

# CALDERYS PERFORMANCE YOU CAN TRUST

For all industries with extreme temperatures and working conditions, Calderys is there for you. Combining a global network with local expertise, we offer customised solutions wherever you are: from monolithic refractory to bricks and precast shapes to a full range of engineering and installation services.

**KEY POINTS** Over 100 years of refractory experience Over 2 300 employees across 33 countries 19 plants in 16 countries totaling 600 000 tons capacity Annual revenue of over € 500 million 1 Global Technology Centre and 15 Customisation Labs 廪 150 major projects implemented every year Wholly-owned subsidiary of Imerys Group 6

# OUR VALUE TO THE STEELMAKING-INDUSTRY

The world leader in monolithic refractory solutions, Calderys has a full product and service portfolio to adapt to the refractory needs of steelmakers. We ensure that we propose products most suitable for your process requirements and deliver to 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.



# CALDERYS A TRUSTED SUPPLIER IN THE STEEL INDUSTRY

A world leader in Refractory Solutions, Calderys has the complete product and service portfolio for all applications. The wide ranging technology of Calderys ensures that the clients' needs are exceeded.

For electric arc furnace, Calderys provides specific solutions for both:

- DC Furnace
- AC Furnace

Calderys is considered a reference supplier in the steel industry, offering value-added solutions based on tailor-made designs and engineering to provide refractory linings for optimal performance.

Our comprehensive technology and services are a result of a world-class innovation network, local expertise from over 30 locations around the globe, and over 100 years of experience in the refractory business.



Alongside the products themselves, Calderys provides a complete range of services:

- 🖊 Design
- Product selection
- Thermal calculations
- FEM calculations
- Installation
- Labour & machinery
- Supervision
- Repair service support
- Full refractory project management



# -CALDE® BRAND The Complete Refractory Solution For Electric Arc Furnaces

Calderys is committed to providing complete refractory solutions for the electric arc furnace (EAF), tailored to specific client needs for all production units and production processes.

As a global partner to the steel industry, Calderys offers a complete range of high grade refractories and related services that ensure the most comprehensive lining solutions for the EAF:

- In-depth range of shaped and unshaped refractory products including basic and non-basic mixes, fired and carbon-bonded bricks, ready-shapes, slide gate and isostatically pressed components.
   Complete service and repair concepts
  - including dedicated machinery, repair systems, and supervision for the application of high value refractory products for the EAF.
- Respected and long-standing partner to clients within the steel industry providing decades of collaborative partnerships that present the latest technologies to our customer base.
- Global sales and service network ensuring the best and most reliable service in the industry.
- Advanced research and development and strategic partnerships providing package and system solutions to meet all variations of customer expectations.

In focus, the **CALDE® BRICK range** is tailored for the working lining and the safety lining of the furnace, providing both fired magnesia and carbon bonded technologies to withstand even the most demanding of applications.

**Calderys Monolithic Refractory Solutions** make use of high grade raw materials that provide finished products meeting key requirements of ease of installation and target performance, optimising technical and commercial parameters. Calderys ready-shapes and cast-in-situ technologies for tapping, spout and delta roof offer robust, reliable and long-lasting solutions for these high demand areas.

Calderys continues to evolve and improve its technical offering, ensuring that the ever-changing demands of clients and applications can be met through the supply of tailor-made solutions and services to reach the **optimum technical and commercial considerations**.

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# **CALDERYS** Solutions For AC Electric Arc Furnace

## EAF Lining - MgO-C Bricks

Aroa		Product	Chemi	cal Analy	sis (Avera	ages)	Residual	Bulk	Apparent	CCS MPa 60 60 45 45 45 35 35 35 35 35 35 35 35 35 3	Anti Oxidants
Alea		Recommendations	MgO %	CaO %	Fe <sub>2</sub> O <sub>3</sub> %	SiO <sub>2</sub> %	%	g/cm <sup>3</sup>	%		
	Cost-Effective	CALDE® BRICK MC R 112-N	94.5	2.3	0.8	2.3	6	2.94	8.3	60	No
Lower Wall	Standard Grade	CALDE® BRICK MC R 212-N	97	0.9	0.7	0.9	6	2.99	6	60	No
	Improved Grade	CALDE® BRICK MC R 552-N	96.5	-	0.8	0.8	6	3.02	6.5	60	No
Lippor Wall	Standard Grade	CALDE® BRICK MC R 214-N	97	0.9	0.7	0.9	12	2.92	4.2	45	No
Upper vvali	Improved Grade	CALDE® BRICK MC R 554-N	96.5	-	0.8	0.8	12	2.98	5.5	t CCS MPa 2 600 1 600 2 600 4 600	No
Slag Line	Cost-Effective	CALDE® BRICK MC R 554-N	96.5	-	0.8	0.8	12	2.98	5.5	45	No
	Standard Grade	CALDE® BRICK MC R 604-N	97	1.1	0.65	0.55	12	3.04	3.7	45	No
		CALDE <sup>®</sup> BRICK MC R 606-N	97	1.1	0.65	0.55	15	2.99	3.3	35	Yes
	Improved Grade	CALDE® BRICK MC R 706-A	97.5	1	0.6	0.5	15	2.99	3.1	CCS MPa 60 60 45 45 45 35 35 35 35 35 35 35 35 35 3	Yes
	Cost-Effective	CALDE® BRICK MC R 554-N	96.5	-	0.8	0.8	12	2.98	5.5	45	No
Upper Wall Slag Line Hot Spot	Standard Crada	CALDE® BRICK MC R 556-N	96.5	-	0.8	0.8	15	2.92	5.5	35	No
Hot Spot	Standard Grade	CALDE <sup>®</sup> BRICK MC R 606-N	97	1.1	0.65	0.55	15	2.99	3.3	35	No
	Improved Grade	CALDE <sup>®</sup> BRICK MC R 606-A	97	1.1	0.65	0.55	15	2.98	2.7	35	Yes
	Improved Grade	CALDE® BRICK MC R 706-A	97.5	1	0.6	0.5	15	2.99	3.1	35	Yes
Door Area	Standard Grade	CALDE® BRICK MC R 604-B	97	1.1	0.65	0.55	12	3.04	3.4	45	Yes
DODI AIGU	Improved Grade	CALDE® BRICK MC R 704-E	97.5	1	0.6	0.5	12	3.01	4.1	CCS MPa 60 60 45 45 45 35 35 35 35 35 35 35 35 45 35 35 35 35 35 35 35 35 35 3	Yes

## EAF Lining - Fired Bricks

A.r.o.o.		Product	С	hemical A	Analysis (J	Average	Bulk	Apparent	CCS MPa	Anti	
Alea		Recommendations	MgO %	CaO %	Fe <sub>2</sub> O <sub>3</sub> %	SiO <sub>2</sub> %	$Al_2O_3\%$	g/cm <sup>3</sup>	%	CC3 IVIF d	Oxidants
Lower Wall, Upper Wall	Standard Grade	CALDE <sup>®</sup> MAG BRICK MD 60 DB	60	-	-	2.0	-	3.08	16	40	No
Slag Line	Standard Grade	CALDE <sup>®</sup> MAG BRICK MD 60 DB	60	-	-	2.0	-	3.08	16	40	No
Hot Spot	Improved Grade	CALDE <sup>®</sup> MAG BRICK MD 61 SRB	60	0.6	11.7	1.5	7.0	3.15	16	CCS MPa 40 40 45 50 50	No
Permanent	Standard Grade	CALDE® MAG BRICK FM 92	92	3.0	2.5	4.5	2.5	2.9	18	50	No
Lining	Improved Grade	CALDE <sup>®</sup> MAG BRICK FM 95	95	2.0	1.5	2.5	1.0	2.95	18	CCS MPa 40 40 45 50 50	No

# **CALDERYS** Solutions For AC Electric Arc Furnace

#### Focus: EAF Bottom / Hearth

The CALDE<sup>®</sup> MAG DRY product range is based on Alpine microcystalline magnesia or synthetic high calcium ferrite magnesia, specifically formulated for best compaction to resist steel and slag penetration. Dry-Vibratable EAF hearth installations provide numerous advantages:

- Low initial cost
- No-dryout or preheat needed
- Easy to repair and re-contour
- Fast installation
- Forms a monolithic surface 'in situ' to slow metal penetration



The CALDE® MAG DRY product range performs particularly well in the EAF hearth.

## **EAF Hearth Products**



#### Focus: CALDE® MAG DRY Products In A DRI AC Electric Arc Furnace

Mini-mills melting direct reduced iron (DRI) often experience an extremely aggressive environment in the EAF, specifically in the hearth of the furnace.

For this application, **Calderys recommends CALDE® MAG DRY K 75 G6 and CALDE® MAG DRY K 67 G8 series Hearth Ramming**. The physical and chemical properties of these products promote fast and complete sintering, reducing the potential for erosion and chemical attack. With these products, the sintering process is volume stable thus eliminating cracking and steel infiltration.

**CALDE® MAG DRY** products have proven their effectiveness in AC EAF mini-mills melting DRI, showing significant savings in refractory consumption of up to 20% compared to competitors' products.

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# **CALDERYS** Solutions for DC Electric Arc Furnace

## EAF With Billet Anodes



EAF With Electrode Pins

## **DC EAF Products**

Hearth Anode Zone

 V
 R
 CALDE® MAG DRY K 56

Anode Outer Sleeve CALDE® MAG BRICK MD 58 DB

Hearth Surrounding Wall CALDE<sup>®</sup> MAG BRICK FM 97

Anode Sleeve Brick CALDE® MAG BRICK MD 58 SRB



## Hearth - Non Anode Zone (Optional)

- V R CALDE® MAG DRY K 75 G6
- V R CALDE® MAG DRY K 85 G6
- V R CALDE® MAG DRY K 67 G6



## EAF With Conductive Hearth

Conductive Hearth Brick CALDE<sup>®</sup> BRICK MC R 604-N S PI

Conductive Hearth Mortar CALDE® TROWEL G 100



# Conductive Mix Installation and Hot/Cold Repair

CALDE<sup>®</sup> MAG RAM R 96 G

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# **CALDERYS** Solutions For DC Electric Arc Furnace

## EAF Lining - Bricks For DC Lining Concept

Aroo	Normal	Chemi	cal Analy	sis (Avera	iges)	Residual	Bulk	Apparent	CCS MPa 40 60 45	Anti Oxidants
Alea	Recommendations	MgO %	CaO %	Fe <sub>2</sub> O <sub>3</sub> %	SiO <sub>2</sub> %	%	g/cm <sup>3</sup>	%		
Hearth Surrounding Wall	CALDE <sup>®</sup> MAG BRICK FM 97	96	2.0	1.5	1.5	-	3.05	17	40	No
Conductive Hearth Brick	CALDE® BRICK MCR 604-N S PI	97	1.1	0.7	0.6	14	3.34	2	60	No
Anode Sleeve Brick	CALDE® MAG BRICK MD 58 SRB	58	-	-	1.5	-	3.15	16	45	No
Anode Outer Sleeve	CALDE <sup>®</sup> MAG BRICK MD 58 D8	58	-	-	2.0	-	3.10	16	40	No

## Focus:Direct-Current Electric Arc Furnace

DC furnaces are gradually growing in popularity where plants are either being upgraded or new plants are being built.

A noticeable feature of this kind of furnace is the extra thick hearth safety lining. Originally these furnaces had full bricked hearths, including complicated & very expensive brick shapes in between the anode pins in the bottom. Calderys dry rammed hearth materials for these DC EAF designs, for example, CALDE® MAG DRY K 56, are lower in  $Fe_2O_3$  and of a finer grain to fit in and around the anode pins.

A typical feature of the DC EAF is that there are no specific hot spots in the sidewalls resulting from the electrodes. Depending on the use of sidewall burners, it is possible that DC furnaces can employ one magnesia carbon quality for the entire working lining side wall.

## Additional Mix Products

#### Backfill

V R CALDE<sup>®</sup> MAG DRY K 78 G2

**EBT Filling Sand** 



#### Ramming Mix

Standard Grade

CALDE<sup>®</sup> MAG PATCH P 80

Improved Grade CALDE® MAG DRY K 95

#### Mortar

Standard Grade

G T CALDE® MAG COAT S 80

Improved Grade

T CALDE® MAG COAT K 95



Hot Installation



sc Spraycast Self-Flow





## Spout / Launder



## Ramming / Casting

V R CALDE<sup>®</sup> MAG CAST G 95

#### Cast on Site

- SF CALDE® FLOW LT 95 SP
- SF CALDE® FLOW UC 92 D4

Ready Shape

- V CALDE® CAST UC 90 D
- V CALDE® CAST LT 95 SP G20

## Eccentric Bottom Tap-hole (EBT)



EBT - Surround Block CALDE<sup>®</sup> BRICK MC R 212-N

EBT - End Block CALDE<sup>®</sup> BRICK ASC 26-62A

CALDE® BRICK MC R 706-E

#### **EBT- Inner Segments**

Standard Grade CALDE<sup>®</sup> BRICK MC R 706-E Improved Grade CALDE<sup>®</sup> BRICK MC R 706-E S PI

### EBT - Filling Sand CALDE<sup>®</sup> DRY SM 50

#### EBT - Annular Gap

V R CALDE® MAG CAST G 95

## Focus: Spout / Launder

The EAF launder tap-hole has to withstand:

- Severe slag corrosion
- Repeat thermal cycling
- Hot erosion by steel and slag

Typical product recommendations to resist these stresses are CALDE<sup>®</sup> CAST UC 90 D or CALDE<sup>®</sup> CAST LT 95 SP G20, with optional steel fibre reinforcement for improved spalling resistance.

For more product info, see monolithic refractory technical specification on page 13

### Focus: EBT

Tap-hole assembly is a key consideration for the EAF. For this application, Calderys recommends:

- High quality 15% MgO-C bricks with antioxidant additions for the sleeve, such as CALDE<sup>®</sup> BRICK MC R 706-E, or CALDE<sup>®</sup> BRICK MC R 706-E S PI
- High quality 15% MgO-C bricks with specific metallic additions, such as CALDE<sup>®</sup> BRICK MC R 706-E, or alumina-SiC-C bricks, such as CALDE<sup>®</sup> BRICK ASC 26-62A, for the end block.

Calderys materials for the EBT exhibit excellent wear characteristics resulting in superb furnace availability.

Aroo		Product		Chemica	al Analysis	s (Averag	ges)	Residual	Bulk	Apparent Porosity	CCC MPa	Anti
Area		Recommendations	MgO%	CaO %	Fe <sub>2</sub> O <sub>3</sub> %	SiO <sub>2</sub> %	Al <sub>2</sub> O <sub>3</sub> %	%	g/cm <sup>3</sup>	%	CCS MPa 60 43 35 60	Oxidants
Surround Block	Standard Grade	CALDE <sup>®</sup> BRICK MC R 212-N	97	0.9	0.7	0.9	-	6	2.99	6	60	No
End Block	Standard Grade	CALDE <sup>®</sup> BRICK ASC 26-62A	2.8	0.8	2.9	-	63.0	15	2.91	4.4	43	Yes
End Block, Inner Segments	Standard Grade	CALDE <sup>®</sup> BRICK MC R 706-E	97.5	1.0	0.6	0.5	-	15	2.98	2.3	35	Yes
Inner Segments	Improved Grade	CALDE <sup>®</sup> BRICK MC R 706-E S PI	97.5	1.0	0.6	0.5	-	17	3.28	2	60	Yes



#### Ready Shape / Cast on Site\*

#### Cast on Site\*

Rev CALDE® CAST UB 80
Rev CALDE® CAST UB 85
Rev CALDE® CAST UB 85 D3
Rev CALDE® CAST UB 86 G8
Rev CALDE® CAST UC 80
Rev CALDE® CAST UC 90 D



CALDE<sup>®</sup> FLOW UB 80 <sup>SF</sup> CALDE<sup>®</sup> FLOW UC 88 D4 <sup>SF</sup>

CALDE<sup>®</sup> FLOW UC 92 D4 SF

#### **Ramming Mix**

CALDE® PLAST 85 S

#### Mortar

CALDE® TROWEL SB 75

\*Note: For Cast on Site, it is typical to use the same products as for Ready Shape but in extreme installation conditions Calderys CALDE® FLOW products, with their higher flow properties, can be considered.

## Focus: Precast Delta Roof For EAF

The main wear characteristics of the EAF Delta are:

- High erosion / corrosion from metal and slag direct from the molten bath mass
- High temperature radiation during melting / treatment of steel
- High temperature impact from the electrodes
- High erosion / corrosion from the effect of the fume offtake
- Direct impact of hot corrosive gases from incorrectly-aligned O<sub>2</sub> burners through the slag door

Calderys has years of expertise in creating refractory solutions to resist these extreme stresses, with one popular option being the Precast Delta Roof, which is tailored to exact client specifications.

The Ready-Shape Departments of Calderys create hundreds of customized EAF roofs every year.

These experts handle everything from initial design to palletization to prepare the finished Delta Roof for transport to the client.

# Gunned Hot Installation Rammed Ready Shaped / Vibrating Spraycast Self-Flow Vibrated Trowelling

## EAF Delta - Brick Roof Options

Aroa		Product		cal Analysis (	Averages)	Bulk	Apparent	CCS MPa	Anti
Alea		Recommendations	Fe <sub>2</sub> O <sub>3</sub> %	SiO <sub>3</sub> %	Al <sub>2</sub> O <sub>3</sub> %	g/cm <sup>3</sup>	%	CC3 IVIF a	Oxidants
	Standard Grade	CALDE® BRICK B 75	1.7	17.5	76.0	2.68	18	70	No
Brick Roof	Improved Grade	CALDE® BRICK B 85	1.8	11.0	84.0	2.78	19	80	No
	High Slag Resistance*	CALDE® BRICK B 80 D3	1.7	14.0	79.0	2.81	19	90	No

NOTE: For specific zones requiring higher slag resistance, e.g. fume extraction side or around the electrodes.

# **CALDERYS** Machines For Efficient Installation & Repair

Effective installation contributes significantly to refractory performance, while maintenance ensures a long lining life, so Calderys supplies the machines clients need for installations and repairs of EAF linings.

## CALDE® MACHINE DRY GUN

Rotary dry gunning machine operated with compressed air. Available in 2 models: permanent or mobile.

## Focus: Gunning / Fettling

Clients worldwide have had great success with their EAF repairs using the Calderys CALDE<sup>®</sup> MAG FRIT (fettling) and CALDE<sup>®</sup> MAG GUN (gunning) product lines.

These Calderys products are specially tailored for mini-mills to increase furnace availability by safely increasing furnace life and reducing maintenance and partial patch down time.

## CALDE<sup>®</sup> MACHINE EAF

Gunning manipulator for repair of all parts of the EAF: side wall, banks, hearth, as well as protection of the water cooled panels. Operates via gunning "robot" in modes ranging from manual to fully automatic.



#### Fettling

- F CALDE<sup>®</sup> MAG FRIT 80 G5
- F CALDE<sup>®</sup> MAG FRIT 80 G8
- F CALDE<sup>®</sup> MAG FRIT 40 G5
- **Gunning Repair**
- G CALDE® MAG GUN G 80
- G CALDE® MAG GUN GS 82
- G CALDE® MAG GUN G 89
- G CALDE® MAG GUN S 65
- G CALDE® MAG GUN S 80
- G CALDE® MAG GUN S 89
  G CALDE® MAG GUN P 82
  G CALDE® MAG GUN P 89
  G CALDE® MAG GUN P 83

# -CALDERYS Monolithic Refractory: Technical Data

Product Namo	Main Component	Binding	Max.	Max. Grain	Chemical Analysis (Averages %)			
Froduct Name	Main Component	System	Temp (°C)	Size (mm)	$Al_2O_3$	MgO	SiO <sub>2</sub>	
CALDE <sup>®</sup> CAST LT 95 SP G20	Tabular Alumina, Spinel	Hydraulic	1850	25	92.5	5.4	0.2	
CALDE® CAST UB 80	Bauxite	Hydraulic	1650	6	82	-	12	
CALDE <sup>®</sup> CAST UB 85	Bauxite	Hydraulic	1680	6	83.5	-	11.6	
CALDE <sup>®</sup> CAST UB 85 D3	Bauxite, Chromium oxide	Hydraulic	1700	6	87	-	6.5	
CALDE <sup>®</sup> CAST UB 86 G8	Bauxite	Hydraulic	1650	8	86.5	-	9.2	
CALDE <sup>®</sup> CAST UC 80	Corundum	Hydraulic	1700	10	80	-	17	
CALDE <sup>®</sup> CAST UC 90 D	Corundum, Chrome oxide	Hydraulic	1800	10	90.5	-	2.3	
CALDE <sup>®</sup> DRY SM 50	Olivine	Ceramic	1750	6	-	50	40	
CALDE <sup>®</sup> FLOW LT 95 SP	Tabular Alumina, Spinel	Hydraulic	1750	6	95.7	2.4	0.1	
CALDE <sup>®</sup> FLOW UB 80	Bauxite	Hydraulic	1600	6	83	-	14	
CALDE® FLOW UC 88 D4	Corundum, Chrome oxide	Hydraulic	1750	6	88	-	3.6	
CALDE <sup>®</sup> FLOW UC 92 D4	Corundum, Chrome oxide	Hydraulic	1850	6	91	-	-	
CALDE <sup>®</sup> MAG CAST G 95	Magnesia	Chemical	1750	3.15	0.4	94.4	2.2	
CALDE <sup>®</sup> MAG COAT K 95	Magnesia	Chemical	1650	0.5	-	95	2.4	
CALDE <sup>®</sup> MAG COAT S 80	Magnesia	Chemical	1650	3.5	1	80	13	
CALDE <sup>®</sup> MAG DRY K 56	Dolomite	Ceramic	1700	4	-	56	1.9	
CALDE <sup>®</sup> MAG DRY K 67 G6	Magnesia	Ceramic	1750	6	0.3	67.5	1.3	
CALDE <sup>®</sup> MAG DRY K 70 G8	Magnesia	Ceramic	1750	8	-	71	0.7	
CALDE <sup>®</sup> MAG DRY K 67 G8	Magnesia	Ceramic	1750	8	0.3	67.5	1.3	
CALDE <sup>®</sup> MAG DRY K 75	Magnesia	Ceramic	1750	5	-	77	0.7	
CALDE <sup>®</sup> MAG DRY K 75 G6	Magnesia	Ceramic	1750	6	-	78.5	0.8	
CALDE <sup>®</sup> MAG DRY K 78 G2	Magnesia	Ceramic	1750	2	-	78	1.2	
CALDE <sup>®</sup> MAG DRY K 80 G8	Magnesia	Ceramic	1750	8	-	79	0.7	
CALDE <sup>®</sup> MAG DRY K 85	Magnesia	Ceramic	1750	5	-	84	1	
CALDE® MAG DRY K 85 G6	Magnesia	Ceramic	1750	6	-	84	1	
CALDE <sup>®</sup> MAG DRY K 95	Magnesia	Ceramic	1700	5	1.0	94.5	1.5	
CALDE <sup>®</sup> MAG FRIT 40 G5	Dolomite	Ceramic	1700	4	0.6	37.5	2	
CALDE <sup>®</sup> MAG FRIT 80 G5	Magnesia	Ceramic	1700	5	-	80	1.4	
CALDE <sup>®</sup> MAG FRIT 80 G8	Magnesia	Ceramic	1700	8	-	80	1	
CALDE <sup>®</sup> MAG GUN G 80	Magnesia	Chemical	1750	3.5	0.6	81.3	12.7	
CALDE <sup>®</sup> MAG GUN G 89	Magnesia	Chemical	1750	3.5	1	86	9.3	
CALDE <sup>®</sup> MAG GUN GS 82	Magnesia	Chemical	1700	4	-	82	9.3	
CALDE <sup>®</sup> MAG GUN P 82	Magnesia	Chemical	1750	3.5	0.6	82	11.5	
CALDE <sup>®</sup> MAG GUN P 89	Magnesia	Chemical	1750	3.5	1.3	88.1	5.9	
CALDE <sup>®</sup> MAG GUN S 65	Magnesia	Chemical	1750	3.15	-	65	12	
CALDE <sup>®</sup> MAG GUN S 80	Magnesia	Chemical	1750	3.5	0.6	80.9	12.5	
CALDE <sup>®</sup> MAG GUN S 89	Magnesia	Chemical	1750	3.5	1.1	87.1	6.9	
CALDE <sup>®</sup> MAG PATCH P 80	Magnesia	Chemical	1700	3	11	81	-	
CALDE® MAG RAM R 96 G	Magnesia, Carbon	Chemical	1700	5	0.5	96	1.5	
CALDE® PLAST 85 S	Bauxite	Chemical	1700	6	85	-	7.4	
CALDE® TROWEL G 100	100% Graphite	Chemical	1650	0.1	-	-	-	
CALDE® TROWEL SB 75	Bauxite	Ceramic	1650	1.2	76	-	19.8	

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