INTERPIPE STEEL
PULSE OF INTERPIPE

INTERPIPE STEEL
NEW STATE-OF-THE-ART ELECTRIC STEEL MELTING FACILITY

CONTENTS

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

CAPACITY:

1,32 mln tons of round steel billets

INVESTMENTS INTO THE PROJECT:

700 mln USD

INCREASE OF SELF-SUFFICIENCY IN STEEL BILLETS

One of the major reasons for mini-mill construction is to ensure the provision of company's plants with our own billets for seamless pipes and railway wheels.

Having launched the new mill, Interpipe completed its transition to a vertically integrated company structure – from scrap procurement and processing, via the production of steel billets to steel pipes and railway wheels, up to the customer servicing.

When Interpipe Steel reaches its full capacity in 2014, Interpipe will significantly increase self-sufficiency in steel billets for production of:

SELF-SUFFICIENCY IN STEEL BILLETS

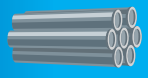
	2011	2014
Seamless pipes	30%	90%
Railway wheels	100%	100%

HIGH QUALITY BILLETS TO FEED INTERPIPE MILLS:

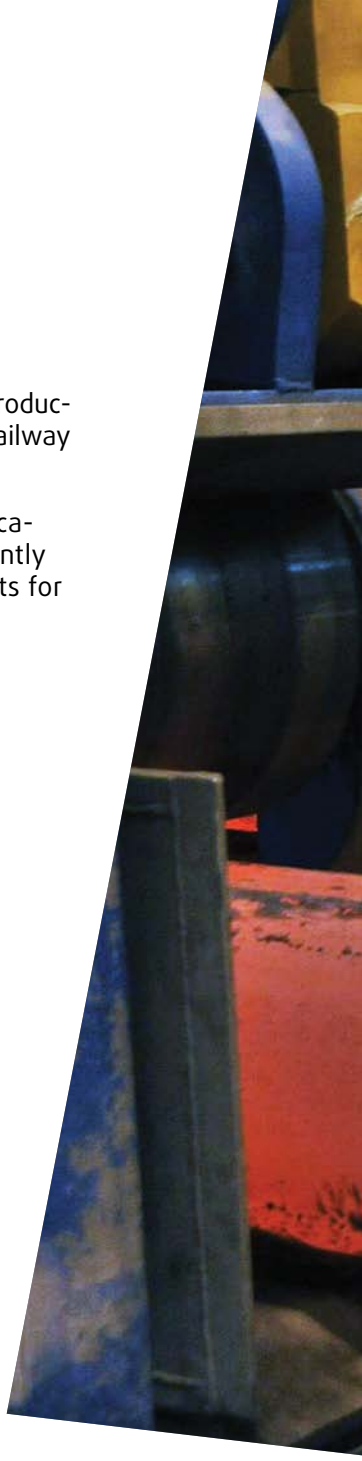
Interpipe NTRP

45%

Interpipe Niko Tube



55%



INNOVATIVE DANIELI TECHNOLOGIES

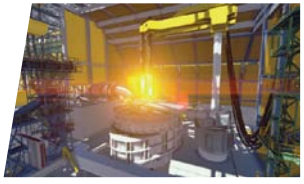
CONTINUOUS CASTING MACHINE 1:

Billets length of cut: 6,0 – 11,7 m;
Billets diameter: 150; 170; 210; 250; 290 mm;
5 strands

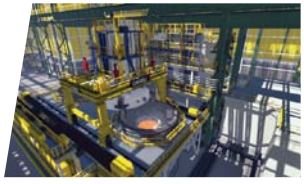
CONTINUOUS CASTING MACHINE 2:

Billets length of cut: 6,2 – 9,85 m;
Billets diameter: 385; 410; 450; 470 mm;
4 strands

The "turnkey" construction of the mill was conducted by Danieli Company – the leader in metallurgical equipment production. Danieli ensured engineering, manufacturing, delivery, and assembly of the primary manufacturing and ancillary equipment, buildings, and communications of the new mill.



ELECTRIC ARC FURNACE, 160 TONS



TWIN TANK VACUUM DEGASSER

TWIN POSITION LADLE FURNACE

TWO CONTINUOUS CASTING MACHINES

INTERPIPE HAS CONSTRUCTED AND UPGRADED KEY INFRASTRUCTE OBJECTS

To provide continuous functioning of the mill, Interpipe carried out the construction of infrastructure objects to supply the mill with necessary materials. These infrastructure facilities include:

SCRAP SUPPLY:

• Expansion of the scrap processing capacities is realized

• Extension of the scrap collection network has been started

LIME SUPPLY:

• New lime plant is built by Interpipe. Equipment was supplied by Cimprogetti

POWER SUPPLY:

• High voltage cable line 330 KV and new substation are built. The cable for cable line was supplied by Sudkabel, while transformers for substation were supplied by ZaporozhTransformator

TECHNOLOGICAL GASES SUPPLY: MESSER

• New industrial gases plant is built by Messer on Site basis

• Interpipe signed «take and pay» contract with Messer

OTHER SUPPLIES

• By contract


ИНТЕРПАЙП
СТАЛЬ-
МЕТАЛЛУРГИЯ
НОВОГО
ПОКОЛЕНИЯ!

NEW MILL HAS A TEAM OF PROGRESSIVELY THINKING PEOPLE

4200
Candidates have visited the mill

10
Persons per job — competition for some professions

500
Employees — the mini-mill staff

76%
Of the staff got university Degree

327
Employees have undergone additional training

31
Years — Employees' average age

CONTEMPORARY ART
IS A PART OF WORKING SPACE

ART OBJECTS FORM SPECIAL ATTITUDE OF EMPLOYEES TO THEIR WORK, MAKE THE EMPLOYEES TO REVISE THEIR ALTITUDE TO THE WORKING PLACES.

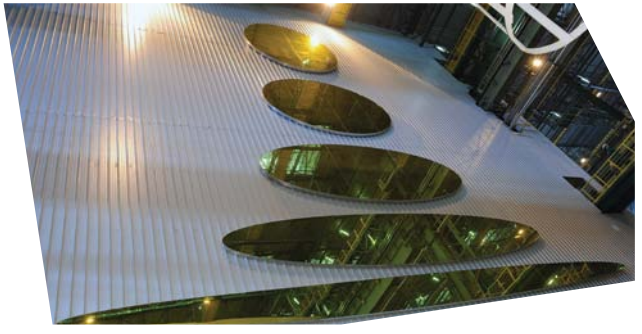
FIVE LARGE-SCALE PERMANENT MASTERPIECES BY OLAFUR ELIASSON ARE INTEGRAL TO INTERPIPE STEEL:

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 Still.

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.

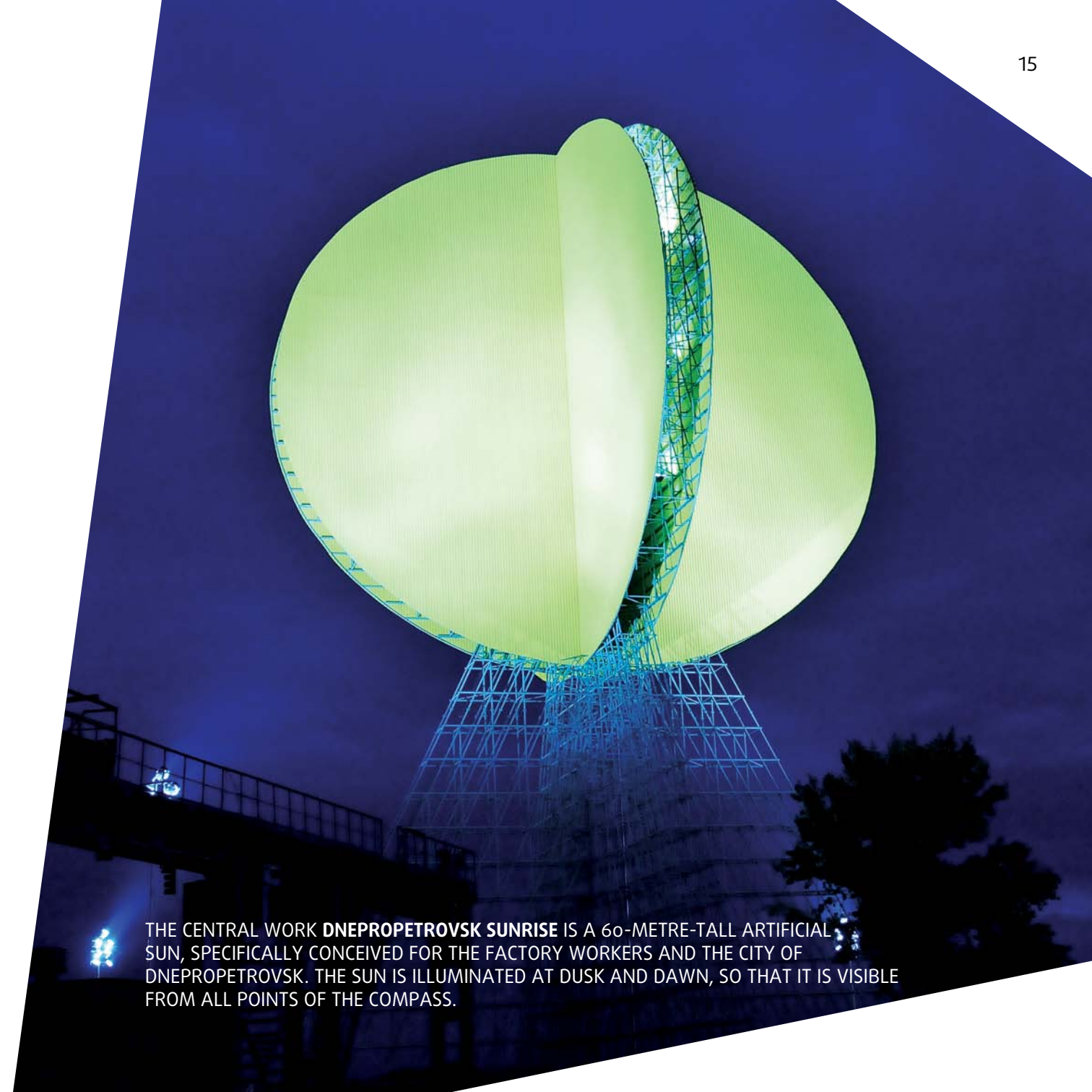


MATERIAL IS MOVEMENT

It is installed inside the main factory hall above the workers' heads like a rising sun, 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 **DNEPROPETROVSK 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.

ECOLOGY AS A PRIORITY

New mill can quite accurately be called the “green” investment of Interpipe as the new mill will replace outdated open-hearth furnaces. Protection of the environment has been at the centre of the new mill construction, which incorporated a plan of environmental and social management at its inception.

The monthly monitoring on the quality of air and noise pollution is conducted at Interpipe Steel.

Shutdown of Interpipe open-hearth production in the 4th quarter of 2012 ensured the reduction of gross emissions of pollutants into the atmosphere by more than 2.5 times (comparing with open-hearth production method).

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 Dnepr.

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 heel	26 t
Duration of melting	53 minutes
Heat per day	29

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


DANIELI
DANIELI

TECHNICAL INFORMATION

TWIN POSITION LADLE FURNACE

TYPE OF UNIT — STATIONERY WITH 2 SCRAP CARS	
Ladle capacity	160 t
Speed of heat	4,7°C /min
Duration of melting	30-50 min (depends on steel grade)
Capacity of furnace transfarmator	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

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

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


DANIELI
CENTRO MET
DANIELI
CENTRO MET
ALBA

TECHNOLOGICAL SCHEME
OF BILLET CASTS PRODUCTION

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 nonmetallic inclusions
- Deacidification of the received intermidiate product from arc furnace — oxygen removal and reduction of the ammount of nonmetallic inclusions

STEEL PROCESSING IN LADLE FURNACE

- Inert atmosphere under the arch of the ladle furnace can reduce the consistence of nonmetallic inclusions
- The final sulfur contents are up to 0,015%
- Purging of liquid steel with an inert gas — removal of gas and nonmetallic inclusions
- Processing of liquid steel by cored wires with calcium fillers — removal of nonmetallic inclusions

MELT PROCESSING IN VACUUM DEGASSING UNIT

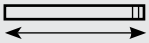
- Treatment of make-up water to compensate
  the losses in recirculating circuits
  in vacuum chamber in order to obtain the composition of:
  hydrogen no more than 2,5 ppm
  nitrogen no more than 70 ppm


3
CAUTION

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 centeral 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

TOLERANCE AND DIMENSIONS OF PRODUCTS

PARAMETERS	SCHEME	PERFORMANCE LEVEL
Allowance for the billets diameter δD = I(DX-D)/D IX 100 where D – nominal diameter		± 1,5% Measurements are carried out on cold billets at the distance of 150 mm from cut ends
Ovality 0% = (DMAX – DMIN) / D X 100 where D – nominal diameter		≤ 1,5%
Curvature T = c / l Where l – is nominal length of billet		≤ 3 mm/m Maximum 25 mm for billets with the length of 11,7 m
Allowance for the billets length		+ 50 mm - for billets with length from 4 m to 6 m + 70 mm - for billets with diameter up to 250 mm with length over 6 m + 100 mm - for billets with diameter over 250 mm
Billets cutting angle		maximal 1°

INTERPIPE STEEL PRODUCES ROUND CONTINUOUS CASTING BILLETS OUT 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 CHEMICAL COMPOSITIONS, COMPLYING WITH CUSTOMERS' REQUIREMENTS.

MAJOR STEEL GRADES FOR WHEEL PRODUCTS PRODUCTION:

STEEL GRADE	APPLICATION	STANDARD
ER6, ER7, ER8, ER9 and their analogues	Hot-rolled wheels production	EN 13262
		BS 5892 (part 2) IRS R 19/93
A, B, C		AAR M 107/208
Steel 2, T		GOST 10791
B2N, B3N, B5T, B6T	tires production	UIC 810-1
Steel 2		GOST 398
EA1N	wheel axles production	EN 13261
OC		GOST 4728

Other steel grades for manufacturing of the railway rolling stock products.

MAJOR STEEL GRADES FOR PIPES PRODUCTION:

STEEL GRADE	APPLICATION	STANDARD
steel A, B, C	line pipes production	API 5L ASTM A53 ASTM A106
X42 - X80 including the corrosion-resistance types		API 5L
from H40 to Q125* including corrosion-resistance grades: C90, T95, and C110 *excluding L80 9Cr and 13Cr	production of casing and tubing pipes	API 5CT
steels of the all strength groups		GOST 632 GOST 633
S275J0H, S275J2H, S355J0H, S355J2H, S355K2H, S355NH, S355NHL	production of pipes for general engineering	EN 10210-1
L210GA, L235GA, L245GA, L290GA		EN 10208-1
E355		EN 10305-1 EN 10294-1 EN 10297-1
20MnV6		EN 10294-1 EN 10297-1
E420J2, E460K2, E590K2		EN 10297-1
P195GH, P235GH, P265GH		EN 10216-2
16Mo3, 13CrMo4-5, 10CrMo9-1		
P195TR1, P195TR2, P235TR1, P235TR2, P265TR1, P265TR2		EN 10216-1
32CrN	mechanical pipes production	
steel 10, 20, 35, 45 and others	rolled metal and forged pieces production	GOST 1050
09Mn2Si, 15MnV and others		GOST 19281
18CrMnTi, 32CrN, 20Cr, 40Cr and others		GOST 4543

Other steel grades for production of rolled metal and forged pieces.

INTERNATIONAL CERTIFICATION


Certificate

ISO 9001:2008

TÜVRheinland

INTERPIPE STEEL QUALITY MANAGEMENT SYSTEM HAS BEEN CERTIFIED IN ACCORDANCE WITH ISO 9001:2008 INTERNATIONAL STANDARD.

ROUND BILLETS ACCORDING TO ISO 14-1-235-91

PARAMETERS	GUARANTEES
Central axle sponge effect	max. 2
Axle liquation (axle heterogeneity of the chemical composition)	max. 2
Flaws and reed stripe because of liquation for all round billets:	
• Along cross section	max. 1
• Along axle	max. 1
• Light reed stripes	max. 1
• Surface point inclusions along fens	Less than 1

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