CATALOG

LAC®

FURNACES FOR CERAMIC AND GLASS

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LAC®

Art of heating

IN CERAMIC AND GLASS SEGMENT LAC COMPANY PRODUCES MORE THAN 200 FURNACES PER YEAR

Art of heating

The LAC company profile

The LAC Company Ltd. has been successful manufacturer and marketer of industrial furnaces, dryers and refractory castable shapes for more than two decades on domestic as well as foreign markets. Since establishment in 1992 the company manufactured more than 11 thousand furnaces.

The products find application in many technological processes of thermal production, namely:

- Low-temperature technologies
- Laboratory technologies
- Technology for the industrial production of glass and industrial ceramics
- Technology for thermal processing of ferrous metals in metallurgy
- Alloys' technology for non-ferrous metals and thermal processing of non-ferrous metals in metallurgy
- Technology for thermal and chemical-thermal metal processing
- Technology for heat processing in metals shaping
- Technology for heat processing in welding
- Technology for production of hobby glass and ceramics

The manufacturing program does not represent only serially manufactured furnaces and dryers, but even accommodates the needs for atypical furnaces according to specific requirements of the customer. Development and design office in tandem with a team of service technicians is a guarantee of quality service to customers and a promise in the next company growth. Significant part of business is the manufacture of refractory castable shapes, whose essential part is used in manufacture of industrial furnaces. Other users are metallurgy companies and manufacturers of boilers for burning wood, pellets, and biomass. In the area of refractory concrete shaped blocks, the company belongs among the largest manufacturers in Europe. The company offers also supplies of heating elements, refractory and insulation materials, regulating elements, and reconstruction of furnaces, heating systems and switchboards.

The aggressive growth of the company is illustrated by its present 200 employees, capital assets in the amount of 480,000€25,000 m^2 for production, warehousing and company administration. In 2007 the company certified its quality management system according to ČSN EN 9001 and in 2010 passed recertification according to the new standard ČSN EN ISO 9001:2009. In 2008 the company opened a branch in China.

DEVELOPED, DESIGNED
AND MANUFACTURED IN CZECH REPUBLIC

PERFECT WORKSHOP PROCESSING

LOW POWER CONSUMPTION

SAFE OPERATION

MAINTENANCE SERVICES

LONG LIFETIME

SUMMARY

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CIRCULAR FURNACES M

Especially for „hobby" ceramic shops, but also for professional ceramics burning which need to be charged into the furnace from the top. The shape and design ensure a perfect temperature distribution and possibility of fast rise to desired temperature. Furnace shell is made of polished stainless steel sheet metal. The use of top insulating materials reduces energy consumption. Matter of course is perfect workshop processing, hardware and smooth and safe operation.

Standard design of furnace:

- Ht40 AL controller
- Stand with height setting
- Wheels (2pcs)

Accessories for an additional charge:

- Ht40 AL or Bentrup TC44 controller
- Desk for the bottom of the furnace
- Distance columns
- Calibration of the controller measuring entry

36 MONTHS WARRANTY

Type LAC	Controller	Tmax	Internal temp. distribution	Volume	External dimensions	Internal dimensions	Input	Weight	Total height of stand	Voltage	Furnace protection
		°C	°C	l	(D*xv) mm	(D*xv) mm	kW	kg	mm	V	
M 30/12	Ht40 AL	1280	10	30	550x495	350x340	3,5	65	640, 800	230	16/1
M 45/12	Ht40 AL	1280	10	45	615x495	410x340	3,5	75	640, 800	230	16/1
M 60/12	Ht40 AL	1280	10	60	615x610	410x455	5,5	90	760, 920	400	16/1
M 100/12	Ht40 AL	1280	10	100	725x610	525x455	7,5	120	760, 920	400	16/1
M 125/12	Ht40 AL	1280	10	125	820x610	620x455	8,5	130	760, 920	400	16/1
M 200/12	Ht40 AL	1280	10	200	820x840	620x685	11	150	990, 1150	400	16/1
M 30/13	Ht40 AL	1340	10	30	550x495	350x340	3,5	65	640, 800	230	16/1
M 45/13	Ht40 AL	1340	10	45	615x495	410x340	3,5	75	640, 800	230	16/1
M 60/13	Ht40 AL	1340	10	60	615x610	410x455	5,5	90	760, 920	400	16/1
M 100/13	Ht40 AL	1340	10	100	725x610	525x455	7,5	120	760, 920	400	16/1
M 125/13	Ht40 AL	1340	10	125	820x610	620x455	8,5	130	760, 920	400	16/1
M 200/13	Ht40 AL	1340	10	200	820x840	620x685	11	150	990, 1150	400	16/1

* proportions of the cylindrical furnace body with the lid

Technical changes reserved

CIRCULAR FURNACES MGF

These furnaces are suitable especially for all „hobby"production of bended and sintered glass also for fusing glass treatment. Can be apply both for artistic and industrial production depending on accessories and size. The shape and design ensures a perfect temperature distribution and possibility of fast rise to desired temperature. Furnace shell is made of polished stainless steel sheet metal. The use of top insulating materials reduces energy consumption. Matter of course is perfect workshop processing, hardware and smooth and safe operation.

Standard design of furnace:

- Ht40 AL controller
- Stand with height setting
- Wheels (2pcs)

Accessories for an additional charge:

- Ht40 AL or Bentrup TC44 controller
- Desk for the bottom of the furnace
- Distance columns
- Calibration of the controller measuring entry

36 MONTHS WARRANTY

Type LAC	Controller	Tmax	Volume	External dimensions	Internal dimensions	Input	Weight	Total height of stand	Voltage	Furnace protection
		°C	l	(D*xv) mm	(D*xv) mm	kW	kg	mm	V	
MGF 30/90	Ht40 AL	900	30	615x420	410x265	3	65	565, 725	230	16/1

* proportions of the cylindrical furnace body with the lid

Technical changes reserved

CHAMBER FURNACES KE

These furnaces are used for firing of the decorative and industrial ceramic, the glass heat treatment and the decoration in higher volume in ceramic and glass industries especially. The shape and design ensures a perfect temperature distribution and possibility of fast rise to desired temperature. Furnace shell is made of polished stainless steel sheet metal. The use of top insulating materials reduces energy consumption. Matter of course is perfect workshop processing, hardware and smooth and safe operation.

Standard design of furnace:

- Ht40 AL controller
- Without stand
- Ventilation chimney (on the ceiling)
- Slider for air supply control
- One-hand operation

Accessories for an additional charge:

- Ht Ceramic controller
- Stand
- Furnace superstructure for charge drying before setting it in the furnace
- Furnace bottom plate
- Calibration of the controller measuring entry

36 MONTHS WARRANTY
ALL METAL PARTS MADE OF STAINLESS STEEL METAL

Type LAC	Controller	Tmax	Number of heating coils	Volume	External dimensions	Internal dimensions	Input	Weight	Voltage	Furnace protection	Width for handling
		°C	ks	l	(šxvxh) mm	(šxvxh) mm	kW	kg	V		mm
KE 125/12	Ht40 AL	1280	3/5	125	910x910x1040	910x910x1040	9	180	400	16/3	790
KE 250/12	Ht40 AL	1280	3/5	275	1060x1060x1190	1060x1060x1190	14	260	400	25/3	940
KE 500/12	Ht40 AL	1280	3/5	504	1110x1220x1450	1110x1220x1450	19	390	400	32/3	990

*after dismounting the regulator and the door closing mechanism

Technical changes reserved

CHAMBER FURNACES K

These furnaces are used for firing of the decorative and industrial ceramic, the glass heat treatment and the decoration in higher volume in ceramic and glass industries especially. The shape and design ensure a perfect temperature distribution and possibility of fast rise to desired temperature. Furnace has a robust steel construction, stable door suspension and aeration which prevent condensation during firing (rust reduction). Furnace shell is made of polished stainless steel sheet metal. The use of top insulating materials reduces energy consumption. Matter of course is perfect workshop processing, hardware and smooth and safe operation.

Standard design of furnace:

- Ht Ceramic controller
- Hand operated left side opened door
- Manually controlled ventilation flap
- Stand for K 50 – K 300

Accessories for an additional charge:

- INDUSTRY controller
- Atypical stand for K 50 – K 300
- Automatic ventilation flap
- Right side door opening
- Pressure cooling
- Calibration of the controller measuring entry
- Interface RS232 or RS485
- Set HtMonit (includes interface + software)

36 MONTHS WARRANTY

Type LAC	Controller	Tmax	Volume	External dimensions	Internal dimensions	Input	Weight	Voltage	Furnace protection	Max floor load capacity
		°C	l	(šxvxh) mm	(šxvxh) mm	kW	kg	V		kg
K 50/13	Ht Ceramic	1300	50	910x1405x1070	350x350x400	5,5	125	400	16/3	50
K 70/13	Ht Ceramic	1300	80	910x1465x1070	350x450x450	7,5	165	400	16/3	50
K 120/13	Ht Ceramic	1340	120	1010x1535x1140	450x530x500	10,5	260	400	16/3	80
K 150/13	Ht Ceramic	1340	150	1010x1620x1160	450x600x530	15	320	400	25/3	80
K 200/13	Ht Ceramic	1340	200	1060x1800x1185	500x750x530	20	360	400	40/3	120
K 250/13	Ht Ceramic	1340	230	1090x1800x1230	520x800x550	23	420	400	40/3	120
K 300/13	Ht Ceramic	1340	310	1105x1820x1340	560x800x710	27	480	400	63/3	200
K 500/13	Ht Ceramic	1340	490	1460x1825x1460	650x1000x750	40	770	400	80/3	300
K 700/13	Ht Ceramic	1340	730	1550x1925x1610	750x1100x900	60	990	400	100/3	400
K 1000/13	Ht Ceramic	1340	1000	1570x2120x1775	800x1263x1000	75	2300	400	125/3	500
K 1500/13	Ht Ceramic	1340	1540	1800x2300x2050	950x1350x1200	110	2950	400	200/3	1800
K 2000/13	Ht Ceramic	1340	2100	2150x2500x2450	1000x1500x1400	130	3300	400	250/3	1000
K 120/14	Ht Ceramic	1400	120	1010x1535x1140	450x530x500	10,5	230	400	16/3	80
K 150/14	Ht Ceramic	1400	150	1010x1620x1160	450x600x530	15	280	400	25/3	80
K 200/14	Ht Ceramic	1400	200	1060x1800x1185	500x750x530	20	310	400	40/3	120
K 250/14	Ht Ceramic	1400	230	1090x1800x1230	520x800x550	23	360	400	40/3	120
K 300/14	Ht Ceramic	1400	310	1105x1820x1340	560x800x710	27	420	400	63/3	200
K 500/14	Ht Ceramic	1400	490	1460x1825x1460	650x1000x750	40	700	400	80/3	300
K 700/14	Ht Ceramic	1400	730	1550x1925x1610	750x1100x900	60	920	400	100/3	400
K 1000/14	Ht Ceramic	1400	1000	1570x2120x1775	800x1263x1000	75	2100	400	125/3	500
K 1500/14	Ht Ceramic	1400	1540	1800x2300x2050	950x1350x1200	110	2600	400	200/3	1800
K 2000/14	Ht Ceramic	1400	2100	2150x2500x2450	1000x1500x1400	130	2900	400	250/3	1000

Technical changes reserved

These furnaces are suitable for all laboratory tests in medical, dental, hygienic, industry, ceramic, glassmaking, and other workplaces. They are suitable for technological testing where a very precise temperature distribution and a dynamic progress of the temperature curve are required. For control of cooling, it is possible to separate heat elements in the internal space of the furnace. It is especially suitable for material heat treatments, all sorts of fritting tests, calcinations, softening or material sintering point setting, samples firing etc. The rust-resistant mantle ensures a long service life of the furnace. The heating elements are placed in the ceramic heating boards. The heating coils are thus partially protected against corrosion by aggressive materials which can be released during use.

Standard design of furnace:

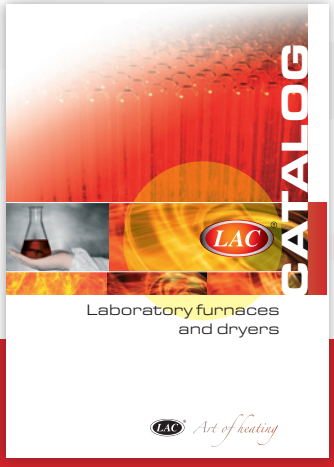
- Ht40 AL or INDUSTRY controller
- Manually operated door opening downwards with an end switch
- Insulation from the mineral fibre insulation boards
- Heating panels from the refractory ceramics in the bottom and in the ceiling
- Airing chimney on the back part of the furnace
- Supply cable fitted with single-phase plug
- Thermocouple Type "S"
- Solid state relay

Accessories for an additional charge:

- Injector with an exhaust fan and draft diverter
- Plate for furnace bottom
- Protection atmosphere inlet
- Calibration of the controller measuring entry
- Interface RS232 or RS485
- Set HtMonit (includes interface + software)

Type LAC	Controller	Tmax	Volume	External dimensions	Internal dimensions	Input	Weight	Voltage	Furnace protection	Max floor load capacity
		°C	l	(šxvxh) mm	(šxvxh) mm	kW	kg	V		kg
L 03/12	Ht40 AL	1200	3	380x440x400	180x100x140	1,2	21	230	16/1	4
L 05/12	Ht40 AL	1200	5	430x470x430	230x130x170	2,4	26	230	16/1	6
L 09/12	Ht40 AL	1200	9	430x505x500	230x170x240	3	32	230	16/1	6
L 15/12	Ht40 AL	1200	15	450x505x600	250x170x340	3,5	39	230	16/1	6
L 03/12	INDUSTRY	1200	3	380x440x400	180x100x140	1,2	21	230	16/1	4
L 05/12	INDUSTRY	1200	5	430x470x430	230x130x170	2,4	26	230	16/1	6
L 09/12	INDUSTRY	1200	9	430x505x500	230x170x240	3	32	230	16/1	6
L 15/12	INDUSTRY	1200	15	450x505x600	250x170x340	3,5	39	230	16/1	6

Technical changes reserved



More information about laboratory furnaces you can find in the catalog "Laboratory furnaces and dryers". On request in printed form or electronically for download on our website: www.lac.cz

BOGIE-HEARTH CHAMBER FURNACES VKK

These furnaces are designed for all professional ceramists, production plants, firing of ceramics, earthenware, glasses, porcelain or decorating. They have a stable door suspension. Dislocation of heating elements ensures excellently equal temperature distribution inside the furnace. The use of top insulating materials reduces energy consumption. Matter of course is perfect workshop processing, hardware and smooth and safe operation.

Standard design of furnace:

- INDUSTRY controller with the limit unit Ht40B
- Bogie with the metal wheels coated by the vulcanite for undercarriage on the floor
- Lever mechanism for lowering operating force when inserting boogie
- Manually operated ventilation flap
- Door is opening manually on „C" hangings to the left side
- Solid state relay – SSR
- Heated bogie
- Optimization of the temperature field to fulfill DIN 17052-1 ΔT 20°C in the internal usable space (in the empty furnace at Tmax)

Accessories for an additional charge:

- Rails of length equal to the 2,5 multiple furnace length installed on the floor
- Second bogie manually or electrically driven
- Electric drive bogie
- Metal plates on the desktop of the bogie to the temperature 90°C, i.e. only for the type VKT xxx/09
- Ammeters for checking heating elements conditions
- Pressure cooling
- Automatic ventilation flap
- Lining from the fireproof bricks and the refractory concrete portal
- Doors opening up
- Second door – model with possibility of inserting boogie from both sides
- Exhaust combustion chamber
- Machine installation (for correct installation we recommend to put machine into operation by LAC specialist)
- Graphic temperature recorder
- Calibration of the controller measuring entry
- Interface RS232 or RS485
- Set HtMonit (includes interface + software)

Type LAC	Controller	Tmax	Volume	External dimensions	Internal dimensions	Input	Weight	Voltage	Furnace protection	Max tonnage
		°C	l	(šxvxh) mm	(šxvxh) mm	kW	kg	V		kg
VKK 1000/12	INDUSTRY	1280	1170	2250x2000x2350	1000x900x1300	45	1500	400	80/30	2000
VKK 1500/12	INDUSTRY	1280	1500	2250x2100x2550	1000x1000x1500	70	1800	400	125/3	3500
VKK 2000/12	INDUSTRY	1280	2000	2250x2100x3100	1000x1000x2000	95	2200	400	160/3	3500
VKK 3000/12	INDUSTRY	1280	3025	2400x2200x3600	1100x1100x2500	130	2500	400	250/3	4500
VKK 5000/12	INDUSTRY	1280	5080	2400x2500x4400	1100x1400x3300	160	3200	400	250/3	5000
VKK 7000/12	INDUSTRY	1280	7084	2400x2500x5800	1100x1400x4600	195	4000	400	300/3	8000
VKK 1000/13	INDUSTRY	1340	1170	2250x2000x2350	650x1000x750	65	1500	400	125/3	2000
VKK 1500/13	INDUSTRY	1340	1500	2250x2100x2550	1000x900x1300	95	1800	400	160/3	3500
VKK 2000/13	INDUSTRY	1340	2000	2250x2100x3100	1000x1000x1500	115	2200	400	200/3	3500
VKK 3000/13	INDUSTRY	1340	3025	2400x2200x3600	1100x1100x2500	160	2500	400	250/3	4500
VKK 5000/13	INDUSTRY	1340	5080	2400x2500x4400	1100x1400x3300	200	3200	400	300/3	5000
VKK 7000/13	INDUSTRY	1340	7084	2400x2500x5800	1100x1400x4600	265	4000	400	400/3	8000

Technical changes reserved

There are various firing aids available which serves for better utilisation of the internal furnace space.

INTERLAYER PLATES AND DISTANCE POLES

Particularly interlayer plates are used to protect the furnace bottom or as interlayer plates for firing on multiple floors (cordierite-mullite material). Distance poles are used to build the floors. We can supply these aids in various standardized sizes but also in dimensions on request. Interlaying crosses are intended for specific charge position.

WARNING

New and unused interlaying plates must be dried before first firing. Temperature in furnace for this purpose should achieve 350 °C for approx. three and a half hours. After this process which protects the plate from cracking, it is possible to use the plates routinely.

TEMPERATURE CONTROLLERS

Electric resistance furnaces manufactured by LAC Ltd. are fitted with the following types of high-quality PID controllers: Ht40 AL, Ht Ceramic or INDUSTRY. These types of controllers are microprocessor-controlled devices meeting all the requirements for temperature control and the security of electro-thermal devices. On request can be some types of furnaces fitted with Bentrup TC 44 regulators.

Temperature controller Ht40 AL

- The device allows the controlling of the temperature to a constant value or by the program (1 program)
- The regulation to a constant value can be disabled
- The program can be launched with a defined time delay
- Measurement accuracy of ± 0,1% from the measuring scope (min. 540 °C), regulation accuracy of ±1 °C
- One auxiliary output for controlling an additional function – end of program signal, program operation signal, end of program signal
- Configurable alarm output (limit temperature monitoring)
- The controller can be equipped with a RS232 or RS485 serial communication line
- The device can be connected to a PC using the series communication line, and the course of the measured and desired temperatures can be displayed on a PC using the HtMonit software (the temperature course can be stored in the memory of a PC)
- Automatic setup of the PID parameters of the control loop

Temperature controller Ht Ceramic

- Program controller designed for controlling of complex technological devices-can be equipped with one input, two control outputs and one alarm output
- Device allows temperature control to constant value or according to the program (up to 20 programs)
- Easy operation
- Real time clock (program starts at the programmed time)
- Regulation accuracy of ±1 °C
- Optional connection to PC using the RS232 or RS485 interface
- Optional modification of parameter settings during the program

The INDUSTRY Temperature Controller

- Program controller designed for controlling of complex technological devices-can be equipped with one input, two control outputs, four slave outputs and one alarm output
- Device allows temperature control to constant value or according to the program (up to 30 programs); programs can be connected by using the JuMP step
- Easy operation
- Real time clock (program starts at the programmed time)
- Regulation accuracy of ±1 °C
- Optional connection to PC using the RS232 or RS485 interface
- Optional fitting with two communication lines (connect to PC and control of subordinate controllers simultaneously, so-called MASTER – SLAVE)
- Optional modification of parameter settings during the program
- Recording of measured values (datalogger), up to 4000 records

MONITORING SOFTWARE HtMonit

This program is designed for monitoring 1 up to 4 devices of Ht series.
The program allows:

- Monitoring connected devices
- Insert data into the database
- Display measured data in the graph
- Search in the graph and print graphs and tables
- Program INDUSTRY controller profiles
- Start or end programs

CALIBRATION OF THE CONTROLLER MEASURING ENTRY
Issue of a calibration certificate which defines the deviation between the temperature values displayed by the controller.

CALIBRATION OF THE MEASURING SYSTEM
Issue of a calibration certificate which defines the deviation and the theoretical values entering to the controller from thermocouple reflecting the deviation of all elements used in measuring system.

SOLID STATE RELAY - SSR
To control the furnace power are used the switching elements which contain no moving parts which can be wear out by frequent switching and also make noise.

PLATE FOR FURNACE BOTTOM – FOR LABORATORY FURNACES
Furnace bottom plate covering and protecting the heating elements or bottom insulation against damage and prevents its contact with the charge.

GRAPHIC TEMPERATURE RECORDER
Device located in the control panel of the furnace which records the temperature in the furnace according to the time on a paper strip.

OPTIMIZATION OF THE TEMPERATURE FIELD TO FULFILL DIN 17052-01
Adjustment of the internal airflow, or adjustment of the furnace heating system according to the information detected by furnace measuring.
These adjustments lead to optimization of temperature distribution in furnace; alternatively the furnace can be tune for specific charge.

COOLING

VENTILATION CHIMNEY
Ventilation of the inner furnace space, airflow cannot be controlled. On request can be supplied seal made of insulating materials.

SLIDERS FOR AIR SUPPLY CONTROL
Supply of the air to the inner space of the furnace is located at the bottom part of the door or on the bottom of the furnace. The amount of air suction can be regulated by inlet covering using a simple mechanism – the slider.

MANUALLY CONTROLLED VENTILATION FLAP
Ventilation, opening or closing the flap is controlled manually.

AUTOMATIC VENTILATION FLAP
Ventilation the furnace innerspace, opening or closing the flap is controlled by controller. It can be combined only with INDUSTRY controller.

INJECTOR WITH AN EXHAUST FAN AND DRAFT DIVERTER
Stainless steel exhaust chimney with a fan that improves the exhaust from the furnace and together with installed draft diverter reduces their temperature and forms preparation for aggressive gases exhaust.

PRESSURE COOLING
Active cooling of the charge. To the bottom of the furnace through the flap is blown cool air that goes through an automatic ventilation flap from the furnace space. Starting the fan and opening the flaps controls the controller according to the furnace cooling speed adjustment. It can be combined only with the INDUSTRY controller.

STANDARDS RS232 OR EIA485

Standards RS232 and EIA485 serve as a communication link between a PC and an external electronic device. RS232 serves to connect one PC with one device, EIA485 can connect up to 30 devices, by using repeaters this number can be further increased.

SET HTMONIT – INCLUDES INTERFACE AND SOFTWARE
Set includes a connector for one of these interfaces situated on accessible place on the furnace, the furnace cable and PC software and equipment – HtMonit software.

INTERFACE RS232 OR EIA485
Includes a connector situated on an accessible place on the furnace.

PROTECTION ATMOSPHERE

PROTECTION ATMOSPHERE INLET
Preparation of the furnace for a supply of the protective atmosphere into the furnace workspace ended by hosepipe input on the side of the furnace. In smaller furnaces, about 550 liters volume, bottle reducing valve with a flow meter is part of the supply. Inlet can be supplemented by automatically controlled solenoid valve – can be combined only with the INDUSTRY controller.

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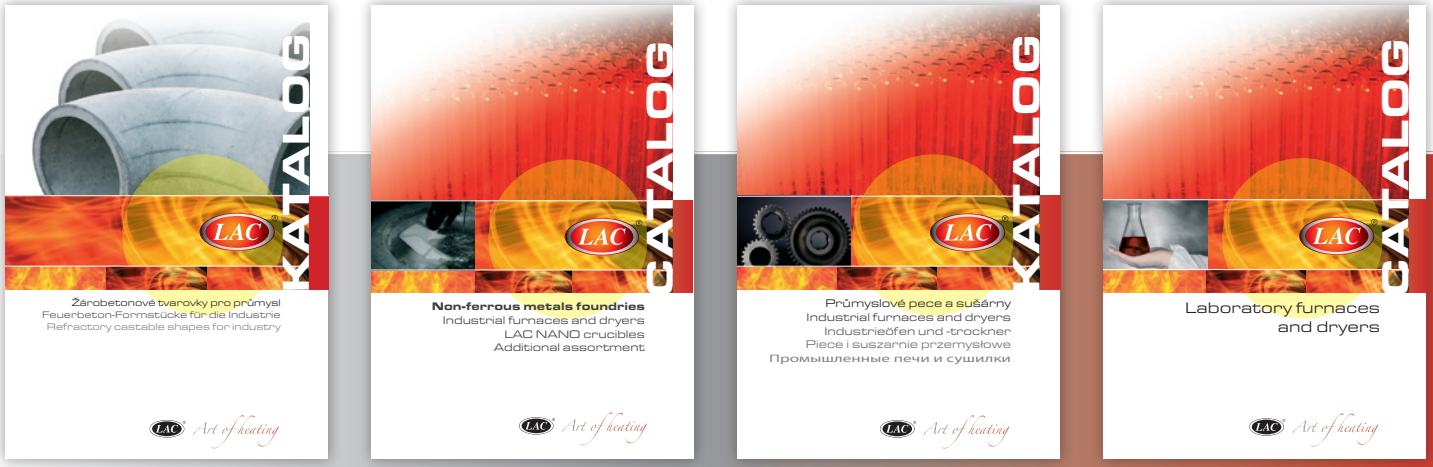
Art of heating

EUROPEAN UNION
EUROPEAN REGIONAL DEVELOPMENT FUND
INVESTMENT IN YOUR FUTURE



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