

KLW: FROM WHEEL TO WHEELSET



INTERNATIONAL WHEEL BRAND KLW

KLW IS A WHEEL BRAND OF TUBULAR-WHEEL COMPANY INTERPIPE. KLW IS ONE OF THE LARGEST MANUFACTURERS OF SOLID-ROLLED RAILWAY WHEELS IN THE WORLD. THE VOLUME OF PRODUCTION IN 2016 WAS 285 THOUSAND PIECES.

KLW has 80 years of experience in the production of railway wheels. Railway wheels under the KLW brand are produced in the Wheel rolling shop of Interpipe NTRP (Dnipro, Ukraine).

INTERPIPE HAS VERTICALLY INTEGRATED BUSINESS STRUCTURE

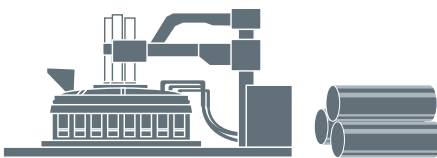
INTERPIPE HAS A VERTICALLY INTEGRATED BUSINESS STRUCTURE, WHICH INCLUDES HIGH EFFICIENT METALLURGICAL MILLS. SUCH STRUCTURE ALLOWS CONTROLLING PRODUCT QUALITY AT EVERY STAGE: FROM STEEL PRODUCTION TO DELIVERY OF FINAL PRODUCTS TO CUSTOMERS.

SCRAP PROCESSING



Interpipe Vtormet
Scrap Metal Processing Plant

STEEL PRODUCTION



Interpipe Steel
Modern electric steel melting complex

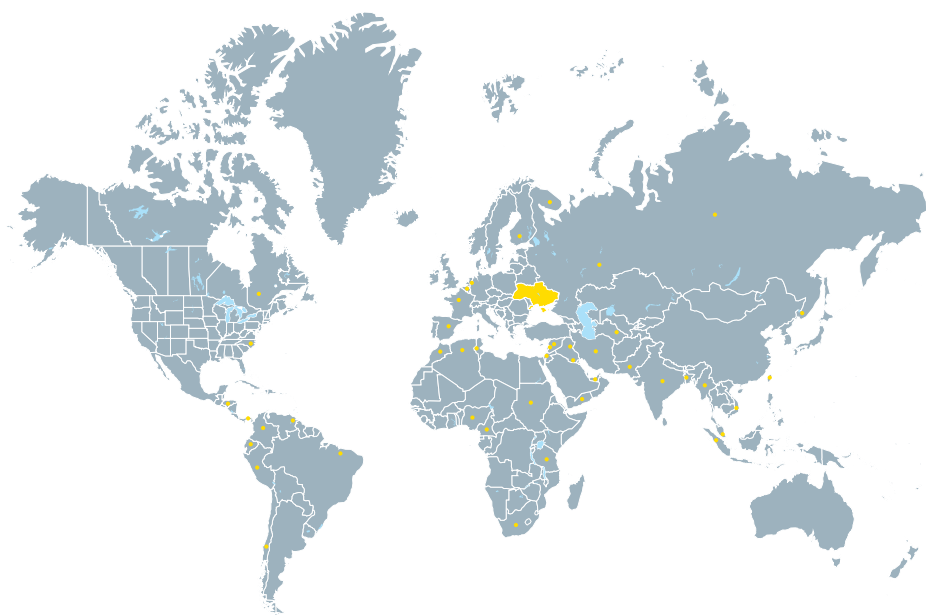
WHEEL AND AXLE PRODUCTION





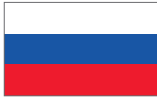



Interpipe NTRP,
Dnepropetrovsk

SELLING TO CUSTOMERS – THE NETWORK OF TRADE OFFICES

World national railway operators and companies have long-term partnership with KLW: Austria, Bulgaria, Croatia, Czech Republic, France, Germany, Greece, Italy, Norway, Poland, Slovakia, Slovenia, Sweden, Switzerland, United Kingdom, Russia, Kazakhstan, Belarus, USA, Iran, Saudi Arabia, India.



-  Interpipe Ukraine
Dnipro
-  North American
Interpipe
Houston
-  KLW WheelCo
Lugano
-  Interpipe
Middle East
Dubai
-  Interpipe M
Moscow
-  Interpipe Central
Trade
Frankfurt

INTERPIPE STEEL: IN-HOUSE GREENFIELD STEEL PRODUCTION

IN 2012, INTERPIPE COMMISSIONED NEW ELECTRIC STEEL MELTING COMPLEX INTERPIPE STEEL. THE CAPACITY OF THE MILL IS 1,320,000 TONS OF STEEL BILLETS. TOTAL INVESTMENT IN PROJECT HAS REACHED \$700 MILLION.

INNOVATIVE DANIELI TECHNOLOGIES ON INTERPIPE STEEL

Continuous casting machine 1	Twin tank vacuum degasser
Continuous casting machine 2	Twin position ladle furnace
Electric arc furnace, 160 tons	Two continuous casting machines

IN 2014 INTERPIPE STEEL HAS STARTED TO EXPORT STEEL BILLETS AS A FINISHED PRODUCTS. THE MAIN APPLICATIONS ARE:

- production for railway use (wheels, tyres and axles)
- production of forgings (rings, shafts, pulleys, flanges, fittings and for space industry)
- tube production

Customers include the European railway wheel producers from Poland, Czech Republic, Spain, France and Germany.

INTERPIPE STEEL HAS DEVELOPED WIDE PRODUCT PORTFOLIO OF TRANSPORT STEEL GRADES FOR CUSTOMERS OF KLV WHEELCO FOR THE PAST THREE YEARS.



INTERPIPE NTRP: SPECIAL EQUIPMENT FOR PRODUCTION ACCORDING TO MAIN STANDARDS

THE MILL HAS BEEN PRODUCING RAILWAY WHEEL PRODUCTS FOR THE PAST 80 YEARS. THE PRODUCTION CAPACITY TOTALS 600,000 PIECES.

FREIGHT WHEELS PRODUCTION FACILITIES AND PROCESSES:

Process	Facility
Steelmill	Electric Arc Furnace, Ladle-Furnace, Vacuumator, Blank Continuous Casting Machines, Special ingot-cutting machines, Annular Furnace
Forging and heat treatment	MN presses, quenching machines, temporary furnaces
Machining of the wheels	Turning-and-boring lathes
Web shot blasting	Pangborn unit manufactured
Marking	Hilti marker or percussion pistol
Quality control	UTS-600 machine, Psd 5015 impact pendulum-type testing machine, universal computerized testing machine "Hydropuls Sinus 250"

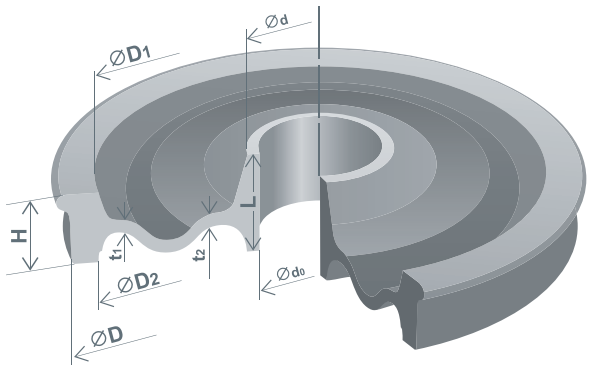
KLW: SMART SOLUTIONS FOR YOUR TRANSPORTATION

MEETING INDUSTRY CHALLENGES, KLW AIMS TO PROVIDE ITS CLIENTS WITH HIGH-QUALITY TRANSPORT PRODUCTS AND SERVICES FOR LOCOMOTIVES, PASSENGER AND FREIGHT WAGONS, METRO AND EMU/DMU VEHICLES.

KLW wheels meet all international standards and their design is made according to the unique requirements of customers.

KLW product portfolio includes more than 250 types of railway wheels and tyres with high production characteristics:

- Increased wear resistance due to the usage of carbon steel (more than 0,77%),
- High lasting qualities due to the retentive structure of metal,
- High reliability,
- High characteristics of ductility,
- High resistance to formation of explorative heat defects,
- Long life cycle.



RANGE OF RAILWAY WHEELS

OUTSIDE DIAMETER Ø D, mm	INSIDE DIAMETER Ø D1, Ø D2, mm	WIDTH OF RIM H, mm	DIAMETER OF HUB Ø D, mm	HEIGHT OF HUB L, mm	DIAMETER OF HOLE IN HUB Ø D0, mm	THICKNESS OF DISK T1, T2, mm	MASS, KG
700-1269	600-1100	95-160	185-350	150-250	110-120	15-80	65-1050

RANGE OF RAILWAY TYRES

OUTSIDE DIAMETER Ø D, mm	INSIDE DIAMETER Ø D, mm	WIDTH OF RIM H, mm	WIDTH OF FLANGE H, mm	MASS, KG
570-1300	375-1100	80-150	15-45	90-550

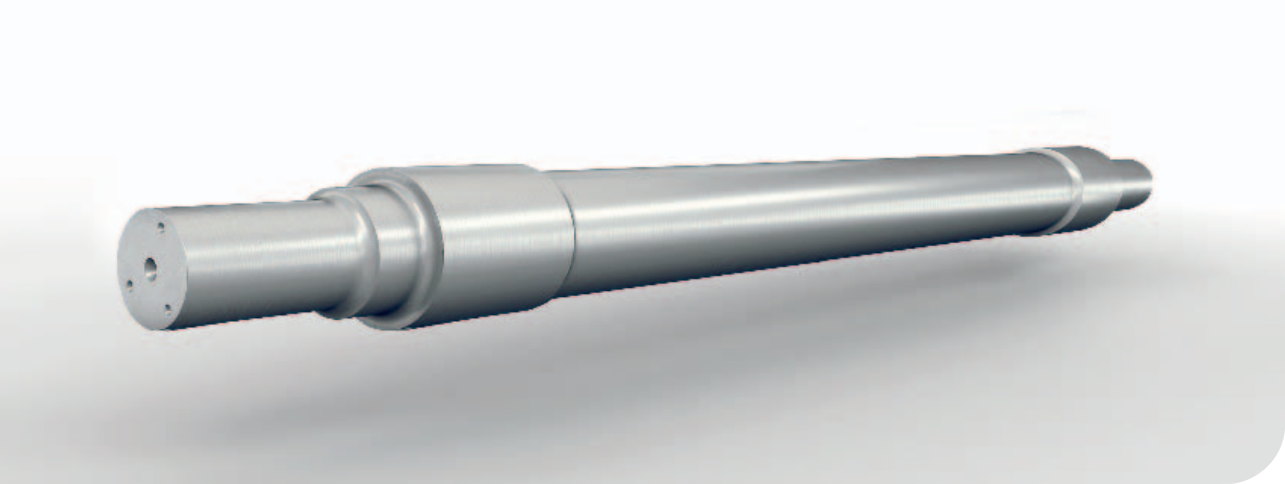
KLW DEDICATED TO RAILWAY AXLES

KLW PRODUCES AXLES IN COMPLIANCE WITH REQUIREMENTS OF EN 13261, TSI, AAR M-101, DSTU GOST.

PRODUCT RANGE OF RAILWAY AXLES

DESIGN	DIAMETER OF THE BODY, mm	AXLE LENGTH, mm	AXLE LOAD, t	STEEL GRADE	COMPLIANCE
BA 302	173+2	2180	25	EA1N	EN 13261, TSI
BA 002	173+2	2180	23,5	EA1N	EN 13261, TSI
G 7"x12"	203,2+3,175	2266,95 +/-1,6		F	AAR M-101
K 6½"x9"	187,325+3,175	2213,768+/-1,6		F	AAR M-101
PY1Ш	177+/-1	2220+/-1	23,5	OC in accordance with DSTU GOST 4728	DSTU GOST
PB2Ш	186+3	2230-1	25	OC in accordance with DSTU GOST 4728	DSTU GOST

ANNUAL CAPACITY OF AXLE PRODUCTION IS 10 000 PIECES PER YEAR.



KLW DEVOTED TO WHEELSETS

KLW IS CERTIFIED ACCORDING TO TSI FOR SUBSYSTEM “ROLLING STOCK – FREIGHT WAGONS” BY VUZ. THE AREA OF CERTIFICATION INCLUDES FOUR TYPES OF RAILWAY WHEELSETS FOR FREIGHT WAGONS OF EUROPEAN RAILWAY OPERATORS AND COMPANIES.

	WHEEL TREAD DIAMETER, mm	DISTANCE BETWEEN THE INTERNAL WHEEL FACES, mm	WHEELSET GAUGE, mm	MAXIMUM SPEED, km/h	FOR AXLE LOAD, t	COMPLIANCE
BA 004	920 ⁺⁴ /0	1360+1/0	1421 +1/-1, 1425 +1/-1	120	23,5	EN 13261, TSI, VPI
BA 314	920 ⁺⁴ /0	1360+1/0	1421 +1/-1, 1425 +1/-1	120	25	EN 13261, TSI, VPI
BA 303	920 ⁺⁴ /0	1360+1/0	1421 +1/-1, 1425 +1/-1	120	25	EN 13261, TSI, VPI
KLW 90 (inhouse development)	920 ⁺⁴ /0	1360 + 1/0	1421 +1/-1 1425 +1/-1	160	25	EN 13261, TSI, VPI

INTERNATIONAL CERTIFICATION

QUALITY IS THE BASIS OF THE PRODUCTION IN KLW.

The Quality Management System is certified in accordance with ISO 9001, IRIS, AAR M-1003. The products comply to the requirements of a number of standards, namely EN 13261, EN 13262, DIN EN 13103, EN 13979, DB BN 918 277, TSI, AAR M-107/M-208, AAR M-101, ASTM A504/A504M-14, GM / RT 2466, IRS, UIC 510-5, UIC 810-1, UIC 812-2, GOST 10791-2011, and individual customers specifications. KLW is ready to meet any additional requirements.



KLW railway wheel products have received certificates on compliance with individual requirements from national railway operators in a number of countries, namely Germany, UK, France, Austria, Switzerland, Poland, Czech Republic, Saudi Arabia and India.

Interpipe has successfully passed the audit inspection of finished railway wheels under the KLW brand, which are being produced specifically for Deutsche Bahn.



KLW IS MOVING TO COMPLEX PRODUCTS

DURING 2014-2016 KLW HAD BEEN IMPLEMENTING A STRATEGIC INVESTMENT PROGRAM. THE MAIN FOCUS OF THE INVESTMENTS IS ON THE INCREASE OF FINISHING CAPACITIES AND PROVISION OF THE NEW SERVICES FOR CUSTOMERS.

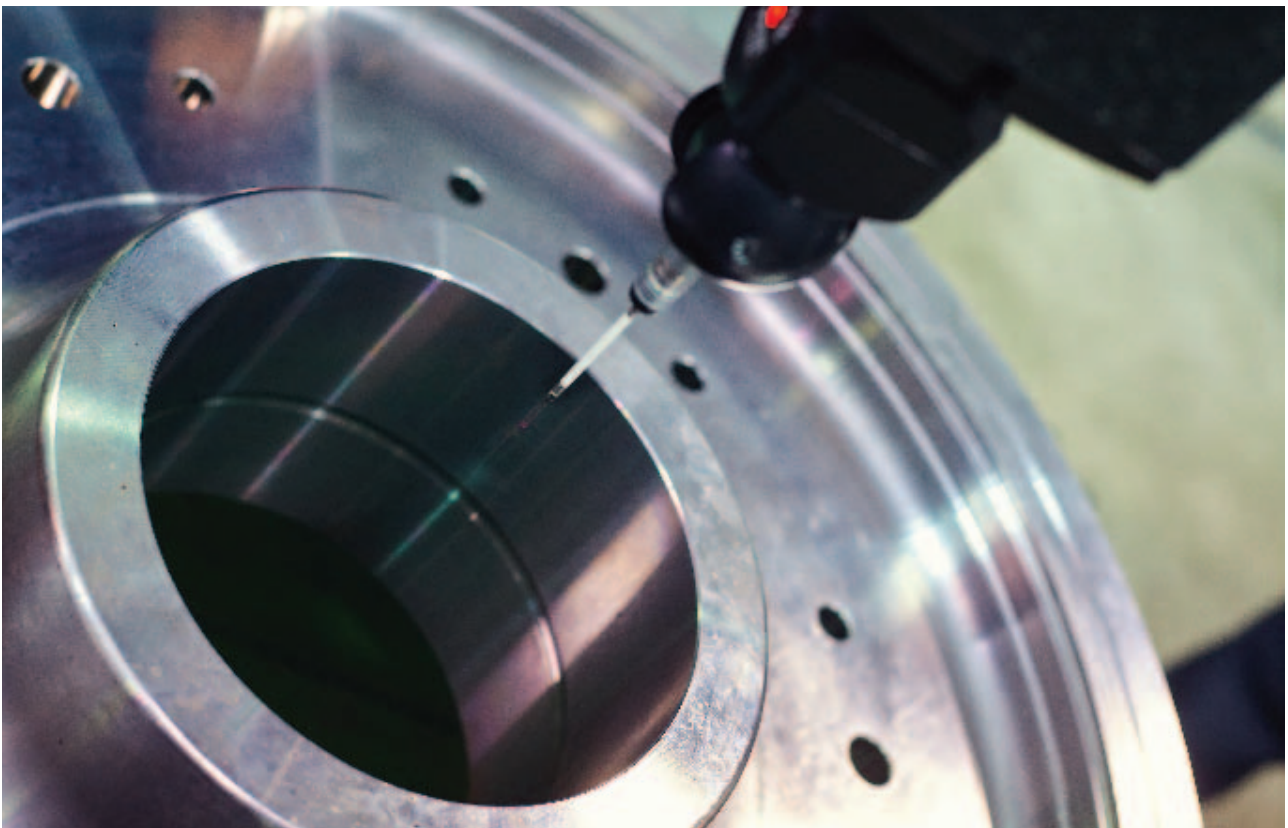
- Finish machining of bore in the wheel hub for mounting of wheels
- Various types of web drilling, especially for the installation of brake discs
- Modernization of quality control equipment
- Increased capacity for wheel finish machining
- Finish-machined axles production
- Paint shops for wheels and axles using water based, alkyd, epoxy resin covers
- Wheelset assembling

ADDITIONAL SERVICES FOR CUSTOMERS

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

- 2 CNC machining centers for precise finish machining of a wheel bore and various types of web drilling, with capacity for up to 60,000 wheels per year, depending on their design
- A coordinate measuring machine for up-to-date 3D geometry control
- A balancing machine for determination of unbalance and balance correction
- An MPI unit for non-destructive control after finishing operations
- A painting shop 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.



INCREASING OF MACHINING OPERATIONS

In May 2016, a new machining line for production of the AAR wheels for NAFTA, African, Middle Eastern markets started 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 UST units, a hardness testing machine, geometry control, and a robotic marking machine

The new line enables K LW to increase its capacities for finish machining to up to 113,000 wheels per year.



EXTENDING THE OFFER FOR CUSTOMERS

In 2014, K LW launched a new production area for rough-machined railway axles.

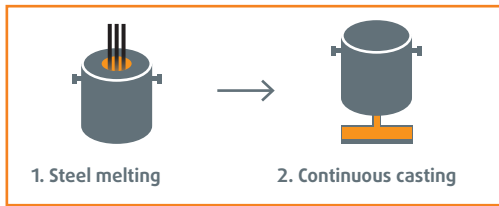
Now we have a new line for the finish machining of the railway axles and wheelset assembling in accordance with European and American standards. The line includes:

- A horizontal machining center for facing and tapping for axle-boxes
- 2 CNC turning lathes for finish machining
- MPI and UST units
- A painting shop

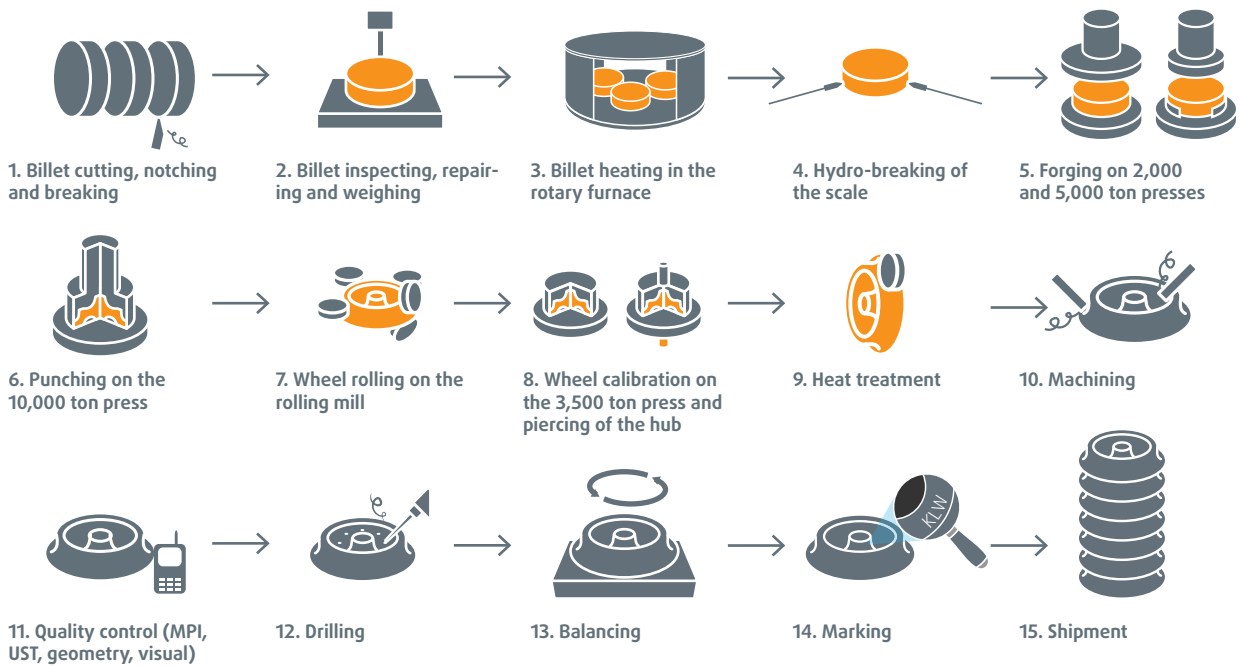
The line has a capacity of 10,000 finish-machined axles per year and 10,000 of railway wheelsets per year.



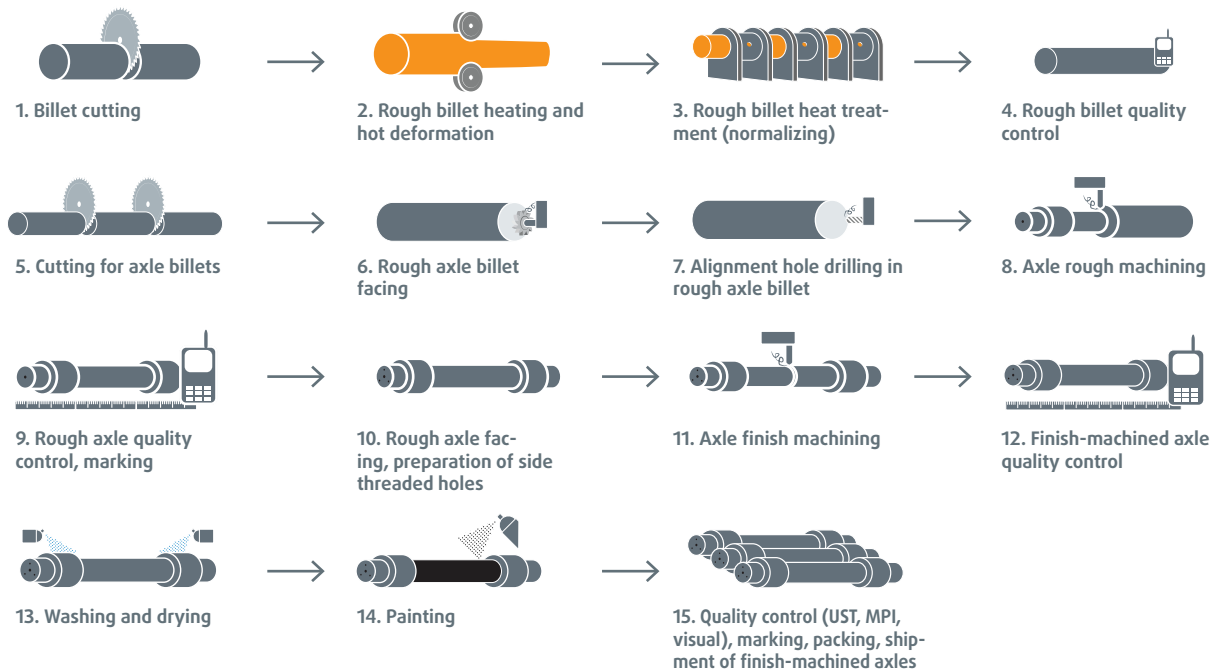
TECHNOLOGY OF THE PRODUCTION



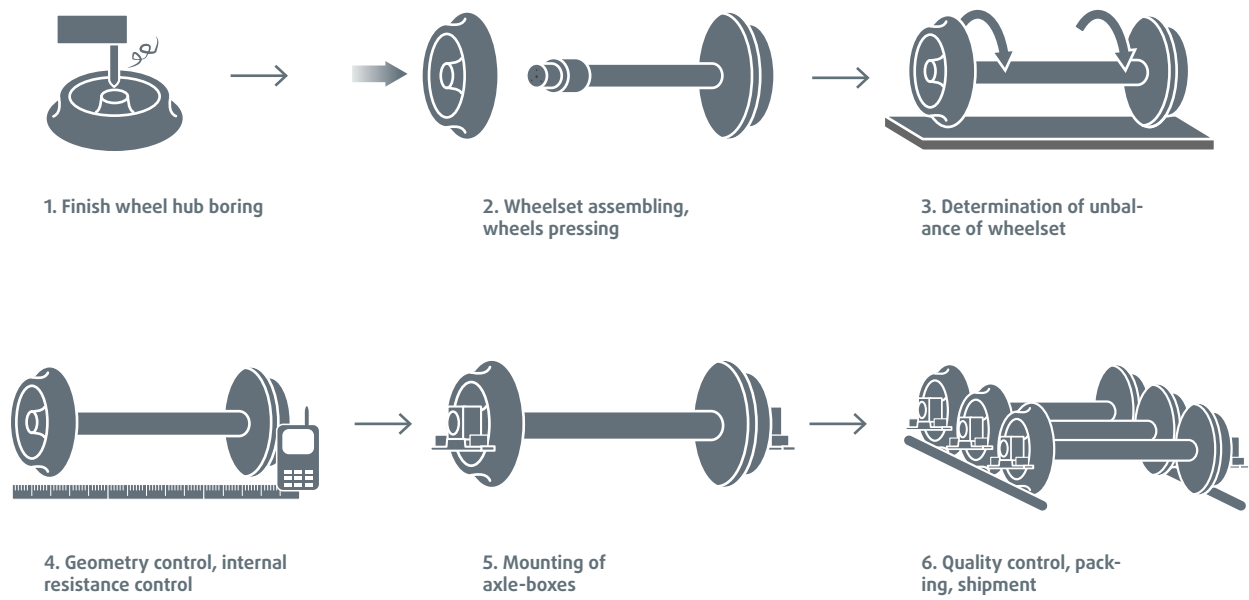
WHEELS



AXLES



WHEELSETS





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