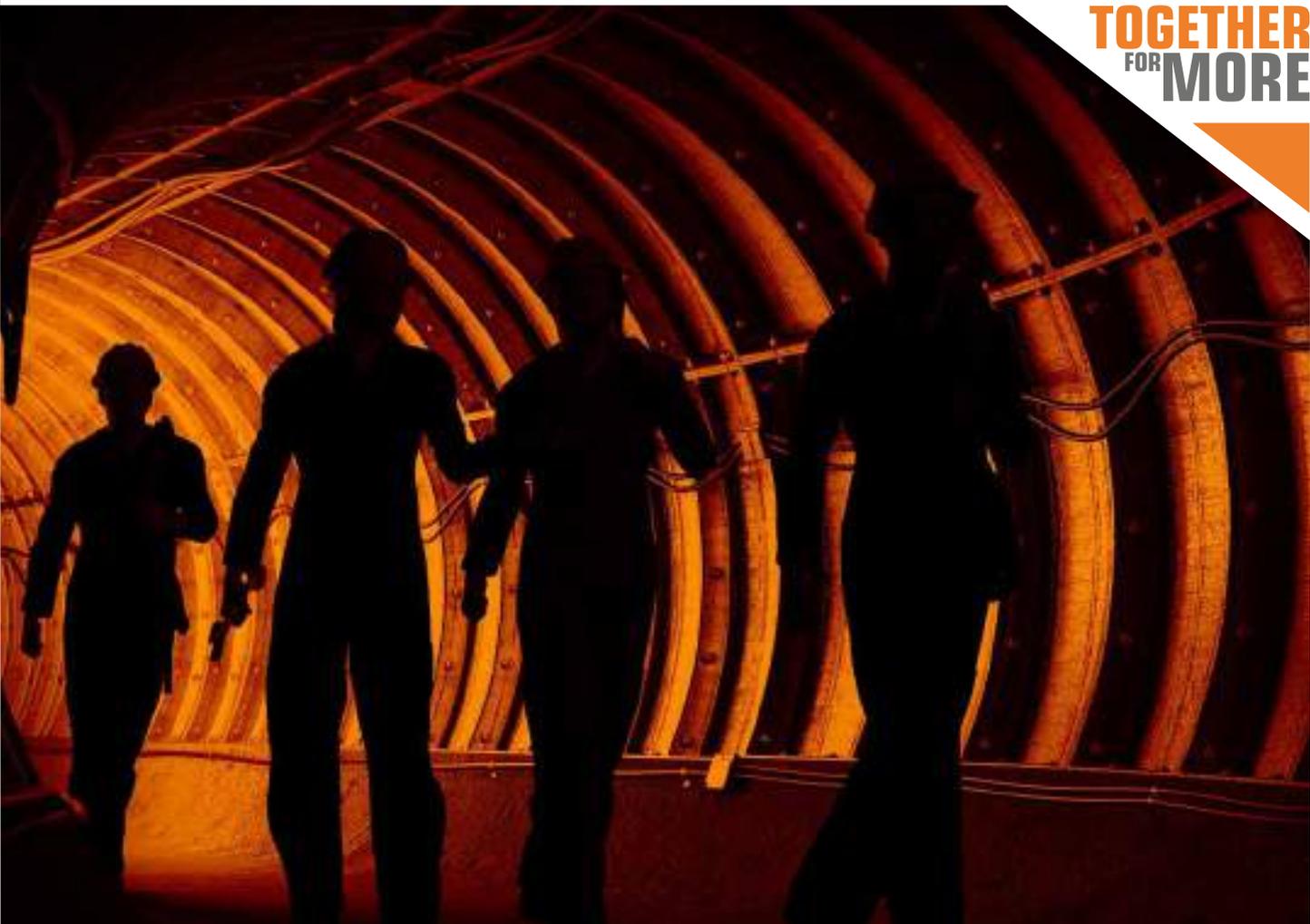




REHEAT INDUSTRY

**CONTINUOUS
FURNACES**

**REFRACTORY
CONCEPT
SOLUTIONS**



**TOGETHER
FOR
MORE**

AT CALDERYS, OUR MISSION IS TO
**DELIVER VALUE
TO OUR CUSTOMERS.**

We are a world leader in providing refractory solutions and services. Our value proposition to you is built on combining our world-class refractory product portfolio with our ability to deliver high-quality project management services - from planning and installation, to turnkey delivery and commissioning.

Across all the industries we serve – Iron, Steel, Foundry, Aluminium, Cement, Power, and Petrochem - we deliver to you our promise of superior product performance and value-adding service, thanks to our global network of specialised industry experts and project management professionals.

Our journey of 100 years is a testimony of our commitment to our customers. We listen to you and understand your requirements. We believe in working as one team with you and aiming for continuous improvement.

Together, we always reach an extra mile for our customers in our mission of delivering MORE.

Over 2,500 employees across

31 COUNTRIES

3 R&D CENTERS

and 11 Design & Engineering Centers

18 PLANTS

in 16 Countries

Annual Revenue of over

500 MILLION EUROS

Wholly-owned Subsidiary of

IMERYS GROUP

PARTNERING YOU IN THE STEEL INDUSTRY FOR MORE

As a leading provider of refractory solutions and services to the global steel industry, Calderys is considered a reference supplier by steel makers across the globe. Our team of steel industry experts ensure that we propose products most suitable for your process requirements and deliver you superior refractory performance and reliable services. We are able to do so by combining our innovative product range and modern installation techniques with end-to-end project management services.



WE BRING TO STEEL MAKERS:

VALUE OPTIMISATION

Offering tailor-made solutions that meet the commercial and technical requirements for optimal performance

COMPLETE REFRACTORY SOLUTIONS

We offer a full range of refractory products to meet the process needs of modern steelmaking

TECHNOLOGY EXPERTISE

By contributing to ensure the best possible steel quality and cleanliness results, whilst adhering to strict environmental regulations in operations

OUR END-TO-END PRODUCTS AND SERVICES DEDICATED TO STEEL INDUSTRY ENCOMPASS:

PRODUCT PORTFOLIO

Our comprehensive product portfolio for steel industry includes both alumina and basic products and covers complete application requirements - Converters, AOD Furnaces, Electric Arc Furnaces, Steel Ladles, RH Degasser Units, Purging plugs, Lances and Tundish Technologies. We also provide installation services for cast-in-situ applications, dry mixes, standard gunning, low-porosity dense gunning, shotcreting and spray solutions.

DESIGN

In addition to product selection considerations, there are considerable benefits to be gained by optimizing the design aspects of the steel vessel. Overall, the selection of products and vessel designs should:

- Meet the metallurgical targets set by the end user, in order to prevent the chosen lining being a potential contaminant in the steelmaking process, and
- Provide the best value in use with regards to cost considerations

Thanks to close working relationship between the steelmakers and Calderys refractory engineers, we are able to meet the design and product selection targets.

INSTALLATION

We carry out high-quality installation services by using in-house equipments and through use of optimal installation techniques. This ensures best installation and dry-out of the refractory so that the customer gets maximum performance.

MAINTENANCE

We offer permanent on-site refractory services including regular and predictive maintenance and repairs. Our comprehensive range of repair products, in co-operation with state-of-the-art measurement techniques, allow for systematic repairs to extend vessel lifetime with minimum vessel downtime.

PROJECT MANAGEMENT

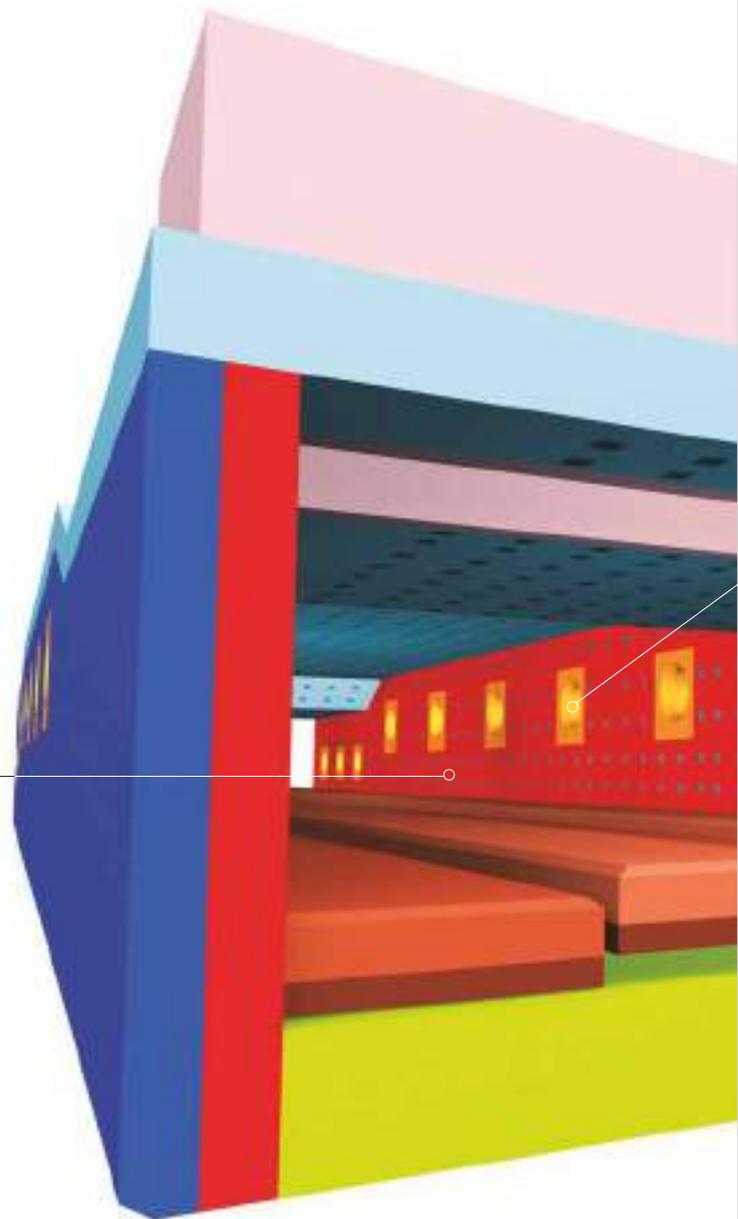
We provide complete project management services including consultation, planning, delivery scheduling, supervision, site management and also direct training for customer personnel.

Walking Hearth Furnaces

The design of these furnaces is very simple, the construction quite easy allowing the transportation and reheating of different size of material. Unfortunately the back-face of the stock cannot be heated so that the stock residence time may be long.

The operation temperature, consequently the corrosion by scaling becomes important. Our systems offer fast, user-friendly installation, good lining performance and overall energy cost savings.

A very performing range of insulating products allows Calderys to replace advantageously the ceramic fibres materials



Wall Heating / Soaking Area

HEATING ZONE

CALDE™ CAST M 28 HR	V
CALDE™ GUN M 60	G
CALDE™ PLAST F 50 AB	R
CALDE™ PLAST SUPERAL AB	R

SOAKING ZONE

CALDE™ CAST LX 58	V
CALDE™ GUN F 65	G
CALDE™ GUN SUPERAL X 70	R
CALDE™ PLAST SUPERAL X AB	R

Walking Hearth Furnaces

Burners

STANDARD

CALDE™ CAST LA 55	V/RS
CALDE™ CAST LM 70	V
CALDE™ PLAST B 70 AB	R

IMPROVED

CALDE™ CAST UC 86	V
CALDE™ RAM PB 84	R

Roof

CHARGING AREA

CALDE™ CAST F 50 G10	V
CALDE™ CAST M 23	V/RS
CALDE™ PLAST SUPERAL AB	R

HEATING AREA

CALDE™ CAST M 28 HR	V/RS
CALDE™ PLAST SUPERAL X AB	R

SOAKING ZONE

CALDE™ CAST M 28 HR	V/RS
CALDE™ PLAST B 70 AB	R
CALDE™ PLAST SUPERAL AB	R

Waste Gas System Front Layer

CALDE™ CAST LW MIX 124 C/G	V/G
CALDE™ CAST MW STRONG LITE	G

STACK

CALDE™ CAST LW MIX 124 C/G	V/G
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RECUPERATOR

CALDE™ CAST MW STRONG LITE	V
CALDE™ GUN F 40	G
CALDE™ GUN MW STRONG LITE	G

Hearth

PREHEATING

CALDE™ CAST LX 58	V/RS
CALDE™ CAST MF 46 G10	V/RS

HEATING

CALDE™ CAST LX 58	V/RS
CALDE™ RAM PB 84	R

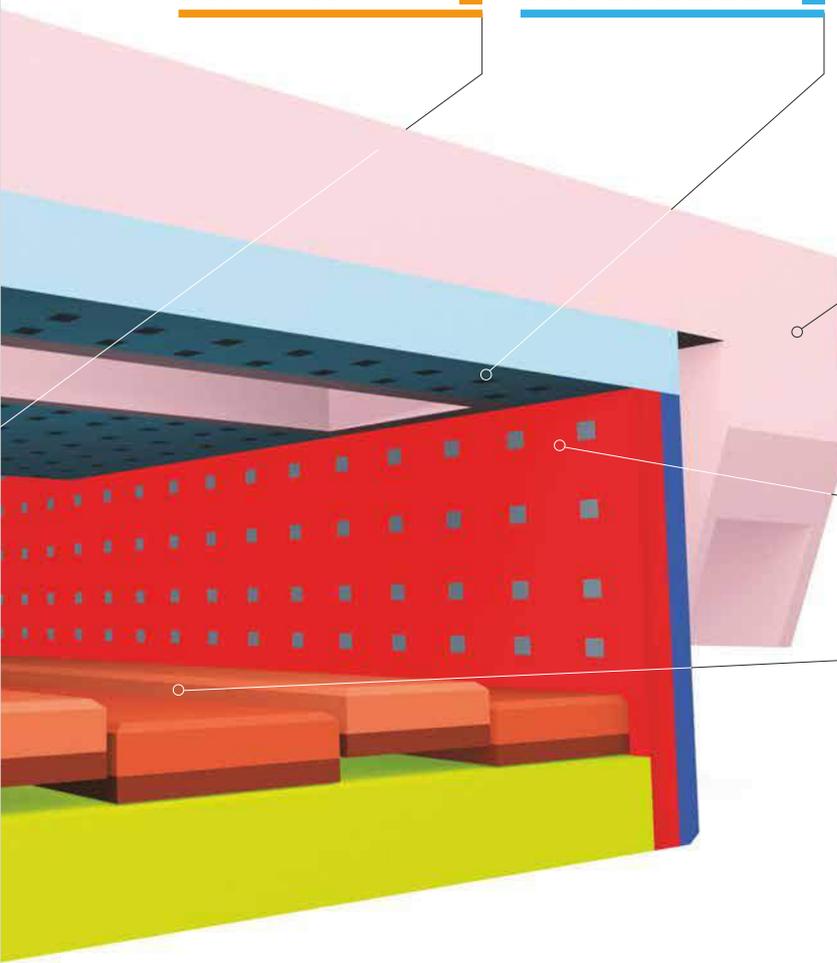
SOAKING

CALDE™ CAST HYMOR 2800	V/RS
CALDE™ CAST LT 90 SP G8	V/RS
CALDE™ CAST NB 82 QD	V/RS
CALDE™ RAM PB 84	R

Wall Preheating Area

LATERAL

CALDE™ CAST M 23	V/RS
CALDE™ GUN F 65	G
CALDE™ PLAST F 50 AB	R
CALDE™ PLAST SUPERAL AB	R



Walking Beam Furnaces

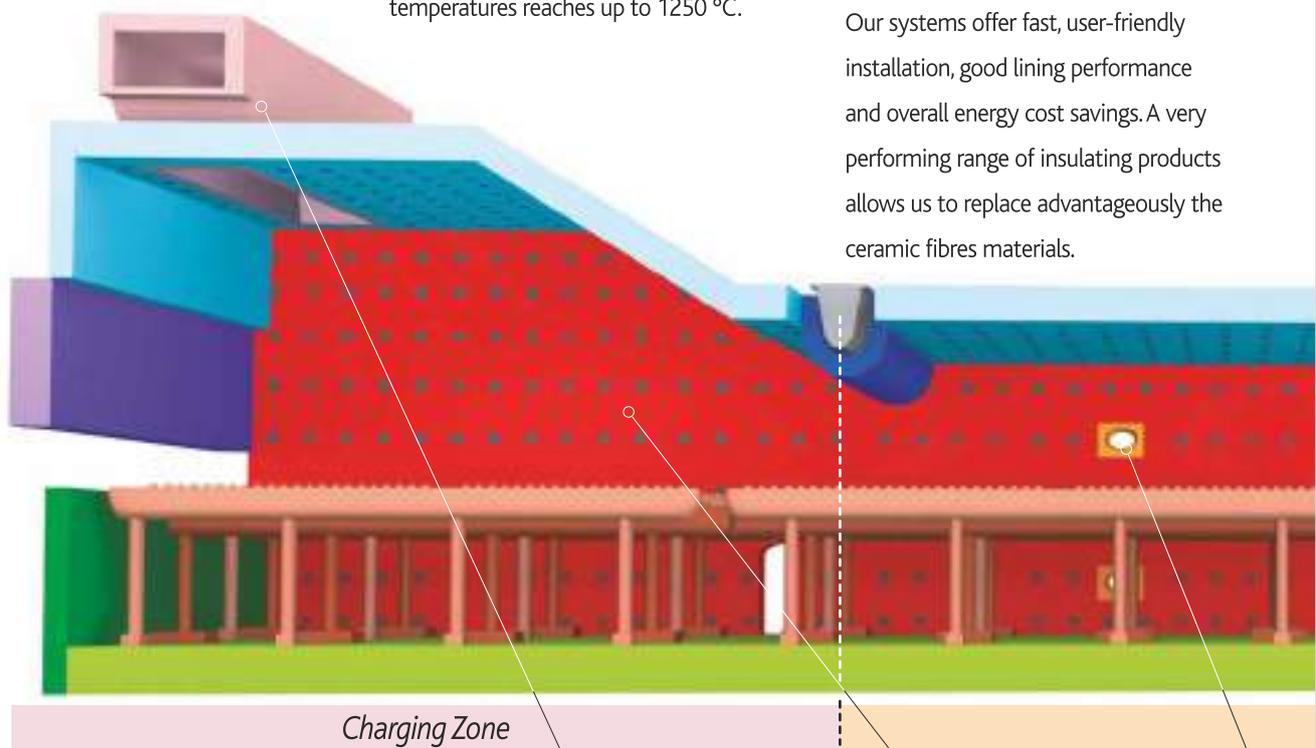


The walking beam furnace overcomes many problems from the pusher and hearth furnaces allowing the heating of the back-face of the stock. This allows shorter heating times and furnace lengths and better operational flexibility. The operating temperatures reaches up to 1250 °C.

The flexibility of the furnace induces the necessity to install materials in the heating and equalizing area with a good thermal shock resistance.

The Skids protections are very exposed to thermo-mechanical stresses.

Our systems offer fast, user-friendly installation, good lining performance and overall energy cost savings. A very performing range of insulating products allows us to replace advantageously the ceramic fibres materials.



Waste Gas System Front Layer

SMOKING AREA

CALDE™ CAST LW MIX 124 C/G V/G

WASTE GAS DUCT

CALDE™ CAST LW MIX 124 C/G V/G

CALDE™ CAST MW STRONG LITE V

STACK

CALDE™ CAST LW MIX 124 C/G V/G

RECUPERATOR

CALDE™ CAST MW STRONG LITE V

CALDE™ GUN F 40 G

CALDE™ GUN MW STRONG LITE G

Wall Preheating Area

LATERAL & CHARGING WALL

CALDE™ CAST M 23 V/RS

CALDE™ GUN F 50 G

CALDE™ PLAST SUPERAL AB R

Burners

STANDARD

CALDE™ CAST LA 55 V/RS

CALDE™ CAST LM 70 V

CALDE™ CAST LX 58 V/RS

CALDE™ PLAST F 50 AB R

IMPROVED

CALDE™ CAST UC 86 V

CALDE™ RAM PB 84 R

Walking Beam Furnaces

Roof

CHARGING AREA

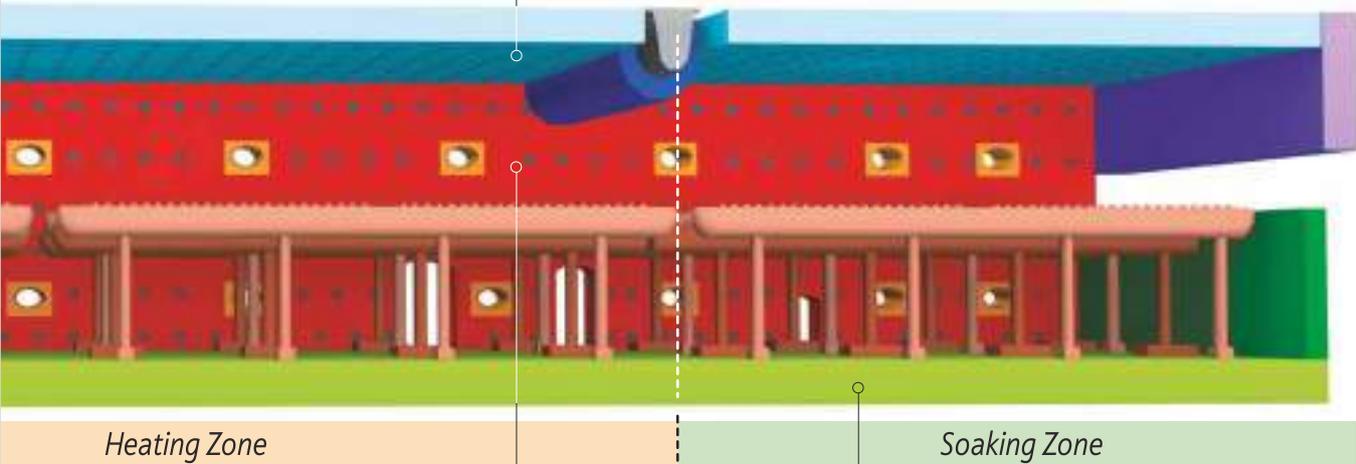
CALDE™ CAST F 50 G10	V
CALDE™ CAST M 23	V/RS
CALDE™ PLAST SUPERAL AB	R

HEATING AREA

CALDE™ CAST M 28 HR	V/RS
CALDE™ PLAST F 50 AB	R
CALDE™ PLAST SUPERAL AB	R

SOAKING ZONE

CALDE™ CAST LX 58	V/RS
CALDE™ PLAST B 70 AB	R
CALDE™ PLAST SUPERAL X AB	R



Heating Zone

Soaking Zone

Wall Heating / Soaking Area

HEATING LATERAL

CALDE™ CAST LX 58	V
CALDE™ PLAST F 50 AB	R
CALDE™ MAG CAST K 70	V/RS
CALDE™ PLAST SUPERAL AB	R
CALDE™ PLAST SUPERAL X AB	R

SOAKING WALL

CALDE™ CAST LX 58	V
CALDE™ GUN F 65	G
CALDE™ PLAST F 50 AB	R
CALDE™ PLAST SUPERAL AB	R
CALDE™ PLAST SUPERAL X AB	R

Hearth

PREHEATING

CALDE™ CAST LX 50	V
CALDE™ PLAST SUPERAL AB	R
CALDE™ RAM F 53 AB	R

HEATING

CALDE™ MAG DRY K 85	DVM
CALDE™ PLAST SUPERAL X AB	R

Skids & Posts Systems



Cooling heat loss through water cooled skid pipes in a continuous reheating furnace amounts to as much as 10%-15% of fuel consumption. In particular, a walking beam-type furnace structurally has about 1.5 times as much water cooled areas as a pushertype furnace does.

Accordingly, the problem of cooling water loss is more significant.

To overcome this problem, the double insulation method for skid pipes has been widely applied to newly build as well as existing furnaces. This method uses high insulation ceramic fibre for internal surface and covers it with castable.

Concept for Posts CALDE™ BLOCK POST

The CALDERYS concept has been proven for the last 20 years. This system allows for maintaining the posts over 10 years with a 5% replacement rate per year. Calderys offers a special type of monoblock construction for easy and quick installation.

Dedicated CALDERYS products

PREHEATING ZONE

CALDE™ CAST M 28 HR 

HEATING AND SOAKING ZONE

CALDE™ CAST NA 55 QD 

CALDE™ CAST NB 82 QD 

Concept for Skids CALDE™ BLOCK SKID

CALDERYS has developed 2 concepts for this application. The standard solution - CALDE™ BLOCK SKID, a concept successful for the past 20 years, with many references all over the world and an innovative concept, particularly time saving and cost-performance oriented - CALDE™ BLOCK SKID QI

(Quick Installation)

CALDE™ BLOCK SKID

This solution can be applied for all types of pipes, for single and for double pipes. This is a very stable system that can resist the strong vibration in the furnace, as well as, in the case of Hi-silicon steel, the heavy weight of the scale stalactites formed during the process. The standard performance of such blocks is nearly 5 years with a repair rate of 10% per year.



Skids & Posts Systems

Prefabricated shapes for slide-bar single tubes

This prefabricated bloc is designed as special type of monoblock construction and is manufactured in two layers: Vacuum formed ceramic fiber shapes inside and CALDE™ CAST Dense “low cement” Castable (LCC) or “ultra low cement” Castable (ULCC) on the outside. This refractory lining solution does not need any additional anchoring except for the integrated alloy-steel basket.

The installation is very easy. With the help of our custom-designed alloy-steel basket as holder, the blocs can be welded onto the slide-bar tubes very quickly.

Dedicated CALDERYS products

PREHEATING ZONE

CALDE™ CAST M 28 HR	V
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HEATING AND SOAKING ZONE

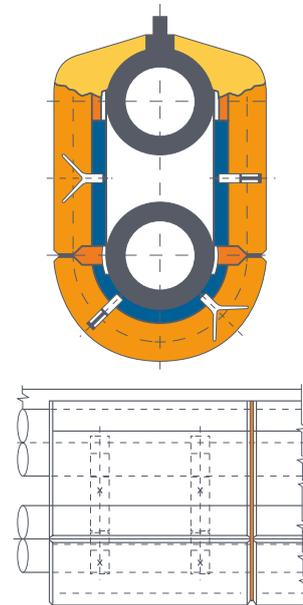
CALDE™ CAST LX 58	V
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CALDE™ CAST NA 55 QD	V
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CALDE™ CAST NB 82 QD	V
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SPECIAL CASE - NEAR THE BURNERS

CALDE™ CAST UC 86	V
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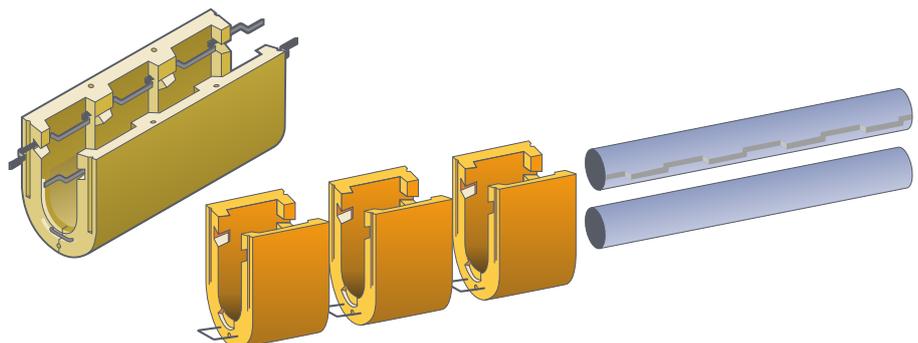


CALDE™ BLOCK SKID QI (Quick Installation)

In many turn-key projects and in the case of simple annual maintenance, the final planning step is the insulation of the skids. Oftentimes other work is delayed, yet the pressure for a quick delivery of the furnace is high. CALDERYS has designed this new concept which allows a separation of the mechanical work on the pipe (repair/construction of the pipe, welding of anchors) from the installation of the blocks. The external protection is done with precast elements. The refractory quality depends on the installation zone inside the furnace. After hanging these elements on the previously welded anchoring system, an insulating powder (CALDE™ MIX BF 35) is inserted between pipe and housing, thus allowing the best insulation.

Main advantages of this concept

- The insulation is particularly effective due to the very low number of metallic parts in contact with the monolithic refractory material. The designed shape of the precast block allows some deformation of the pipe which is compensated by the inserted insulating powder
- The mechanical work (welding) is very simplified. It is not necessary to start installation and welding at the same time - the decoupling of the operation can save time in the planning.



Dedicated CALDERYS products for the front layer

PREHEATING ZONE

CALDE™ CAST M 46 G10	V
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CALDE™ FLOW LA 70	SF
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CALDE™ FLOW MW 136 (high insulating alternative)	SF
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HEATING AND SOAKING ZONE

CALDE™ CAST LF 44	V
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CALDE™ CAST M 28 HR	V
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CALDE™ CAST NA 55 QD	V
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CALDE™ CAST NB 82 QD	V
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CALDE™ FLOW LA 70	SF
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SPECIAL CASE - NEAR THE BURNERS

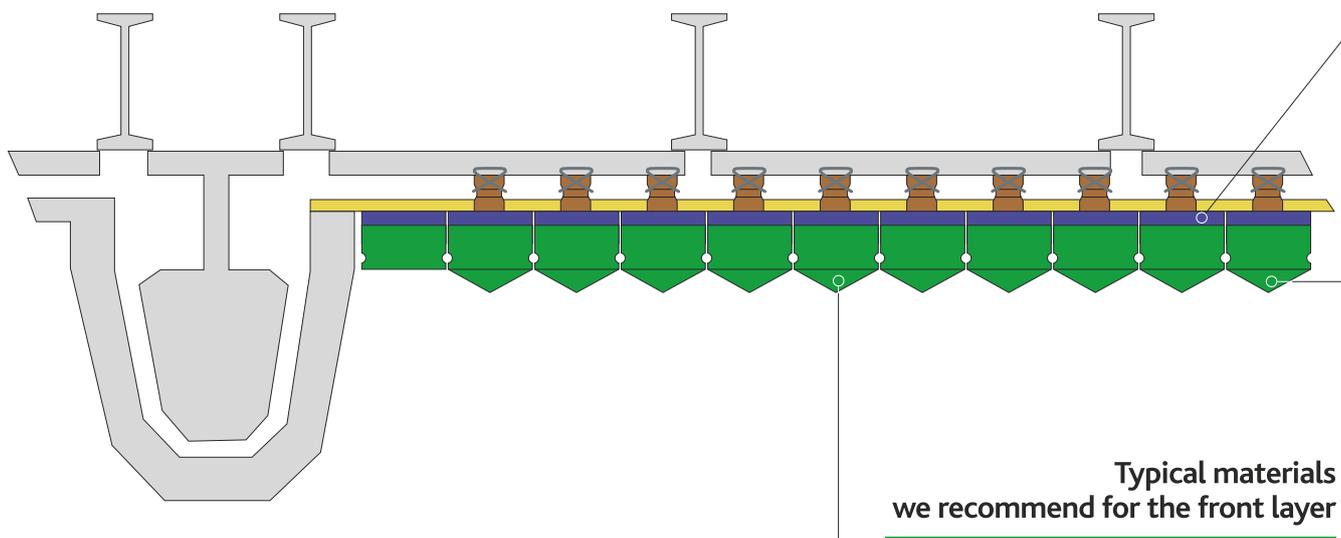
CALDE™ CAST UC 86	V
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Diamond Roof

Reheat furnaces are heavy energy consumers. Confronted with the increasing energy costs, Calderys customers are looking for innovative refractory solutions that would also reduce the installation time. Calderys identified the lack of insulation in the furnace walls and roof was one of the main contributors to the heat loss. Also, the roofs of pusher type, walking beam, walking hearth are mainly installed with ramming materials. Even though the performance is very good – products can last up to 20 years – the installation requires a lot of experienced workers and takes time, from 3 to 4 weeks.

To meet the needs, Calderys, since the early 2000s' developed a new concept - the CALDE™ BLOCK ROOF DIAMOND - to improve the insulation of the roof furnace. The Calderys design engineers made sure that the CALDE™ BLOCK ROOF DIAMOND would be easier, quicker and much more comfortable to install than regular ramming materials. The CALDE™ BLOCK ROOF DIAMOND solution can be implemented easily in less than 5 days by a team of 5 non experienced workers using electric lift tables for safer work at heights. CALDE™ BLOCK ROOF DIAMOND allows a 6% saving on the energy consumption;

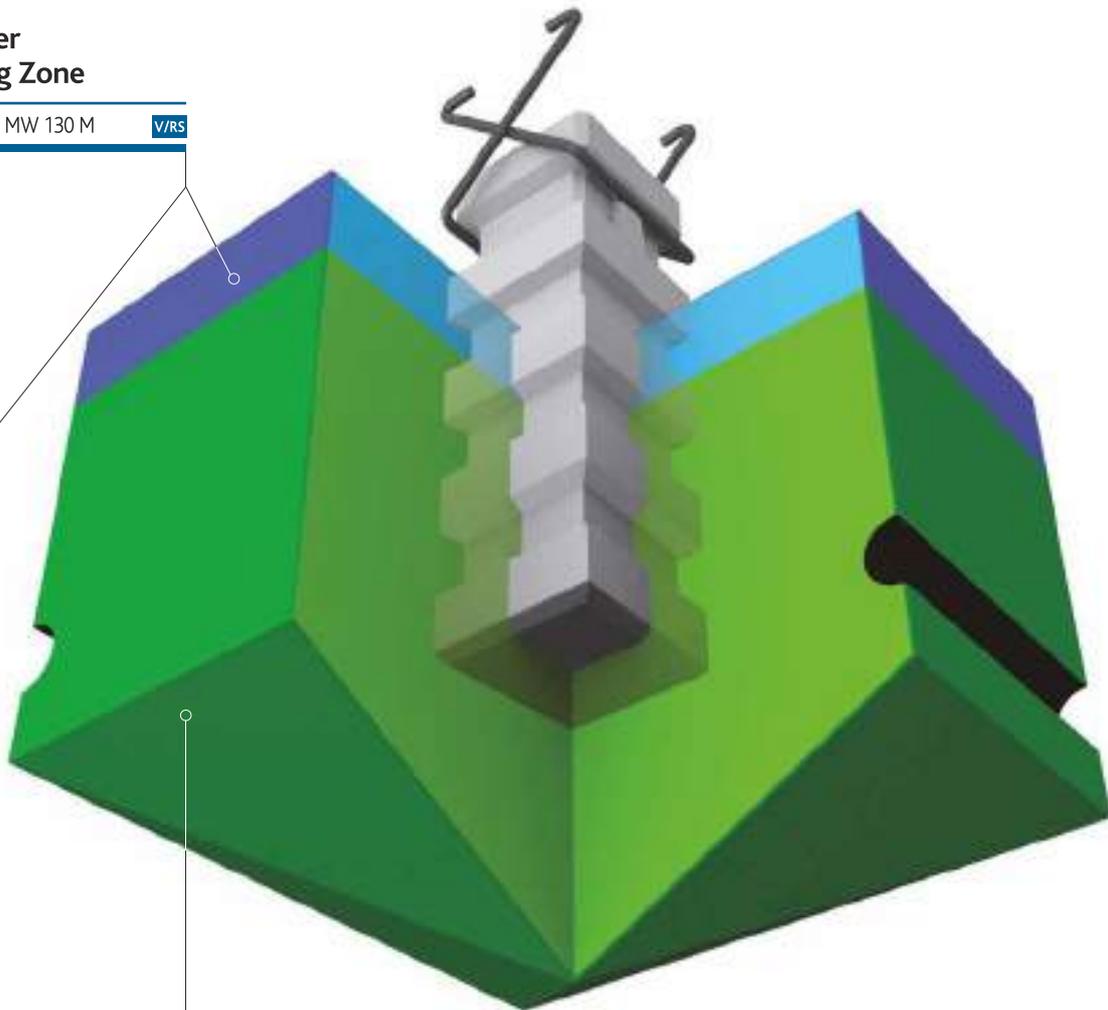
for comparison, a reduction of 1% on the energy consumption of a furnace can induce savings of close to € 0.2 million for a 350 t/h furnace. Since the CALDE™ BLOCK ROOF DIAMOND concept meet all the needed requirement of the reheat furnaces industry, it is becoming fast a real success story with high profile references in France, India, Korea and Russia.



Diamond Roof

Back Layer Insulating Zone

CALDE™ CAST MW 130 M V/RS



Working Line

PREHEATING ZONE

CALDE™ CAST M 28 HR V/RS

HEATING & SOAKING ZONE

CALDE™ CAST LX 58 V/RS

CALDE™ CAST NA 55 QD V/RS

CALDE™ CAST NB 82 QD V/RS



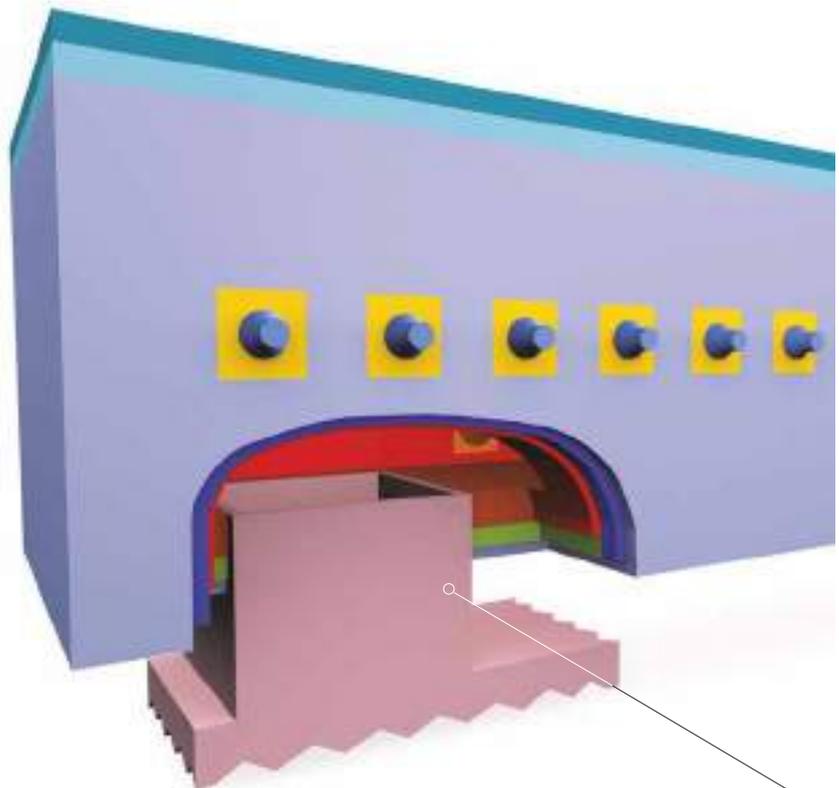
CALDE™ BLOCK ROOF DIAMOND

Roller Hearth Furnace



The roller hearth conveyor system consists of a series of externally driven rolls. There are no cumulative conveyor pressures or tensions as in belt, chain or pusher furnaces. As a result, there are no production or cycle limitations and the length of the furnace is dependent only upon your application needs.

Because individual conveyor rolls are externally driven and remain in the same temperature zones, they are not subject to thermal cycling and can be designed for maximum operation life at working temperatures.



Waste Gas System

WASTE GAS FLUE DUCT

CALDE™ CAST MW STRONG LITE **V**

CALDE™ GUN LW 128 **G**

Roller Hearth Furnace

Roof

SECOND LAYER

CALDE™ CAST XL 116 C/G V/G

Burners

CALDE™ CAST LM 60 V/RS

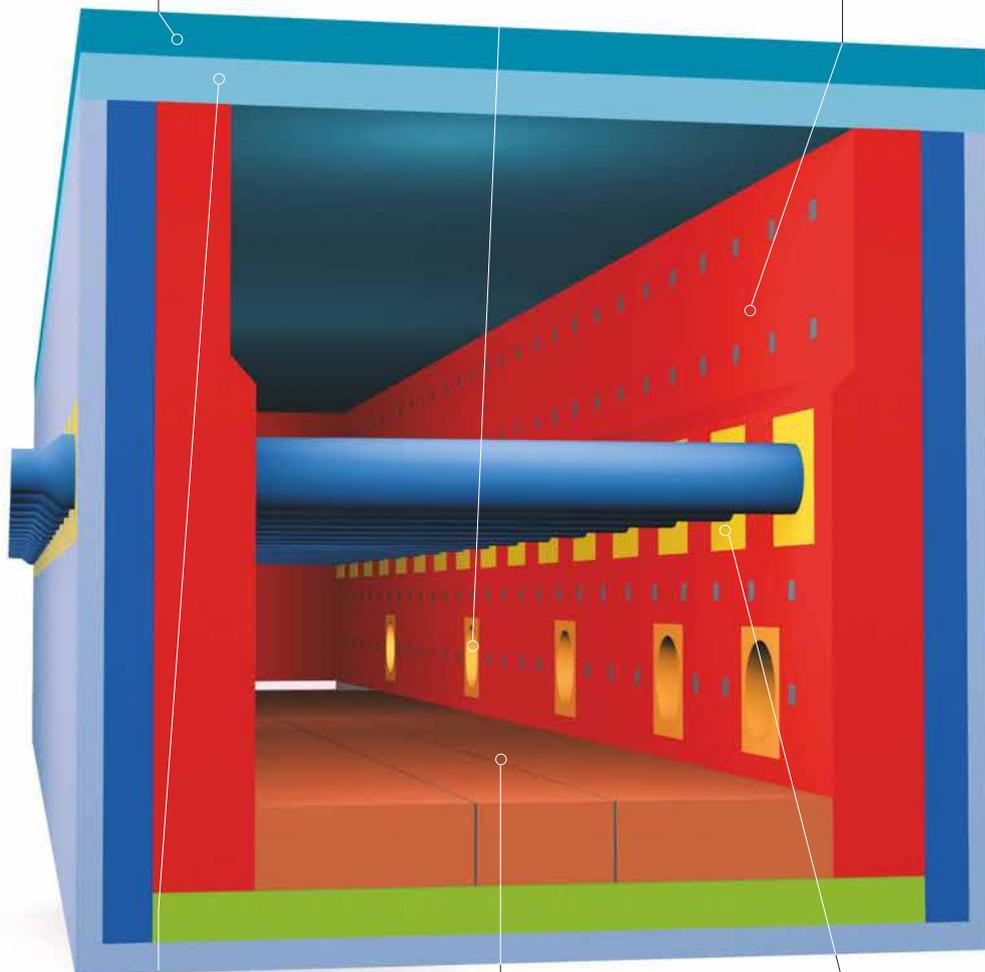
CALDE™ CAST LA 55 R

Walls

CALDE™ CAST F 48 V

CALDE™ CAST M 23 V

CALDE™ CAST MW STRONG LITE V



Roof

FRONT LAYER

CALDE™ CAST LW 154 CO V

CALDE™ CAST LW MIX 124 C/G V

Hearth

FRONT

CALDE™ CAST M 23 V

CALDE™ CAST M 23 V

CALDE™ CAST M 23 V

CALDE™ CAST LW MIX 124 C/G V/G

Roller Bearing

CALDE™ CAST LW MIX 124 C/G V/G

CALDE™ CAST MW STRONG LITE V/RS

Rotary Hearth Furnaces

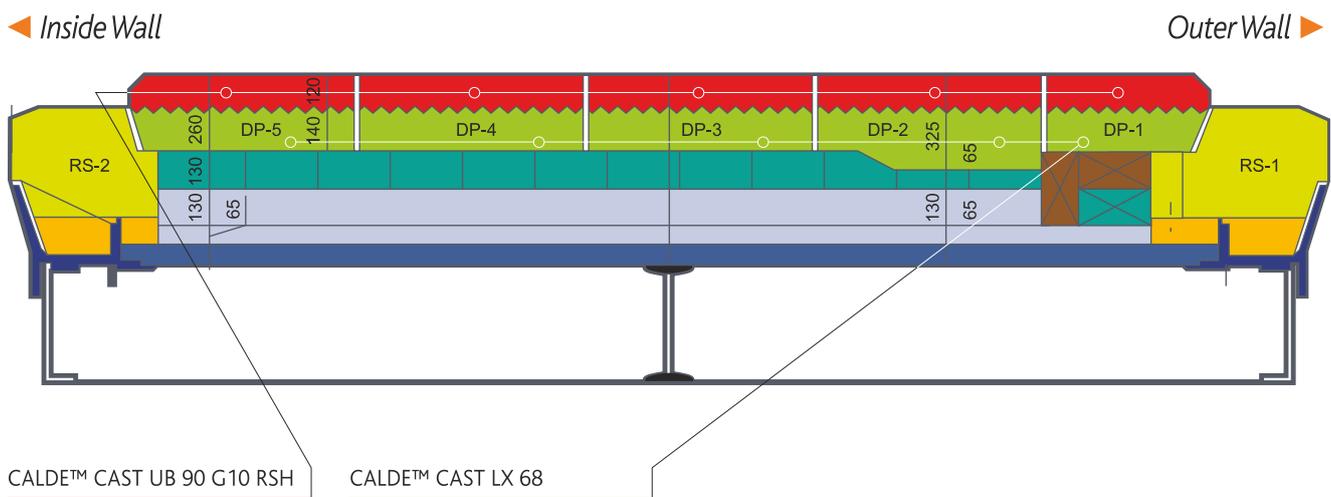
These types of moving hearth furnaces tend to be used for variable size and geometry stocks. The heat storage can sometimes be optimized by using grooves or humps. This can fragilise the structure of the hearth blocks. The unevenly distributed deposit of the

stocks on the hearth can also contribute to inducing strong thermo-mechanical stresses in the blocks. Consequently, the materials have to reach good thermal shock resistance but also a good resistance to scale.

Our systems offer fast, user-friendly installation, good lining performance and overall energy cost savings. A very performing range of insulating products allows us to replace advantageously the ceramic fibres materials.

Assembled precast blocks for floating hearth (dense castable product)

Fixed Hearth Plateau Precast Pieces (Sandwich – System)



Rotary Hearth Furnaces

Walls

CHARGING UPPER ZONE	
CALDE™ CAST M 23	V/RS
CALDE™ GUN F 50	G
CALDE™ PLAST SUPERAL AB	R

CHARGING LOWER ZONE	
CALDE™ CAST MF 46 G10	RS

DISCHARGING UPPER ZONE	
CALDE™ CAST M 28 HR	V
CALDE™ GUN M 60	G

DISCHARGING LOWER ZONE	
CALDE™ CAST LX 58	V
CALDE™ CAST MF 46 G10	RS

Burner

CALDE™ CAST LM 70	V
CALDE™ CAST LX 58	V/RS
CALDE™ PLAST SUPERAL X AB	R

Roof

CHARGING AREA	
CALDE™ CAST M 23	V/RS
CALDE™ PLAST SUPERAL AB	R

HEATING AREA	
CALDE™ CAST M 28 HR	V/RS
CALDE™ LM 60	V/RS
CALDE™ PLAST SUPERAL X AB	R

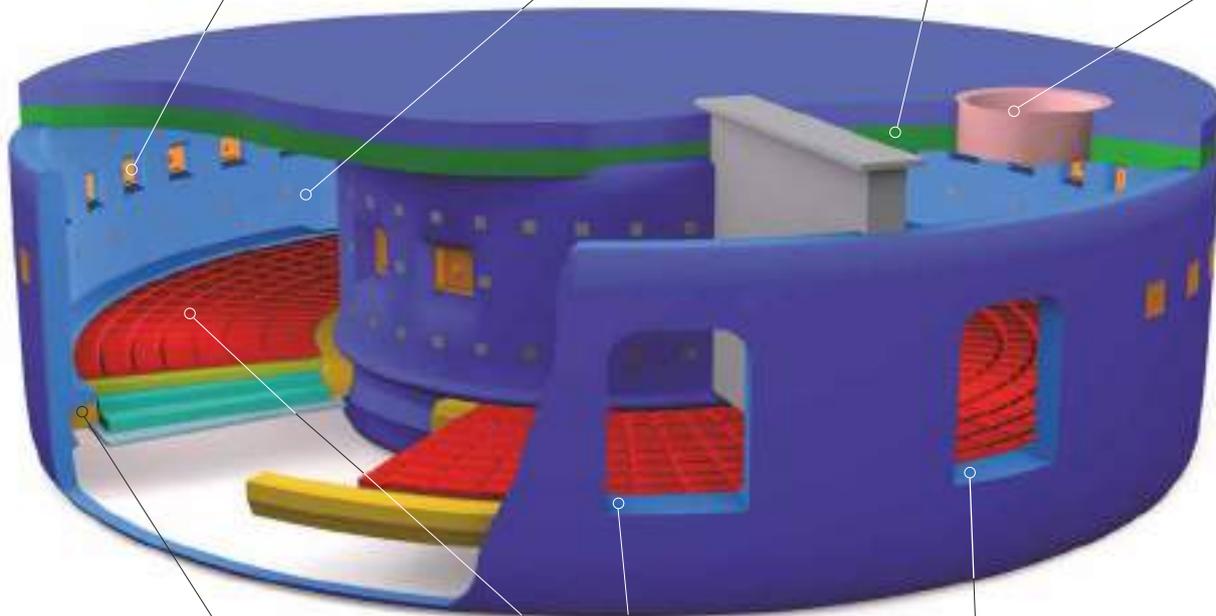
Waste Gas Flue Duct

WASTE GAS DUCT	
CALDE™ CAST LW MIX 124 C/G	V/G
CALDE™ CAST MW STRONG LITE	V

STACK	
CALDE™ CAST LW MIX 124 C/G	V/G

RECUPERATOR	
CALDE™ CAST MW STRONG LITE	V
CALDE™ GUN MW STRONG LITE	G

SMOKING AREA	
CALDE™ CAST F 48	V
CALDE™ CAST M 23	V



Banks of Hearth

CALDE™ CAST GIBRAM	V/RS
CALDE™ CAST LX 58	V/RS

Hearth

CALDE™ CAST 80	V/RS
CALDE™ CAST GIBRAM	V/RS
CALDE™ CAST LT 90 SP G8	RS
CALDE™ CAST M 32	V/RS
CALDE™ CAST NB 82QD	V/RS
CALDE™ CAST UB 90 G10 RSH	V/RS
CALDE™ RAM PB 84	R

Charging Area

Discharging Area

Technical Data

Product name	Main component	Binding system	Max. recomm. temp. (°C)	Max grain size (mm)	Chemical analysis (wt %)				Material required (t/m³)	Water required (l/100kg)	Permanent Linear Change (%)		CCS (Mpa)		Thermal conductivity (W/m.K)		
					Al ₂ O ₃	SiO ₂	CaO	Fe ₂ O ₃			-	+	-	+	-	+	
CALDE™ CAST 80	Tabular Alumina Mullite	Hydraulic	1 750	5	78	18.60	15	0.50	2.70	5.20 to 6	-0.20 (1000°C)	+1 (1700°C)	80 (110°C)	120 (1000°C)	213 (800°C)	2.08 (1000°C)	2.08 (1200°C)
CALDE™ CAST F 48	Chamotte	Hydraulic	1 450	6	49	43	5.20	1.10	2.08	10 to 12	-0.25 (1200°C)	+0.80 (1400°C)	18 (1200°C)	30 (1400°C)	0.99 (800°C)	1.02 (1000°C)	1.06 (1200°C)
CALDE™ CAST F 50 G10	Chamotte	Hydraulic	1 500	12	49	42	6	1	2.07	10 to 12	-0.10 (1200°C)	+0.80 (1400°C)	22 (1200°C)	35 (1400°C)	0.83 (800°C)	0.89 (1000°C)	0.95 (1200°C)
CALDE™ CAST F 60 G10	Alumina Silica	Hydraulic	1 500	12	62	30	4.10	1	2.25	9.60 to 10.40	-0.20 (1200°C)	+1.50 (1400°C)	25 (1200°C)	15 (1400°C)	1.14 (500°C)	1.09 (1000°C)	1.13 (1200°C)
CALDE™ CAST GIBRAM	Bauxite	Hydraulic	1 600	5	82.50	12.40	1.20	1.50	2.90	5 to 6	-0.30 (1200°C)	-0.50 (1600°C)	140 (1200°C)	140 (1600°C)	2.80 (800°C)	2.64 (1000°C)	2.53 (1200°C)
CALDE™ CAST LA 55	Andalusite	Hydraulic	1 600	6	56	39	2.20	1.10	2.46	6 to 7.50	+0 (1200°C)	+1.40 (1600°C)	55 (1200°C)	80 (1600°C)	1.72 (800°C)	1.71 (1000°C)	1.79 (1200°C)
CALDE™ CAST LF 44	Chamotte	Hydraulic	1 500	5	43	50.30	2.50	1.40	2.17	7.50 to 9.50	-0.20 (1200°C)	+0.20 (1500°C)	40 (1200°C)	70 (1500°C)	1.21 (800°C)	1.25 (1000°C)	1.40 (1200°C)
CALDE™ CAST LM 60	Alumina Silica	Hydraulic	1 580	6	61	33	2.50	1	2.31	8 to 10	-0.30 (1200°C)	+0.20 (1400°C)	30 (1200°C)	60 (1400°C)	1.10 (800°C)	1.11 (1000°C)	1.13 (1200°C)
CALDE™ CAST LM 70	Alumina Silica	Hydraulic	1 650	6	70	26	1.90	0.70	2.51	6 to 6.80	-0.09 (1200°C)	+0.43 (1600°C)	32 (1200°C)	100 (1600°C)	2.58 (800°C)	2.76 (1000°C)	2.94 (1200°C)
CALDE™ CAST LT 90 SP G8	Tabular Alumina	Hydraulic	1 750	10	92	MgO 5	1.30	0.10	3.20	3.80 to 4.20	+0.10 (1200°C)	-0.15 (1600°C)	140 (1200°C)	200 (1600°C)	0.25 (500°C)	0.25 (800°C)	0.25 (1000°C)
CALDE™ CAST LW 154 CO	Light Weight Aggregates	Hydraulic	1540	5	85	0.20	14	0.20	1.12	50 to 56	-0.10 (1200°C)	-0.35 (1400°C)	4 (1200°C)	3 (1400°C)	0.25 (500°C)	0.25 (800°C)	0.25 (1000°C)
CALDE™ CAST LW MIX 124 C/G	Chamotte Vermiculite	Hydraulic	1 140	4	24	42	15	9.50	0.94 (cast) 1.24 (gun)*	45 to 49 (cast)	-0.25 (cast) -0.40 (gunned) (800°C)	-0.90 (cast) -0.90 (gunned) (1000°C)	3 (cast) 3 (gunned) (800°C)	2 (cast) 2.70 (gunned) (1000°C)	0.24 (500°C)	0.26 (800°C)	0.55 (1000°C)
CALDE™ CAST LX 50	Chamotte	Hydraulic	1 520	6	52	43	2.30	1.10	2.42	5.60 to 6.80	-0.20 (1200°C)	+0.15 (1400°C)	110 (1200°C)	110 (1400°C)	1.66 (800°C)	1.74 (1000°C)	1.83 (1200°C)
CALDE™ CAST LX 58	Andalusite	Hydraulic	1 650	6	57	38	2.30	1.10	2.50	5.60 to 6	+0.04 (1200°C)	+1 (1600°C)	85 (1200°C)	90 (1600°C)	1.66 (800°C)	1.70 (1000°C)	1.74 (1200°C)
CALDE™ CAST M 23	Chamotte	Hydraulic	1 350	5	37	51.50	4.60	3.20	2.10	7 to 8.50	-0.18 (800°C)	-0.70 (1300°C)	68 (800°C)	65 (1300°C)	1.06 (800°C)	1.11 (1000°C)	1.26 (1200°C)
CALDE™ CAST M 28 HR	Chamotte	Hydraulic	1 550	5	45.50	47.80	3	1.30	2.20	6 to 7.50	-0.40 (1200°C)	-0.60 (1500°C)	80 (1200°C)	115 (1500°C)	1.27 (800°C)	1.30 (1000°C)	1.44 (1200°C)
CALDE™ CAST M 32	Bauxite	Hydraulic	1600	5	77.70	15	3.10	1	2.65	6 to 8.50	-0.30 (1200°C)	+0.30 (1400°C)	110 (1200°C)	80 (1400°C)	2.11 (800°C)	2.05 (1000°C)	2.07 (1200°C)
CALDE™ CAST MF 46 G10	Chamotte	Hydraulic	1 450	10	46.50	42.50	4.60	3.20	2.25	6.80 to 8	-0.20 (1200°C)	-0.50 (1400°C)	80 (1200°C)	105 (1400°C)	1.27 (800°C)	1.30 (1000°C)	1.44 (1200°C)
CALDE™ CAST MW 130 M	Light Chamotte	Hydraulic	1300	10	37.50	42.50	10	6	1.45	25 to 30	-0.20 (800°C)	-0.60 (1300°C)	15 (800°C)	10 (1300°C)	0.55 (800°C)	0.61 (1000°C)	0.78 (1200°C)
CALDE™ CAST MW STRONG LITE	Light Chamotte	Hydraulic	1 320	4	40	38	13	5.50	1.43	20 to 24	-0.35 (1000°C)	-0.50 (1200°C)	12 (1000°C)	10 (1200°C)	0.49 (500°C)	0.51 (1000°C)	0.54 (1200°C)
CALDE™ CAST NA 55 QD	Andalusite	Chemical	1 650	6	55	41	0.20	MgO 1.70	2.48	5.50 to 6.50	+0.02 (1200°C)	+0.48 (1600°C)	124 (1200°C)	164 (1600°C)	1.56 (800°C)	1.57 (1000°C)	1.67 (1200°C)
CALDE™ CAST NB 82 QD	Bauxite	Chemical	1 650	6	82	13.50	0.20	1	2.80	6 to 7	-0.13 (1200°C)	+0.17 (1400°C)	160 (1200°C)	140 (1400°C)	2.47 (800°C)	2.36 (1000°C)	2.31 (1200°C)
CALDE™ CAST UB 90 G 10	Bauxite Corundum	Hydraulic	1700	10	89	7	0.85	0.70	3.17	3.60 to 4.40	-0.10 (1200°C)	+0.20 (1600°C)	145 (1200°C)	160 (1600°C)	3.72 (800°C)	3.41 (1000°C)	3.09 (1200°C)
CALDE™ CAST UC 86	Corundum	Hydraulic	1 750	7	85	14	0.50	0.40	2.92	5.20 to 5.60	+0.05 (1200°C)	+0.55 (1600°C)	100 (1200°C)	100 (1600°C)	2.70 (800°C)	2.57 (1000°C)	2.47 (1200°C)
CALDE™ CAST XL 116 C/G	Insulating Chamotte Vermiculite	Hydraulic	1 160	4	31	31	22	7	0.73 (cast) 1.10 (gun)*	62 to 72 (cast)	-0.60 (cast) -0.80 (gunned) (800°C)	-1.40 (cast) -1.50 (gunned) (1000°C)	2.80 (cast) 3.50 (gunned) (800°C)	1.90 (cast) 2.50 (gunned) (1000°C)	0.19 (500°C)	0.23 (800°C)	0.25 (1000°C)

* Rebound included

Technical Data

Product name	Main component	Binding system	Max. recomm. temp. (°C)	Max grain size (mm)	Chemical analysis (wt %)				Material required (t/m ³)	Water required (l/100kg)	Permanent Linear Change (%)		CCS (Mpa)		Thermal conductivity (W/m.K)		
					Al ₂ O ₃	SiO ₂	CaO	Fe ₂ O ₃			-	+	-	+	-	+	
CALDE™ FLOW LA 70	Andalusite	Hydraulic	1 650	5	67.30	28.30	1.50	0.90	2.75	5.50 to 6.50	-0.10 (1200°C)	+0.50 (1500°C)	140 (1200°C)	110 (1500°C)	2.14 (800°C)	2.08 (1000°C)	2.09 (1200°C)
CALDE™ FLOW MW 136	Light Chamotte	Hydraulic	1 360	5	40	41	13.50	3	1.38	21 to 25	-0.50 (1000°C)	-0.65 (1200°C)	13 (1000°C)	15 (1200°C)	0.42 (500°C)	0.43 (800°C)	0.49 (1000°C)
CALDE™ GUN F 40	Chamotte	Hydraulic	1 300	6	39	45	9.20	2.40	2.14*	Added at the nozzle	-0.45 (1000°C)	-0.70 (1200°C)	22 (1000°C)	16 (1200°C)	0.73 (800°C)	0.76 (1000°C)	0.78 (1200°C)
CALDE™ GUN F 50	Alumina Silica	Hydraulic	1 480	6	50	40	4	1.80	2.52*	Added at the nozzle	-0.30 (1200°C)	-1 (1400°C)	17 (1200°C)	25 (1400°C)	0.99 (800°C)	1.02 (1000°C)	1.06 (1200°C)
CALDE™ GUN F 65	Chamotte	Hydraulic	1650°C	5	62	27	7.10	1.20	2.50	Added at the nozzle	-0.40 (1200°C)	-0.40 (1550°C)	57 (800°C)	34 (1200°C)	1.06 (800°C)	1.11 (1000°C)	1.26 (1200°C)
CALDE™ GUN LW 128	Vermiculite	Hydraulic	1 280	4	37	45	9	4	1.35*	Added at the nozzle	-1 (1000°C)	-1.50 (1200°C)	5.50 (1000°C)	6.0 (1200°C)	0.32 (500°C)	0.35 (800°C)	0.38 (1000°C)
CALDE™ GUN M 60	Alumina Silica	Ceramic	1 600	6	59	35.50	1	1.10	2.35*	Added at the nozzle	-0.60 (1200°C)	-0.10 (1400°C)	12 (1200°C)	10 (1400°C)	1.02 (800°C)	1.07 (1000°C)	1.11 (1200°C)
CALDE™ GUN MW STRONG LITE	Insulating Chamotte	Hydraulic	1 320	4	39	41	12	5.50	1.68*	Added at the nozzle	-0.35 (1000°C)	-0.70 (1200°C)	9 (1000°C)	9 (1200°C)	0.45 (800°C)	0.48 (1000°C)	0.51 (1200°C)
CALDE™ GUN SUPERAL X 70	Alumina Silica	Ceramic	1 650	6	69	26	0.90	1.20	2.40*	Added at the nozzle	-0.40 (1200°C)	+0.60 (1600°C)	12 (1200°C)	13 (1600°C)	1.00 (800°C)	1.07 (1000°C)	1.12 (1200°C)
CALDE™ MAG CAST K 70	Magnesia	Chemical	1700	5	MgO 68,50	26.50	0.40	3.90	3	3.40 to 4.50	-	-0.20	155 (1500°C)	100 (1500°C)	-	-	-
CALDE™ MAG DRY K 85	Magnesia	Ceramic	>1 750	5	MgO 83	2	8.30	5.50	2.70	-	-	-	-	26 (1600°C)	-	-	-
CALDE™ MIX BF 35	Chamotte	Ceramic	1 400	3	37	54	B ₂ O ₃ 2,80	1.60	1.20	Dry, ready to use	-	-	-	-	0.35 (800°C)	0.42 (1000°C)	0.58 (1200°C)
CALDE™ PLAST B 70 AB	Bauxite	Chemical	1 650	7	70	26	TiO ₂ 2,30	1.70	2.70	Wet, ready to use	-0.10 (1200°C)	+2 (1600°C)	25 (1200°C)	20 (1600°C)	1.53 (800°C)	1.53 (1000°C)	1.64 (1200°C)
CALDE™ PLAST F 50 AB	Chamotte	Chemical	1 600	5	49.80	45.60	TiO ₂ 1,90	1.30	2.40	Wet, ready to use	-0.40 (1200°C)	+0.50 (1600°C)	20 (1200°C)	20 (1600°C)	1.20 (800°C)	1.23 (1000°C)	1.38 (1200°C)
CALDE™ PLAST SUPERAL AB	Chamotte	Ceramic	1 650	6	51	45	-	1.10	2.35	Wet, ready to use	-1.50 (1200°C)	+0.10 (1400°C)	20 (1200°C)	15 (1400°C)	1.28 (800°C)	1.24 (1000°C)	1.20 (1200°C)
CALDE™ PLAST SUPERAL X AB	Bauxite	Ceramic	1 650	6	73	22	-	1.35	2.62	Wet, ready to use	-1.50 (1200°C)	+0.65 (1400°C)	20 (1200°C)	13 (1400°C)	1.28 (800°C)	1.30 (1000°C)	1.32 (1200°C)
CALDE™ RAM F 53 AB	Alumina Silica	Ceramic	1 620	7	55	38	-	1.30	2.45	Wet, ready to use	-0.90 (1200°C)	+1.60 (1600°C)	22 (1200°C)	18 (1600°C)	1.19 (800°C)	1.24 (1000°C)	1.28 (1200°C)
CALDE™ RAM PB 84 AB	Bauxite	Chemical	1 650	6	84	10	P ₂ O ₅ 3,30	1	2.89	Wet, ready to use	-0.50 (1200°C)	+1.30 (1600°C)	120 (1200°C)	60 (1600°C)	2.07 (800°C)	2.07 (1000°C)	2.07 (1200°C)
CALDE™ RAM PB 84	Bauxite	Chemical	1750	6	84	10	-	1	2.89	-	-0.50 (1200°C)	+1.30 (1600°C)	120 (1200°C)	60 (1600°C)	2.07 (800°C)	2.07 (1000°C)	2.07 (1200°C)
CALDE™ RAM PF 55	Chamotte	Chemical	1 620	6	60	35	P ₂ O ₅ 2,60	0.80	2.60	Wet, ready to use	-0.45 (1200°C)	-0.10 (1400°C)	90 (1200°C)	90 (1400°C)	1.76 (500°C)	1.84 (1000°C)	1.88 (1200°C)

* Rebound included

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