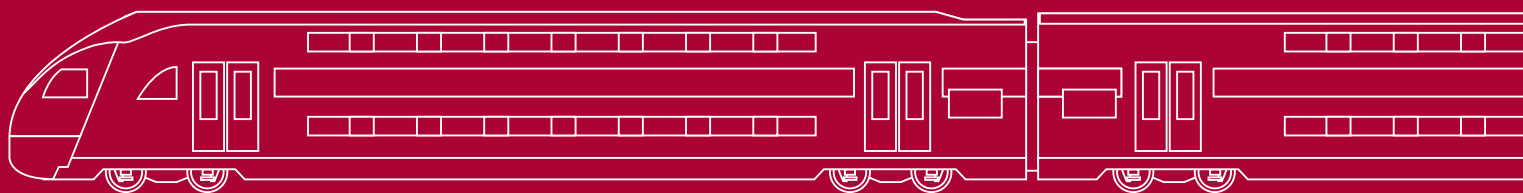




KLW: SMART SOLUTIONS **FOR PASSENGER TRANSPORT AND LOCOMOTIVES**



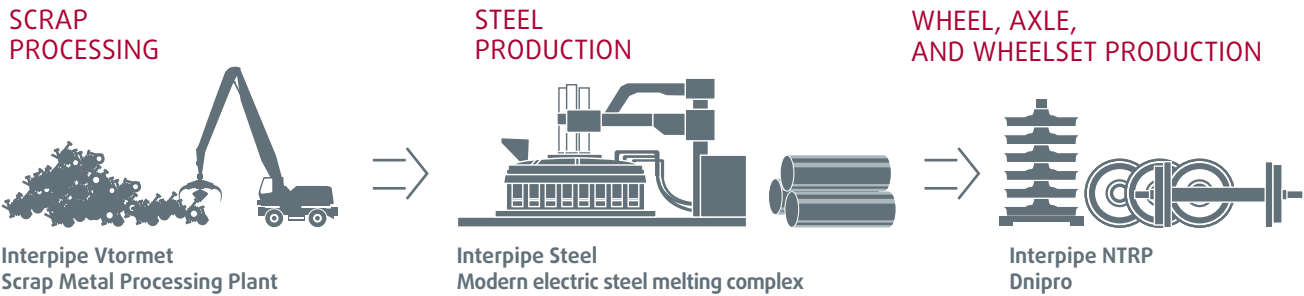
KLW – INTERNATIONAL WHEEL BRAND

KLW IS A SINGLE BRAND OF INTERPIPE RAILWAY PRODUCTS DIVISION CONSOLIDATING SALES TO ALL STRATEGIC MARKETS.

Interpipe is a global steel pipe and railway product company and one of the largest manufacturers of solid-rolled railway wheels in the world. The company has 90 years of experience in railway wheel production. KLW-branded wheels, axles and wheelsets are manufactured at Interpipe NTRP mill (Dnipro, Ukraine).

ENTIRE PRODUCTION PROCESS IS UNDER OUR CONTROL

THE COMPANY’S STRUCTURE INCLUDES HIGHLY EFFICIENT METALLURGICAL MILLS. SUCH STRUCTURE ALLOWS CONTROLLING PRODUCT QUALITY AT EVERY STAGE – FROM STEEL PRODUCTION TO DELIVERY OF FINISHED PRODUCTS TO CUSTOMERS.



SELLING TO CUSTOMERS FROM 60 COUNTRIES

EUROPE IS ONE OF THE KEY MARKETS FOR KLW. WE SUPPLY RAILWAY PRODUCTS THROUGH SALES COMPANIES IN UKRAINE, SWITZERLAND AND GERMANY.



INTERPIPE STEEL: IN-HOUSE GREEN STEEL PRODUCTION

INTERPIPE COMPANY NEEDS FOR STEEL BILLETS IS 100% COVERED BY OWN FACILITIES – INTERPIPE STEEL PLANT. INTERPIPE STEEL – IS AN INNOVATIVE EAF COMPLEX, LAUNCHED IN 2012 WITH BEST AVAILABLE TECHNOLOGIES FROM DANIELI.

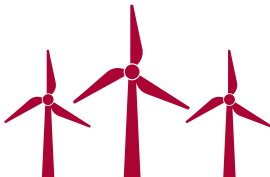
A few years before the European Green Deal emerged, Interpipe made the largest environmental investment in the Ukrainian industry, investing \$1 billion into the construction of the innovative electric steel-making complex Interpipe Steel. It enabled Interpipe to achieve one of the lowest greenhouse gas emission intensity in the global steel industry – lower than 200 kg per ton of steel billets – that reflects low carbon nature of Interpipe production.



LOW CARBON FOOTPRINT
<110 kg/ton of steel (Scope 1)
<230 kg/ton of steel (Scope 2)



RECYCLING DEVELOPMENT
96% of steel produced from scrap



CLEAN ENERGY USAGE
Over 71% of energy comes from environmentally sustainable sources

INNOVATIVE DANIELI TECHNOLOGIES AT INTERPIPE STEEL ENABLES TO PRODUCE 1,320,000 TONS OF STEEL BILLET ANNUALY

Electric arc furnace, 160 tons	Twin tank vacuum-degasser
Twin position ladle furnace	Two continuous casting machines

INTERPIPE STEEL IS THE LARGEST “GREEN” INVESTMENT INTO UKRAINIAN STEEL INDUSTRY DURING THE LAST 30 YEARS

State-of-the-art gas collection and purification system allows the efficient collection of gas and dust, generated during the steel-melting process
Completely closed circulating water supply system of the mill, without any industrial wastewater discharge

INTERPIPE STEEL ENSURES 100% NEEDS IN STEEL BILLETS FOR RAILWAY PRODUCTS MANUFACTURING. THE MILL HAS DEVELOPED WIDE PRODUCT PORTFOLIO OF TRANSPORT STEEL GRADES FOR CUSTOMERS OF KLW WHEELCO.



INTERPIPE NTRP: SPECIAL EQUIPMENT FOR PRODUCTION ACCORDING TO MAIN STANDARDS

THE MILL HAS BEEN MANUFACTURING RAILWAY WHEEL PRODUCTS FOR THE NEARLY 90 YEARS. THE PRODUCTION CAPACITIES ARE CONTINUOUSLY DEVELOPING IN LINE WITH THE WORLD-CLASS STANDARDS.

PASSENGER WHEELS PRODUCTION FACILITIES AND PROCESSES:

Process	Facility
Steel mill	Electric arc furnace, ladle furnace, vacuum-degasser, steel billet continuous casting machines, special billet-cutting machines
Forging and heat treatment	Rotary-hearth furnace, MN presses, quenching machines, tempering furnaces
Wheel machining	Turning-and-boring lathes, drilling machines
Shot blasting	Pangborn shot blaster
Marking	Hilti marker, robotic marking machine
Quality control	UTS-600 machine, impact pendulum-type testing machine, universal computerized testing machine "Hydropuls Sinus 250", balancing machine, hardness testing machine
Coating	Fully automatic coating line

THE PRODUCTS PORTFOLIO INCLUDES MORE THAN 250 TYPES OF RAILWAY WHEELS, AXLES, WHEELSETS AND TYRES FOR FREIGHT AND PASSENGER WAGONS, LOCOMOTIVES, URBAN RAIL TRANSIT AND HIGH-SPEED RAIL.

SMART SOLUTIONS FOR PASSENGER TRANSPORT

KLW OFFERS SUFFICIENT RANGE OF WHEELS FOR PASSENGER RAILWAY TRANSPORT.



KLW OFFERS A WIDE RANGE OF WHEELS FOR PASSENGER RAILWAY TRANSPORT

Wheels for passenger traffic such as EMU /DMU wheels have high performance and a design that meets the requirements of each customer.

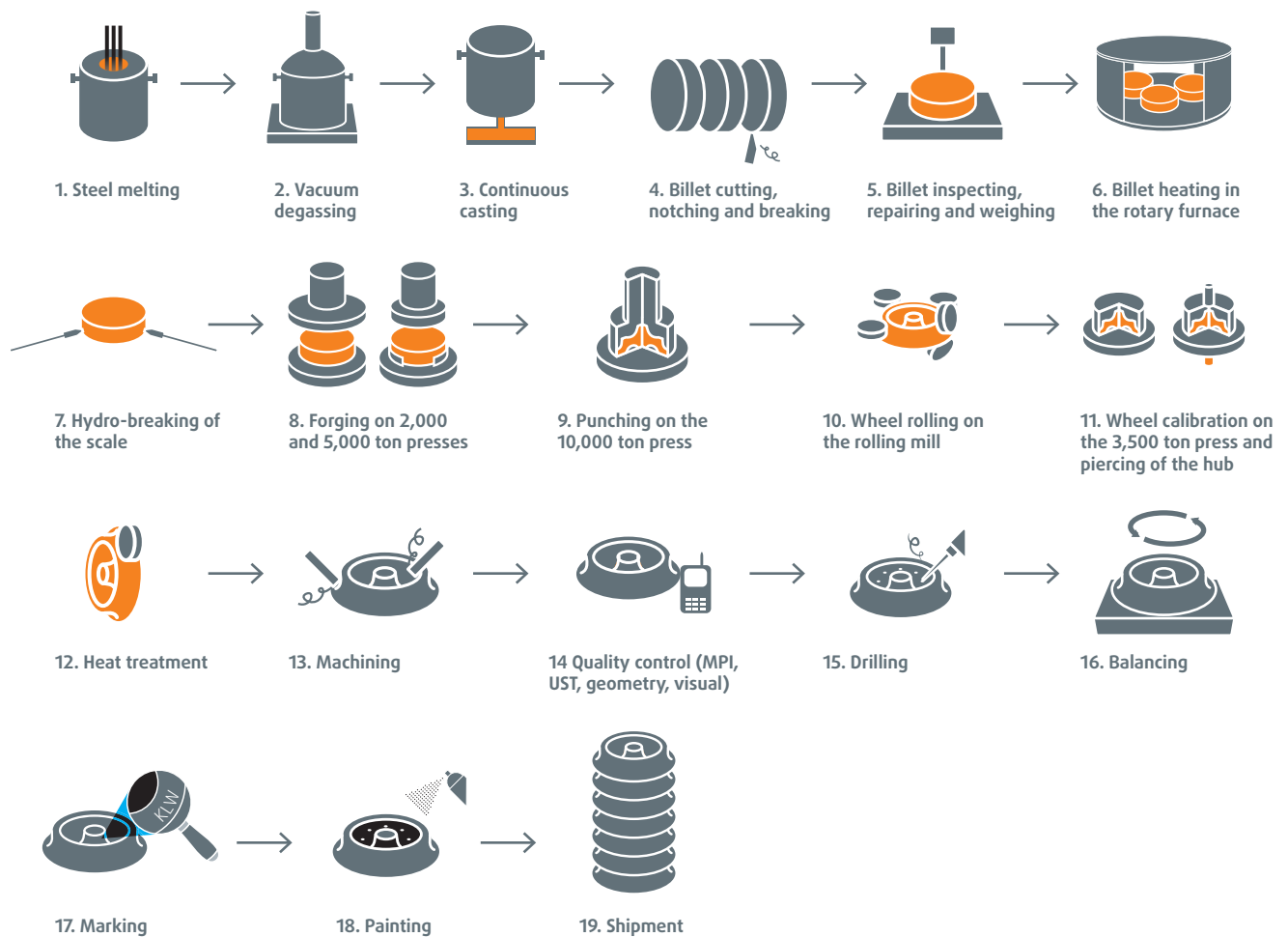
In-house steel production ensures high quality of billets increasing safety characteristics and guarantees longer life cycle of wheels and higher flexibility in their manufacturing. KLW offers passenger wheels of various steel grades, including ER6, ER7, ER8, ER9 of Category 1 and 2 to accommodate specific customer requests worldwide.

WHEELS DESIGNED AND PRODUCED ACCORDING TO INTERNATIONAL STANDARDS AND SPECIAL CUSTOMER REQUIREMENTS.

KLW offers significant product portfolio from small metro wheels to standard-size wheels for passenger cars and locomotives.

OUTSIDE DIAMETER	INSIDE DIAMETER	WIDTH OF RIM	DIAMETER OF HUB	HEIGHT OF HUB	DIAMETER OF HOLE IN HUB	THICKNESS OF DISC	MASS
D, MM	D1, D2, MM	H, MM	D, MM	L, MM	D0, MM	T1, T2, MM	KG
700-1269	600-1100	95-160	185-350	150-250	110-120	15-80	165-1050

TECHNOLOGY OF RAILWAY WHEEL PRODUCTION



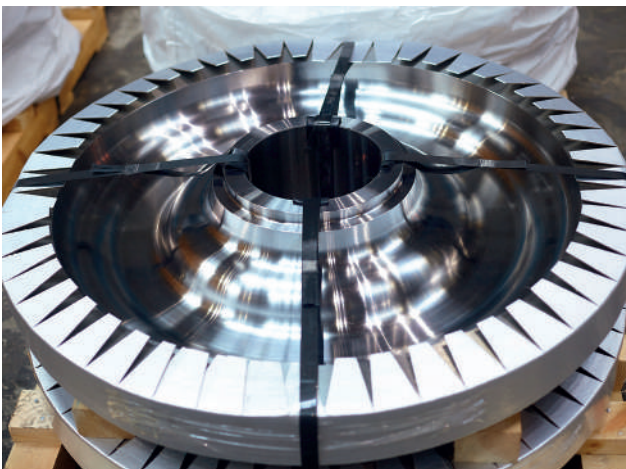
RELIABLE PARTNER FOR CAR-BUILDERS AND NATIONAL RAILWAYS WORLDWIDE

KLW SUPPLIES HIGH QUALITY WHEELS FOR PASSENGER TRANSPORTATION AND LOCOMOTIVES ALL AROUND THE WORLD. OUR MAIN ADVANTAGE – CONTROL OVER FULL-CYCLE PRODUCTION STARTING FROM STEEL MELTING TO ALL MACHINING OPERATIONS AND LABORATORY TESTS.

KLW ensures a high level of safety and long-life cycle wheels according to international standards as well as offers products developing and manufacturing to meet individual customer requirements. The company has wide supply and cooperation portfolio for the passenger segment:

- KLW is a partner of numerous railroads around the globe. The company supplies wheels for Passenger mainlines, Metros, Locomotives, and High Speed Trains.
- We have a long-term partnership for deliveries of wheels to the United Kingdom for passenger railcars (EMU/DMU) in compliance with British standards.
- KLW's in-house R&D team enhanced wheel design for Indian Railways to increase railway traffic after repairs of passenger rolling stock in compliance with local operating conditions.
- KLW has extensive experience in supplies for urban rail transit, including wheels for metro in the US, the Netherlands, Turkey, Hungary, and other countries.
- Interpipe has successfully completed qualifications for Alstom and Siemens to supply wheels for passenger trains of their production around the world.
- Interpipe group of companies holds an Ecovadis Bronze Medal, and so we are among Top 35% of sustainable businesses globally.

KLW is able to handle development and qualification of new design and steel grades to accommodate specific customer requests worldwide (e.g., wheels made of category 1 steel grades for high speed).



REFERENCE LIST OF KLV SUPPLIES FOR PASSENGER RAIL



Ø850 mm wheel
Bombardier EMU, DB S-Bahn Class 423, Deutsche Bahn



Ø840 mm wheel
Bombardier Talent 2, DBAG Class 442, Deutsche Bahn



Ø890 mm wheel
Bombardier DMU, DBAG Class 612, Deutsche Bahn



Ø850 mm wheel
YHT 65000 T High-speed train, Turkish State Railways (TCDD)



8 Ø1250 mm locomotive wheel
Alstom electric double-section locomotives of 12,000 HP, Indian Railways



Ø870 mm wheel
Kawasaki PA-5 metro cars, PATH (New York – New Jersey), the USA



Ø840 mm wheel
Alstom M5 Metropolis metro cars, The Amsterdam Metro, the Netherlands



Ø890 mm wheel
Renfe Class 447, Spain



Ø840 mm wheel
Alstom AM5-M2/AM4-M4 Metropolis metro cars, BKV Budapest metro, Hungary



Ø850 mm wheel
Siemens metro cars, Bangkok Blue Line metro, Thailand

KLW FOR FUTURE OF GLOBAL MOBILITY

OVER THE LAST 8 YEARS KLW SCALED UP ITS PRODUCTION FACILITIES TO INCREASE WHEEL FINISH-MACHINING CAPACITIES, PRODUCE FINISH-MACHINED AXLES AND READY-TO-MOUNT WHEELSETS WITH AXLE-BOXES.

38.2 mln USD

Invested into wheel and wheelset production in the last 12 years

Advanced operations for wheel finishing and high-quality control

In July 2016, KLW launched a new finishing line for machining operations that had not been previously performed by the company. The line consists of:

- 2 CNC machining centers for precise finish machining of a wheel bore and various types of web drilling, with the capacity of up to 60,000 wheels per year, depending on their design
- Coordinate measuring machine for up-to-date 3D geometry control
- Balancing machine for determination of imbalance and balance correction
- MPI unit for non-destructive control after finishing operations
- Painting line for water based, alkyd, epoxy resin covers

The line enables KLW to produce a wide range of products for all rolling stock categories. The new facilities correspond in full with the requirements of car-building, car-maintenance mills and national railway operators.



Continuous development of production capacities

In May 2016, a new machining line to increase production of full-profile machined wheels for European, American and Middle Eastern markets, started its operation. The line is equipped with:

- 4 high-efficiency turning and boring machines for finish machining
- A modernized wheel control and acceptance stand including MPI and UT units, a hardness testing machine, geometry control, and a robotic marking machine



Precise machining operations

In 2019, KLW completed the next stage of the strategic development program and scaled-up production of finish-machined wheels increasing wheel production for freight wagons as well as suburban diesel and electric trains, locomotives and high-speed transport.

The launched wheel finish machining line includes:

- An automatic full-profile wheel machining line that includes 3 Hegenscheidt CNC lathes and robotic arm for loading and unloading wheels
- Enhanced capacities for non-destructive testing including imbalance and geometry measurement

Precise machining operations were extended with two high-precision CNC machines for:

- Finish machining of wheel hub bore
- Drilling and milling of wheels and wheel centers



COMMITMENT TO QUALITY CONFIRMED BY THE INTERNATIONAL CERTIFICATION

QUALITY IS THE BASIS OF WHEEL PRODUCTION IN KLW.

The quality management system is certified in accordance with ISO 9001, IRIS, and AAR M-1003. The customer-related norms used are EN 13260, EN 13261, EN 13262, DB BN 918 277, AAR M-107/M-208, Indian Railway standard, TSI, etc.

KLW complies with all requirements demanded by its clients. KLW railway products have received certificates on compliance with individual requirements from operators in a number of European countries such as Germany, UK, France, Austria, Switzerland, Poland and Czech Republic.





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