



INTERPIPE STEEL
PULSE OF INTERPIPE

INTERPIPE STEEL

INNOVATIVE ELECTRIC STEEL MELTING COMPLEX

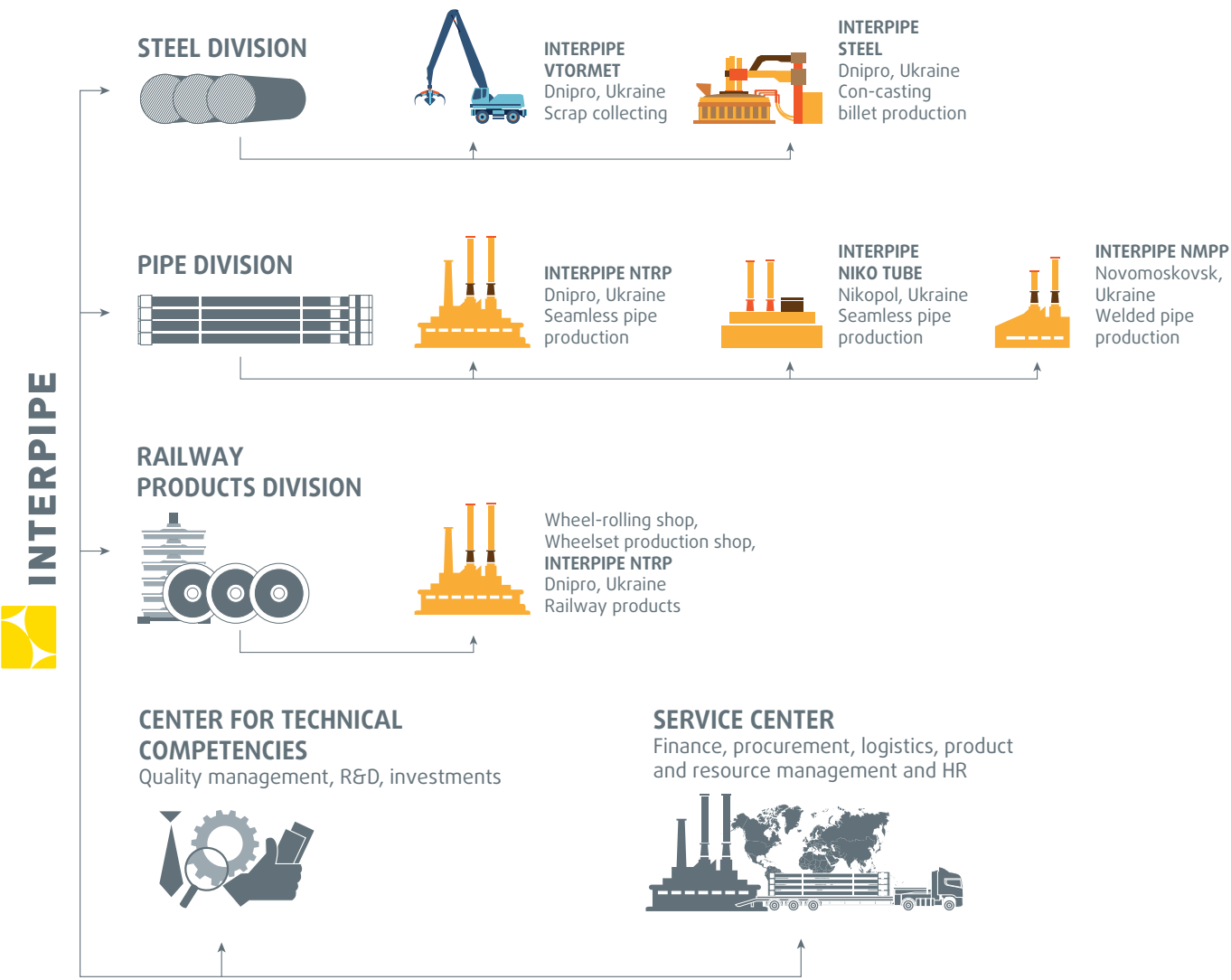


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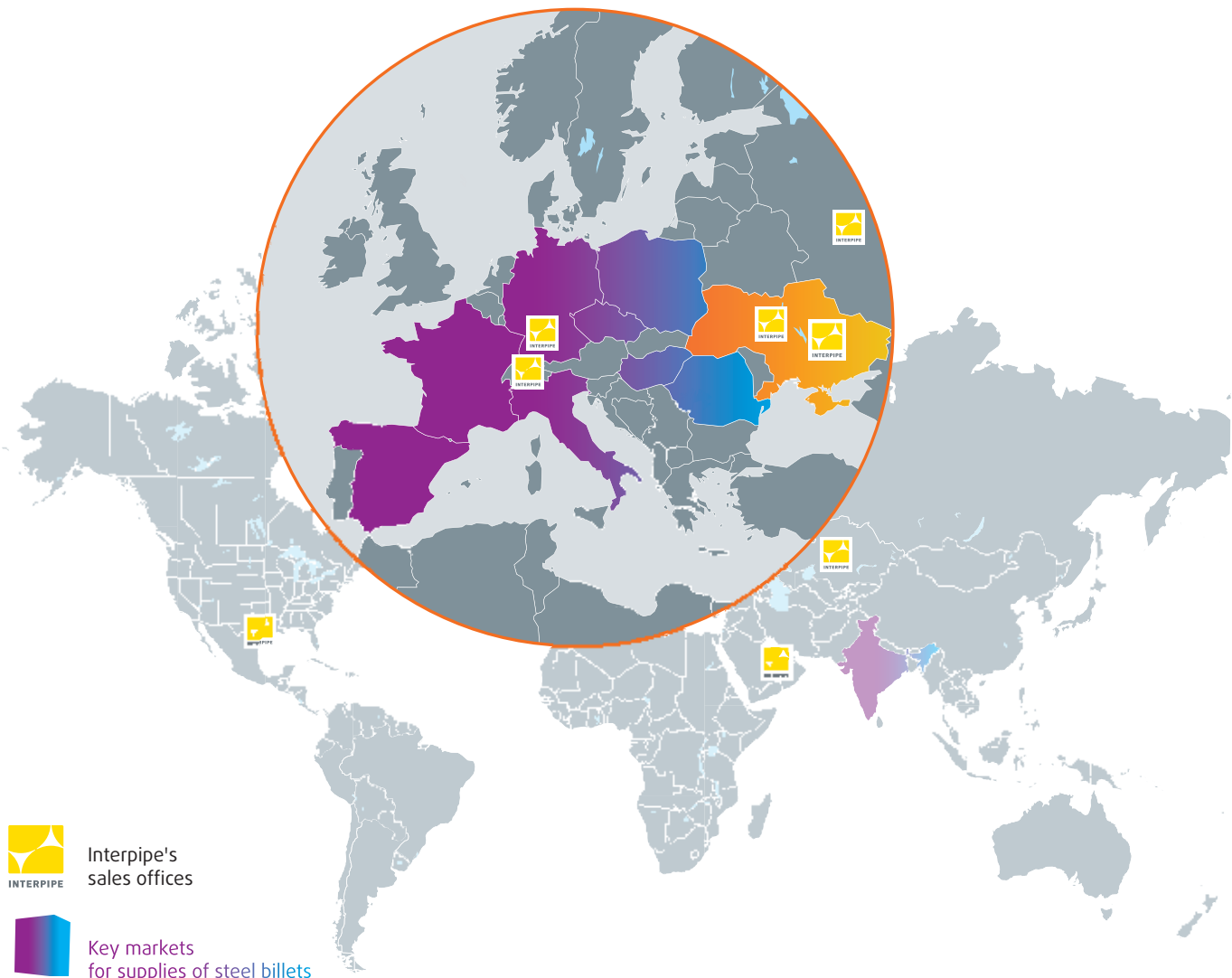
INTERPIPE – GLOBAL STEEL PIPE AND RAILWAY PRODUCT COMPANY

Interpipe is a global steel pipe and railway products manufacturer.
The company includes 3 operating divisions – Steel, Pipe and Railway Products.



STEEL PRODUCTION FOR EXPORT

In 2014 Interpipe Steel started to export steel billets as finished products. We deliver the material to customers in Germany, France, Italy, Spain, Poland, the Czech Republic, Romania, Hungary and India.



THE BIGGEST FACILITY FOR HIGH QUALITY ROUND BILLETS' PRODUCTION IN EASTERN EUROPE

CAPACITY:

1.32 mln tons of round steel billets

INVESTMENTS:

700 mln USD

INTERNATIONAL CERTIFICATION

- Quality Management System for production and supply of continuously cast billets and blooms – ISO 9001:2015
- Energy Management System – ISO 50001:2011
- Certificate in accordance with the Rules of Lloyd's Register for steelmaking and semi-finished products
- Det Norske Veritas Certificate in accordance with Rules for Classification Pt.2. Semi-finished products; billets and blooms for forging and piping stock for shipbuilding

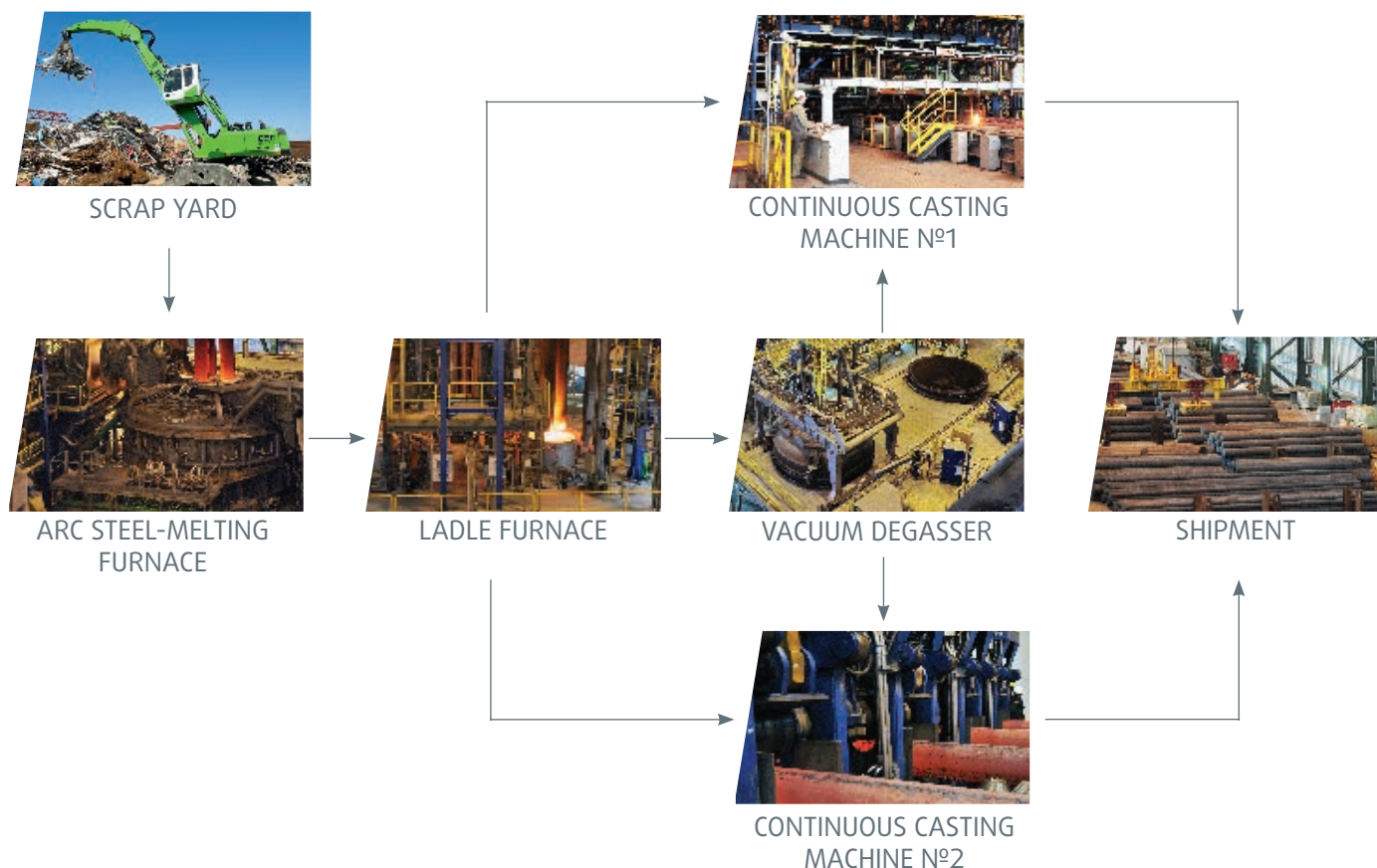




INNOVATIVE DANIELI TECHNOLOGIES

The turn-key construction of the mill has been carried out by Danieli Company – a global leader in metallurgical equipment manufacturing. Danieli ensured engineering, manufacturing, delivery, and assembly of the primary manufacturing and ancillary equipment, buildings, and communications of the mill.

MANUFACTURING CHAIN OF PRODUCTION PROCESS





TECHNICAL INFORMATION

ELECTRIC ARC FURNACE

The furnace is equipped with automatic system of slag-forming and ferroalloy supply through crown to ladle

Capacity	186 t
Heat size	160 t
Liquid steel	154 t
Duration of melting	50 minutes
Heats per day	29

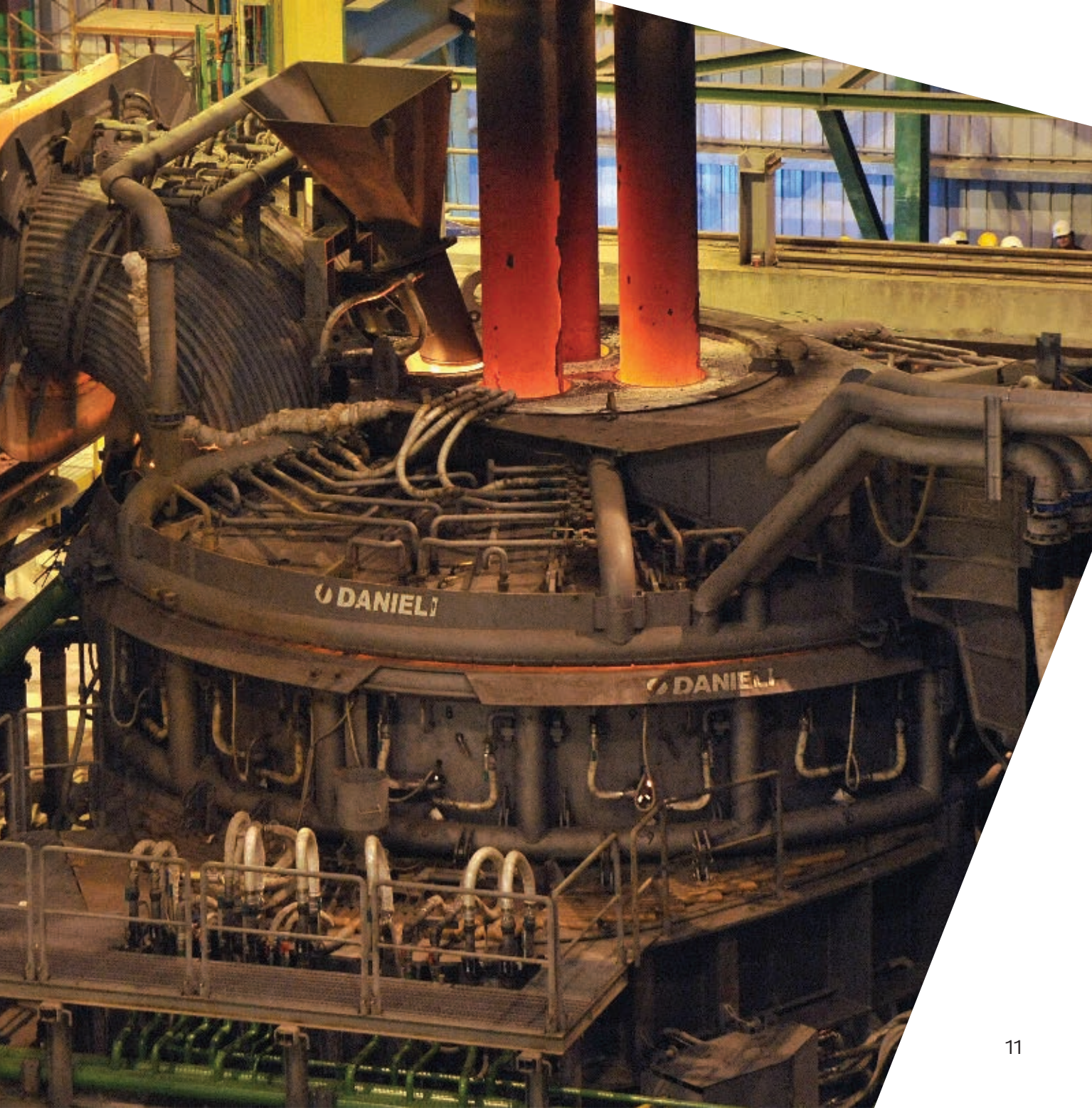
FURNACE TYPE:

3 phase electric arc furnace of alternating current with eccentric bottom tapping

CASTING IN ELECTRIC ARC FURNACE:

- Foamed slag — reduction of N2, the effective removal of phosphorus up to 0.015%
- EBT discharge — cut-off of the oxidized slag and reduction of non-metallic inclusions
- Deacidification of the received intermediate product from arc furnace — oxygen removal and reduction of the amount of non-metallic inclusions





TECHNICAL INFORMATION

TWIN POSITION LADLE FURNACE

TYPE OF UNIT — STATIONERY WITH 2 SCRAP CARS

Ladle capacity	160 t
Speed of heat	4 °C/min
Duration of melting	30-50 min (depends on steel grade)
Capacity of furnace transformator	28 MBA
Connecting voltage	35 kv, 50 hz, 3 phases
Graphitized electrode	3-diameter 450 mm

Ladle furnace is equipped with automatic system of slag-forming and ferroalloy supply through crown

STEEL PROCESSING IN LADLE FURNACE

- Inert atmosphere under the arch of the ladle furnace can reduce the consistence of non-metallic inclusions
- The final sulfur contents no more than 0.003%
- Purging of liquid steel with an inert gas — removal of gas and non-metallic inclusions
- Processing of liquid steel by cored wires with calcium fillers — removal of non-metallic inclusions



TECHNICAL INFORMATION

VACUUM DEGASSING UNIT



TYPE OF UNIT — BATCH TYPE, 2 CHAMBERS, 1 DOOR

Number of units	1
Number of vacuum pumps	1
Vacuum system	4-stage vapour ejectors vacuum pump with parallel ejectors for 3 and 4 stages
Pumping capacity	400 kg/h temperature 20°C with 0.67 mbar
Vacuuming melting duration	40-50 min

MELT PROCESSING IN VACUUM DEGASSING UNIT

- Treatment of make-up water to compensate the losses in recirculating circuits in vacuum chamber in order to obtain the composition of:
 - hydrogen no more than 2.0 ppm
 - nitrogen no more than 70 ppm

TECHNICAL INFORMATION

CONTINUOUS CASTING MACHINE №1

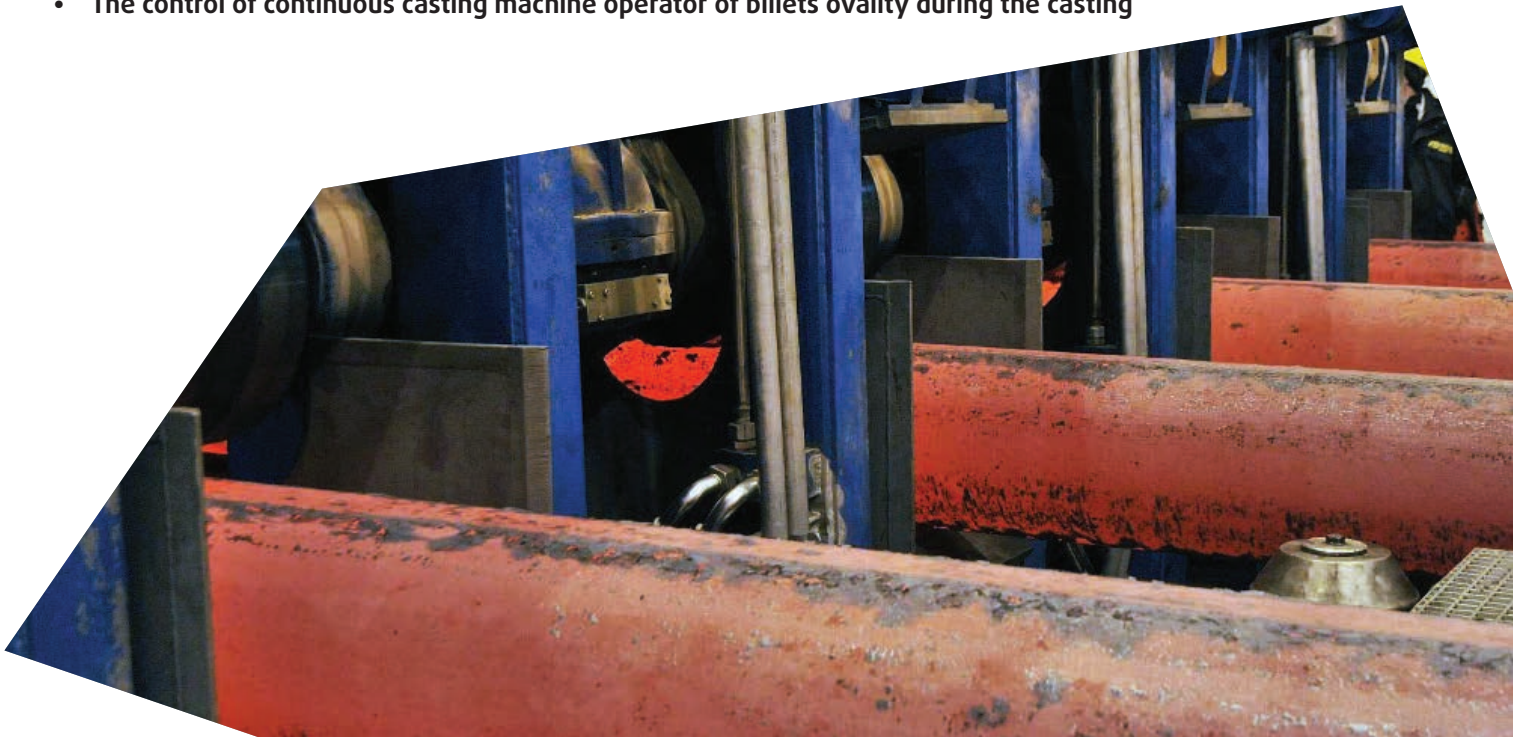
CONTINUOUS CASTING MACHINE TYPE — CURVED-RADIAL	
Basic radius	12 m
Number of strands	5
Distance between strands	1500 mm
Casting size ranges	round Ø 150; 170; 210; 250; 290 mm
Number of casts in size range	4-12
Maximum casting speed	3.4 m/min
The length of cast billets	6-11.7 m
Billets cutting	Gas and oxy cutting
Production capacity	770,000 t/year

CONTINUOUS CASTING MACHINE №2

CONTINUOUS CASTING MACHINE TYPE — CURVED-RADIAL	
Basic radius	12 m
Number of strands	4
Distance between strands	1800 mm
Casting size ranges	round Ø 385; 410; 450; 470 mm
Number of casts in size range	4-12
Maximum casting speed	0.68 m/min
The length of cast billets	6.2-9.85 m
Billets cutting	Gas and oxy cutting
Production capacity	550,000 t/year

CASTING BY CONTINUOUS CASTING MACHINES




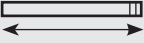
- **Reduction of non-metallic inclusions applying a complete protection of liquid steel steam from ladle to ladle furnace, from ladle furnace to the mould**
- **Electromagnetic stirring (M-EMS & F-EMS):**
 - reduction of inclusions, cavities, gas bubbles and pores on the surface and subsurface zone of continuously cast billets
 - promotes equiaxial structure in the central part of continuously cast billets
 - reduces central porosity of continuously cast billets
 - decrease liquation of carbon and alloying elements of the continuous cast billets
- **The hydraulic system of mold oscillation ensures the reduction in the depth of oscillation marks and high-quality surface of continuously cast billets**
- **Automatic control system in staching mode, straightening and cutting of continuously cast billets:**
 - exclusion of cracking
 - guaranteed cutting length
- **Controls the roundness of billets at each melting complex, by using a continuous casting machine operator**
- **Quality control system (second level) – billets defects prevention**
- **The control of continuous casting machine operator of billets ovality during the casting**



SHIPMENT OF FINISHED PRODUCTS

- 4 electromagnetic crane for loading billets
- 10 storage wells, 4 of them are thermowells for slow cooling of billets for production of wheel products
- Shipment is carried out with railway and road transport

TOLERANCE AND DIMENSIONS OF PRODUCTS

PARAMETERS	SCHEME	PERFORMANCE LEVEL
Allowance for the billets diameter $\delta D = I(DX-D)/D \times 100$ where D – nominal diameter		$\pm 1.5\%$ Measurements are carried out on cold billets at the distance of 150 mm from cut ends
Ovality $0\% = (D_{MAX} - D_{MIN}) / D \times 100$ where D – nominal diameter		$\leq 1.5\%$
Curvature $T = c / l$ Where l – is nominal length of billet		$\leq 3 \text{ mm/m}$ Maximum 25 mm for billets with the length of 11.7 m
Allowance for the billets length Billets cutting angle		CCM 1 from 6.0 m – 11.7 m CCM 2 from 6.0 m – 9.85 m maximal 1°



INTERPIPE STEEL PRODUCES ROUND BILLETS OF THE CARBON AND ALLOYED STEEL

BILLETS ARE PRODUCED OUT OF THE CARBON AND ALLOYED STEEL WITH CHEMICAL COMPOSITIONS IN ACCORDANCE WITH COMPANY’S STEEL GRADE GUIDE OR WITH CUSTOMERS’ REQUIREMENTS.

MAJOR STEEL GRADES FOR RAILWAY PRODUCTION:

STEEL GRADE	APPLICATION	STANDARD
ER6, ER7, ER8, ER9 and their analogues	Hot-rolled wheels production	EN 13262
A, B, C		BS 5892 (part 2)
Steel 2, T		AAR M 107/208
B2, B3, B4, B5, B6		GOST 10791
Steel 2	Tires production	UIC 810-1
EA1N		GOST 398
F	Wheel axles production	EN 13261
OC		AAR M 101
		GOST 4728

STEEL GRADES FOR GENERAL ENGINEERING:

STEEL GRADE	APPLICATION	STANDARD
LF2 and their analogues	Steel forgings	ASTM A350
4130, 4140 and their analogues		ASTM A29
S235JR, S235J0, S235J2, S275JR, S275J0, S275J2, S355JR, S355J0, S355J2, S355K2		EN 10025-2
S275N, S355NL, S355N, S355NL		EN 10025-3
C35E, C45E, C45		EN 10083-2



STEEL GRADES FOR GENERAL ENGINEERING:

STEEL GRADE	APPLICATION	STANDARD
34CrMo4, 34CrNiMo6 , 25CrMo4, 42CrMo4	Steel forgings	EN 10083-3
18CrNiMo7-6 and their analogues		EN 10084
30CrMo4		EN 10210
Ck60		DIN 17200
Steel grades 10, 20, 35, 45		GOST 1050
09G2S, 15GS, 17GS, 17G1S etc.	Mechanical engineering and automotive components	GOST 19281
15G, 35G, 30HMA, 30HGSA, 10G2, 30G2		GOST 4543

MAJOR STEEL GRADES FOR PIPE PRODUCTION:

STEEL GRADE	APPLICATION	STANDARD
Steel A, B, C	Line pipes production	ANSI API 5L/ISO 3183 ASTM A53 ASTM A106
L290 or X42 - L555 or X80		ANSI API 5L/ISO 3183
from H40 to Q125* including corrosion-resistance grades: C90, T95 and C110 <small>*excluding L80 9Cr and 13Cr</small>	Production of casing and tubing pipes	API 5CT
Steel of all strength groups		GOST 632
S235JRH, S275J0H, S275J2H, S355J0H, S355J2H, S355K2H, S355NH, S355NLH, S460NH, S460NLH	Production of pipes for general engineering for pipelines and metal structures	EN 10210-1
L219GA, L235GA, L245GA, L290GA, L210GA		EN 10208-1
E275, E355, 20MnV6, 25CrMo4, 34CrMo4, E470, E420J2, E460K2, E590K2, E235		EN 10305-1 EN 10294-1 EN 10297-1
P195GH, P235GH, P265GH, 16Mo3		EN 10216-2
P195TR1, P195TR2, P235TR1, P235TR2, P265TR1, P265TR2		EN 10216-1



HIGH QUALITY ROUND BILLETS FOR VARIOUS INDUSTRIES

PIPE PRODUCTION



Pipes



Fittings



Flanges



RAILWAY PRODUCTION



Wheels



Tires



Axles



GENERAL MACHINERY & WIND POWER GENERATION



Power transmission parts





ENVIRONMENTAL FRIENDLY TECHNOLOGY AT INTERPIPE STEEL

Greenfield Interpipe Steel has replaced outdated open-hearth steel furnaces. The complete decommissioning of the open-heart furnace allowed the reduction of gross emissions of pollution substances to the atmosphere by 2.5 times (comparing with the open-heart furnace production method).

The new high-tech Interpipe Steel mill is equipped with the state-of-the-art highly efficient technologies of environmental protection, allowing the virtually complete absence of detrimental impacts upon the ecological situation in the region.

ENVIRONMENTALLY FRIENDLY TECHNOLOGY

- Interpipe Steel is equipped with the up-to-date out-gassing and gas purification system to reduce the dust content of emissions
- The arc steel-melting furnace has dog-house, ensuring noise reduction down to the general city level
- The closed cycle of water supply system ensures complete elimination of industrial waste water discharge to the river Dnipro



BRINGING MODERN ART MASTERPIECES TO LIFE IS A PART OF WORKING SPACE

FIVE LARGE-SCALE PERMANENT MASTERPIECES BY OLAFUR ELIASSON ARE INTEGRAL TO INTERPIPE STEEL:



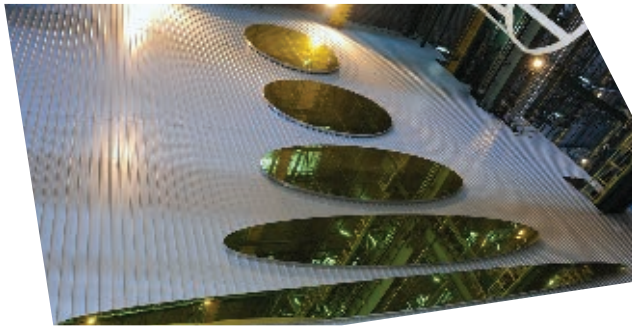
YOUR TIME TUNNEL

A series of arcs constructed from pipes produced at the factory. They form an impressive portal through which traffic flows into and out of the Interpipe Steel.



YOUR HEAT MURAL

A group of giant thermal images on the factory's façade. The effect is reminiscent of a thermal analysis of the mill interior.



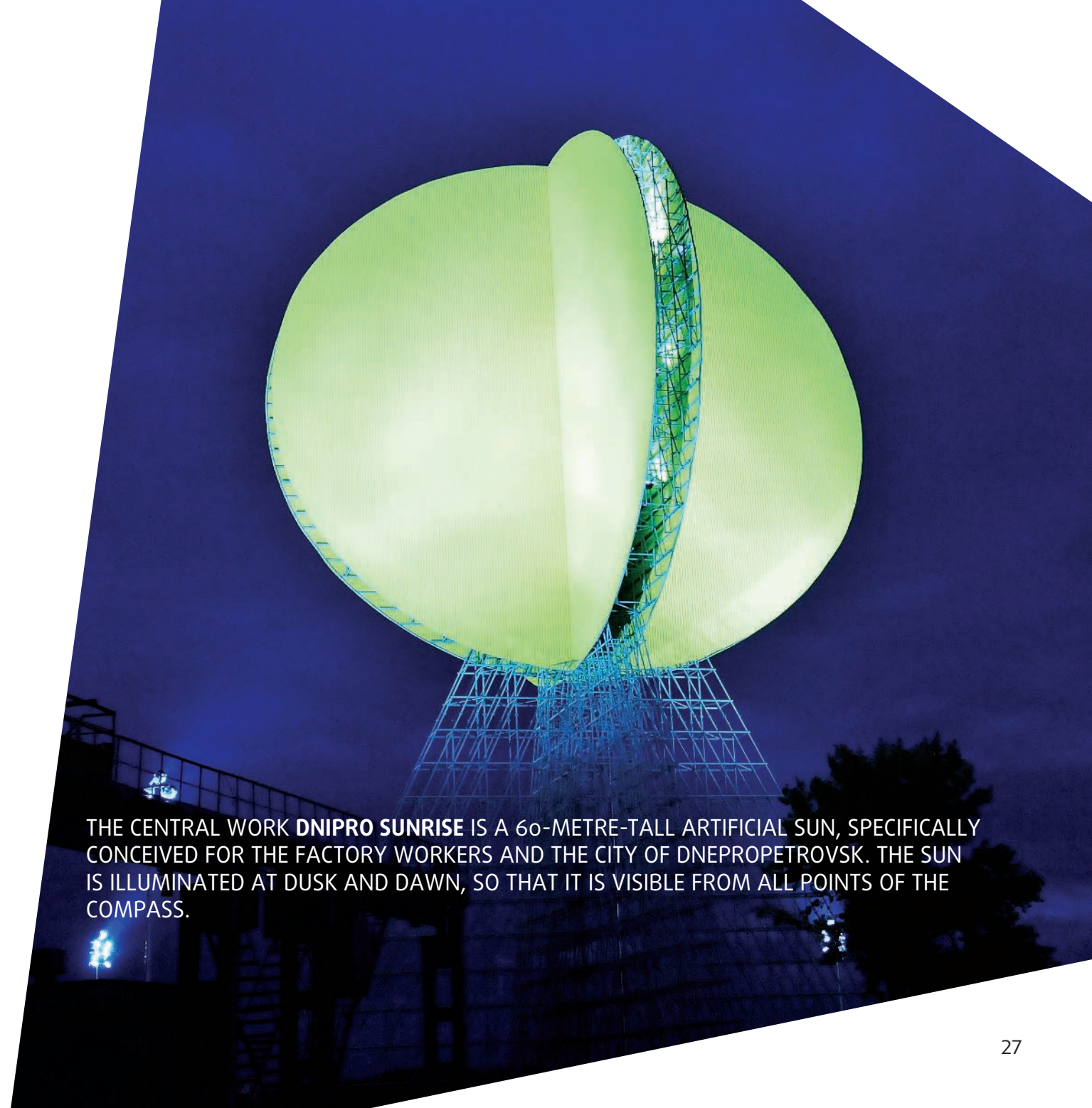
MATERIAL IS MOVEMENT

It is installed inside the main factory hall above the workers' heads like a rising sun. It comprises a series of circular and elliptical discs made of reflective glass.



YOUR THINKING BRIDGE

An elevated walkway with the mirror-clad walls and ceiling that connects the administrative spaces with the production hall.



THE CENTRAL WORK **DNIPRO SUNRISE** IS A 60-METRE-TALL ARTIFICIAL SUN, SPECIFICALLY CONCEIVED FOR THE FACTORY WORKERS AND THE CITY OF DNEPROPETROVSK. THE SUN IS ILLUMINATED AT DUSK AND DAWN, SO THAT IT IS VISIBLE FROM ALL POINTS OF THE COMPASS.



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