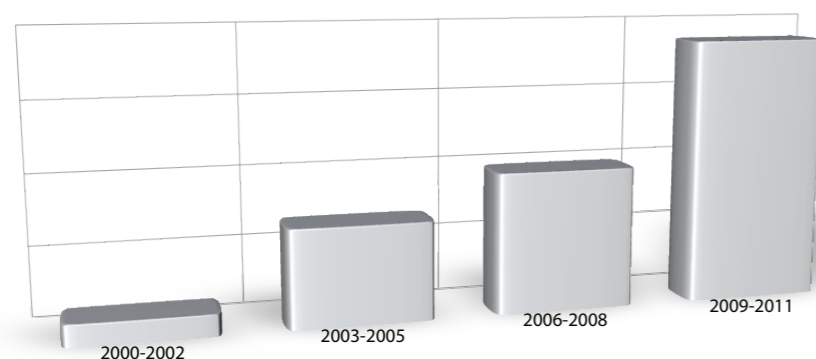


SALES GROWTH OF IF-TYPE FLOTATION MACHINES BETWEEN 2000 AND 2011



PREVIOUS APPLICATIONS:

- Main flotation, cleaning flotation, supplementary flotation and the flotation in grinding circuit in the copper ore beneficiation plants,
- All stages of flotation in zinc-copper ores beneficiation plants,
- Flotation of bituminous coal,
- Flotation of coal slurry from old sedimentation ponds.

THE MOST IMPORTANT PLACES OF IF-TYPE FLOTATION MACHINES USE

- **KGHM Polska Miedz S.A** - one of the biggest copper producer in the world
- **Jastrzebska Spółka Węglowa S.A** - the biggest producer of coking coal in Poland
- **ZGH Bukowno S.A** - the biggest producer of zinc and lead in Poland
- Coal dressing plants in China

AWARDS AND PRIZES

- In recognition of a new type of aerator was to award it the gold medal at the 50th World Exhibition of Innovation, Research and New Technology BRUSSELS EUREKA 2001, a medal at International Fair for Economic Innovation and Research INTARG, Katowice 2011 and a Certificate of Appreciation given by Committee for Scientific Research.
- IF-100 Flotation Machine received a title of the Biggest Innovation of 2009 and a GOLD MEDAL at International Fairs in Poznań "Innovations-Technologies-Machines Poland 2010"



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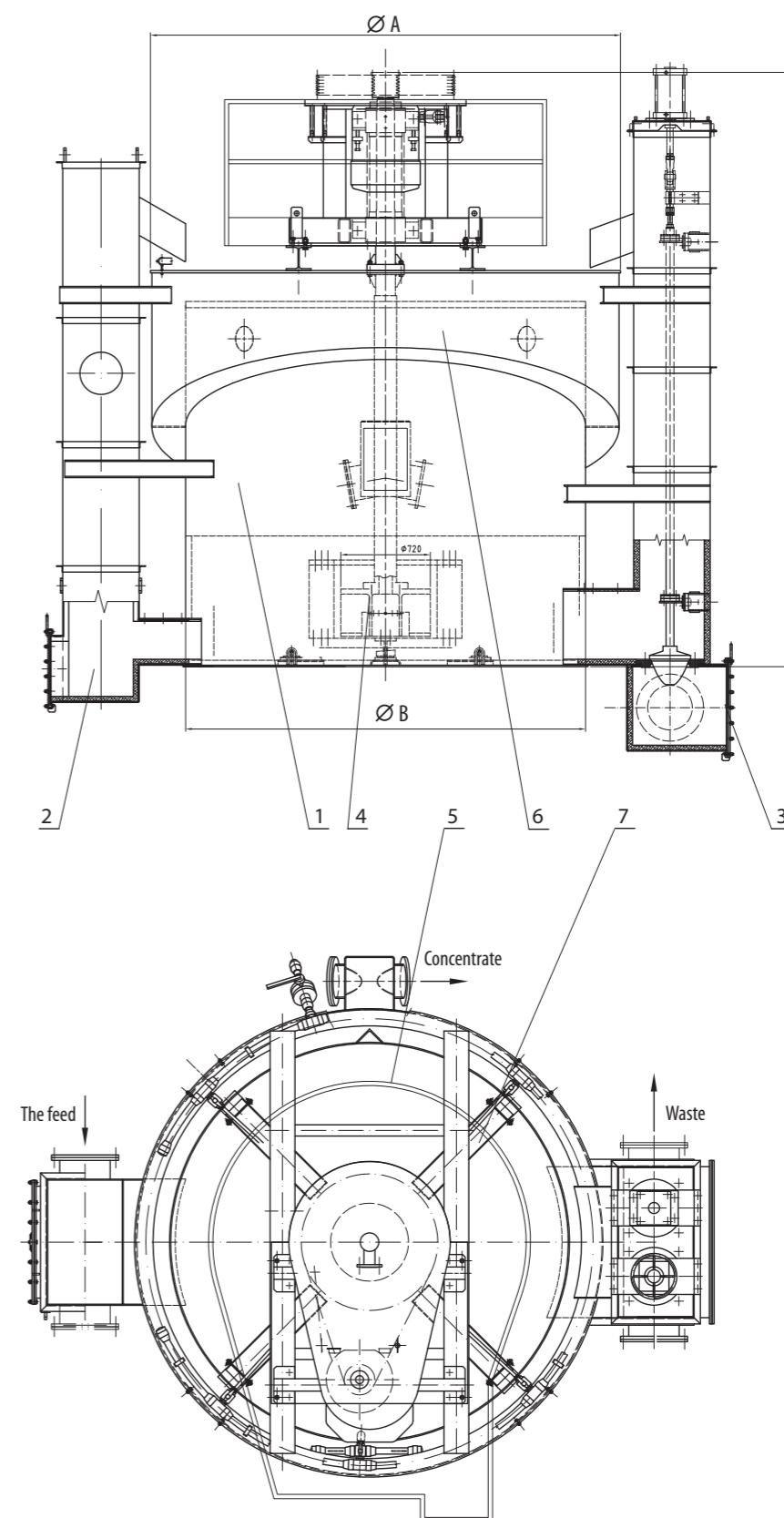
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IF-TYPE FLOTATION MACHINES



The drawing shows an IF flotation machine in which both the loading box and the waste box were made in an outdoor version.

1. Flotation machine chamber
2. External loading box
3. External waste box
4. Aerator
5. Drive maintenance platform
6. Peripheral concentrate trough
7. Radial concentrate trough

MACHINE MODEL		IF-20	IF-30	IF-45	IF-48	IF-57	IF-100
Overall dimensions [mm]	∅ A	4060	4300	4900	4900	5300	6550
	∅ B	3220	3760	4000	4300	4750	5800
	C	5930	5100	6350	6500	6000	7070
Rated power of the electromotor [kW]		30	30 ÷ 37	45	45	55	110 ÷ 132
Effective capacity of the chamber		20	30	45	48	60	100
Maksymalne natężenie przepływu powietrza technologicznego[Nm³/h]		<480	<480	<840	840	<1200	<1800
Technical atmospheric pressure [Mpa]		0,03 - 0,06					
Ciśnienie powietrza sprężonego w systemie automatyki [Mpa]		0,4 - 0,6	0,4 - 0,6	0,4	0,4	0,4 - 0,6	0,4 - 0,6
Total weight [kg]		11200	13100	18.600	19500	22000	27690

* Information on dimensions given in the table should be treated as approximate.

TECHNICAL DESCRIPTION

Pneumo-mechanic IF-type flotation machines are modern devices designed to conduct flotation process of useful minerals including non-ferrous metal ores and coal. They are the result of research and design works carried out at the Institute of Non-ferrous Metals in Gliwice. IF-type flotation machines can be used in the process of pulp flotation with a wide range of concentration of solid parts, as well as in the processes of beneficiation of minerals with high density. IF -type flotation machine may operate as a single-chamber, but mostly they are multi-chamber. Depending on the assumed technological concept and localization particular chambers are arranged in a straight line, or any broken line. The chambers of flotation machines are in the shape of cylinders with capacities ranging from 1m³ to 100m³. With the applied technology, lifetime of IF-type flotation machines has been greatly extended.

The aerator design (rotor +stator) allows keeping the flotation process at a low peripheral speed of the rotor depending on the properties of the beneficiated mineral. A distinctive feature of the IF -type flotation machines is low specific power consumption.

DESCRIPTION OF THE ACTION

The feed to the flotation is transported to the flotation machine by means of a loading box which, depending on the properties of the material to be floated and the place where the machine functions, is installed inside or outside the machine. Foam product (concentrate) is collected from the machine through receiving troughs placed radially on the circuit and radially in the upper part of the chamber.

Depending on the capacity of flotation machines and type of flotation there are used 4-8 flotation radial troughs. Flotation waste are collected using the waste boxes optionally installed outside or inside the flotation machine. The flow of flotation waste is controlled by a seat type valve or mitre valve. The movement of the valve head is optionally controlled by means of a pneumatic actuators or electric actuators.

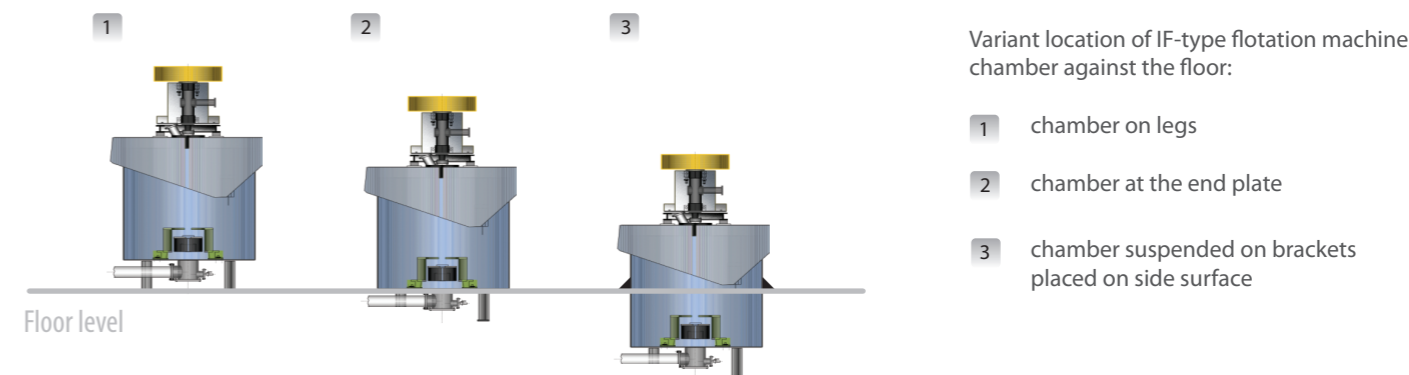
IF-type flotation machines are equipped with reliable automatic control systems such as:

- control system of the amount of air supplied to the flotation machine,
- control system of suspended solids level in flotation machine,

There is a possibility to equip these machines with control system of flotation agents dose. Machine control centers are located in the control cabinets (Control and Measurement Instruments and Automation equipment) equipped with PLC microprocessor controllers. They cooperate with measuring devices and regulating devices that are installed on the machines which allows optimum process automation. All control cabinets are equipped with control touch panels to fully control the process and view the flotation parameters. Automation and control systems installed in IF-type machines are suited to work in Ethernet network.

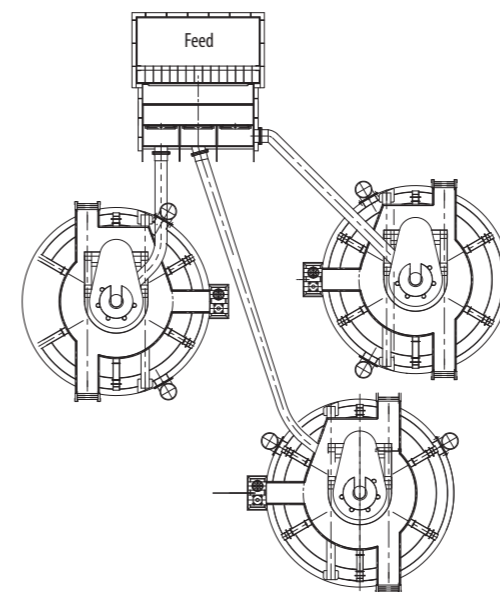
SAMPLE CONFIGURATION OF IF-TYPE FLOTATION MACHINES

Most often the manner of flotation machines configuration is determined by the place where they must be located. Construction of IF-type flotation machines gives the investors a fairly large choice of options for their foundation



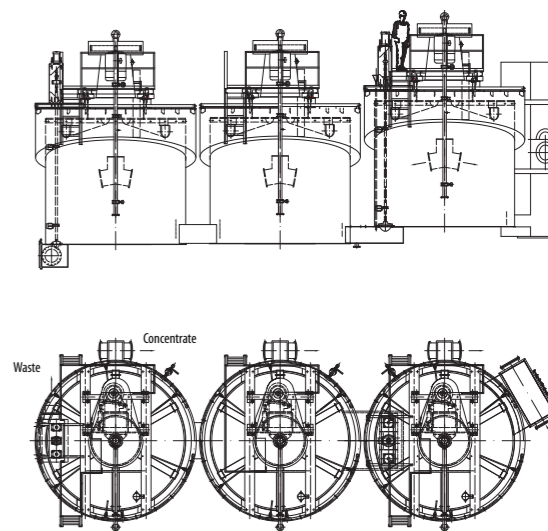
Variant location of IF-type flotation machine chamber against the floor:

- 1 chamber on legs
- 2 chamber at the end plate
- 3 chamber suspended on brackets placed on side surface



IF type flotation machines with a central point of the feed transportation

Internal loading boxes, external waste collection boxes.



IF type flotation machine is arranged in 1+2 configuration flow

External loading box, internal waste collection box.



All machines and devices offered by us after familiarizing ourselves with the characteristics of minerals to be beneficiated, technological procedures used for these processes and technological requirements concerning location are suited to the individual needs of the investors.

