ROLLS FOR THE PRODUCTION OF LONG PRODUCTS

WALZEN IRLE ROLLS
INCREASE YOUR ROLLING MILL PRODUCTIVITY

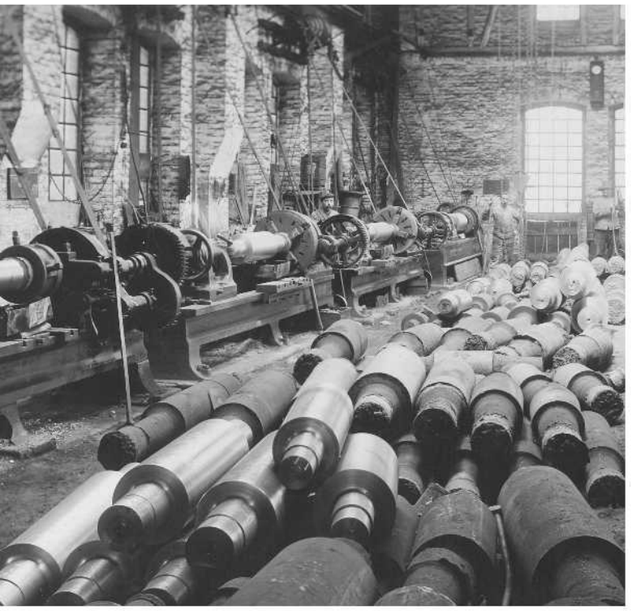
WALZEN IRLE is a worldwide leading company in the production of rolls for various areas of industry. The company stands for over more than 200 years of experience, technological competence, continuous research and development in the production of rolls.

The traditional and consequently close cooperation with machine builders and operators of constructions has lead to permanent and successful improvements of the WALZEN IRLE technologies and has made them an innovative technology leader.

Today we offer top-technology for the steel industry (plate mills, strip mills, sheet mills and section mills) as well as for the paper, rubber, plastic and food industry.
Our technically orientated sales specialists are always available for our customers, to discuss and develop professional solutions for the various problems in rolling mills.

INCREASE YOUR PROFIT - WITH OUR ROLLING KNOWLEDGE!

MORE THAN 300 YEARS OF FOUNDRY EXPERTISE, 200 YEARS OF ROLL CASTING



Rolls »made in Deuz« are used worldwide and have made a name for themselves for sophisticated technology and highest quality.

Following the most important facts:

1693 start of casting and machining of iron parts by Johannes Irle

1820 founding year of the iron foundry in Marienborn and casting of the first chilled cast iron roll

1906 start of production of heavy rolls

1920 casting of the first cast steel roll

1950 casting of the first nodular iron roll

since 2001 big investments in the production of centrifugally casted work rolls for heavy plate mills and roughing rolls as well as work rolls for hot strip mills.

2006 erection of the large vertical spin casting machine (up to 80 t casting weight)

2007 production start of the new vertical spin casting machine

2007 implementation of a complete new production line for heavy rolls

2009 more than 100 heavy plate mill rolls, produced with the vertical spin casting machine, are already running in customers mills worldwide

2010 WALZEN IRLE celebrates its 190st anniversary as a roll manufacturer

2012 the 300th roll has been casted at the vertical spin casting machine

until today continuous development of different grades for the benefit of the steel industry

ROLLS FOR THE STEEL INDUSTRY

The main customers for long products are building-, construction and machine-, ship building-, commercial vehicle-/automobile industries as well as the railway sector.
The customers have high demands on the material properties and surface quality. The adjustment of the material properties is significantly affected by type and order of the rolling processes. The condition of the roll surface and subsequently the quality of the used rolls have a high influence on the surface quality of long products. All components of the profile rolling mill run under extreme conditions: roll force, high temperatures and humidity. Especially the profile rolls have to apply the necessary roll force cyclically and are exposed to high thermal demands by the rolled steel (up to 1.300°C).

That's why our target for the WALZEN IRLE profile rolls is to achieve the highest possible reliability, wear resistance and surface quality to ensure an increase in the rolling performances at our customer's mills.

HOT-STRIP ROLLS

HEAVY PLATE ROLLS

BACK-UP ROLLS

EDGER ROLLS

WITH WALZEN IRLE PROFILE ROLLS, LONG PRODUCTS SUCH AS

- roll wire,
- slabs,
- concrete steel,
- profiles and
- rails

CAN BE MANUFACTURED

QUALITY AND EXPERIENCE

A guideline of our recommended roll materials according to their applications, can be found on the following pages. These recommendations are based on experience collected over a period of almost two centuries of roll production, based on performance data and tests carried out by our R&D department (metallurgical laboratory and engineering) on the IRLE rolls during and after having been in operation.

Our technical advisers permanently support our customers worldwide in order to optimise their rolling processes, especially in selecting the most suitable roll material and adapting the roll properties to the individual rolling process

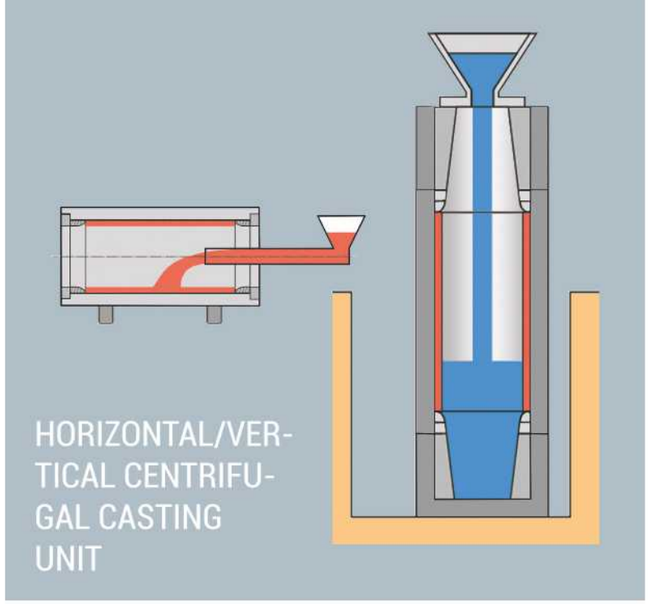
MATERIAL RECOMMANDATION

Material	Chilled cast		Indefinite		Nodular cast iron			High Chromium rolls						Steel casting / Steel casting graphitized								Special steel	
	K 30	K 40	I	I*plus*	S	SA	SP/A	CR 5	CR 5 *plus*	CR 15	CR 15 *plus*	CR 25	CR 25 *plus*	ST 0	ST 10	ST 20	ST 30	STG 0	STG 10	STG 20	STG 30	SST	SST mod.
Semi-finished rolling mill																							
Continuous mill: roughing mill					•		•													•			
Continuous mill: intermediate mill					•															•			
Continuous mill: finishing mill					•															•	•		
Duo-reversing mills / 3-high stand					•		•												•	•			
Heavy profile mills																							
Duo-reversing mills / 3-high stand																							
Roughing mill stand							•							•	•			•	•				
Intermediate mill stand					•									•	•	•		•	•	•			
Finishing mills					•														•	•	•		
Universal mill stand for heavy beams and profiles																							
Horizontal rolls					•	•				•		•				•				•	•		
Vertical rolling / edge rolling					•	•														•	•		
Bar-slab-mill stand																							
Mills / rolls							•							•	•			•	•	•			
Central forging mill																							
Roughing mill stand					•										•	•			•				
Intermediate mill stand			•		•					•					•	•			•	•			
Finishing mill stand			•		•	•						•								•	•		
Small section mill																							
Roughing mill stand					•		•													•			
Intermediate mill stand	•		•		•		•			•											•	•	
Finishing mill stand	•	•	•		•	•						•									•	•	
Wire and bar rolling mill																							
Roughing mill stand					•		•														•		
Intermediate mill stand	•		•		•	•	•															•	
Finishing mill stand	•	•	•			•																•	

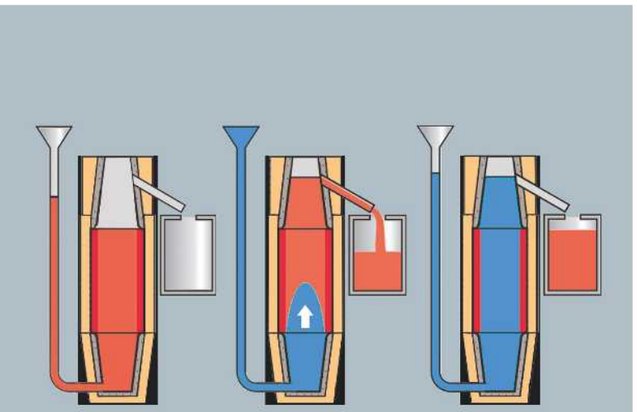
Mechanical properties									
Tensile strength (N/mm²)	160-250	300-450	330-600	800-900	700-800	700-800	600-950	350-650	700-1000
Bending strength (N/mm²)	330-450	450-800	550-1150	1320-1480	1150-1320	1150-1320	580-1120	580-1200	1230-1560
Bending alternating strength (N/mm²)	60-80	–	100-240	260-300	230-270	230-270	110-420	110-230	240-320
Modulus of elasticity (kN/mm²)	170-185	160-180	160-180	200-210	200-210	200-210	190-210	180-200	200-210
Expansion (%)	–	–	0,5-3	–	–	–	0,5-3	0,3-1	–

Hardness Shore C									
Sleeve / Work layer	55-75	70-85	40-70	60-85	60-85	60-85	30-60	40-60	72-94
Core Material	35-45	35-45	35-60	35-45	35-45	35-45	30-50	30-50	35-45

MANUFACTURING PROCESS

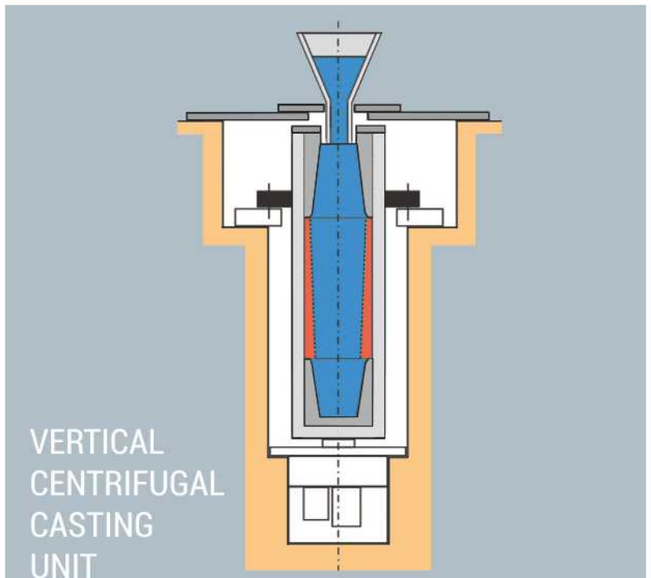


HORIZONTAL/VERTICAL CENTRIFUGAL CASTING UNIT



STATIC CASTING PROCESS

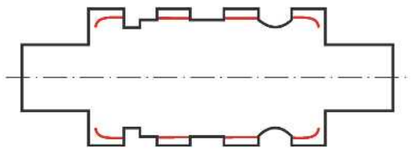
STATIC COMPOUND CASTING PROCESS



VERTICAL CENTRIFUGAL CASTING UNIT

ADVANTAGES OF PRE-CALIBRATION PRIOR TO THE THERMAL TREATMENT

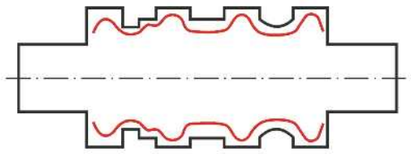
Rolls with pre-calibration prior to the thermal treatment



— Lines with the same hardness, the same metallic microstruture and similar residual stress follow the pre-contour

→ Favourable properties especially in the profile insections

Roll with cylindrical barrel, profile insections to be done on site



— Lines with the same properties follow the cylindrical pre-contour and will be interrupted when the caliper is incised

→ Unfavourable properties in the insections

ADVANTAGES OF COMPOUND- AND CENTRIFUGALLY CASTED MATERIAL

Compound casting:

Shell and core material are adjusted according to the demands of the respective application.
shell: Hardness/wear resistance of the usable layer, largely consistent properties in the usable depth.
Core/journals: Rigidity and durability, reduction of tension peaks.

Centrifugal casting:

The specific heavy iron melt will be pushed to the outside by the centrifugal force, non-metallic inclusions to the inside.
Defined adjustment of shell thickness.
Combination possibilities for the shell- and core material, which have different properties.

PRODUCTION CAPACITY

Casting facilities:

- static single poured and compound casts - single pieces up to a maximum cast weight of 130 tons, over a diameter of over 1,700 mm and 13 m length
- 3 horizontal/vertical centrifugal casting machines for single poured and compound cast pieces up to a barrel length of 6 meters
- vertical spin casting machine for rolls up to 11,5 m length and 75 tons finish weight

Machining:

- CNC-controlled turning-, milling-, grinding-, drilling-, and balancing machines in 12 processing halls, for finished size:
  - max. barrel length up to 13 meters,
  - Ø over 1,700 mm,
  - 120 tons finished weight
- approx. 1.500 tons finished products per month

Melting facilities:

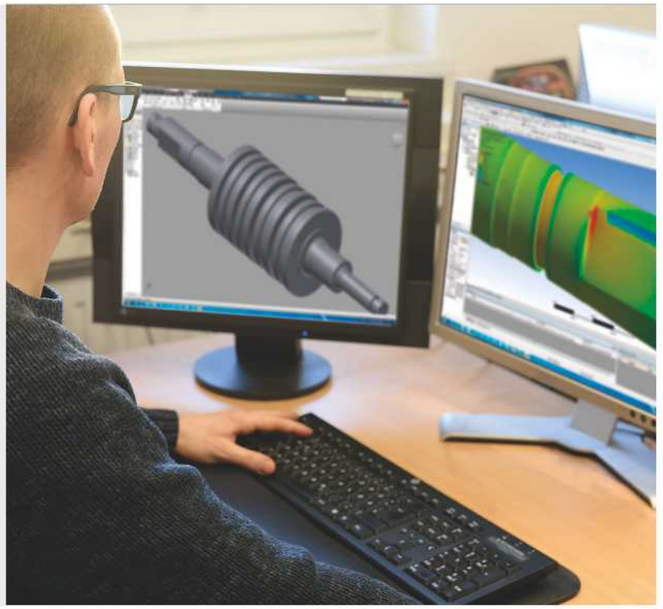
- 8 electrical melting furnaces (induction), from 3 to 30 tons capacity

Heat treating facilities:

- 17 gas-fired heat treatment furnaces

ENGINEERING

WALZEN IRLE has its own engineering- and calculating department (amongst others, according to FEM-Methods of Finite Elements). Thereby the customers get supported effectively by the construction of new plants or major rebuilding of existing rolling mills.



Apart from the preparation of drawings- and order documents the following areas are also covered:

- **on-going technical support of the customer regarding our products**
- **planning of the technical documents for our products**
- **research and development especially in the area of heated calender rolls in cooperation with the metallurgic laboratory**
- **Patent monitoring**

Technical consultation and constructional support

- technical sales support
- dimensioning of components according to customers demands
- load-carrying capacity of the components- and fatigue strength analysis
- optimising of the components according to the customer's requirements

QUALITY MANAGEMENT

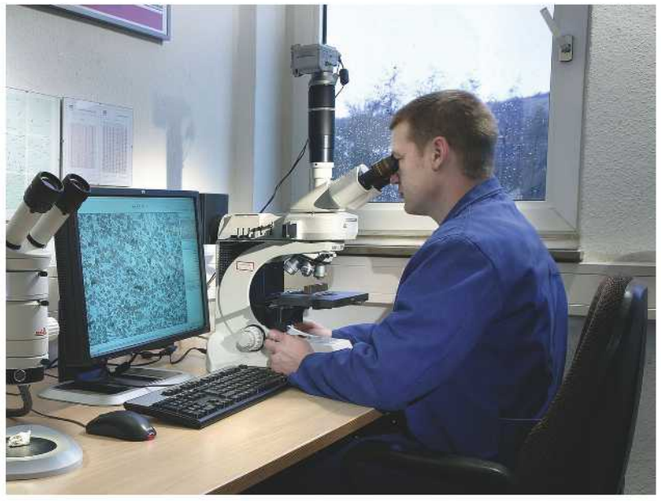
The high requirements of our customer in the material properties of our products are fulfilled by the specialists in our materials laboratory.
The standard tasks are continuous chemical analyses during the melting- and casting processes, permanent quality controls during all production steps and description of the metallurgic criteria for the manufactured products.

The following essential operations are carried out in the laboratory:

- sales support in the area of application specific material recommendations
- chemical analysis using spectrometer
- measuring the bending and tensile strength
- testing the surface hardness with all, in the industry, accredited measurement- methods
- non-destructive measurements with ultra sonic devices
- non-destructive measurements with eddy-current gauge
- magnetic powder testing
- material tension testing
- surface testing with perthometers
- research and development especially in the area of production methods

TÜV NORD CERT GmbH ISO 9001 · TÜV NORD CERT GmbH ISO 14001 · TÜV NORD CERT GmbH ISO 50001

The high qualification of our staff in combination with our experience enables us to realise tailor made solutions and customer specific improvements. We are continuously optimising our work process according to the ISO 9001:2015 Quality Management, the ISO 14001:2015 Environment Management and the ISO 50001:2018 Energy Management Systems.



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