



FOUNDRY & CASTINGS INFORMATION



KAL-TECH-ODLEW

**KAL-TECH ODLEW
GROUP SP. Z O.O.**

Adres:

ul. Poczтовая 23
58-302 Wałbrzych,
Dolny Śląsk / Polska
(Lower Silesia /
Poland)

**KRS (National Court
Register):**

0000784691

NIP (VAT):

886-300-88-10

**REGON (Register of
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383280818

Kamil Wroński
Michał Sieklucki

**Odlewy, obróbka,
modele:**

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lub +48 784 824 884

**Materiały dla
odlewni metali:**

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I. Description of the production

The company is composed of following departments:

- cast iron foundry
- non-ferrous metals foundry
- steel foundry
- fettling (machining) shop
- pattern shop

The cast-iron foundry.

Usually manufactures castings being elements of marine pumps, parts of valves, mining pumps, gear boxes, parts of machines for chemical industry, building industry and metallurgy.

The castings are manufactured of following sorts of materials:

- grey cast-iron of grade EN-GJL-150, EN-GJL-200, EN-GJL-250, acc. to PN-EN 1561,
- alloy cast-iron ZICr0,8, acc. to PN-88/H-83144,
- nodular cast-iron of grade EN-GJS-400-15, EN-GJS-500-7, EN-GJS-600-3, EN-GJS-700-2, EN-GJS-350-22-LT, EN-GJS-400-18-LT acc. to PN-EN-1563,
- alloy nodular cast-iron ZsCu1,0, according to PN-88/H-83144,
- maximum weight of raw casting manufactured in the foundry is:
 - small – up to 100 kg
 - medium – up to 1 ton
 - heavy – up to 8 tons
- the amount of manufactured castings is about 1.500 tons per year

Non-ferrous metals foundry.

The castings are manufactured of following sorts of materials:

- bronzes of grade CuSn10-C, CuSn12-C, CuSn5Zn5Pb5-C, CuAl10Fe5Ni5-C, acc. to PN-EN 1982, BK331 acc. to PN-91/H-87026,
- copper of grade M4 acc. to PN-77/H-82120,
- maximum weight of raw casting manufactured in the foundry is
 - for bronzes – 800 kg for 1 piece
 - for copper – 600 kg for 1 piece

b) The amount of manufactured castings is about 200 tons per year



Steel foundry.

The steel foundry manufactures castings being elements of marine pumps, parts of valves, mining pumps, gear boxes, parts of machines for chemical industry, building industry and metallurgy. The castings are manufactured of following sorts of materials - examples:

- steel castings of carbon steel alloys grades: 1.0619, 1.0625, 1.1165 ,
- steel castings of austenitic stainless steel grades: 1.4301, 1.4401, 1.4404, 1.4408, 1.4409, 316C16, 316, 316L
- steel castings of duplex stainless steel grades: 1.4517, 332C13.
- other material grades available on demand.
- maximum weight of raw casting manufactured in the foundry is:
 - small – up to 100 kg
 - medium – up to 1 ton (depends on which alloy, some of them up to 600 or 350 kgs)
 - heavy – up to 12 tons

II. Production of grey cast iron

Melting of metal has been performed using induction furnaces The lining of furnaces is quartzite (acid).

The metal charge:

- foundry pig iron,
- grey cast-iron circulating scrap,
- steel scrap,
- ferro-alloys,
- carburizator,
- Cu (metallic).

A modification of a liquid metal is made using granulated ferro-silicon containing additionally calcium or strontium.

The chemical analysis is performed using a spectrometer made by the Great Britain company Oxford Instruments Analytical – Type FOUNDRY MASTER EXPERT. The spectrometer specifies the following elements: C, Si, Mn, P, S, Cr, Cu, Al, Mg, Pb, Fe.

The temperature measurement is checked by a mobile lance “Digital” by Electro-Nite. The lance is equipped with single PtRd-Pt sensors.

III. Production of nodular cast iron

The metal charge:

- special foundry pig iron,
- nodular cast-iron circulating scrap,
- steel scrap,
- ferro-alloys,
- carburizator,
- Cu (metallic)



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A modification of a liquid metal is made using granulated ferro-silicon containing additionally calcium or boron

The spheroidization is performed by flexible conduit containing Fe-Si-Mg with the "Mishmetal" added.

The chemical analysis is performed using a spectrometer made by the Great Britain company Oxford Instruments Analytical – Type FOUNDRY MASTER EXPERT. The spectrometer specifies the following elements: C, Si, Mn, P, S, Cr, Cu, Al, Mg, Pb, Fe.

IV. Production of bronze castings

The weight of castings: 0,2 ÷ 800 kg for 1 piece, The foundry is equipped with:

- 1 induction furnace of 1000 kg,
- 1 induction furnace of 2x250 kg, the metal charge is composed of:
 - bronze castings:
bronze pig sows – 75÷100%,
bronze scrap – up to 25%,
 - copper castings:
copper cathodes – 75÷100%,
copper scrap – up to 25%

The melting process is performed coating the liquid metal with coating-refining slug, the pouring of a liquid metal is made using foundry ladles, the temperature measurement is checked by a mobile lance "Digital" by Electro-Nite. The lance is equipped with single PtRd-Pt sensors, chemical analysis:

- if the charge consists of bronze pig sows in 100% the chemical constitution is adequate to the pig sows specified by their manufacturer,
- if the charge consists of pig sows and scrap, the chemical analysis is performed the chemical analysis is performed using a spectrometer made by the Great Britain company Oxford Instruments Analytical – Type FOUNDRY MASTER EXPERT of 2014. The spectrometer specifies the following elements: C, Sn, Pb, Zn, Fe, Ni, Al, Mn, Si, P, Bi, Mg, Sb, As, S.

V. Quality Control

The Quality Control Department is subjected directly to the President of the Board. Quality controller is responsible for the quality of released castings and their compliance with a technical documentation, technical conditions and the Customer's requirements. The Quality Control Department keeps 3 employees. The scope of work:

- materials supply control,
- patterns control,
- castings control,
- chemical analysis with the spectrometer,
- molding masses control,
- the performance of research strength, hardness, structure
- issuing the documents of the control acc. to PN-EN 10204. The samples used for chemical constitution are kept for 3 years.



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Mechanical properties analysis

- strength and hardness analysis of the samples of grey cast iron, nodular cast iron and bronze is performed in the Laboratory of GZUT Odlewnia Sp. z o.o.,
- the hardness analysis is performed using Brinell testing machine or the Poldie's hammer in situ,
- metallographic tests are performed on an optical microscope at our laboratory,
- the impact resistance is performed in the Laboratory of The Institute of Welding in Gliwice when impact is over 50J.

Chemical constitution analysis

a) grey cast iron and nodular cast iron

The chemical analysis is performed using a spectrometer made by the Great Britain company Oxford Instruments Analytical – Type FOUNRY MASTER EXPERT of 2014. The spectrometer specifies the following elements: C, Si, Mn, P, S, Cr, Cu, Al, Mg, Pb, Fe.

The chemical analysis is checked on the samples $\varnothing 40 \times 5$ mm, with the hard spot structure, cast into the copper molds. Stages of the control:

- control analysis in the furnace (2÷3 times)
- final analysis from the ladle before molds pourig.

b) bronzes

- if the charge consists of bronze pig saws in 100% the chemical constitution is adequate to the pig sows specified by their manufacturer,
- if the charge consists of pigs saws and scrap, the chemical analysis is performed using a spectrometer made by the Great Britain company Oxford Instruments Analytical – Type FOUNRY MASTER EXPERT of 2014.

Marking of castings

Marking of castings is made on the Customers' demand given in the order and the casting is then mark with eg.:

- the number or the date of the cast,
- product logo,
- drawings or patterns numbers.

Non-destructive testing

- non-destructive testing is performed through the company "DETECTOR",
- who has the appropriate permissions,
- the penetration analysis is not performed,
- the leakproof analysis of castings such as pump bodies and covers



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VI. Certificates

Actual Certificates of Approval for production of grey cast iron, nodular cast iron and bronze castings of the following marine societies:

- Det Norske Veritas and Germanischer Lloyd (DNV-GL),
- Lloyd's Register
- NKK - during proceeding



INVESTMENT CASTINGS FOR DIFFERENT BRANCHES

*With Kindest Regards,
Kamil Wronski Michal Sieklucki
Co-Owners*



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