ODLEWNIE POLSKIE S.A.

INNOVATIVE TECHNOLOGIES, WIDE EXPERIENCE

COMPANY AND ITS MARKET

HISTORY

In 1899, the first furnace fed with coke on the Polish territories was run on the site of the present Foundry and the first castings were made.

During the period between WWI and WWII, the Starachowice Plants became a part of the Central Industrial Area. Castings for an armaments factory were made in Starachowice (anti-aircraft guns were produced there).

After WWII until 1993 the foundries were part of the Heavy Goods Vehicles Factory and castings for the motor industry were produced.

In 1993–2001, the foundries became part of Grupa Kapitałowa Exbud, one of the first private Polish companies listed on the stock exchange (privatization of the foundries).

Since 1998, shares of Spółka Akcyjna ODLEWNIE POLSKIE, a joint-stock company, have been quoted on the Warsaw Stock Exchange (WSE) – our company was the first foundry to be listed on the WSE in Warsaw.

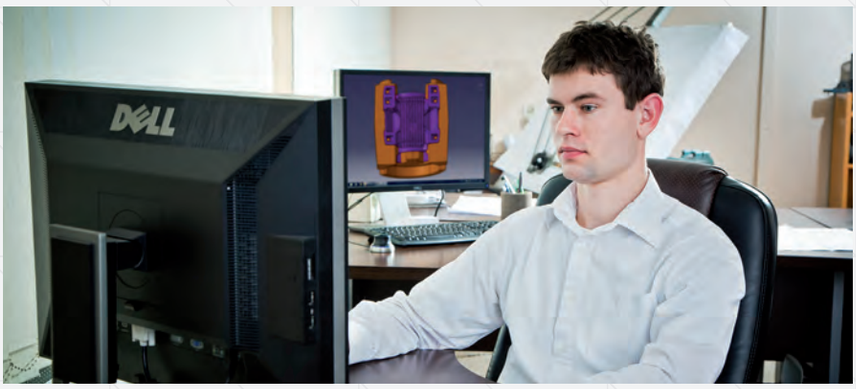
In 2002, OP Invest Company took over the controlling block of shares of Spółka Akcyjna ODLEWNIE POLSKIE. OP Invest is a private company of Polish entrepreneurs managing Spółka Akcyjna ODLEWNIE POLSKIE.

COMPANY PROFILE

We are a service foundry manufacturing castings for numerous industries and customers. 60% of our products are delivered to EU customers.

We are specialized in the production of nodular cast iron (about 80% of our production); we also produce grey cast iron and ADI iron castings.

We offer comprehensive customer service, including the design, production of foundry equipment and creation of castings, their machining and heat treatment, as well as painting, assembly and shipment.

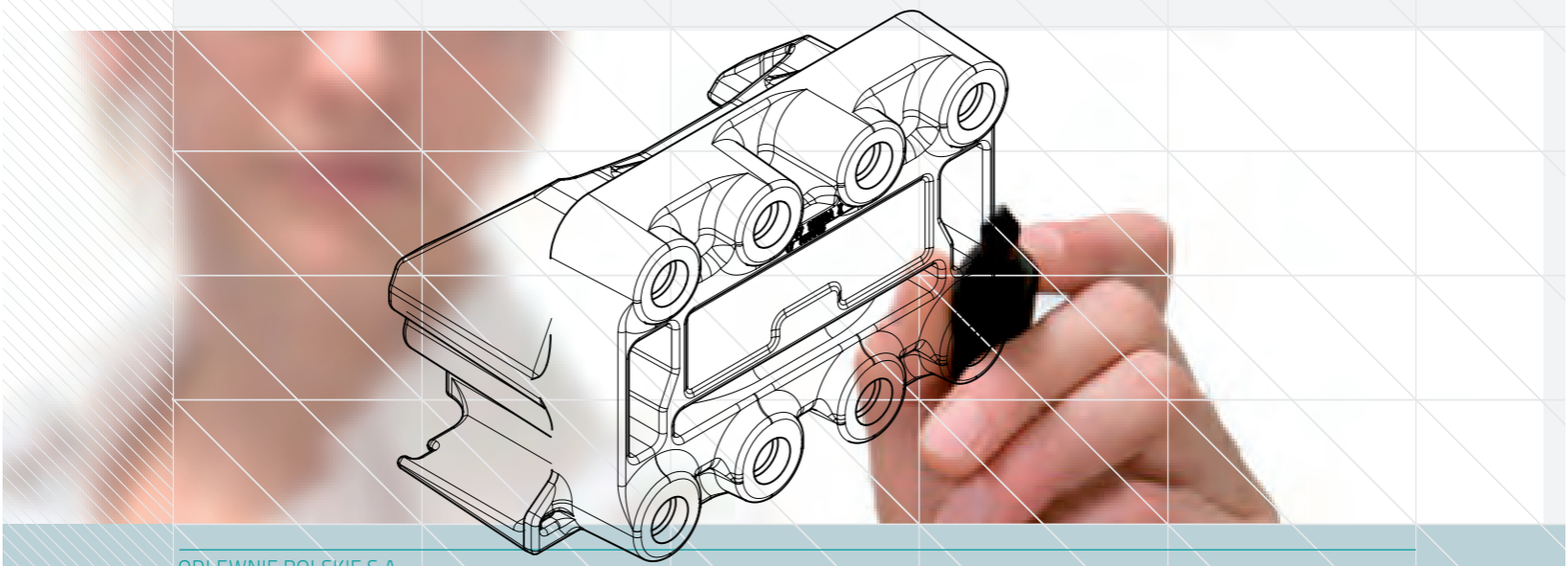


STRATEGY

The strategy enables the Company to compete with the best foundries of the developed countries and ensures high operational profitability (higher than the average for the foundry industry). The main tools for the strategy implementation are:

- implementation of a long-term program of modernization investment projects aimed at the full automation of the process with the application of modern controlling and measurement devices as well as IT software;
- continuous technology and process development with the utilization of our own Research & Development Centre for Foundry Components (RDCFC);
- implementation of environmentally friendly processes and technologies;
- design of casting construction in cooperation with customers;
- very short period needed to start the production of new items (CAD, CAM and CNC patterns performance, CAE technology designing – ProCAST simulation software), documentation management – SMARTEAM system;
- reorganization of the Company involving the performance of only primary technological processes on site and outsourcing of secondary processes and operations;
- development of a cooperative network, especially with respect to the cast machining and development of machining by our own means;
- IT management system.

The strategy ensures meeting all the requirements and expectations of our customers with respect to the cast construction designing, the selection of highly-efficient compounds and just-in-time delivery of components – ready machined sub-assemblies to the assembly line. Odlewnie Polskie S.A. provides its customers with the advice of highly qualified engineering staff.



MANUFACTURING PROCESS AND TECHNOLOGIES

DESIGNING

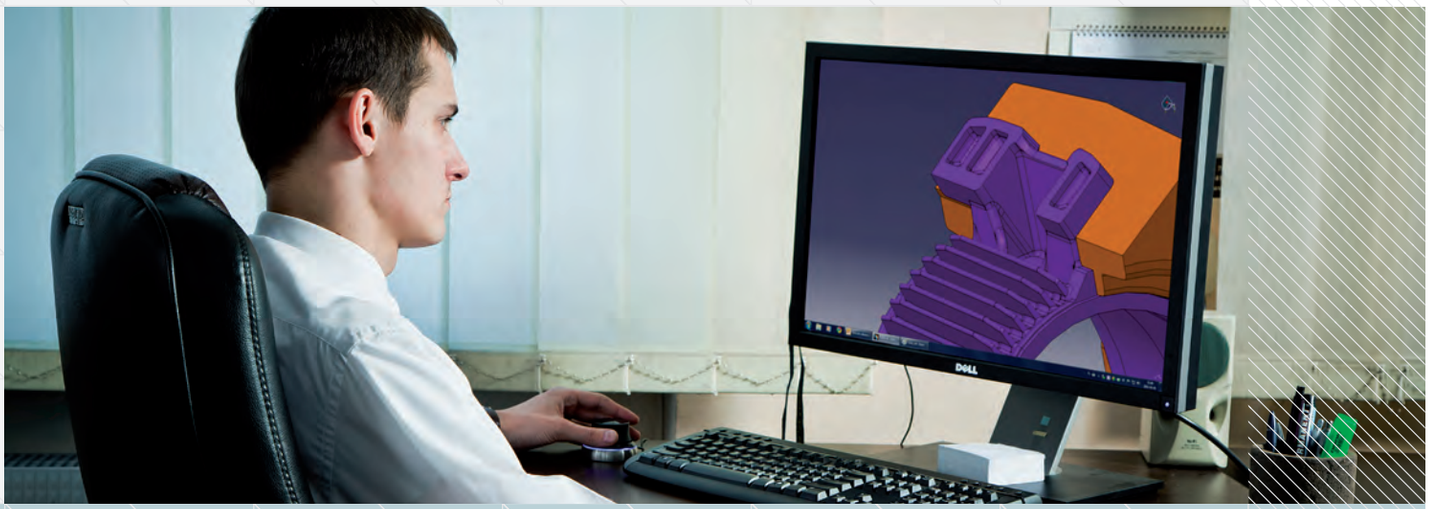
In the production designing, creating and preparation process, Odlewnie Polskie S.A. uses **Catia, ProEngineer**, **NX Unigraphics** computer assisted systems.

The computer assisted systems reduce the designing and production preparation time and enable us to provide customers with modified engineering solutions which optimize the manufacturing costs and improve the usability cast features.

Our Company can design castings in co-operation with customers to optimize the manufacturing costs by applying suitable foundry technologies and developing the best engineering solutions with respect to the usability features of the final products.

The results of computer simulations are applied in the designing of foundry technologies. **Procast** software is used to monitor the process of pouring and solidification,

optimization of running systems, identification of mould-cast boundary conditions and the analysis of construction with respect to stresses, distortions and heat effects, as well as microstructure and microporosity simulations. **Quickcast** software is used to simulate the cold-box technology with respect to core box filling and core gassing.

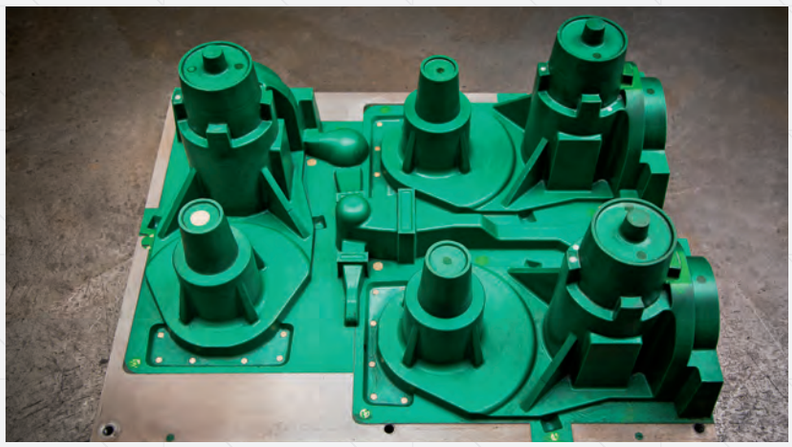


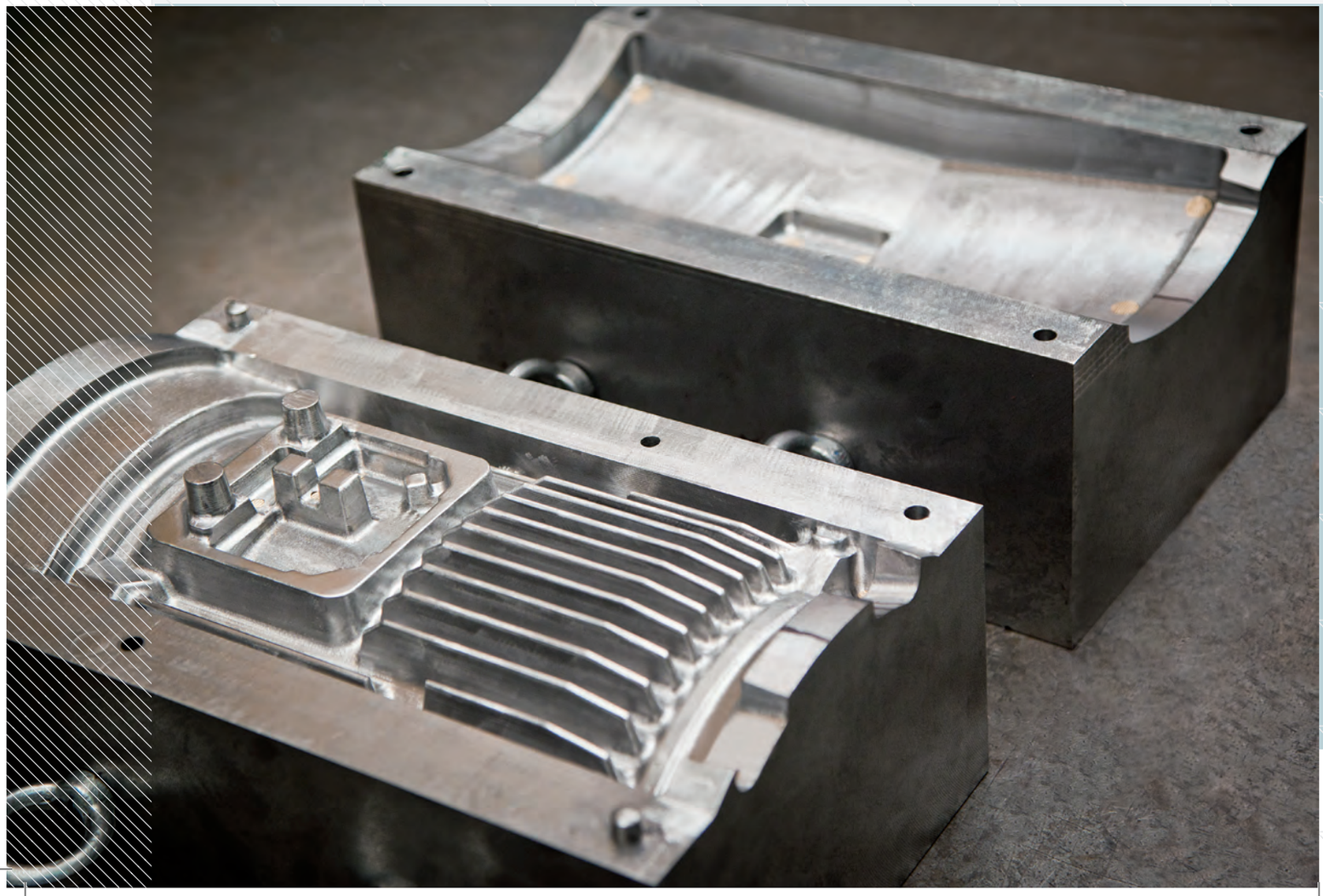
MODEL CONSTRUCTION

The range of casting instruments covers models including the assembly on plates as well as core boxes.

The company offers the provision of metal, plastic and timber models.

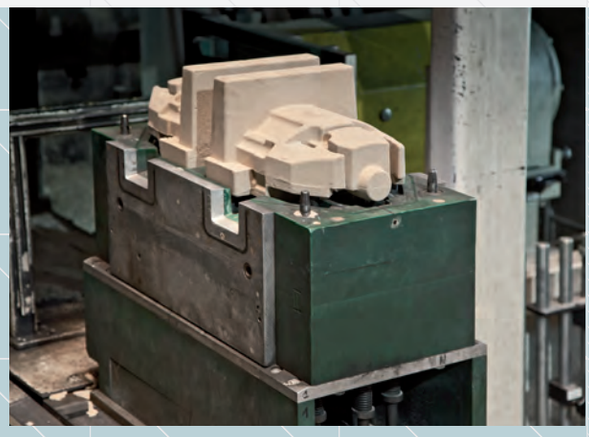
The models are produced using automatic machining centres (e.g. **DMU 100 Mono-Block** – a 5-axial universal milling machine controlled by **DECKEL MAHO** CNC HEIDENHAIN iTNC 530 system).





CORE CONSTRUCTION

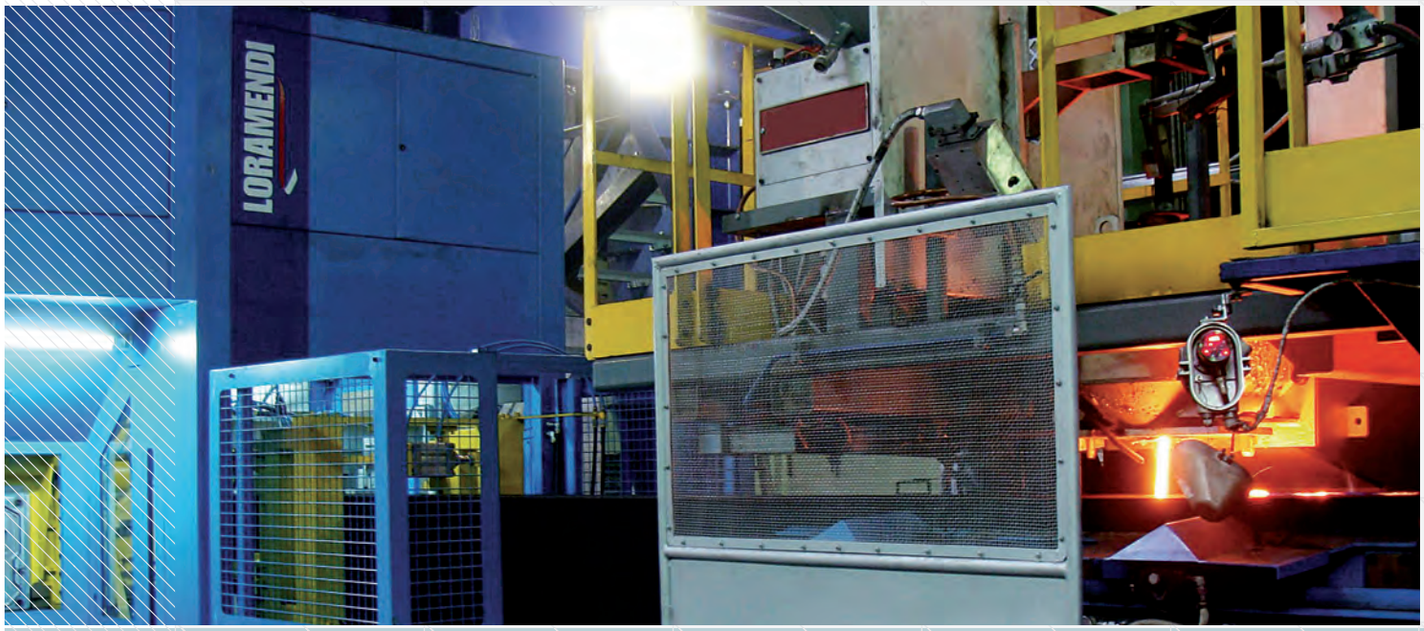
Cores are prepared using the HOT-BOX method on Shalko and Gisag shooters and the COLD BOX method on Röperwerk and **Laempe** shooters, in amine technology and manually in CO2 technology.



MOULDING SAND PROCESSING AND MOULDING

Moulding sands are prepared in the automatic sand processing plant of a capacity of 66 Mg/h based on **Eirich-Küttner** machines.

MICHENFELDER ELEKTROTECHNIK GmbH & Co. KG automatic moulding sand parameter controller is additionally installed.



LORAMATIC

Moulding machine type	Machine type	Mould dimensions (mm)	Production volume	Casting weight (kg)
Automatic moulding line with vertical split and variable moulding chamber	LORAMATIC VMM 5070 C	480/550 x 600 /675 x 300	Medium and large series	0,5 ÷ 25

HWS

Moulding machine type	Machine type	Mould dimensions (mm)	Production volume	Casting weight (kg)
Automatic moulding line with vertical split and variable moulding chamber	HSP – 2D	650 x 800 x 350 /350	Medium and large series	15 ÷ 150

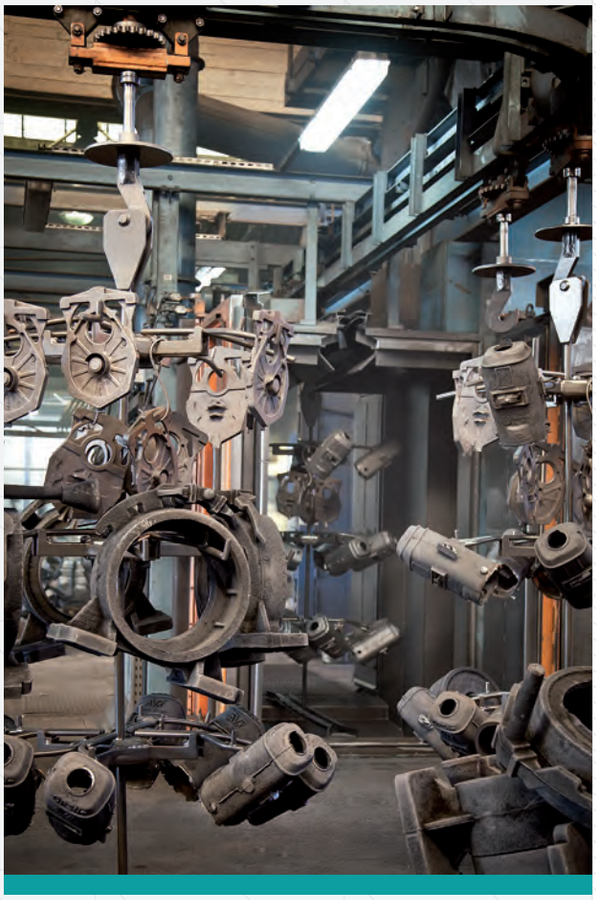
METAL MELTING

- Double-crucible furnace of medium frequency and with a capacity of 6 Mg + 6 Mg, with a cooling system and a loading machine together with accompanying infrastructure from **OTTO JUNKER GmbH**, Germany; liquid cast iron quality control by ATAS system.
- Modern melting shop additionally supported by 2 electric induction furnaces of a capacity of 6 Mg.

PURIFICATION

Castings are cleaned:

- in **DISA** HT-4-15/21 shot-blasting chamber (maximum load capacity of 1500 kg);
- in **MAUS S.p.A. SAM 300 and SAM 600** automatic cast grinding machines;
- in OWT-400 cleaning drums.



QUALITY

PROCESS QUALITY CONTROL

Our control and measurement laboratories ensure:

- quick chemical composition analysis
  - » Spectrolab (**SPECTRO A.I. GmbH & Co KG**) optical emission spectrometer, including trace element analysis;
  - » E980C emission spectrometer from the English Hilger Analytical company with PC-PLUS analytical software (24 elements);
- cast iron microstructure evaluation, including graphite morphology – **NIKON MA**-100 metallographic microscope with a computer image analyzer;
- evaluation of oxygen activity in liquid cast iron – Heraeus Elektro-Nite MULTI-LAB III Celox Foundry including Checkmate IV Positherm/Celox;
- testing of such moulding sand parameters as: permeability, strength, compactability, cohesiveness, moisture content, bonding condition, active clay;
- Mischenfelder system with Vedimat moulding sand properties automatic controller;
- strength testing on **Z250 RED** AllroundLine machine of **Zwick GmbH & Co. KG**;

- ultrasound and magnetic cast testing:
  - » Ultrasound defectoscope with EPOCH 1000 software;
  - » AC230 magnetic stream yoke defectoscope;

- measurement testing:
  - » **3D LH 87 Wenzel**, a German-Austrian company;
  - » SAM measuring table with Wenzel software;
- burden material testing.

CERTIFICATES / AWARDS

The principal objective of our quality policy is to produce and supply products of a quality meeting the requirements and expectations of customers, while maintaining competitive and profitable prices. The way to meet this objective is to introduce a new management philosophy through quality and increasing conscious commitment of the staff and the development of their skills.

Odlewnie Polskie S.A. implemented a certified system for quality management compliant with **ISO 9001:2008** standard in 1996 and a management system for environmental protection compliant with **ISO 14001:2004** in 2006.

Certificate

Standard ISO 9001:2008

Certificate Registr. No. 0198 100 00530

TÜV Rheinland Polska Sp. z o.o. certifies:

Certificate Holder: Odlewnie Polskie S. A.
Al. Wyzwolenia 70
PL - 27-200 Starachowice

Scope: manufacture of ductile cast iron and grey cast iron and cast steel castings

An audit was performed, Report No. 0 00530. Proof has been furnished that the requirements according to ISO 9001:2008 are fulfilled.
The due date for all future audits is 08-12.

Validity: The certificate is valid from 2010-01-13 until 2013-01-12.
First certification 1996

Warszawa, 2010-01-13

TÜV Rheinland Polska Sp. z o.o.
ul. 17 Stycznia 56 02-146 Warszawa

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Jury konkursu
Międzynarodowych Targów Innowacji, Nowych Technologii i Współpracy Gospodarczej
INVEST-TECHNOLOGY
Warszawa 25-27.04.2002, Centrum EXPO XXI

przyznaje **Złoty Medal**

Instytutowi Wdrożeń i Technologii
Odlewnie Polskie S.A. ze Starachowic
za prezentowane na Targach

„Nowoczesne aluminiowe tarcze hamulcowe zbrojone cząsteczkami węglika krzemu o istotnie wydłużonym okresie użytkowania"

opracowane przez zespół w składzie:
prof. dr hab. inż. Jerzy Sobczak (Instytut Odlewnictwa, Kraków)
dr inż. Andrzej Wojciechowski (Instytut Transportu Samochodowego, Warszawa)
dr inż. Adam Nowak (Instytut Wdrożeń i Technologii, Odlewnie Polskie S.A.)

prof. dr hab. Jan Szmidt, Przewodniczący Jury
Krzysztof Loth, Dyrektor UNIDO ITPO Warszawa
Wacław J. Białkowski, Prezes Hi-Tech

Spółka Akcyjna Odlewnie Polskie is also a holder of:

Certificate of quality assurance system for the producers of materials according to Directive 97/23/EC concerning pressure equipment according to AD 2000 – Merkblatt W0/TRD100 – 03.02.2014;

Title of "Polish Qualified Foundry" granted on 10 December 2004;

Honour in the Polish Future Product contest of 2000;

Integrated permit for the installation of a foundry for ferrous metals located at Odlewnie Polskie S.A. in Starachowice issued by the Head of Świętokrzyskie Province in Kielce.

RESEARCH & DEVELOPMENT CENTRE FOR FOUNDRY COMPONENTS

RDCFC objectives:

- Conducting the company's own research and development works in the scope of casting technology and process improvements, projects contracted by other customers, including basic and implementation research carried out in cooperation with universities, research institutes and supplier technical services.
- Effective implementation and use of IT systems competitive in terms of technology supporting the cast component designing and manufacturing processes.
- Research projects in the field of technical cast production preparation optimization (designing of instrumentation including core boxes for the cold box process, instrumentation programming and construction in the CNC technology, casting logistics).
- Improvement and escalation of the process control with modern non-destructive and destructive testing methods.
- Implementation of technologically advanced castings (ADI, CADI, SiMo) in the production practice based on modern boxless moulding automatic machines of a variable chamber and specialized automatic grinding machines.
- Implementation and development of documentation management systems in the field of new start-ups (stage I) and in the manufacturing process (stage II).
- Organization and provision of training to all staff groups concerning product and process innovations.

PRODUCTS

INDUSTRIES

Machine industry, automotive industry, industrial instruments, vacuum pumps, plumbing and sewage systems, railway industry, power industry, home appliance industry.

For the machine industry, we produce castings for gears, reduction gears, construction and agricultural machines, machine tools, hoists and forklift trucks.

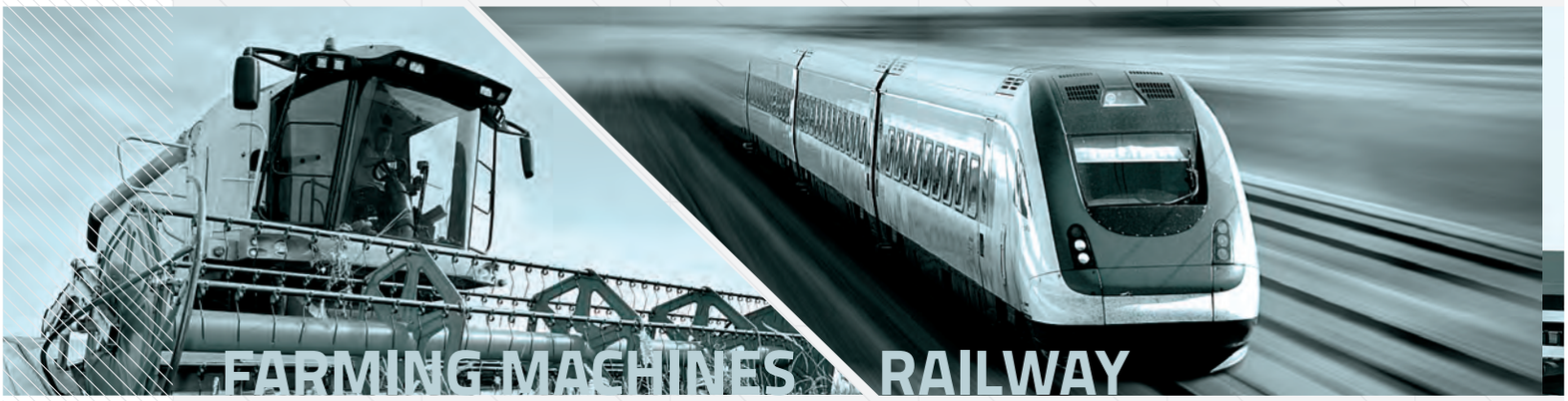
For the automotive industry, we supply parts of starters, chassis, brakes, pump and compressor gears, car and truck engines as well as trailer parts.

We manufacture elements of vacuum pumps for the electronic industry, food industry and solar collectors.

We produce elements of railway traction and rolling stock such as fixing anchors and clamps, sleeper slabs, switch elements, cable connections, handles, inlet inserts as well as railway car bumpers.

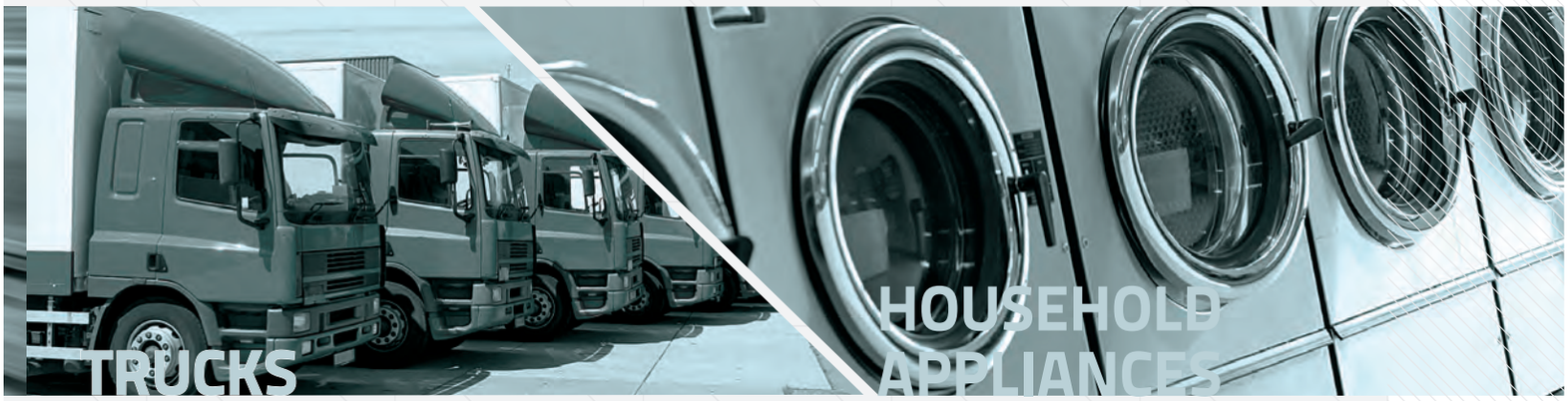
Concerning industrial instruments, we supply elements of valve housings and covers, gate valve housings and wedges, throttles, flanges, sleeves, seals, connectors, T-connections, elbows, connector pipes, reducers, bolts and nuts.

We are also a supplier of castings to manufacturers of plumbing and sewage systems such as overground and underground hydrants, sewage hatchways, road and bridge inlets, catch basin grates.



MATERIALS

Material	Grade	According to Standard
Grey cast iron	EN-GJL-150 EN-GJL-200 EN-GJL-250	EN 1561
Nodular cast iron	EN-GJS-400-15 EN-GJS-400-18 LT EN-GJS-450-10 EN-GJS-500-7 EN-GJS-600-3 EN-GJS-700-2	EN 1563
ADI cast iron	EN-GJS-800-8 EN-GJS-1000-5 EN-GJS-1200-2	EN 1564



INNOVATIVE TECHNOLOGIES, WIDE EXPERIENCE

A service foundry manufacturing for numerous industries and customers.

We are specialized in nodular cast iron (80% of our production); we also produce grey cast iron and ADI castings.

We offer castings with mechanical treatment, cataphoresis or galvanization.

60% of our production is exported to the EU and USA markets.

ODLEWNIE POLSKIE S.A.

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