

A 4 tons induction furnace is installed in **the powder metallurgy shop**. The ASEA-STORA process (cold and hot isostatic pressing at temperature 1100-1150°C and pressure 1000 atm) is used to produce more than 30 grades of high-speed and tool steel meeting the requirements of GOST, DIN, and ASTM standards.

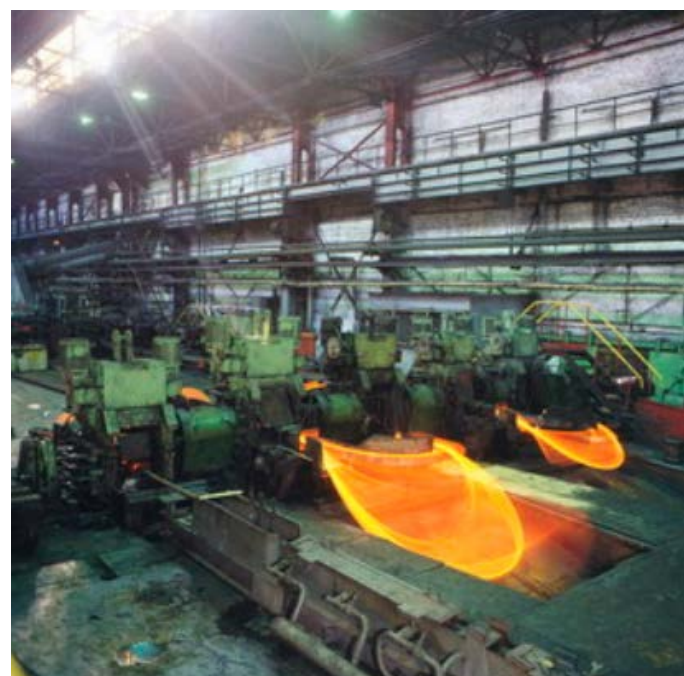
**In steelmaking shop No. 2**, steel is smelted in an open electric arc furnace, followed by purging in an argon-oxygen converter and processing in a ladle-furnace unit. This process allows to obtain low-carbon corrosion-resistant stainless steel. The shop is equipped with an 8-ton induction furnace for the production of heat-resistant steels and special alloys.

**Steelmaking shop No. 3** produces high-quality steel by processing semi-products at the Danieli ladle furnace unit with subsequent vacuumization of the melt in a Mannesmann Demag vacuumator.

**Steelmaking shop No. 5** is equipped with EAF and VDP furnaces of various capacities, which allow producing of long ingots weighing 0.9-6.0 tons and sheet ingots weighing 9.3-20.0 tons. EAF technology provides the production of steel and special alloys used in the most demanding industries: aviation, defense, thermal, and nuclear power industries.

- **Conversion production**

Dneprospetsstal's remaking production is represented by **rolling, thermo-calibration, forging, forging and press shops, and metal dusting shops**.





The billet mill 1050/950 of **the rolling shop** produces billets for further rolling in section mills and also produces bars with a diameter of 130-280 mm. Section rolling mills 550, 325, and 280 produce products with diameters from 8 to 130 mm, with a surface in a post-rolling condition or mechanically processed. Surface finishing is carried out on centerless deburring machines in a fully mechanized process. In the finishing line section of the rolling shop, the Loeser RPS 377 is used to process bars with a diameter of 120-280 mm from the entire range of the plant weighing up to 2.6 tons. The equipment utilizes the wet grinding technology on a "contact wheel" or "free belt". All products with a diameter of 20 mm and more are subject to ultrasonic control by EN 10308, ASTM A388, or SEP 1921.

**The calibration shop** produces cold-drawn round bars with a diameter of 2-45 mm, round bars with a special surface finish with a diameter of 1.9-50 mm, and calibrated hexagonal bars with an inscribed circle diameter of 12-46 mm (for the CIS market).

Large-size forgings of round, square and rectangular cross-sections from various steel grades are the products of **the forging and pressing shop**. The shop has hydraulic presses with 60 MH and 32 MH force, equipped with 5- and 10-ton manipulators. The shop has areas for heat treatment, straightening, and finishing of forgings, as well as for ultrasonic quality control.





The **forging shop** produces products from stainless, tool, high-speed steel grades, and alloys, and also specializes in the production of bars from hard-to-deform alloy steel grades. The shop is equipped with two radial forging machines with a nominal force of 10 MH and 3.4 MH.

Heat treatment of metal products is performed in **the thermal calibration shop** and the corresponding areas of the conversion shops.

The **metal adjusting shop** performs mechanical surface machining of bars with a diameter of 20-200 mm, final machining of bars with special finishing up to a circle of 160 mm is performed on the RPS 327 machine. Two lines for turning and special surface finishing are installed in the shop. Bars coming from rolling mills 1050, 550, 325, and 280, as well as from forging and forging-press shops, undergo final treatment here.



### Certification

The quality management system of PJSC "Dneprospetsstal" is certified for compliance with the international standard ISO9001:2015 by the certification body TÜV Thüringen eV (Germany), whose official representative in Ukraine is TÜV Thüringen Ukraine (TÜV Thüringen Ukraine).

### Steel grades and profiles

- ❖ Stainless steel
- ❖ Bearing steel
- ❖ Tool steel and PM
- ❖ Structural steel
- ❖ High-speed steel and PM
- ❖ Heat-resistant steels and alloys

- Squares

hot-rolled 10-21mm  
 hot-rolled 22-42mm  
 hot-rolled 45-130mm  
 hot-rolled 140-250mm  
 forged 80-190mm  
 forged 190-450mm



- Circles

Cold drawn 2-50mm

hot-rolled 8-21mm

hot-rolled 22-42mm

hot-rolled 45-130mm

hot-rolled 140-250mm

forged 80-190mm

forged 190-600mm

- Axial billet

according to drawings

- Strips

forged on presses 100-300x300-800mm

forged on RCM 50-150x80-360mm

- Hexagons

cold-drawn 14-36mm

- Washers

forged 300-1100x120-300mm



### Annual Indicators (2020)

*Steel - 255 thousand tons*

*Rolled steel - 154 thousand tons*

*Structural alloy steel rolled products - 55 thousand tons*

*Tool steel rolled products - 17 thousand tons*

*Stainless steel rolled products - 51 thousand tons*

### Results of 2021.

According to the results of 2021 "Dneprospetsstal" reduced its net loss by 48.1% compared to 2020 - to UAH 461.02 mln. Steel output at the plant in 2021 decreased by 6.2% y/y. - to 210.94 thousand tons, rolled products - by 2.1% y/y, to 150.8 thousand tons. The total value of production amounted to UAH 9.8 bln.



### Results of 2022.

Electrometallurgical Combine "Dneprospetsstal" by the end of 2022 increased net loss by 4.1 times compared to 2021 - up to UAH 1.901 billion. To uncovered (outstanding) loss of the enterprise at the end of 2022 amounted to UAH 4.91 billion.

At the beginning of March 2022, the company was forced to suspend steelmaking and hot deformation processing due to military operations in Ukraine. All other productions, shops, and sections continue to operate. Already at the end of May 2022, the mill launched production at hot sections and started producing billets for CentraVis. By July, Dneprospetsstal had reached 55% of the pre-war production level and planned to increase the output of high-tech steel to 75% if logistics problems were solved.

### Contacts

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Pivdennoye Shose Street, Building 81

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<http://dss.com.ua>

## 6. Alchevsk Metallurgical Plant



**Alchevsk Metallurgical Plant** is a large ferrous metallurgy enterprise with a full technological cycle, which produces pig iron, coke, sinter, and basic rolled products. It occupies an area of almost one and a half thousand hectares with 13 workshops. It was founded in 1895.

In 1994, the state-owned enterprise was corporatized and transformed into OJSC Alchevsk



Metallurgical Plant.

In 1995, the Cabinet of Ministers of Ukraine approved the decision to privatize the plant.



Until the early 2000s, the company had a rather difficult time, having been going through bankruptcy proceedings since 1997. Until recently, the plant was jointly managed by Interpipe and the Industrial Union of Donbas. Since 2002, AMP has been fully managed by IUD.

In 2004, the bankruptcy was finalized by signing a settlement agreement with creditors.

In 2005-2008, IUD carried out a modernization program of the enterprise, within the framework of which 2 continuous casting machines, a ladle furnace unit, a vacuum cleaner, a converter shop, and blast furnaces were built and put into operation.



In 2013, the mill increased production of rolled metal products by 9.3% compared to 2012, to 3.8 million tons, steel production by 7.8%, to 4.2 million tons, and pig iron production by 7.7%, to 3.8 million tons.

In 2014, the number of employees was over 13.5 thousand people.



After the outbreak of hostilities in the spring of 2014, the situation of the enterprise became more complicated, and in August 2014, AMP's operations were halted.

Alchevsk Metallurgical Plant supplied its products to foreign markets in more than 60 countries. Alchevsk plate and pig iron were in particular demand in the foreign market.

Alchevsk steel is widely used in shipbuilding, nuclear and chemical engineering, for the production of gas pipelines, locomotives, tractors, mining supports, etc.

Rolling production at the mill is represented by a powerful blooming-slabbing mill 1250, where ingots are rolled into slabs and blooms with their further transfer to thick plate mills 2250, 2800, and large-size semi-continuous mill 600.

The mill's shops produce thick plate and large-section rolled products from open-hearth steel. Low-alloy sheet steel is used for the production of electric-welded pipes with a diameter of 1020-1220 mm. The quality of strips made of this steel is controlled by an ultrasonic unit.

The use of new technology for the production of mine support made of alloy steel provides a significant increase in the reliability and serviceability of the products.



Main workshops:

- coal preparation shop No. 1;
- coal preparation shop No. 2;
- coke shop No. 2;
- coke shop No. 3;
- recovery shop;
- desulfurization shop;
- sintering shop;
- blast furnace shop;
- oxygen converter shop \*;



- crimping shop;
  - plate shop No. 1;
  - plate shop No. 2;
  - section rolling shop.
- \* The oxygen-converter shop, the only one on the European continent, is capable of finishing 600 tons of steel at a time.

The mill's products are also products of different profiles: round billets with diameters from 70 to 120 mm, square billets 100x100 mm, equal-sided angles 100x100, 110x110, and 125x125, as well as long and shaped rolled products: double-beams, channels with parallel sides of the flanges, profiles for the support of mining workings of various types, narrow gauge railroad rails, metal sleepers.



#### Products:

- Hot-rolled sheet
- Normalized sheet
- Steel channels with parallel flanges
- Steel I-beams
- Angle with equal flanges
- Mine pillar for mining support (MPS)
- Square billet
- Slab
- Pig iron and foundry iron

- Coke nut
- Coal tar
- Crude coal benzene
- Ammonium sulfate of coke nut
- Polymers of benzene compartments
- Phenolates



In 2014, the enterprise was cut off from all necessary resources: technical water from Seversky Donets, electricity, and supplies of Kriviy Rig ore, and was shut down. Under the conditions of the war, the plant periodically resumed work, but it was impossible to cope with the accumulated problems on its own. Since 2017 it has been under the control of the LNR.

Since 2021, the Southern Mining and Metallurgical Complex has been managing the combine. Today about 10 thousand people work at AMK. The combine performs a full metallurgical cycle, although not at full capacity. All basic sites are fully functional, producing about 3,700 tons of pig iron, coke, sinter, and basic rolled products.

As of December 2021, about 100 tons of coke per day, 4,500 tons of sinter (from 2 machines), and 3,700 tons of pig iron (from 2 blast furnaces) are produced.

**Contacts:**

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## 7. Yenakieve metallurgical plant («YMP»)



**Yenakieve metallurgical plant («YMP»)** is a full-cycle enterprise. The enterprise works in close cooperation with Makiivka Metallurgical Plant ("MMZ"), which is a subsidiary of YMP and produces rolled products from YMP billets. Previously, the main customer for the export of square billets was Promet Steel, a Bulgarian plant of Metinvest Holding.

YMP was founded in 1897. There were large deposits of coking coal and ore, water, limestone, and a railroad near the plant construction site.



Since its foundation, the plant has been implementing advanced production technologies. Back in pre-revolutionary times, the largest blast furnace in Europe was built here, and for the first time pig iron was smelted using mineral fuel. It was also at Yenakieve Steel that the first sinter plant and casting machine were launched. In the early 50s, Enakievo metallurgists were the first in the world to develop and implement a new technological process for the production of medium-carbon steel. In the 80s the problem of a hundred percent thermal straightening of angle steel at the mill "360" was solved at the plant.

In the 2000s, Yenakieve Steel began large-scale modernization. Two continuous casting machines were built and launched, and a few years later in 2007 and 2011 new powerful blast furnaces were built and powered.

High-quality products of the enterprise are in demand in many countries of the world - materials manufactured at Yenakieve Steel have been used in the countries of Europe, the Middle East, North Africa, and Central America.

In early February 2015, due to the hostilities in eastern Ukraine, the plant stopped work.

Metinvest had control over the plant until the spring of 2017, after that, it was nationalized by the DNR authorities.

The plant's products include long sections (channels, angles, beams, wire, rebar) and billets.

#### **Main workshops:**

- sintering shop;
- blast furnace shop;
- converter shop;
- rolling mill shop;
- railway transportation department;
- a group of power shops;
- repair, engineering, and technical services;



#### **Production capacity**

- Sinter plant 2000 thousand tons
- Blast furnace production 3 blast furnaces, 3000 thousand tons
- Steel production 3 converters, 3300 thousand tons  
3 furnace-ladle units, 2 CCMs
- Yenakieve Steel rolled products production:  
Long product mills 550 and 360

- rebar mill 280

- wire mill 250

MMP\*:

- medium section mill 390

- wire mill 150

\*«Makiivka branch of Yenakiieve metallurgical plant », number of employees - about 1000 people. Main products - rebar, wire rod 5,5-12,5 mm, angle bar.

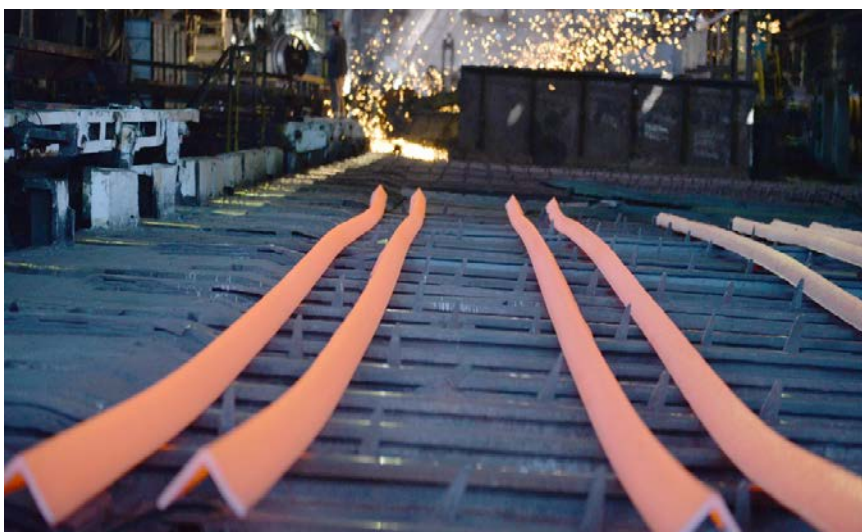
#### Operating shops:

- rolling processing shop CPP, formerly Rolling Shop No. 2 (wire mill 150, small section mill 390);
- rolling mill;
- oxygen shop and other auxiliary shops.



#### Products:

- Redesigned pig iron
- Continuously cast billet
- Angle equal-shelved
- Unequal-sided angle
- I-beam
- Channel
- Narrow gauge railroad rails
- Hot-rolled asymmetrical hollow bulb for shipbuilding
- Circle



## Production figures

Rolled product output in 2011 amounted to 2.176 million tons.

Rolled product output in 2019 amounted to 1,446 thousand tons.

The volume of rolled products output in 2020 amounted to 677 thousand tons.

Today Yenakieve Iron and Steel Works is a branch of YSMK. The plant has a full cycle of metallurgical production - from the production of sinter and pig iron to the production of commercial cast and hot-rolled square billets, long products, and wire rods. The plant currently employs more than 5,000 people.

## Contacts:

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<https://info.ygmk.ru/filialyi/filial-2-enakievskij-metallurgicheskij-zavod>

## 8. Donetsk Metal Rolling Plant (DMRP)



**Donetsk Metal Rolling Plant (DMRP)** is a manufacturer of long products (strips, angles, fittings, circles, squares, and hexagons of various sizes). The enterprise also can produce steel grinding balls, cast iron pipes, hardware, cast iron-shaped castings, and sewer manholes.

Donetsk Iron and Steel Works worked on a tolling scheme with "Donetskstal-MZ". Donetskstal-MZ was the supplier of slabs, and Donetsk Electrometallurgical Plant was the supplier of square billets.

**The product mix includes round, square, reinforcing sections, spring strips, shaped sections, and thick plate hot-rolled steel.**

**Key markets:** Ukraine, export share in 2014. - 9,5%.

**Production facilities:**

Rolling shop, n/a

Grinding balls production line, 40 thousand tons

Pipe Foundry, n/a

Metalware shop, n/a

- Plate rolling production mills 250, 350, 400; 370 thousand tons
- Plate rolling production mills 2300, 520 thousand tons

Number of personnel is 235 persons as of 2016.

In 2013 the plate rolling mill was stopped. Since 2014 sheet rolling mills have not been in operation. Before nationalization in 2017, the plant leased its property to Donetskstal-MZ.

DMPZ is located near Donetsk airport, in the zone of active hostilities.

Since 2015, the enterprise stopped selling products for export; until 2017, supplies were made to the territory of Ukraine. Since 2017, the enterprise has been idle.

## 9. Donetskstal-Metallurgical Plant (Donetskstal-MP)



**Donetskstal-Metallurgical Plant PJSC (Donetskstal-MZ)** was established in August 2002 based on the blast furnace and open-hearth shops of Donetsk Metallurgical Plant. It includes 2 branches: the Metallurgical complex and the Enrichment plant "Svyato-Varvarinskaya".

The metallurgical complex since 2012, after the closure of the open-hearth shop, specializes in the production of pig iron. The Svyato-Varvarinskaya coal preparation plant produces coal concentrate for coking (including Premium grade) and fuel for combustion in boiler plants and TPPs.

The source of coal is the Pokrovskoye mine department, which is located near the processing plant.

#### Production capacity

- Blast furnace production 2 blast furnaces, 1,450 thousand tons
- Electric steelmaking production electric arc furnace DSP-150, 1,500 thousand tons (under construction)
- Coal preparation plant 7,895 thousand tons of raw coal

Number of employees 6,438 as of 2016.

The metallurgical complex is currently controlled by the DNR authorities.

#### 10. Donetsk Electrometallurgical Plant (DEMP)



**Donetsk Electrometallurgical Plant (DEMP)** is a mini-mill of incomplete cycle. It was established in 1999 based on electric steelmaking, crimping, and boiler shops of the Donetsk Metallurgical Plant.

DEMP can produce square and tubular billets, as well as hot-rolled round products from carbon, structural, and alloy steel grades.

#### Production facilities

- Electric steelmaking production  
Main (EDP-120) and auxiliary (DSP-100N3A) electric arc furnaces, 1000 thousand tons CCM
- Rolled steel production Mill 950/900

The number of employees is 857 (2015).

Production at DEMP has been completely halted. In July 2016, the plant was nationalized by the DNR authorities. The enterprise was renamed Yuzovsky Metallurgical Plant (Yuzovsky MP).

In October 2017, the Yuzovsky MPP was launched.

The production utilizes environmentally friendly technology of smelting, out-of-furnace treatment, and casting of steel.

**Main equipment:**

2 arc electric steelmaking furnaces with modern gas purification, vacuumator, furnace-ladle unit, continuous casting machine, as well as rolling mill 950/0

Yuzovsky MZ produced 55 thousand tons of steel.

The plant made 1-2 melts per week on average, fulfilling single orders. Export deliveries were made, including to Turkey, Iran, and Syria.

In November 2018 it was shut down due to scrap shortage and other problems.

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**11. «Elektrostal-Kurakhovo»**



**Elektrostal-Kurakhovo LLC** is a mini-electrosteel smelting plant in Kurakhovo, Donetsk region. Donetsk Metal Rolling Plant (DMPP), which specialized in the production and sale of metal products: long products, cast iron pipes, structural elements of ferrous metals, nuts, and shovels, since 2000 began to experience a shortage of purchased steel billets for its rolling production, as a result of which it was decided to build a steelmaking plant - "Elektrostal".

LLC "Elektrostal" was registered in 2004. The founders are Hercules PJSC (Donetsk region, Kramatorsk, beneficiary - Viktor Gaspar) with a 99% share and Metallurgy LLC (Kiev) - 1%.

The plant was put into operation in 2008. The volume of investments in the construction of the plant amounted to \$80 mln.

On November 30, 2021, the press service of the scrap group of companies UkrMet reported that it had held negotiations with the owners of Elektrostal on the acquisition of the plant.

### Production capacity

The planned steel production capacity is more than 500000 tons per year

### Production Products

Production of cast billets and crushed sand mixtures.

The company produces square billets:

Row assortment ST0-ST5SP, ST1-ST5PS, ST3GSP, ST5GSP; ST20, ST35, ST45, ST50; 20X, 30X, 40X, 45X, 40XH, 45XH, 35XГГСА, 35XM; 35ГС; 55С2, 60Г, 50Г, 65Г, 70Г, 60С2А; ST 52. 3, ST 44.2, ST 37.0, St 37.2; 1006-1055; Gr40, Gr 60; RSt 37-2, RSt 44-2, RSt 50-2, RSt 60-2, S275J0.

Square-section NLZs in sizes from 120x120 to 150x150.

Before the cessation of trade with the uncontrolled territories of the Donetsk region, Elektrostal worked in close cooperation with Donetsk Metal Rolling Plant (DMPP), which produced rolled products from Elektrostal's billets.

As of 2018, all products were exported.

**Key markets:** Turkey, Egypt, Algeria, Italy

### Production equipment

- Steel production Electric arc furnace, 565 thousand tons
- Furnace-ladle unit
- 3-strand sectional continuous casting machine

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*Production volume in 2020.*

*84 thousand tons of steel (square billets).*

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### Contacts:

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[+380 62 33 20770](tel:+380623320770)

### 12. Energomashspetsstal PJSC



"Energomashspetsstal" is a machine-building enterprise located in the city of Kramatorsk (Donetsk region), producing special cast and forged products of individual and small batch production for metallurgy, shipbuilding, power engineering (wind, steam, hydro, nuclear) and general engineering.



The enterprise has the latest metallurgical, metalworking, and machining equipment and is capable of performing a full cycle of production.



The plant is located on the left bank of the Belenkaya (Belyanka) River at its confluence with the Kazennyi Toret. The area of the territory is 136 hectares.



Energomashspetsstal closely cooperates with leading companies in more than 50 countries. The company's partners include such industry giants as ArcelorMittal, Alstom, General Electric, BHEL, Siemens AG, and others.

### Production structure

- Metallurgical production
  - 10.4.1. Electric Steelmaking Shop
  - 10.4.2. Steel foundry shop
- Forging and thermal production
  - Forging and press shop
  - Thermal shop
- Machining shop
  - Machining shop
  - Mechanical tooling shop



### Manufacturing products

- Forgings and castings for the metallurgical industry and power industry,
- mechanical engineering and shipbuilding,
- Flat and round bars
- Ingots





**Products for the metallurgy industry:**

Forged steel rolling rolls:

Support rolls for:

- thick plate conditions weighing from 60 t to 230 t
- hot and cold strip conditions with weights from 20 t to 60 t

Material: alloy steels with content of: 1.4...5.5% Cr; 0.2...1.0% Mo; 0.4...0.9% C

Hot rolling work rolls for:

- strip conditions
- crimping conditions
- long products
- rail and beam conditions
- ball-rolling conditions
- tube states weighing from 1 t to 60 t

Material: alloy steels with content: 0.5...3.5% Cr; 0.3...1.5% Ni; 0.3...0.9% C



**Spare parts for:**

- metallurgical equipment
- rolling mills
- lines and units for rolling processing

**Forged**

- rollers
- shafts
- spindles
- couplings
- cauldrons

**Cast**

- 11.0 m<sup>3</sup>, 16.0 m<sup>3</sup>, 16.5 m<sup>3</sup> slag bowls
- beds
- plates
- die holders

**Billets without finishing heat and mechanical treatment for manufacturers of cold rolling work rolls.**

Material - alloy steels according to the customer's chemical composition.

**Products for power engineering**

Forgings with pre-finishing and finishing machining

**Rotor shafts for wind power plants:**

- 1.5 MW, 2 MW, 2.5 MW capacity.
- steels used: 34CrNiMoV6, 42CrMo4V

**Rotors of medium and high-pressure turbines:**

- weighing up to 30 tons
- steels used: 28CrMoNiV5-9, 30CrMoNiV5-11, etc.

**Low-pressure turbine rotors:**

- weighing up to 100 tons
- steels used: 26NiCrMoV14-5, etc.

**Generator rotors**

- weighing up to 100 tons
- steels used: 26NiCrMoV11-5, 26NiCrMoV14-5, etc.

**Hydrolifts**

- weighing up to 125 tons
- used steels A668 and 20SiMn, etc.

**Rotor shanks, disks**

- steels used: 25X2HMΦA, 25X2H4MΦA, etc.

**Castings with preliminary and finishing machining****Turbine casings, high, medium, low-pressure, and cylinders:**

- weighing up to 90 tons
- used steels 15XM1Φ, g17CrMo5-5, g17CrMoV5-10, 15X1M1ΦЛ, etc.

**Hydraulic turbine impeller parts (casing, rim, hubs, blades)**

- steels used: carbon and alloy steel grades

Rotor bushings, thrust bearing bushings

- steels used: carbon and alloy steel grades

**Products for nuclear power plants**Steam generator shellsReactor vessel shellsMain circulation pump partsMain circulation piping partsReactor vessel bottomSteam generator header parts for VVER-1000, VVER-1200 reactor unit

- Shell dimensions:  $\varnothing 6300$  x up to 5000,  $\varnothing 5600$  x up to 2500

- Used steels: 15X2NMFA-A, 15X2NMFA, 10GN2MFA, 10GN2MFA-A, 08X18N10, 06X12N3D, 22K

**Shipbuilding products and semi-finished products****Shipbuilding**Propeller shaftsIntermediate shaftsRudder Ballers

– weights from 3 tons to 90 tons

– products for shipbuilding are manufactured from structural, high-alloy, and stainless steels.

Deadwood shaftsPropeller blades and hubs

– steels used: stainless

Parts of electric machines

– weight from 2 tons to 60 tons

– steels used: structural, alloy steels

**Semifinished products**Round forgings

– dimensions:  $\varnothing 300$ -1500 mm

– steels used: structural, high-alloyed, stainless, tool steels

Rectangular and square forgings

– dimensions:

height - from 200 mm to 1 500 mm

width - from 500 mm to 3 500 mm

length - up to 10,000 mm

– used steels: structural, high-alloy, stainless, tool

Ingots

- weight from 3.0 tons to 415 tons

- steels used: structural, high-alloy steels

**Products for the general engineering and the petrochemical industry****General engineering**Mining equipment

- shaft – gears

- pinions

- crushing cone shaft blanks

- fan shafts

- gear rings
- end walls
- hubs
- shafts

Cement equipment

- support rollers
- shafts
- bands
- gear rings

Forging - press equipment

- die cubes
- columns
- nuts
- eccentric shaft
- traverses
- punch
- matrix
- casting

**Accessories for the petrochemical industry**

- cylinders
- caps
- flanges
- pipe grids
- crankshaft blanks
- plugs
- crosses
- spigots

Manufactured from carbon, alloy, and high-alloy steel grades.

**Contacts:**

84306, Ukraine, Donetsk region, Kramatorsk, PJSC "Energomashspetsstal".

For reference: +38 (06264) 6-01-32 Marketing and Sales Department: +38 (06264) 6-01-32

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**13. Kremenchuk Steel Works**



**Kremenchuk Steel Foundry JSC** is a specialized enterprise producing castings for two-axle and three-axle bogies of freight cars, auto couplers, castings for KrAZ vehicles, various castings for other industrial enterprises, and its own repair needs. It was founded in 1962.

**Key markets:** domestic market, CIS countries, USA, South Africa, Iran, Cuba, and other countries.



### Production structure

The plant occupies an area of 48.9848 hectares and consists of five main buildings with an area of more than 123 thousand m<sup>2</sup>, **which house production workshops:**

- steelmaking,
- shaped foundry,
- hoop shop of foundry production,
- metallurgical tooling,
- trucking,
- railroad,
- repair-mechanical,
- power and
  
- oxygen-compressor,

The main task of **the steelmaking shop** is to melt liquid steel of various grades and pour molds into the FLC. The main grade is steel 20 GL. Structurally, the shop is divided into sections: charge preparation, melting, and casting.

At the charge preparation section, metal scrap and own production returns are processed, as well as the prepared charge is loaded into piling pans and fed to the melting section.

**The melting section** melts steel in electric arc furnaces DSP-25.



**The pouring section** prepares ladles to receive liquid metal and pours the molds.

To obtain quality steel, advanced technologies are used using precipitation, diffusion deoxidation, and out-of-furnace treatment of steel by deoxidizing in the ladle with Al Ca (aluminocalcium) wire and argon blowing.

**Castings** are produced in the molding shop. They are produced on three automatic lines by the German company "Kunkel-Wagner". Quick-change floating tooling of these lines allows to change models in automatic mode. Application of one of the most progressive methods of compaction of raw sand-clay molds on the lines allows for obtaining castings with minimum tolerances of main dimensions, and high quality of the cast surface meeting the highest requirements. The core section was reconstructed and the range of cores produced by cold-box-amin process on Laempe automatic machines was expanded.

**Heat and mechanical processing of castings** is carried out in the stump shop of foundry production.

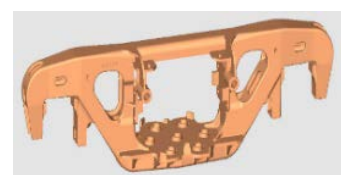
**The metallurgical tooling shop** produces model rod tooling for CNC machines, non-standard equipment, castings from cast iron various steel grades up to 200-300 kg in weight, and various types of repairs.

**Oxygen-compressor shop** provides all production areas with oxygen and compressed air.  
The company also operates all necessary preparatory, transportation, and repair infrastructure.

## Company's products

### Side frame

It is designed to absorb transmitted loads from the car body, transfer them to the wheelsets, and also to place the spring set. The side frame is a casting, in the middle part of which there is a slot for the spring set, and at the ends there are

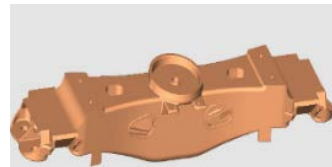




slots for installation of wheelsets with axle box unit. The frame design is modernized by installing the bracket of the mechanism of parallel withdrawal of brake pads, which increases the service life of wheels and promotes uniform wear of wheels and brake pads.

### Over-spring beam

Serves for load transfer through spring sets to side frames mounted on the ends of the beam and is a box section casting with a molded footplate and a pad for installation of removable slides. These beams are used in the new generation of carts. Removable skates installed in the bogie structure improve the running qualities and reduce the impact of the car on the track. The side frame and spar beam are designed to complete the bogie of a two-axle three-element model 18-7033, as well as bogies of other interchangeable models with an axial load of 25 tons for the track gauge of 1520 mm.



### Auto coupling

Various modifications, the unit of the coupling device, used for coupling units of rolling stock, as well as for transferring traction and impact loads, consists of the body and parts of the coupling mechanism: lock, lock holder, fuse, lock lifter, and lifter roller.



### Lock

### Bracket

### Lock holder

### Lock fuse

### Lock hoist

### Elevator roller

### Pulling clamp

### Thrusters



### Crankcase of KrAZ heavy-duty truck

"Rear axle crankcase" (drawing 255B-2401011-12) (casting weight 160.42 kg);

"Rear axle crankcase" (drawing 6505-240101011-01) (casting weight 190.5 kg);

"Front axle crankcase" (drawing 260-2301011-10) (casting weight 140 kg).





The plant shut down in 2014, before which it provided 30% of the CIS market with castings. At the end of 2015, the plant partially and briefly restarted operations to extend the company's quality certificate. The plant also halted operations in March 2020 due to a lack of product sales and contract disruptions.

In February 2022, Krukiv Carriage Works (KVSZ) signed a contract between PJSC KVSZ and PJSC Kremenchuk Steel Works for the supply of castings for UAH 432 mln.

**Contacts:**

141, Kremenchuk, Poltava region, Kremenchuk, Ukraine, 39600

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