



**MATHIOS  
REFRACTORIES S.A.**

[refractories.mathios.com](http://refractories.mathios.com)

# MATHIOS REFRACTORIES INTEGRATED SOLUTIONS



**IDEAL  
REFRACTORIES**



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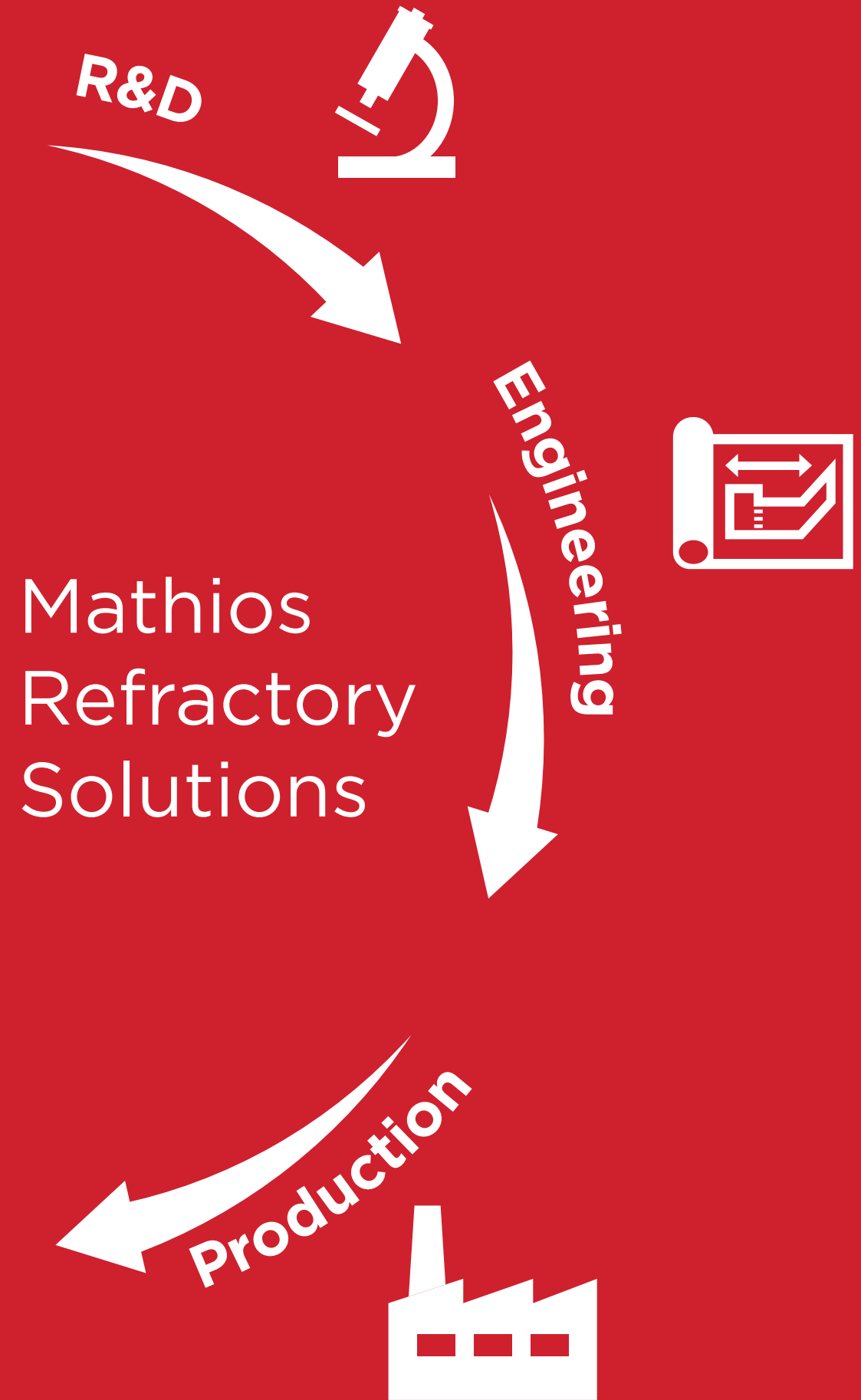
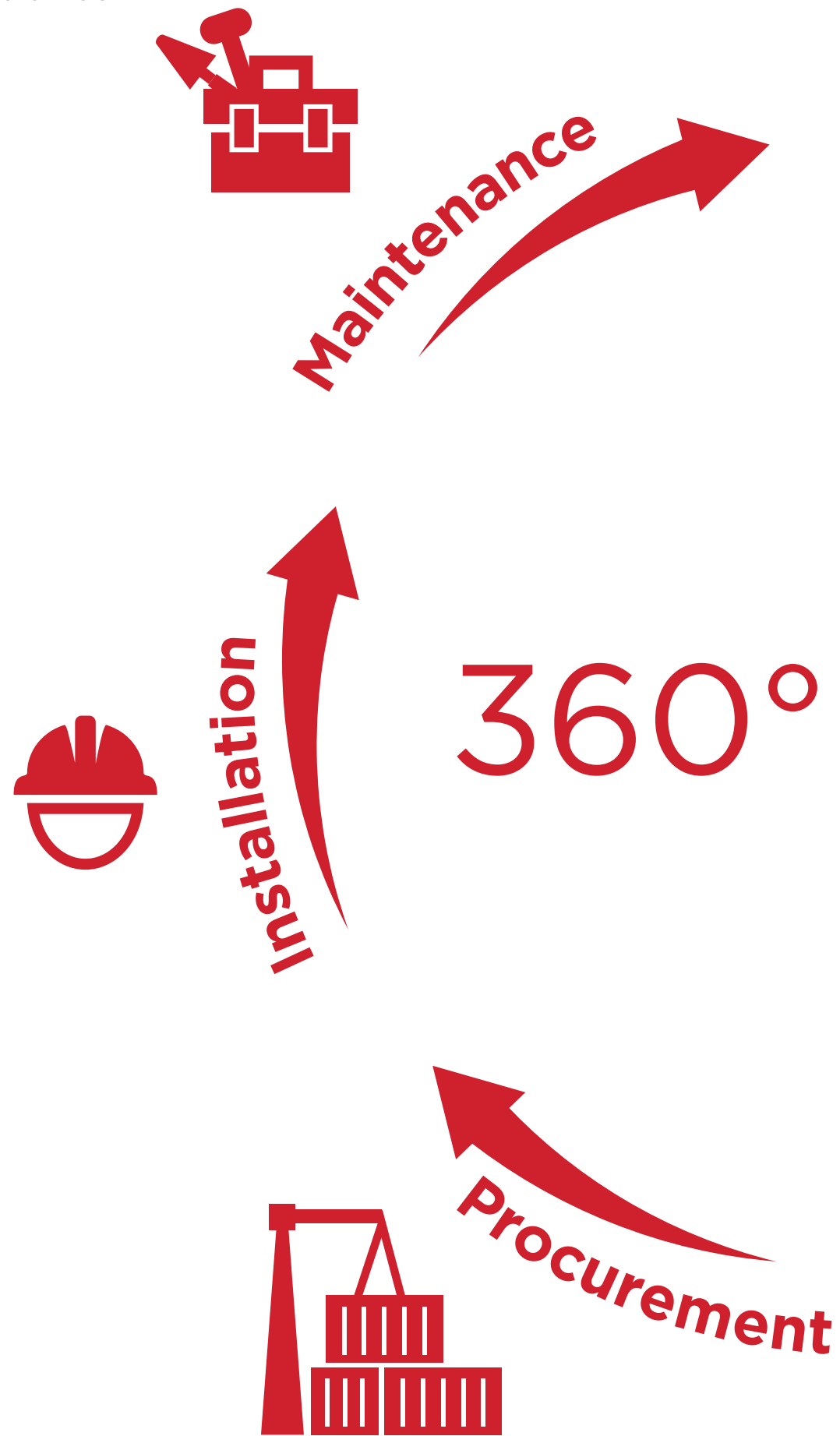
**Mathios Refractories** develops, manufactures, and sells first class refractory products and customized lining solutions for all major industrial sectors. We offer a complete services portfolio, spanning from engineering, production and procurement to installation, maintenance and repair services. Every single step of refractory work, starting from the detailed design of refractory linings right through to the selection of raw materials, production and installation, is performed by highly skilled teams. Well-structured working practices and procedures, meticulous checks and tests, as well as effective quality management are standard elements of everything we do.

At Mathios Refractories we have built a track record of successful projects and partnerships. Being a world class refractory company, our objective is to offer solutions which maximize the value of our customers' heat and chemical processing equipment.

**Founded in 1890** and particularly after the acquisition of Ideal Refractories S.A. in 2006, Mathios Refractories has developed into one of the biggest production, commercial and construction units of its kind globally and the only one in Greece. The company has a world-wide customer base and a network of partners leading to exports to more than 50 countries, having hence built a significant and solid expertise.

Mathios Refractories is certified according to **EN ISO 9001-2015** for Research, Development, Production and Trading of Refractory, Anti-Acid, Insulating, Building Chemistry Construction Materials. Refractory, Anti-Acid and Building Constructions.

# Introduction





## Constant effort on product and methods development

As a forward-thinking and innovative company, Mathios Refractories continues to invest resources in research and development. Through using state-of-the-art-equipment, bringing in R&D technical experts and collaborating with key partners of various Industries and Universities, the company constantly evolves its products and solutions portfolios.

Experiments in lab environment, simulations and tests, pilot plant trials in different industrial sectors, post mortem analyses and exploitation of the most updated scientific knowledge are

some of the key things the R&D Department does in order to develop new and optimize existing products. Our trained Technical Department staff, our Customer Engagement Experts and the feedback we get from our Customers all play an important role in our innovation process.

Keeping ourselves abreast of the latest advances in the refractory technology and actively listening to our Customers, help us better understand their needs and come up with the next great product or solution.



# R&D

Research & Development



# Customized Refractory Solutions

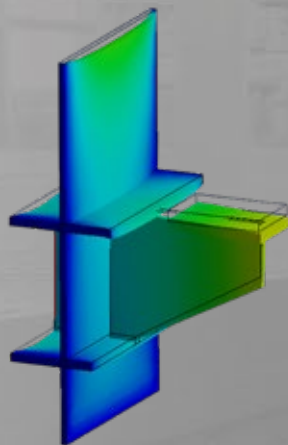
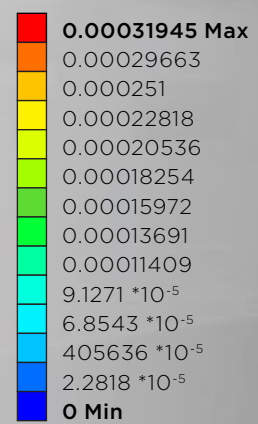
As we realize that every project is different, our engineering department offers tailor made solutions for each client according to its special requirements.

A group of highly competent and dedicated engineers will provide you with the optimal solution, both from technical and economical points of view.

All of the above is assisted by the use of modern and powerful software for 3D modelling, drafting, heat transfer calculations, project planning etc. Your refractory engineering needs is our passion.

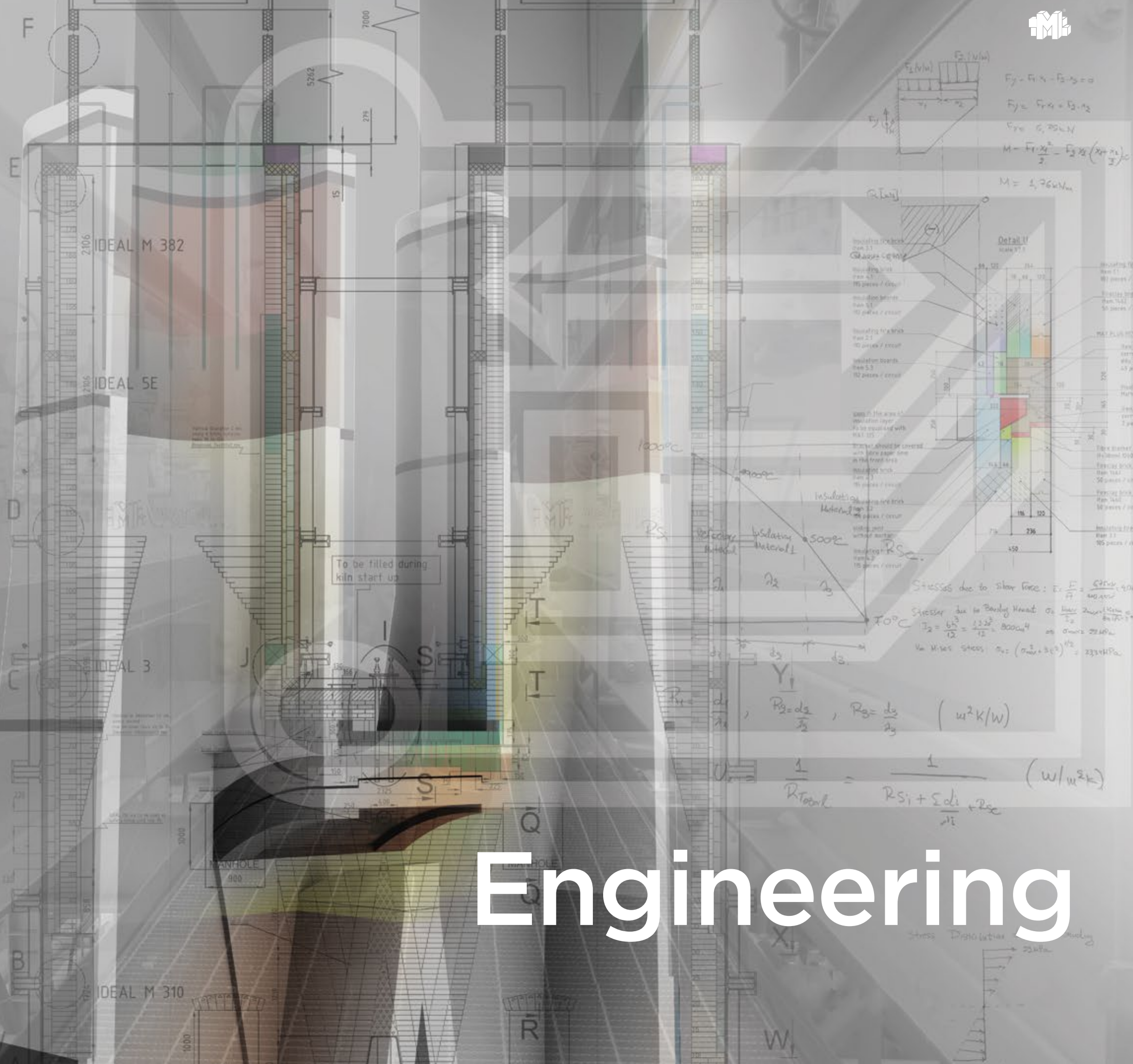
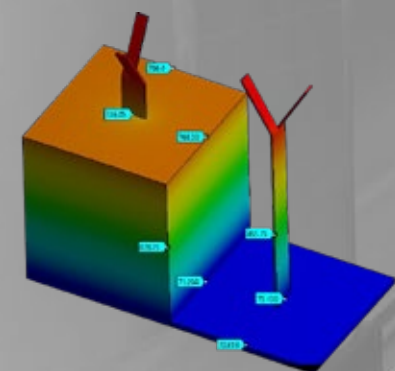
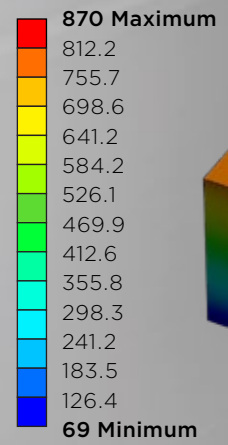
## Hot gas recirculation duct support bracket static calculation.

Structural Static Deformation (mm)



## Heat transfer calculation of refractory lining including anchors.

Thermal Steady State Temperature (°C)



# Engineering



## High Quality Materials to Resist Heat

Each industry has different needs and each production phase is different, thus imposing a variety of challenges on the refractories lining it.

No single refractory, or refractory type, suits all applications.

That's why we offer a complete range of refractory products, tailored to each production step. Mathios Refractories develops, manufactures, and sells innovative refractory products and lining systems, which are matched to the latest technological developments and environmental regulations, and today is among the best solutions for refractories.

Our products which set performance benchmarks for the industry, include:

### SHAPED REFRACTORIES (IDEAL)

- Fireclay Bricks
- High Alumina Bricks
- Andalusite - Mullite - Silimanite Bricks
- SiC Containing Bricks
- Acid Resistant Bricks
- Prefabricated Shapes

### UNSHAPED REFRACTORIES

- Dense Castables (MAT)
- Medium Cement Castables (MAT PLUS MC)
- Low Cement Castables (MAT PLUS)
- Ultra Low Cement Castables (MAT CAST, MAT MICRON)
- Medium Cement Gunning (MAT GS)
- Low Cement Gunning (MAT LG)
- Insulating Castables (MAT)
- Insulating Gunning (MAT G)
- Patching Materials (MAT RAM)
- Plastic Ramming Materials (MAT RAM)
- Refractory Mortars (MAC, MAT MOR)
- Self Flowing Low Cement Castables (MAT PLUS SF)
- Self Flowing Ultra Low Cement Castables (MAT SF)
- Nano Bonded (MAT NANO)

# Production



## Handling product challenges

In order to provide you with comprehensive refractory solutions and guarantee top performance, Mathios Refractories has strategic partnerships with selected raw material and complementary refractory material suppliers.

Our highly trained Procurement Experts and our global network of approved suppliers guarantees you qualified refractory solutions, combining top quality and proper logistics handling.

Proper methods of continuous supplier assessment are in effect so that high standards are always met.



mathios.com



Procurement





## First-class installation services on-site

Many refractory problems, such as unusual wear patterns and distortion, are due to poor installation techniques. At Mathios Refractories we pride ourselves on our technical expertise, gained through the all-inclusive projects we have undertaken over the years. We are confident that only the type of refractory material required is not enough. The method of installation and the refractory start-up process play a crucial role for the equipment's performance and the running expenses.

Our Technical Specialists are certified and continuously trained with the latest application methods so that they can offer the highest standards of quality and safety within budget and schedule. The core objective of Mathios Refractories' Technical Department is to exceed safety standards and extend refractory life. Our professional experience, project management practices, and excellent workmanship result in accurate and quality services that you can count on.



# Installation



## Preserving Refractory Longevity

Mathios Refractories offers integrated maintenance services such as areas checkup, planning, scheduling, execution and project management. Our specialized Technical Sector has expertise in carrying out major maintenance services and repairs, delivering projects within budget and deadlines.

Through continuous inspections, Mathios Refractories Technical experts maintain and optimize the performance of the applied refractory materials, enhancing safety and longevity. By meticulous planning and efficient procurement we manage to execute refractory maintenance with reduced shutdown duration and confident budgeting.

# Maintenance



# Equipment

For ensuring the optimum installation and maintenance we provide a comprehensive range of state-of-the-art machinery and equipment.

### Pan Mixers

High - performance mixers suitable for all refractory unshaped materials. They homogenise the mix perfectly allowing for optimum results. Available in various engine types and batch sizes. Our Technical Experts can propose the best choice that suits your needs.



### Gunning Machines

With intensive mixing, high pressure, low rebound and less dust creation, the gunning installation technique saves time and money and should be preferred when possible. It is highly recommended for closed and hard to reach spaces. Gunning machines work well in both hot and cold conditions.



### Brick Machines

Brick Machines offer a great combination of reliable, accurate, safer and quicker refractory installation for rotary kilns. Thank to its hydraulic cylinders, the machine can be adjusted to different kiln diameters.



### Refractory Brick Cutting Machines

Achieve high productivity and accuracy in shaping new Bricks, with the Refractory Brick Cutting Machine. Designed to cut bricks of various sizes and thicknesses, both vertically and horizontally the Machine is suitable for both wet and dry cutting.



### Concrete pumps

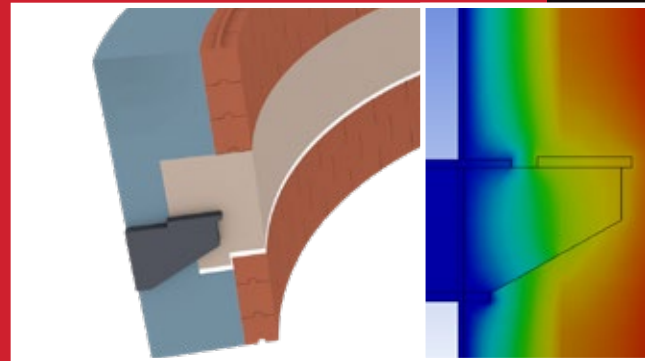
When the installation of big volumes of refractory castable is required, pump casting is recommended. Pumping ensures timely applications while minimizing the manpower required and time from mix to casting.

# Equipment



## Coal Fired Power Plants

As a core business for Mathios Refractories - Coal Fired Power plants are one of our many fields of expertise. Projects are handled on an EPPC basis that is Engineering, Production, Procurement and Construction.



## Anode Baking Furnaces

Mathios Refractories has been serving the Aluminium industry for many decades while developing full solutions for many of its parts, both in primary production and smelters. Having accomplished unique applications in the field - Mathios Refractories Anode Baking Furnace bricks coupled with our first class installation services constitute the optimum solution for any scale project.



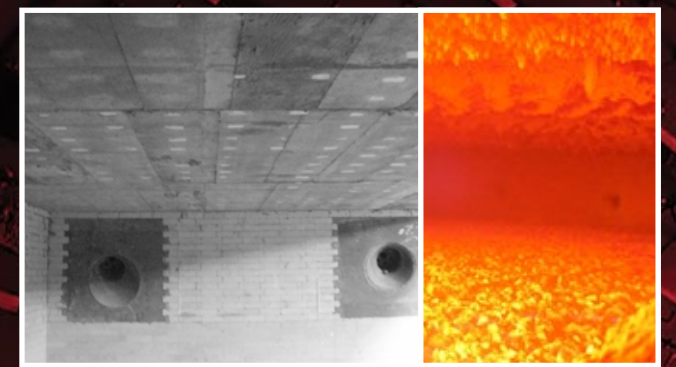
## Incinerators

Industrial, Municipal, Agricultural waste incinerators worldwide are being constructed with Mathios Refractories materials. Services offered include special engineering, material production, procurement and installation



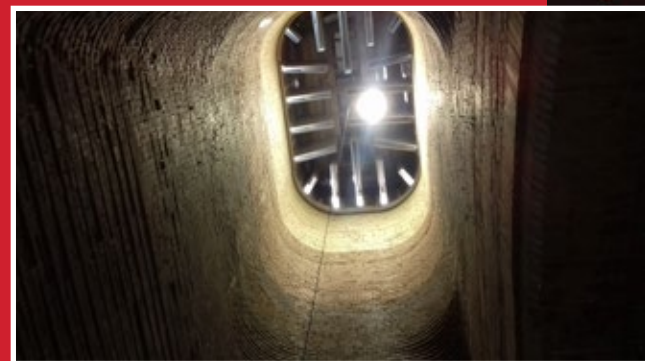
## Melting Furnaces

The long experience of Mathios Refractories in the Aluminium industry help us gain better understanding of the processes and the requirements of each alloy. Thus we are able to provide 360° tailor-made solutions covering the entire spectrum of the Aluminium industry requirements.



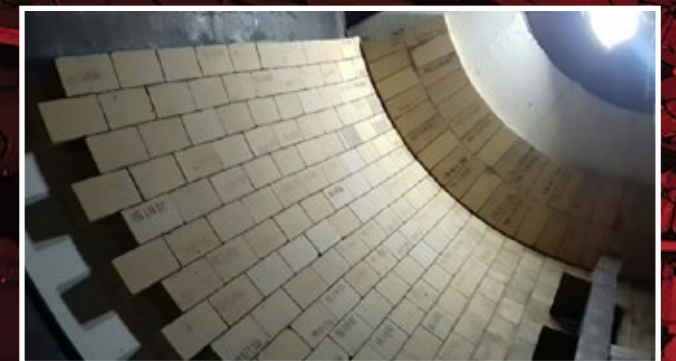
## Calcination Shaft Kilns

Single, double or other type of shaft kilns can be fully lined taking advantage of the Mathios Refractories Integrated Solutions; Engineering, Production, Procurement and Construction.



## Recycling Furnaces

Mathios Refractories provides an array of comprehensive services related to the challenging sector of recycling. Extended service life, cost saving and reliability are key characteristics of our solutions.



## Rotary Kilns

As a core business for Mathios Refractories - Rotary kilns for Cement, Alumina and Magnesia are refractory engineered and lined with Mathios' materials by Mathios' Installation Experts. With focus on long life, consumption and energy efficiency Mathios Refractories provides high quality solutions.



# Projects

With solid experience, proven by the numerous and successful integrated solutions in various industries across the world, Mathios Refractories is an innovative and reliable partner.

Steel Industry

Aluminium Industry

Cement Industry

Power Generation

Refineries

Lime Industry

Foundry

Glass Industry

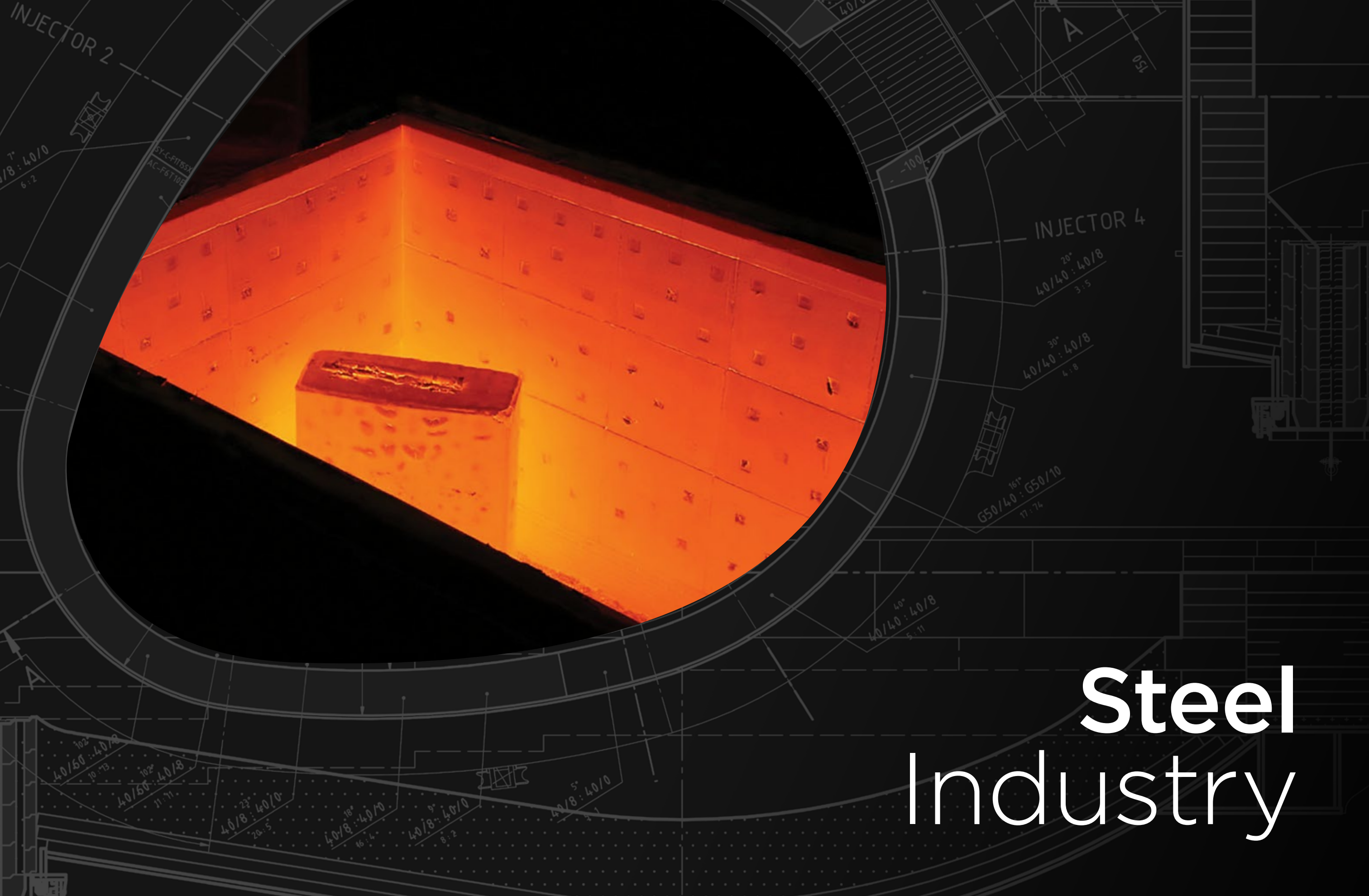
Ceramic Industry

Waste Incinerators

Non Ferrous

Chemical Industry

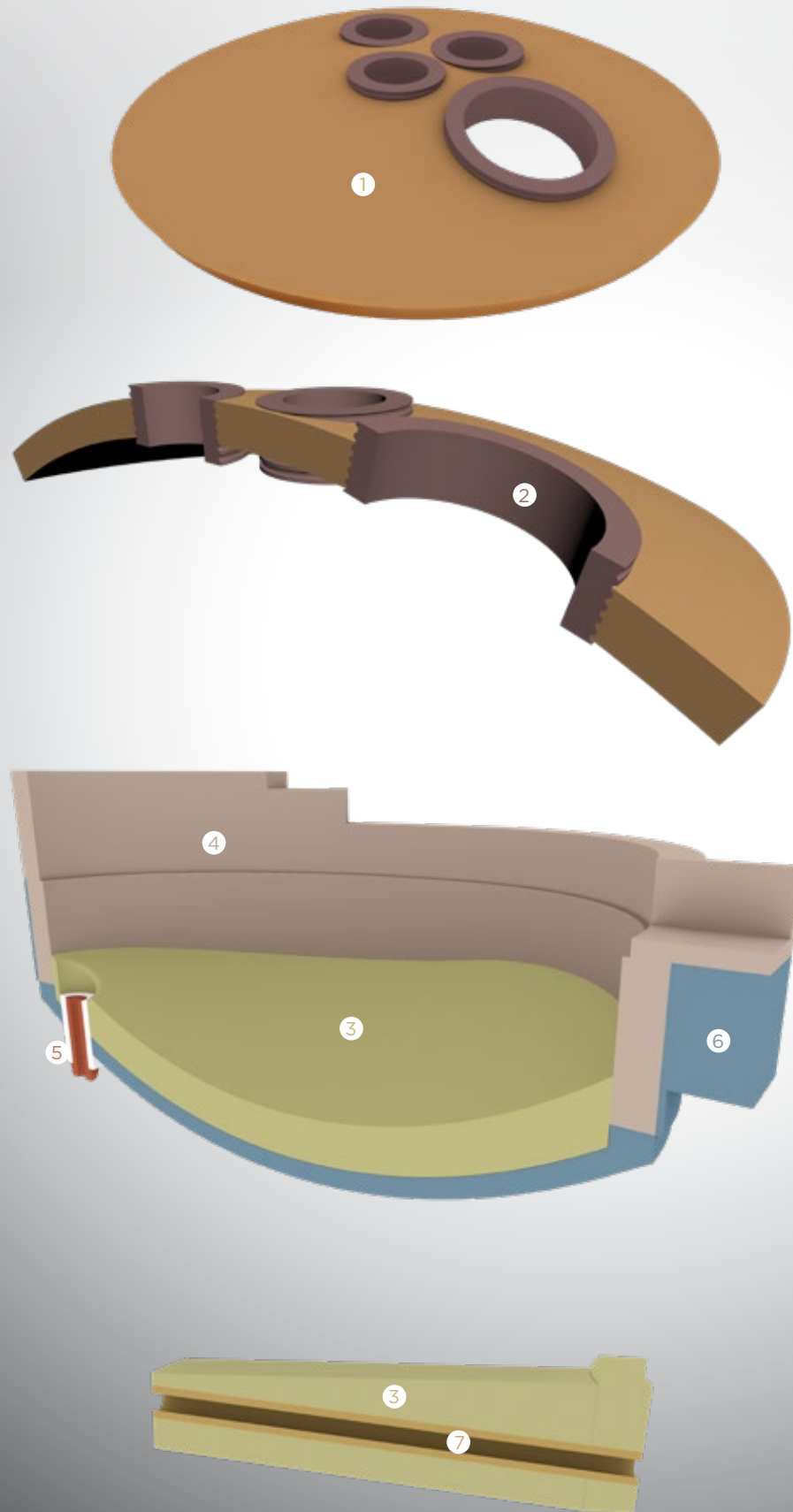
**Integrated  
solutions  
for all  
Industries**



# Steel Industry

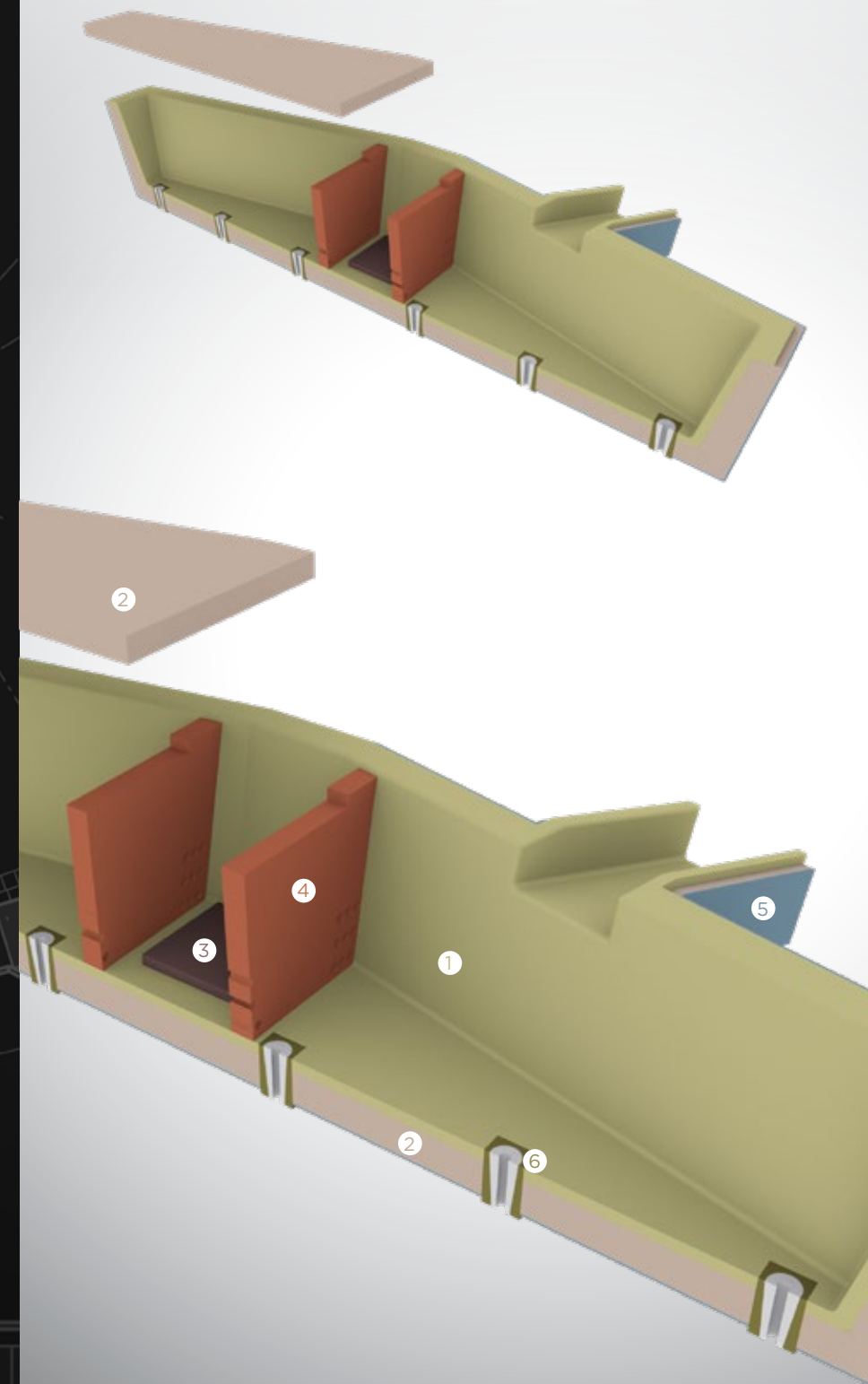
# E.A.F (Electric Arc Furnace)

- 1 Roof - Delta Section**
  - MAT PLUS 88 CR 8
  - MAT PLUS 88 CR 8 S
  - MAT PLUS 90 CR 4
  - MAT PLUS 94 CR 2
  - MAT PLUS 98 T
- 2 Electrode Rings**
  - IDEAL B 85
  - IDEAL MU 80 S
  - IDEAL B 80
  - IDEAL MU 60
- 3 Bottom Lining**
  - MgO Based Ramming Mass
- 4 Side Walls**
  - MC H 9710 F2
  - MC H 9715 F2
  - MAT GUN 90 S
- 5 E.B.T Lining**
  - MgO-C Special Shapes
- 6 Safety Lining**
  - MgO or MgO-Cr<sub>2</sub>O<sub>3</sub> Bricks
- 7 Tap Hole / Runner**
  - MAT PLUS 88 CR 8
  - MAT PLUS 90 CR 4



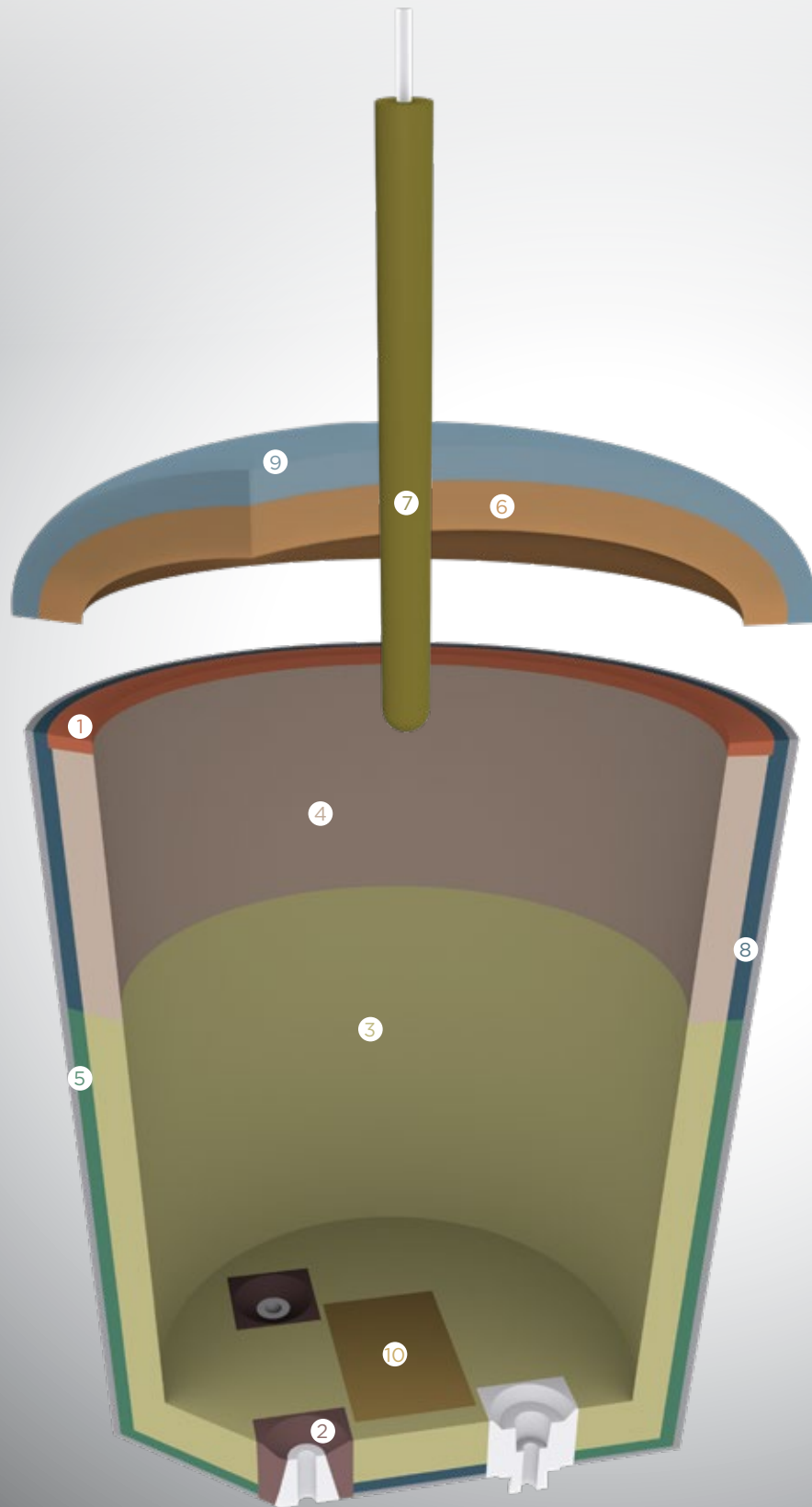
# Tundish

- 1 Working Lining**
  - MAT TUN 60
  - MAT TUN 80
  - MAT TUN 85 L
- 2 Permanent Lining**
  - MAT PLUS 80 E
  - MAT PLUS 80 EA
  - MAT PLUS 60 A
  - MAT PLUS 60 M
  - MAT MICRON 80 E
- 3 Impact Pads**
  - MAT PLUS 80 E
  - MAT PLUS 93 SP 4
  - MAT PLUS 95 T
  - MAT MICRON 80 E
- 4 Slag Wares**
  - MAT PLUS 80 E
  - MAT PLUS 95 W
  - MAT PLUS 93 SP 4
  - MAT MICRON 80 E
- 5 Insulating Lining**
  - INSULATING MATERIALS
- 6 Well Blocks**
  - MAT PLUS 62
  - MAT PLUS 60 A
  - MAT PLUS 60 M



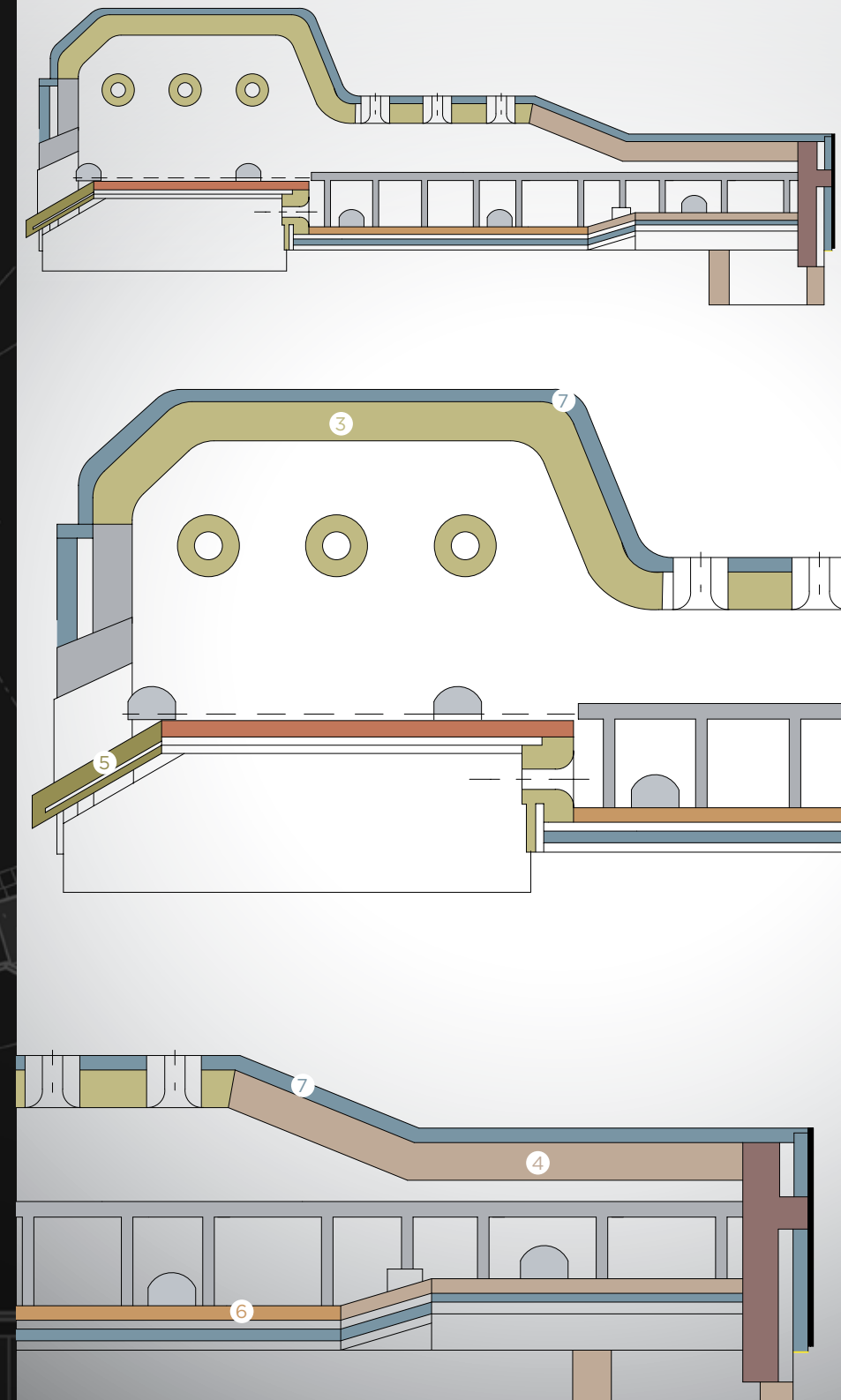
# Ladle for Secondary Metallurgy

- 1 Filling Materials**
  - PYROPLASTIC SUPER 80
  - MAT 80
  - MAT 80 TS
- 2 Well Blocks**
  - MAT PLUS 93 SP 4
- 3 Metal Zone**
  - MAT SF 93 SP
- 4 Slag Zone**
  - MC H L610
  - MC H L605 F2
  - MC H L615 F2
- 5 Safety Lining**
  - IDEAL M 308
  - IDEAL M 310
  - IDEAL MU 60
  - IDEAL B 80
- 6 Cover**
  - MAT PLUS 80 EA
  - MAT PLUS 80 E
  - MAT MICRON 80 E
- 7 Emergency Lance**
  - MAT PLUS 93 SP 4
  - MAT PLUS 95 T
  - MAT MICRON 80 E
- 8 Safety Lining of Slag Zone**
  - IDEAL B 80
  - IDEAL B 85
- 9 Insulation of Cover**
  - MAT 125
  - MAT 125 G
- 10 Impact Zone**
  - MAT PLUS 93 SP 4
  - MAT MICRON 60 A

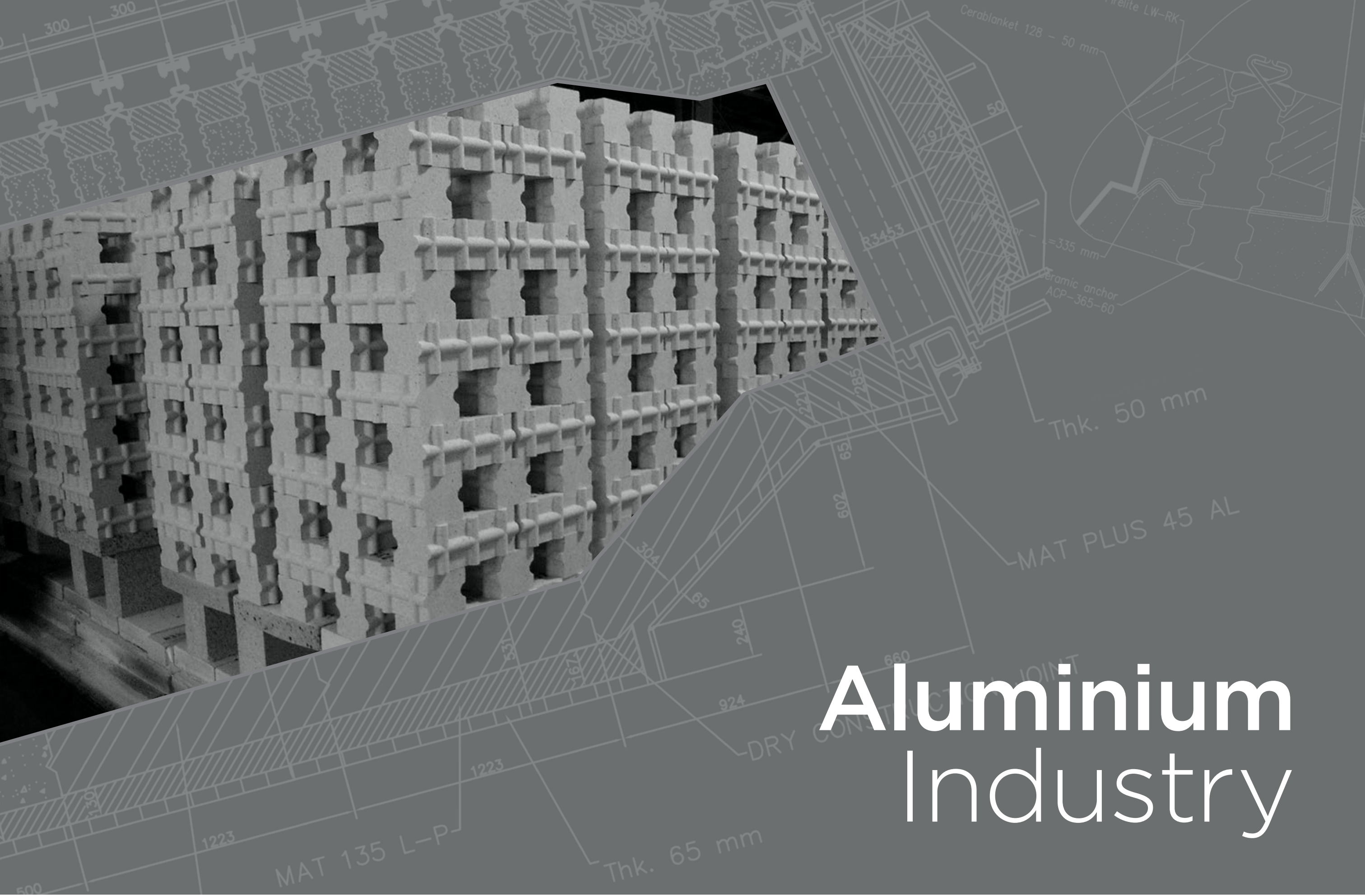


# Pusher Type Reheating Furnace

- 1 Soaking Zone**
  - MAT PLUS 50 UHS
  - MAT PLUS 50 ML
  - MAT PLUS 60 M
- 2 Charging Zone**
  - MAT PLUS 60 A
  - MAT PLUS 60 M
- 3 Roof / Burner Zone**
  - MAT PLUS 60 M
  - MAT RAM 80 C
  - MAT RAM 70 CM
- 4 Preheating Zone**
  - MAT PLUS 50 ML
  - MAT PLUS MC 50
  - MAT RAM 50 C
  - MAT 50
- 5 Outlet Zone**
  - MAT PLUS 60 M
  - MAT PLUS 80 E
- 6 Hearth**
  - MAT PLUS 50
  - MAT PLUS 60 M
  - MAT RAM 50 C
  - MAT RAM 80 C
- 7 Insulating Lining**
  - MAT 125 HT-P
  - MAT 125 G
  - MAT MW
  - MAT MW G







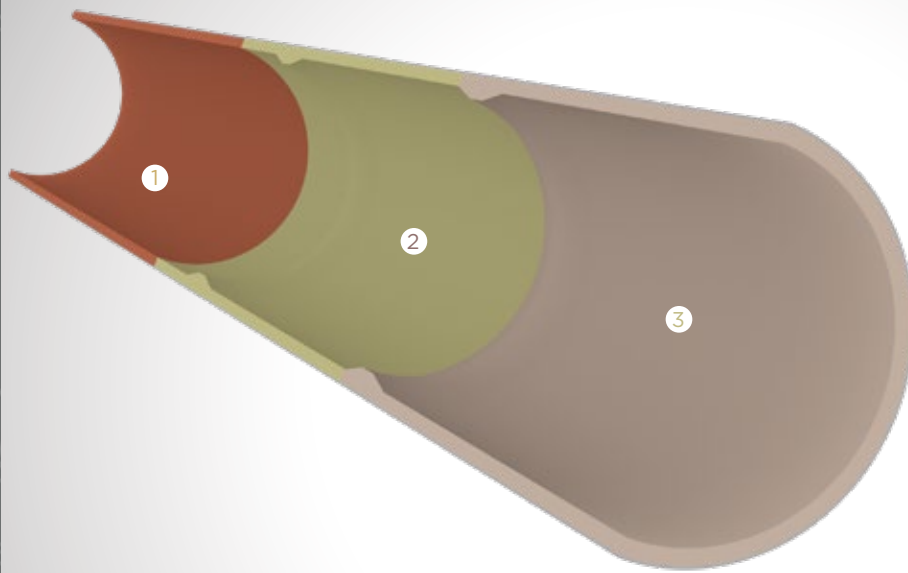
# Aluminium Industry

# Rotary Kiln Calcination of Alumina

- 1 Inlet Zone**
- MAT PLUS 50 ML
  - MAT PLUS 80
  - MAT PLUS 82 UHS
  - MAT PLUS 55 M SiC 7
  - MAT MICRON 80 E

- 2 Calcination Zone**
- MAT PLUS 60 A
  - MAT PLUS 80
  - MAT PLUS 82 UHS
  - MAT MICRON 80 E

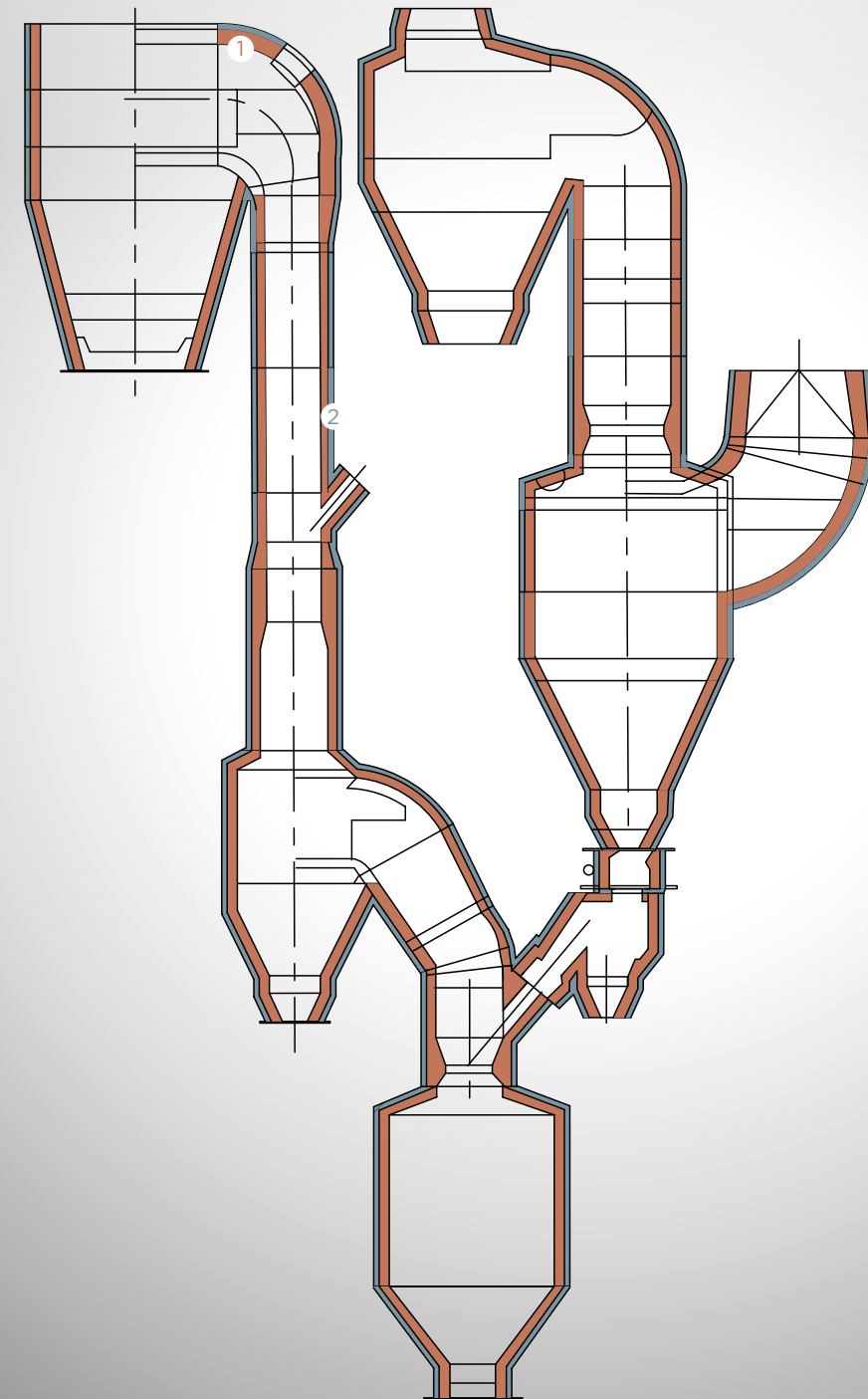
- 3 Cooling Zone**
- MAT PLUS 80
  - MAT PLUS 82 UHS
  - MAT PLUS 55 M SiC 7
  - MAT MICRON 80 E



# Static Furnace Calcination of Alumina

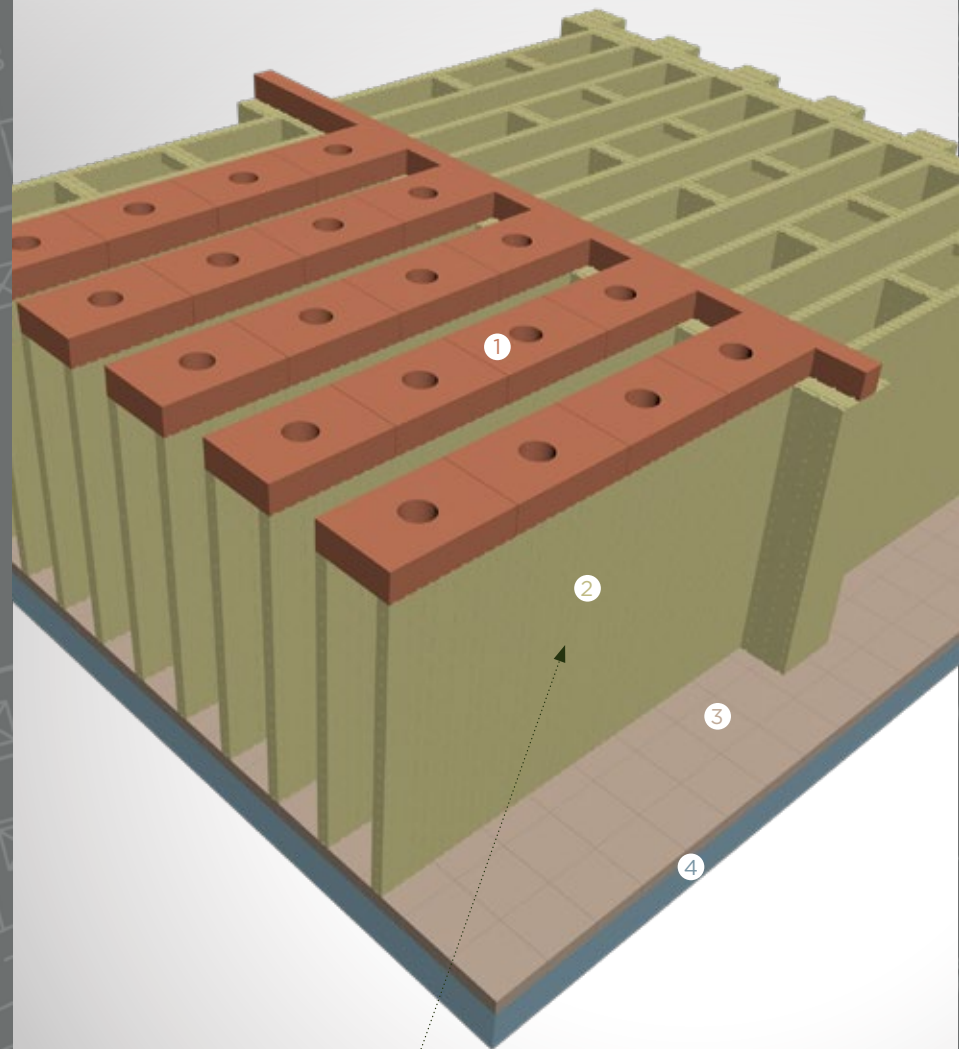
- 1 Refractory Lining**
- MAT PLUS 60 A
  - MAT PLUS 80
  - MAT PLUS 82 UHS
  - MAT LG 60 M
  - MAT MICRON 80 E
  - MAT NANO 85

- 2 Insulating Lining**
- MAT 125
  - MAT 125 G
  - INSULATING MATERIALS

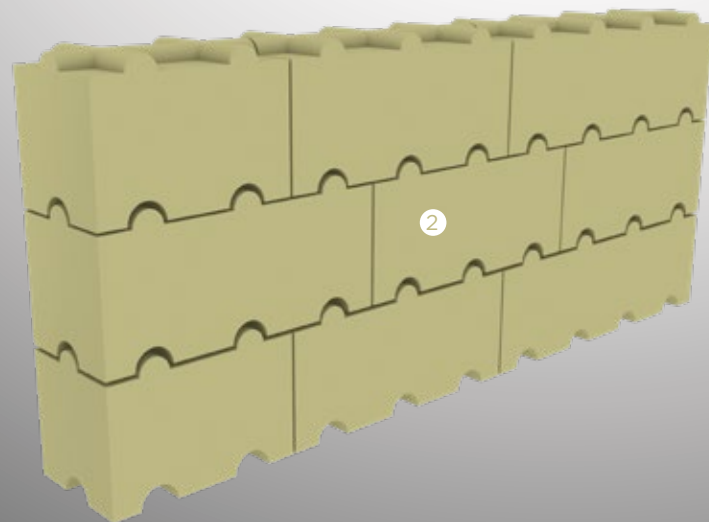


# Anode Baking Furnace

- 1 Roof  
MAT 42 C
- 2 Side Walls  
IDEAL MU 48  
IDEAL A 63
- 3 Bottom Lining  
IDEAL MU 44  
IDEAL M 310
- 4 Insulating Lining  
MAT MW

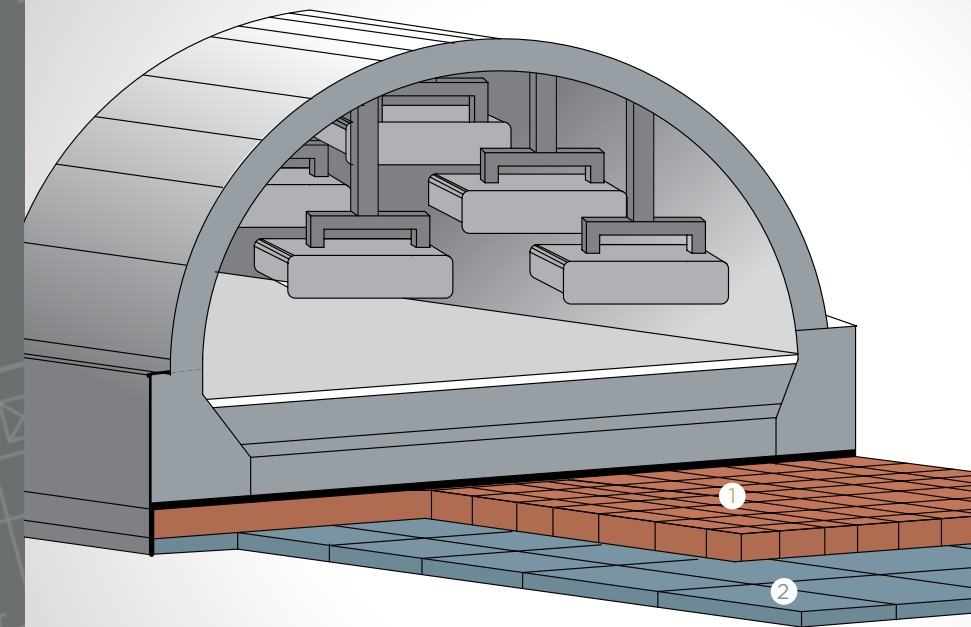


Bricks



# Electrolytic Cell

- 1 Refractory Lining  
IDEAL M 334 AL  
MAT PLUS MC 45  
MAT PLUS 50 ML
- 2 Insulating Lining  
MAT MW  
INSULATING BRICKS



## Tilting Melting Furnace

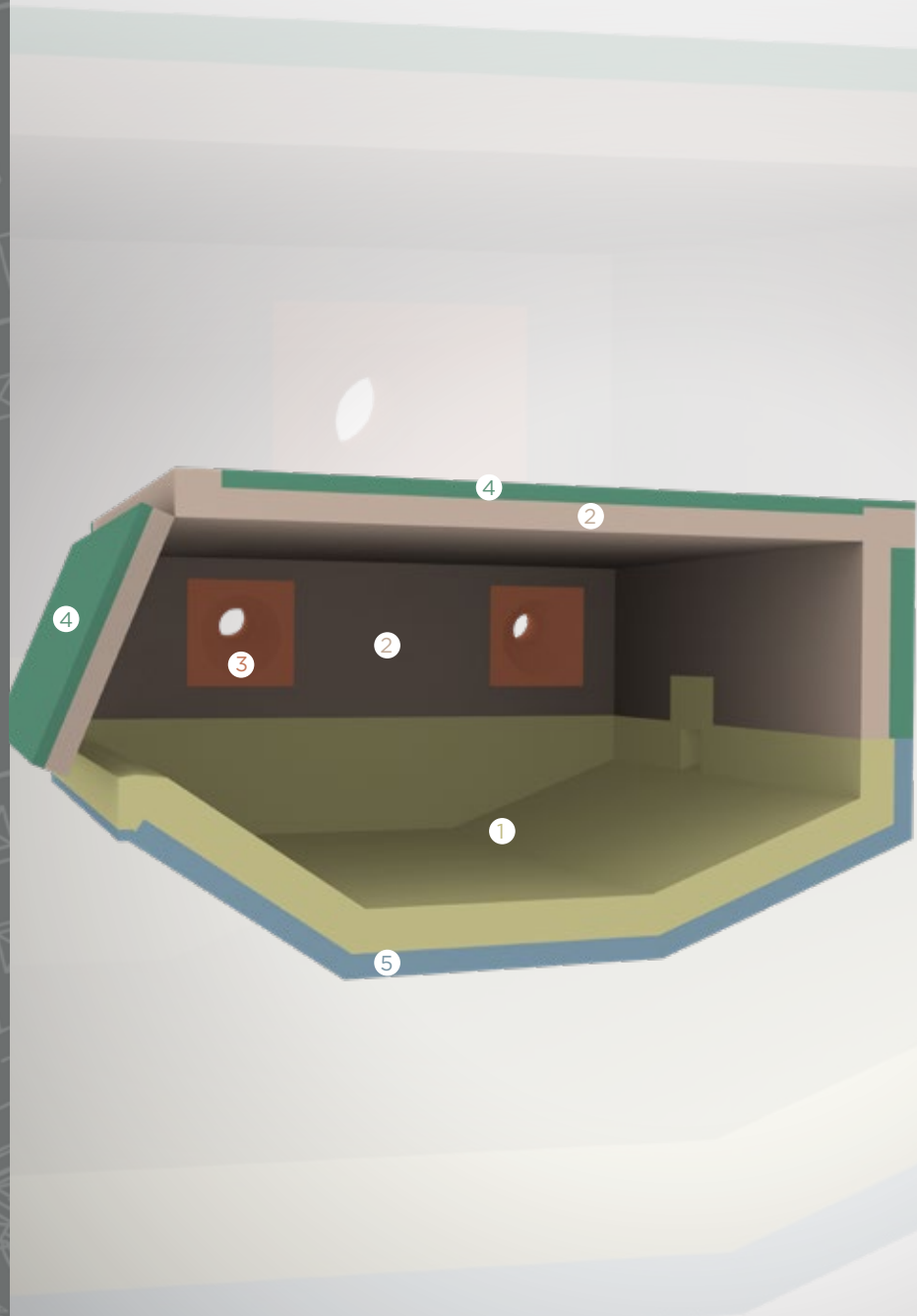
- 1 Bath Zone
- MAT PLUS 80 AL
  - MAT PLUS 80 UHS AL
  - MAT PLUS MC 84 AL
  - MAT MICRON 80 AL
  - MAT NANO 80 AL
  - MAT NANO 90 AL
  - IDEAL B 83 AC

- 2 Roof & Side Walls
- MAT PLUS 60 M
  - MAT PLUS 80
  - MAT LG 50
  - MAT LG 60 M
  - MAT LG 80
  - MAT LGP 86
  - MAT MICRON 60 M
  - MAT MICRON 80 E
  - MAT NANO 60 M
  - MAT NANO 85
  - MAT 58 M GS
  - IDEAL MU 60
  - IDEAL B 80

- 3 Burner Lining
- MAT PLUS 60 A
  - MAT PLUS 80 EA
  - MAT 96 S
  - MAT MICRON 60 A

- 4 Roof & Door Insulation
- MAT 106
  - MAT 125
  - MAT MW G

- 5 Insulating Lining
- MAT MW
  - MAT MW AL
  - MATH AB 70



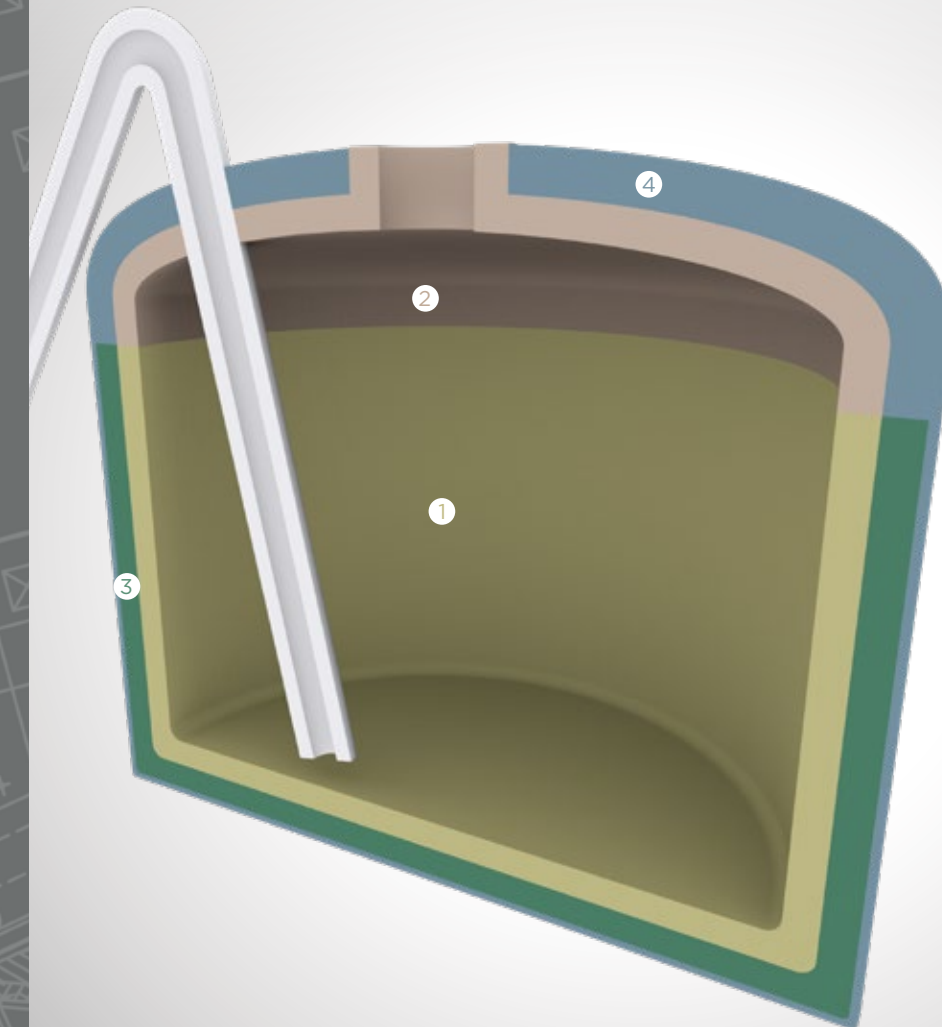
## Ladle for Molten Aluminium Transportation

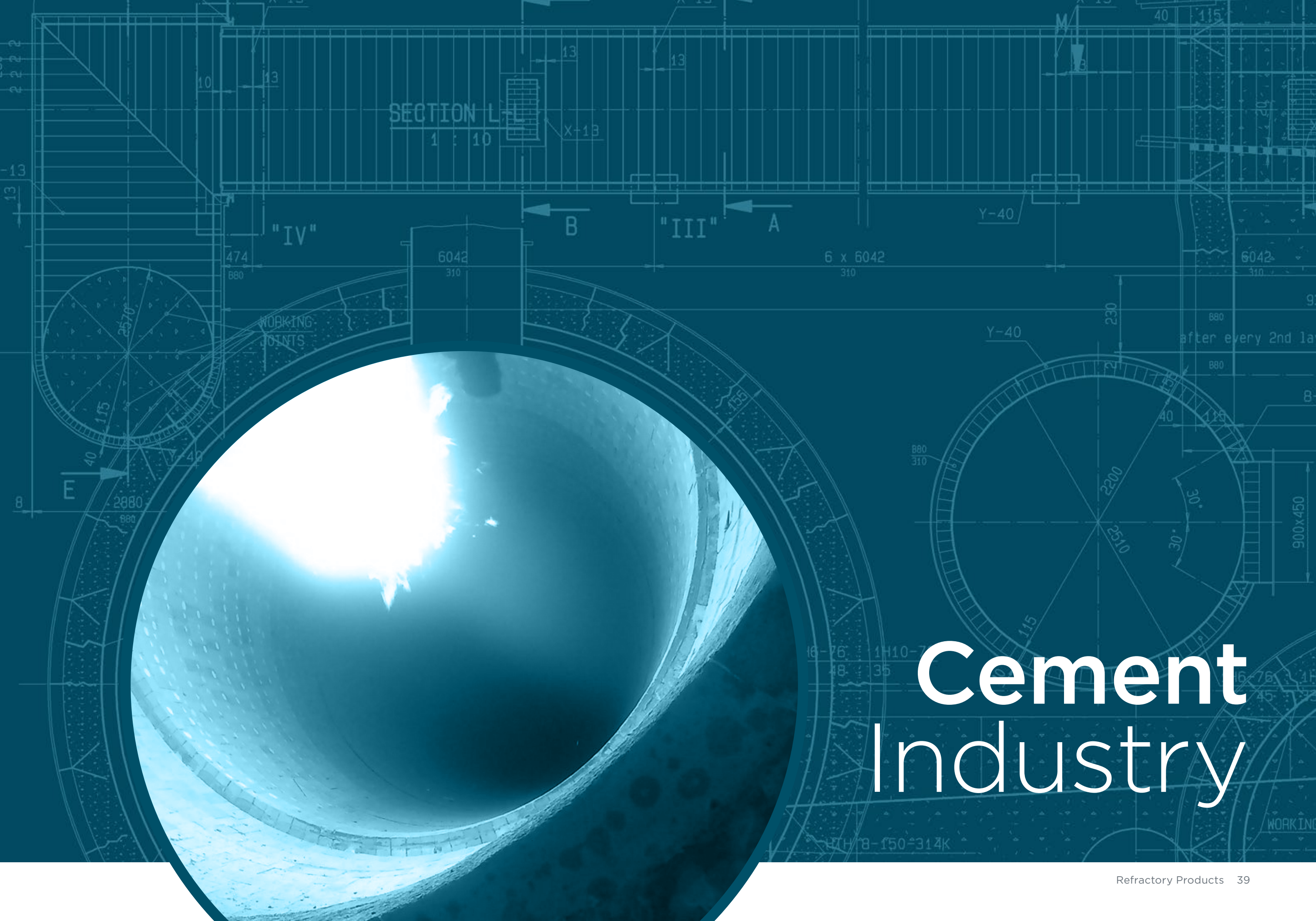
- 1 Refractory Lining
- MAT PLUS 80 H
  - MAT PLUS 82 UHS
  - MAT PLUS 60 SiC
  - IDEAL M 310
  - IDEAL B 80

- 2 Cover
- MAT 50
  - MAT PLUS MC 50
  - MAT MICRON 80 E

- 3 Insulating Lining
- MAT MW AL
  - MAT MW G

- 4 Insulation
- INSULATING MATERIALS
  - CERAMIC FIBERS

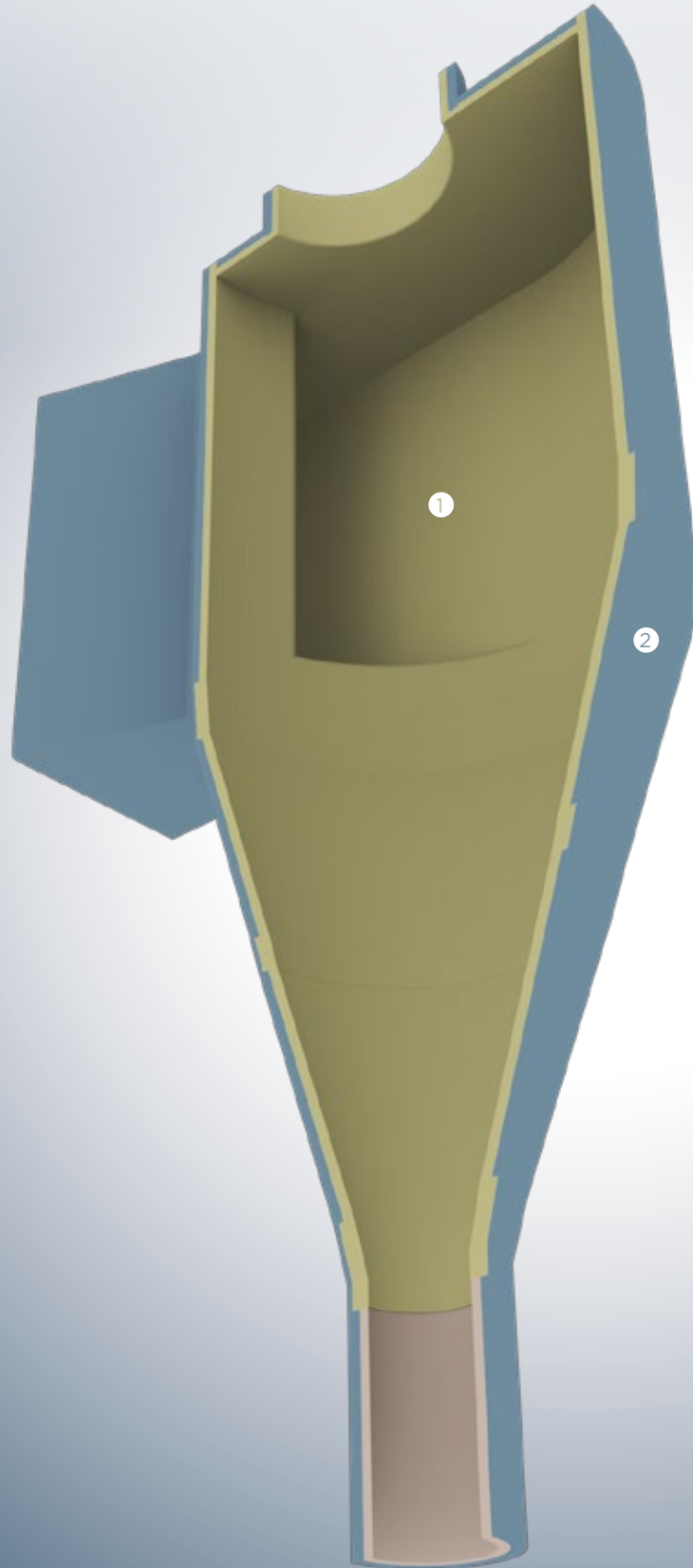




# Cement Industry

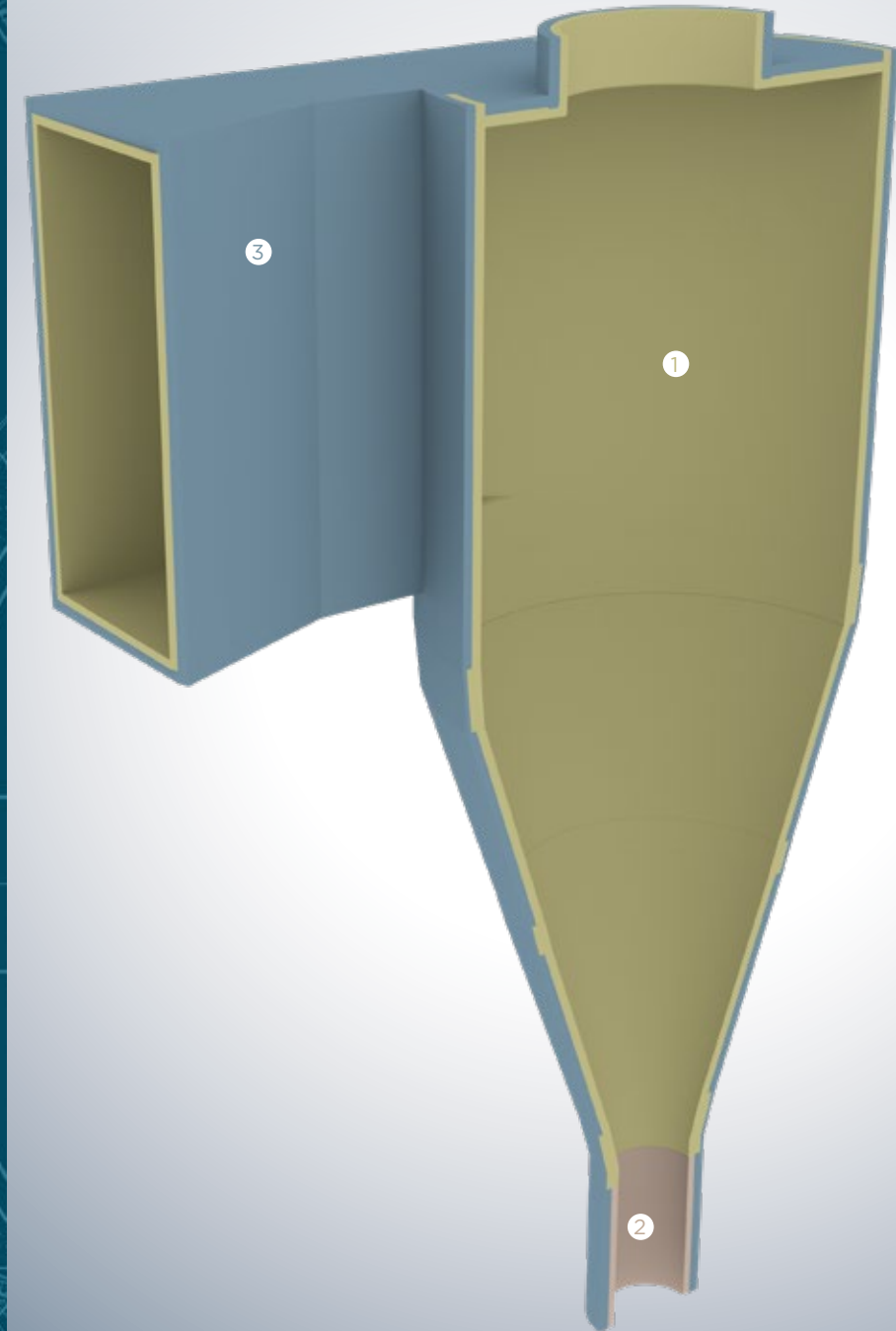
# Upper Cyclone

- ① Cyclone Lining
  - MAT PLUS GR
  - MAT PLUS 42
  - MAT PLUS MC 35
  - MAT PLUS MC 50
  - MAT 32 GS
  - MAT 50 HG
  - IDEAL 282
  - IDEAL M 334
  - IDEAL M 335 SiC 10
- ② Insulating Lining
  - MAT 125
  - MAT 125 G
  - CALCIUM SILICATE N



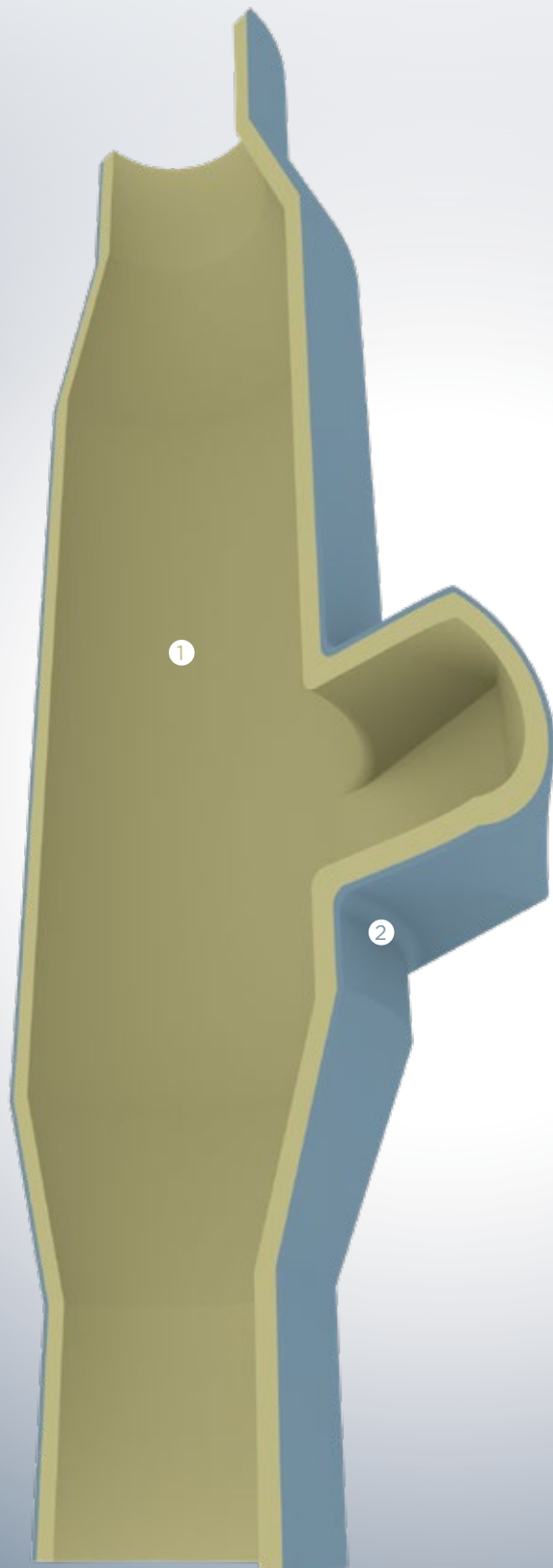
# Lower Cyclone

- ① Cyclone Lining
  - MAT PLUS 50 ML E
  - MAT PLUS 25 ZR
  - MAT PLUS ZS 10
  - MAT PLUS 60 M
  - MAT PLUS 10 SiC
  - MAT PLUS MC 50
  - MAT 32 GS
  - MAT 50 GS
  - IDEAL M 334
  - IDEAL M 335 SiC 10
- ② Raw Mill Duct
  - MAT PLUS 25 ZR
  - MAT PLUS 50 UHS
  - MAT PLUS 82 UHS
  - MAT 30 ZR G
  - MAT 57 HG
- ③ Insulating Lining
  - MAT 125
  - MAT 125 G
  - CALCIUM SILICATE N



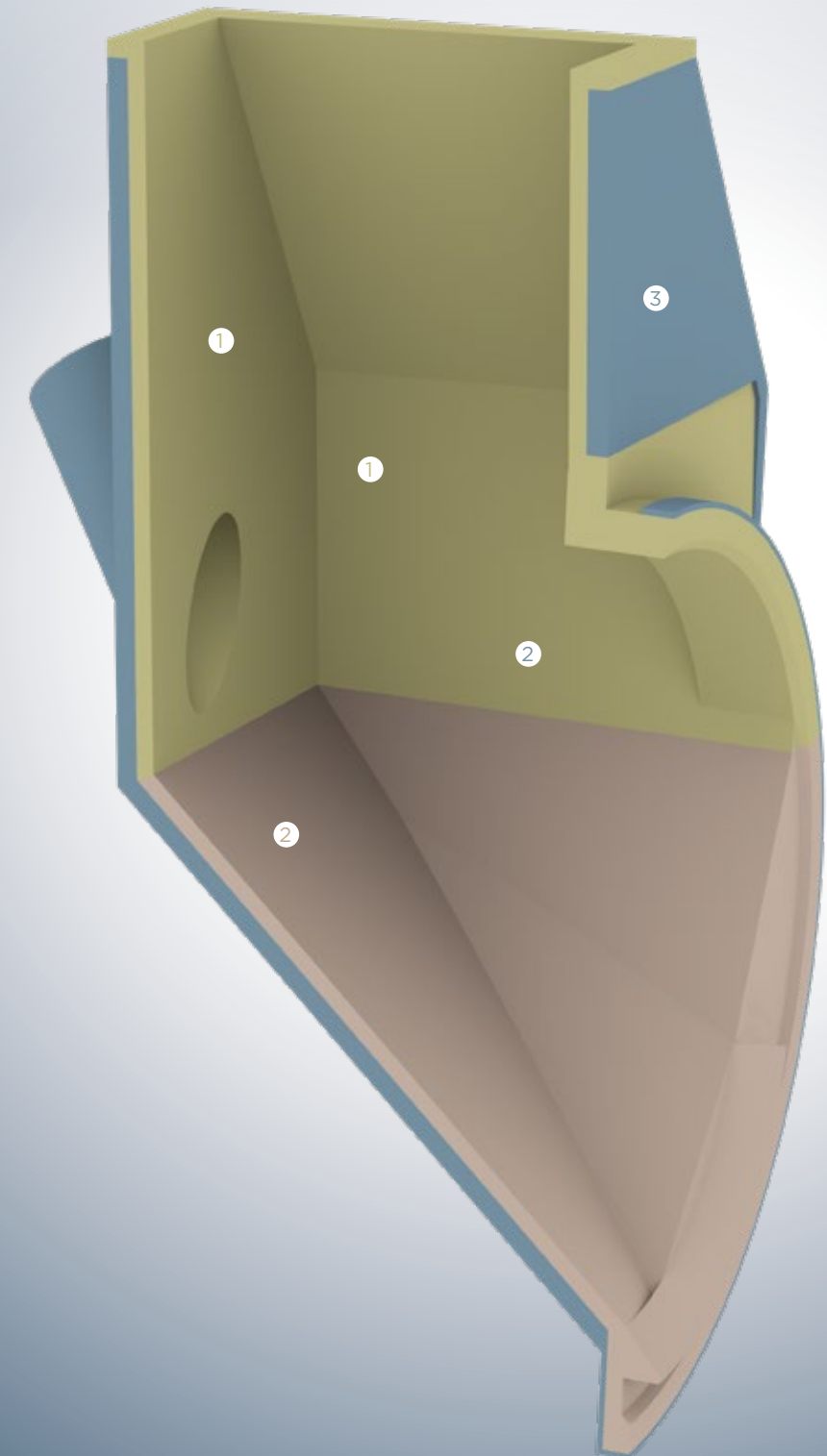
# Calcinator

- 1 Refractory Lining**
  - MAT PLUS 82 UHS
  - MAT PLUS 60 M
  - MAT PLUS 10 SiC M
  - MAT 57 HG
  - MAT 57 M SiC 5 GS
  - MAT 58 M GS
  - MAT LG 58 M SiC 6
  - IDEAL M 334
  - IDEAL M 335 SiC 10
  - IDEAL MU 48
- 2 Insulating Lining**
  - MAT 125
  - MAT 125 G
  - CALCIUM SILICATE N



# Riser Duct / Inlet Zone

- 1 Riser Duct**
  - MAT PLUS 60 M
  - MAT PLUS ZS 10
  - MAT PLUS 10 SiC
  - MAT PLUS 30 SiC
  - MAT PLUS MC 60 M
  - MAT MICRON 60 M
  - MAT LG 58 M SiC 6
  - MAT 58 M GS
  - MAT ZS 10 GS
- 2 Inlet Chamber**
  - MAT PLUS 60 M
  - MAT PLUS 82 UHS
  - MAT PLUS 10 SiC M
  - MAT PLUS 30 SiC M
  - MAT PLUS MC 60 M
  - MAT MICRON 10 SiC M
- 3 Insulating Lining**
  - MAT 125
  - MAT 125 G
  - CALCIUM SILICATE N



# Cement Rotary Kiln

- 1 Nose Ring**
- MAT PLUS 60 A
  - MAT PLUS 60 M
  - MAT PLUS 10 SiC M
  - MAT PLUS 30 SiC M
  - MAT MICRON 60 M
  - MAT MICRON 10 SiC M
  - MAT NANO 60 M
  - IDEAL A 45 SiC 25

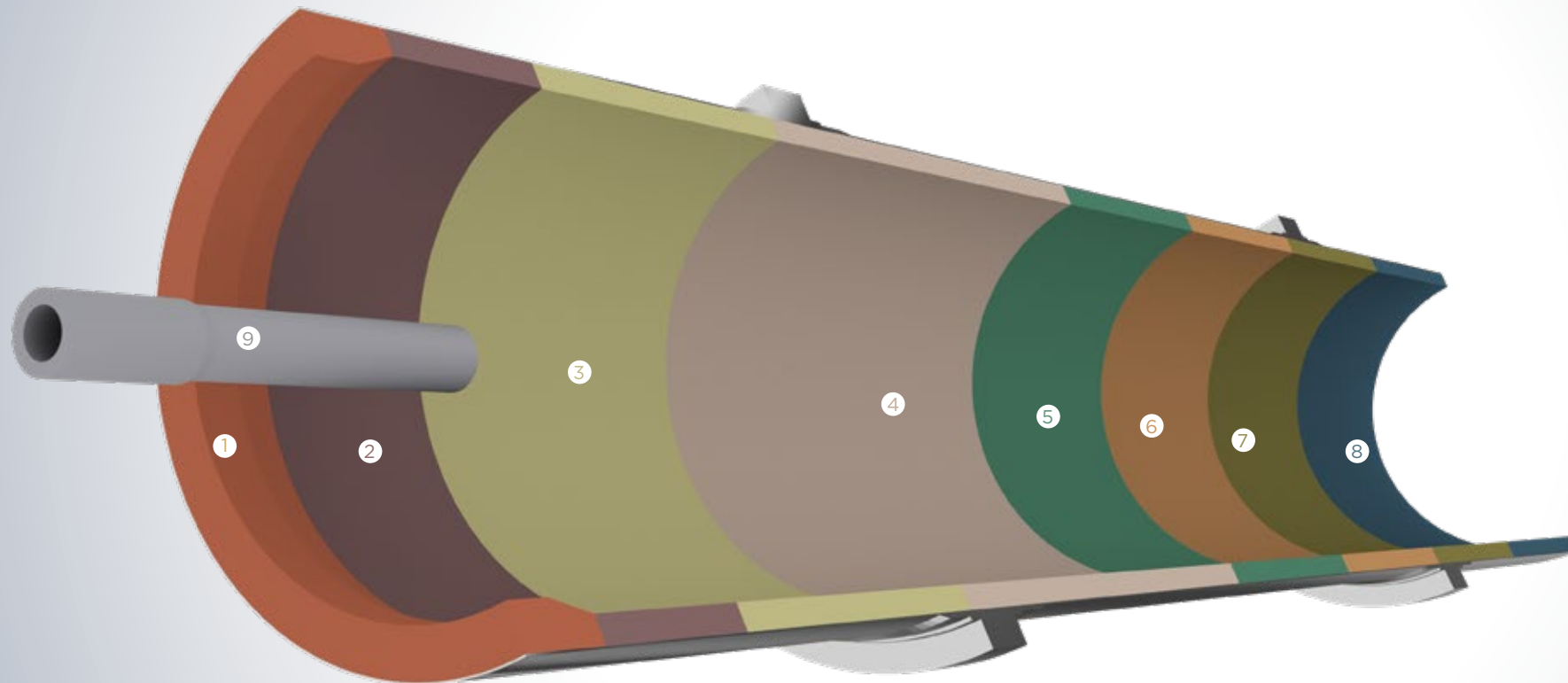
- 2 Outlet Zone**
- IDEAL 5 E
  - IDEAL 12
  - IDEAL A
  - IDEAL 7

- 3 Lower Transition Zone**
- IDEAL 5 E
  - IDEAL 12
  - IDEAL A
  - IDEAL 7

- 4 Burning Zone**
- IDEAL A
  - IDEAL 12
  - IDEAL 8 H
  - IDEAL HF

- 5 Upper Transition Zone**
- IDEAL 5 E
  - IDEAL 12
  - IDEAL A
  - IDEAL 7

- 6 Safety Zone**
- IDEAL A 63
  - IDEAL MU 60
  - IDEAL MU 80 S
  - IDEAL B 80
  - IDEAL A 45 SiC 25
  - IDEAL A 52 SiC 15
  - IDEAL MU 40 SiC 10



- 7 Calcination Zone**
- IDEAL MU 48
  - IDEAL MU 60
  - IDEAL B 50 Z
  - IDEAL MU 40 SiC 10
  - IDEAL A 52 SiC 15

- 8 Preheating Zone**
- MAT PLUS 60 M
  - MAT PLUS 10 SiC M
  - IDEAL MU 46
  - IDEAL M 310
  - IDEAL M 334
  - IDEAL 282
  - IDEAL M 335 SiC 10

- 9 Burner**
- MAT PLUS 60 M
  - MAT PLUS 10 SiC M
  - MAT MICRON 60 M
  - MAT MICRON 10 SiC M
  - MAT NANO 60 M



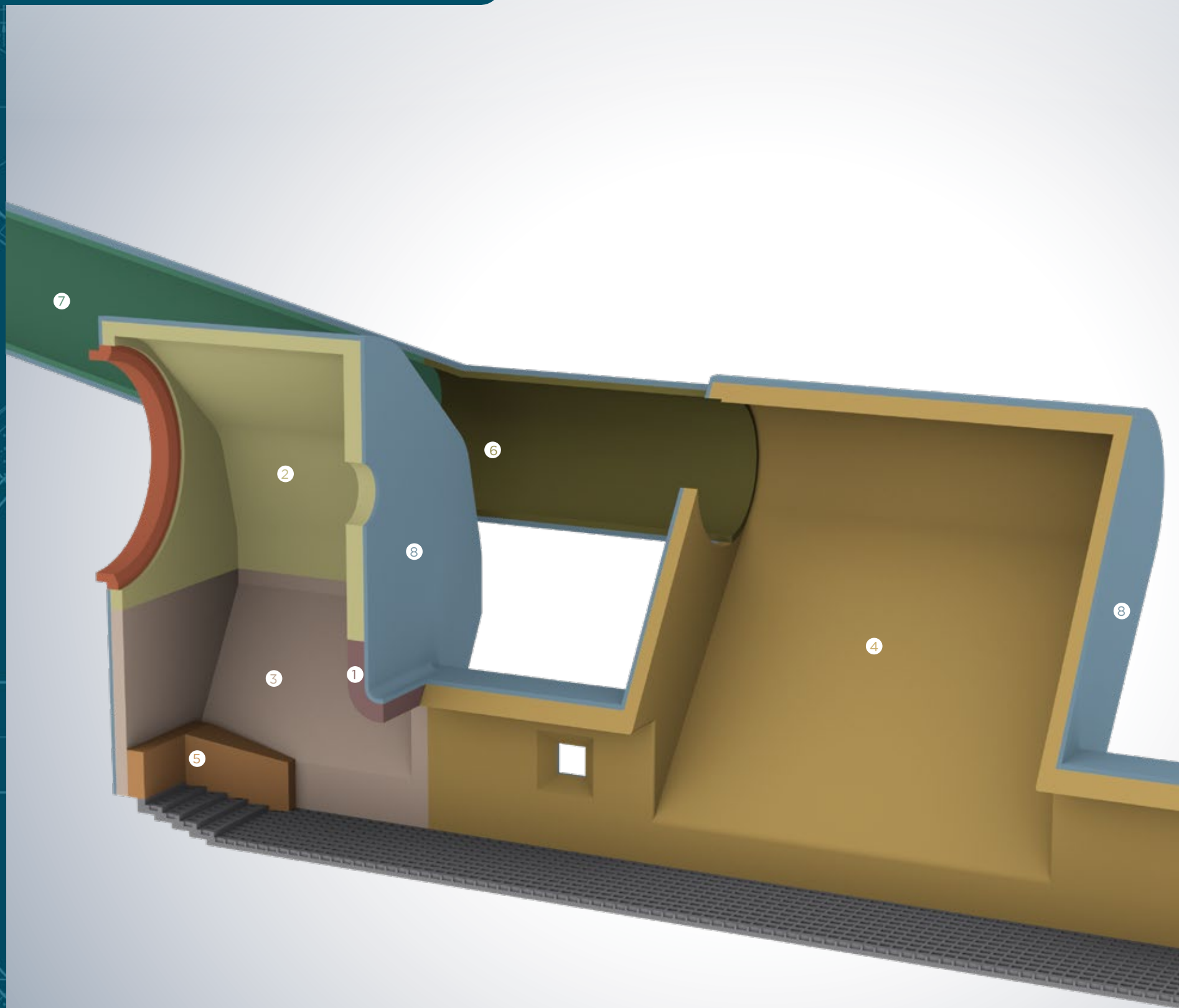
# Grate Cooler & Kiln Hood

- 1 Bull Nose**
- MAT PLUS 60 M
  - MAT PLUS MC 60 M
  - MAT PLUS 10 SiC M
  - MAT PLUS 82 UHS
  - MAT MICRON 60 M

- 2 Kiln Hood**
- MAT PLUS 60 M
  - MAT PLUS MC 60 M
  - MAT MICRON 60 M
  - MAT LG 58 M SiC 6
  - MAT 58 M GS
  - MAT 80 GS
  - MAT 57 HG
  - IDEAL MU 60
  - IDEAL MU 80

- 3 Cooler-Hot Section**
- MAT PLUS 80
  - MAT PLUS 60 M
  - MAT PLUS 10 SiC M
  - MAT PLUS MC 60
  - MAT MICRON 60 M
  - IDEAL MU 80 S
  - IDEAL MU 60

- 4 Cooler-Cool Section**
- MAT PLUS MC 50
  - MAT 50 GS
  - MAT MICRON 48 EA
  - IDEAL M 310

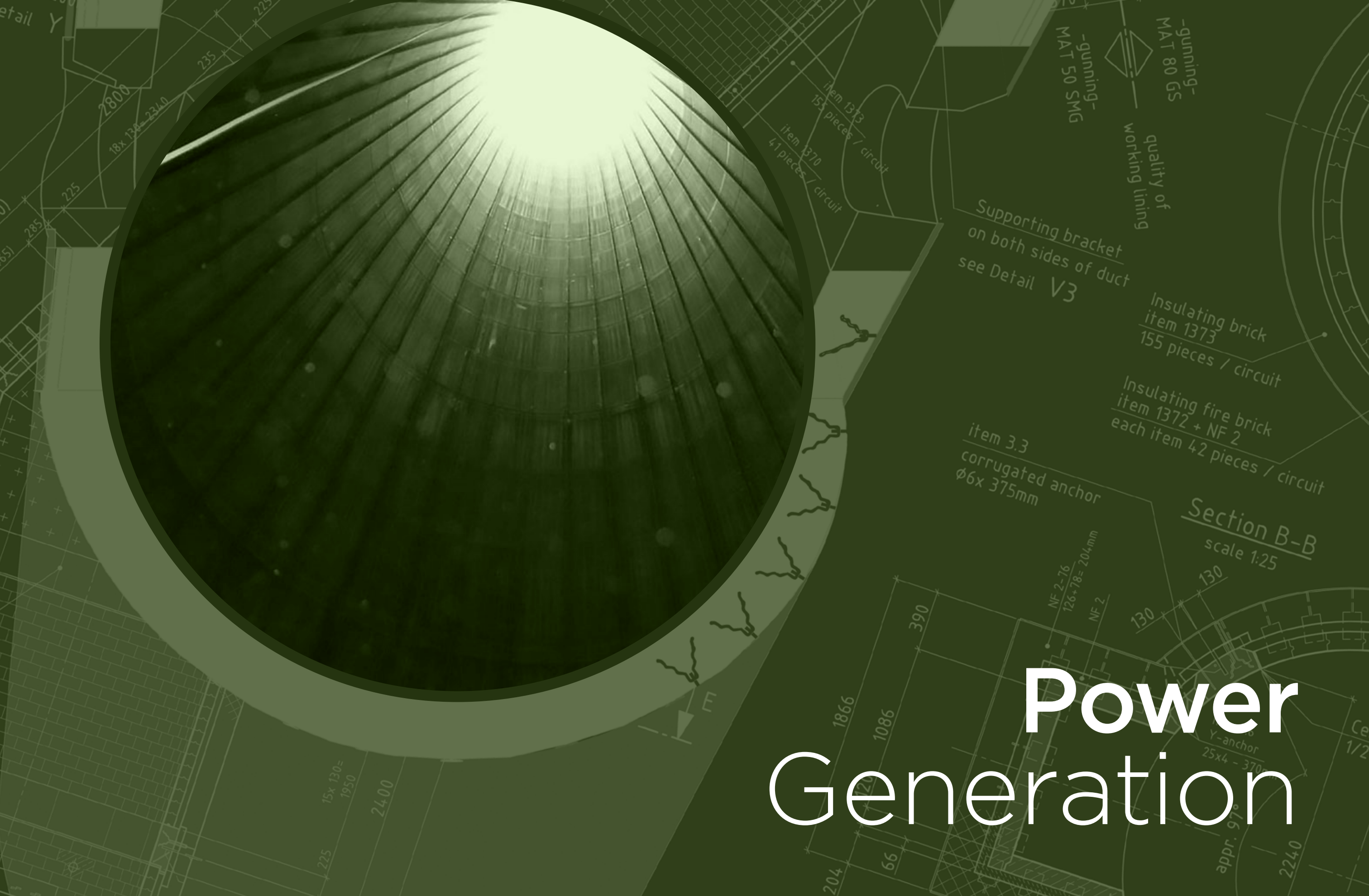


- 5 Horseshoe**
- MAT PLUS 30 SiC
  - MAT PLUS 30 SiC M
  - MAT PLUS 60 SiC
  - MAT PLUS 60 M AC
  - MAT PLUS 10 SiC M
  - MAT MICRON 10 SiC M
  - MAT MICRON 50 SiC M

- 6 Lower Tertiary Air Duct**
- MAT PLUS MC 50
  - MAT 50 HG
  - MAT 30 ZR G
  - MAT 50 GS
  - MAT GUN 10 SiC
  - MAT LG 58 M SiC 6
  - IDEAL 282
  - IDEAL M 335

- 7 Upper Tertiary Air Duct**
- MAT 50 HG
  - MAT 30 ZR G
  - MAT LG 58 M SiC 6
  - IDEAL MU 48
  - IDEAL M 335

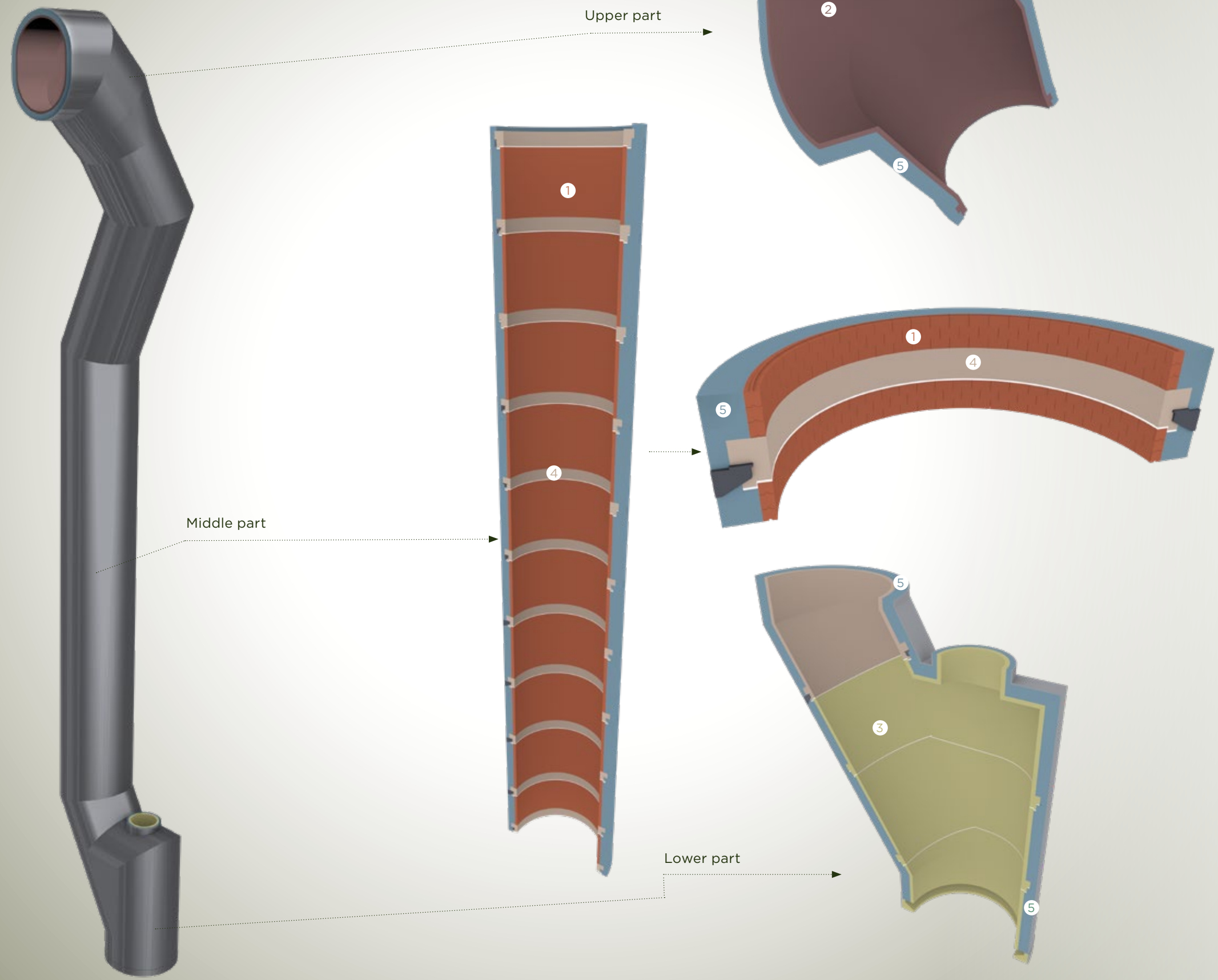
- 8 Insulating Lining**
- MAT 125
  - MAT 125 G
  - CALCIUM SILICATE N



# Power Generation

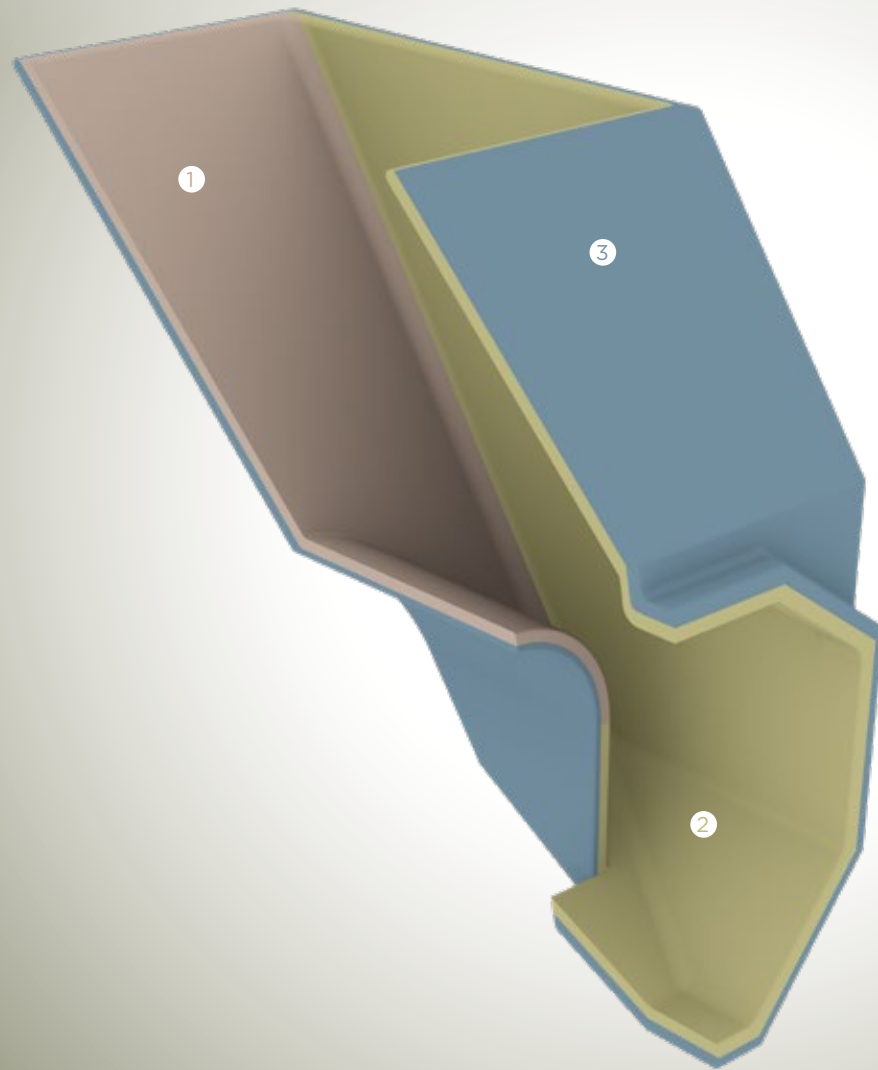
# Flue Gas Resuction Duct

- 1 Refractory Lining**
  - MAT 50 SMG
  - MAT 80 SPDG
  - MAT 50 GS
  - MAT 80 GS
  - MAT LG 50
  - MAT LG 80
  - IDEAL M 334
  - IDEAL M 335
  
- 2 Upper**
  - MAT 80 SPDG
  - MAT 80 GS
  
- 3 High Abrasion Refractory**
  - MAT PLUS MC 50
  - MAT PLUS 50 ML E
  - MAT PLUS 80
  - MAT PLUS 82 UHS
  - MAT MICRON 80 E
  - IDEAL M 334
  - IDEAL M 335
  
- 4 Support Bracket**
  - MAT PLUS MC 50
  - MAT PLUS 60 M
  - IDEAL 334
  - IDEAL 335
  
- 5 Insulating Lining**
  - MAT 125 G
  - MATH 23 HD
  - MATH 23
  - MATH 26
  - MATH 450



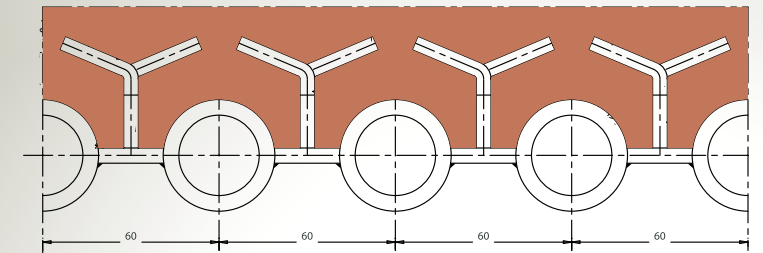
# Coal Mill Door

- 1 Impact Zone
  - MAT PLUS 82 UHS
  - MAT PLUS MC 50
  - MAT MICRON 80 E
- 2 Refractory Lining
  - MAT PLUS 42
  - MAT PLUS 50 ML E
  - MAT PLUS MC 50
  - MAT MICRON 80
- 3 Insulating Lining
  - MATH 450

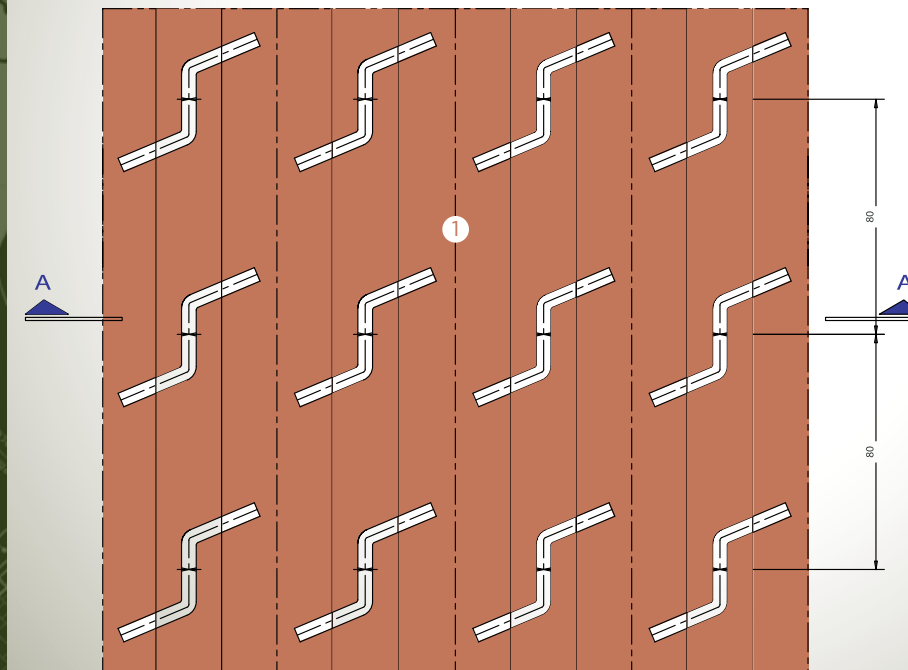


# Boiler Furnace Hopper

- 1 Refractory Lining
  - MAT PLUS 70 SiC
  - MAT GUN 70 SiC
  - MAT LG 40 SiC M
  - MAT LG 60 SiC M
  - MAT P 90 C



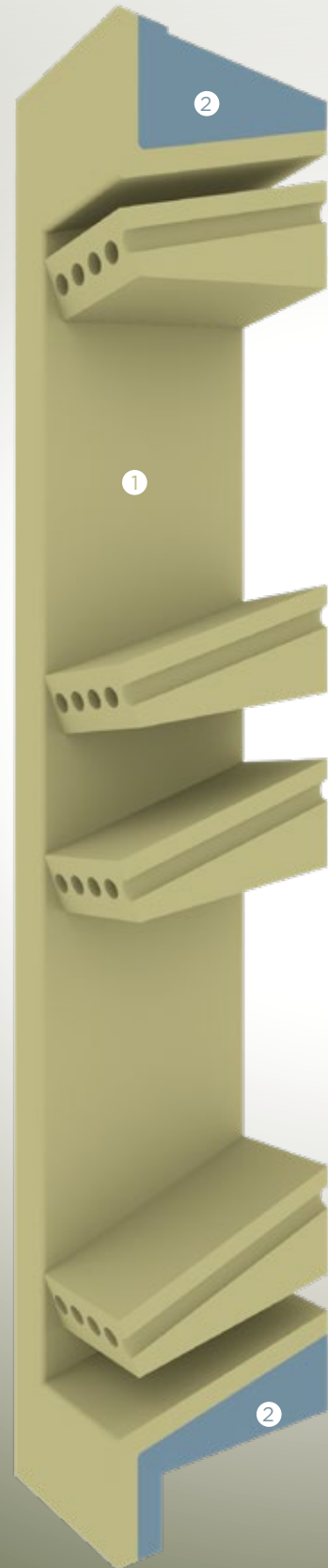
SECTION A-A



# Refractory Lining of main Coal Burners

- 1 Refractory Lining**
- MAT PLUS 50 ML E**
  - MAT 86 RT**
  - MAT 80 GS**
  - MAT PLUS MC 50**
  - MAT MICRON 60 M**
  - MAT MICRON 80 E**

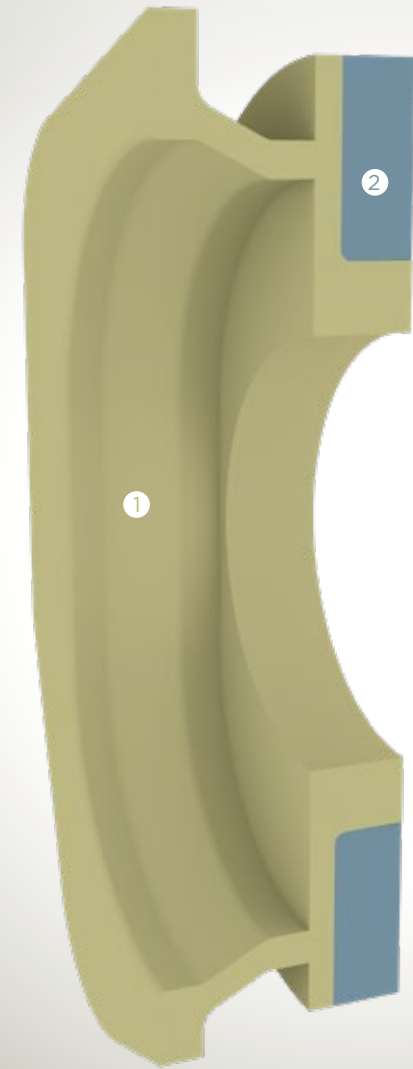
- 2 Insulating Lining**
- MAT 125**
  - MAT 125 G**
  - MATH 450**
  - MATH 23**



# Burner

- 1 Refractory Lining**
- MAT PLUS 50 ML E**
  - MAT 80 GS**
  - MAT PLUS MC 50**
  - MAT MICRON 60 M**
  - MAT MICRON 80 E**

- 2 Insulating Lining**
- MAT 125**
  - MAT 125 G**
  - MATH 450**
  - MATH 23**

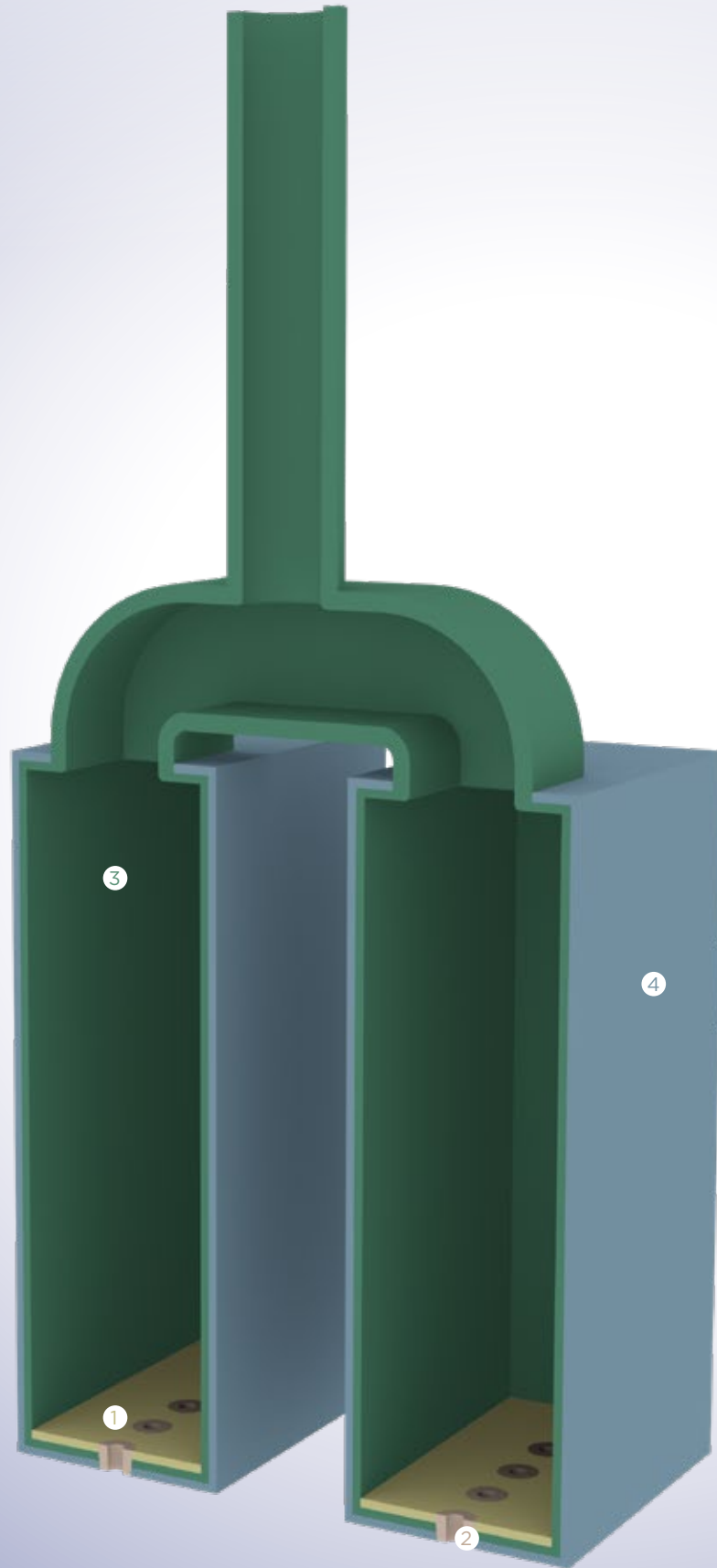




# Refineries

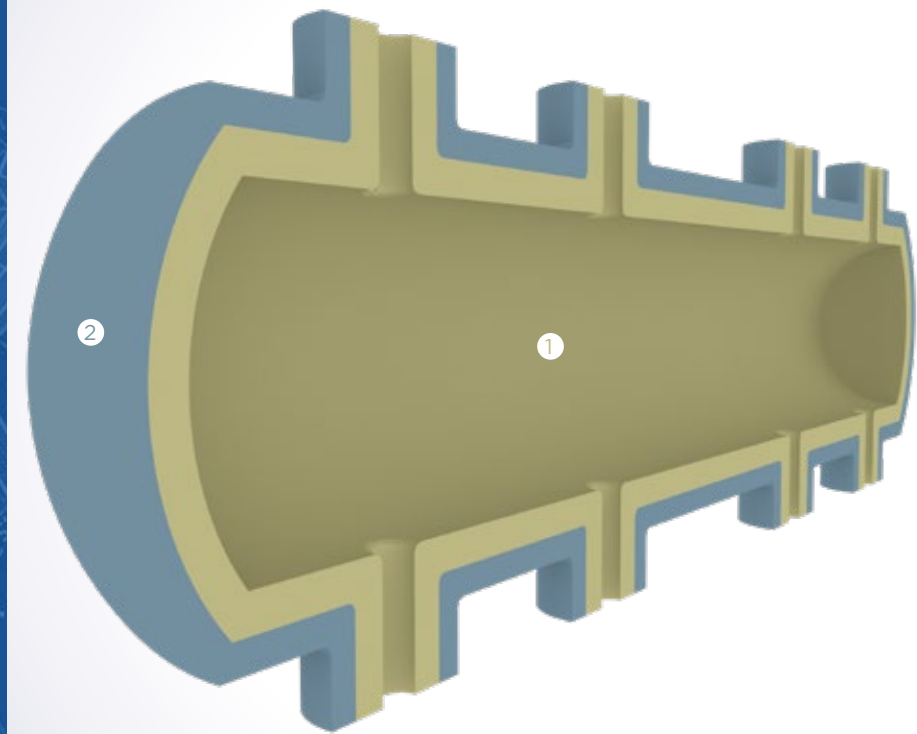
## Crude & Vacuum Distillation Unit

- ① Floor
  - IDEAL M 310
  - IDEAL MU 48
  - IDEAL MU 60
- ② Burners
  - MAT PLUS 60 M
  - MAT MICRON 60 M
  - MAT MICRON 80 E
- ③ Insulating Lining
  - MAT 125 P
  - MAT 125 GP
- ④ Insulating Lining
  - MAT 106
  - MAT 106 LG P



## Sulfur Recovery Unit - Waste Heat Boiler

- ① Refractory Lining
  - MAT 42 C
- ② Insulating Lining
  - MAT 124
  - MAT 124 P



# Sulfur Recovery Unit - Burner - Combustion Chamber

- ① Burning Zone

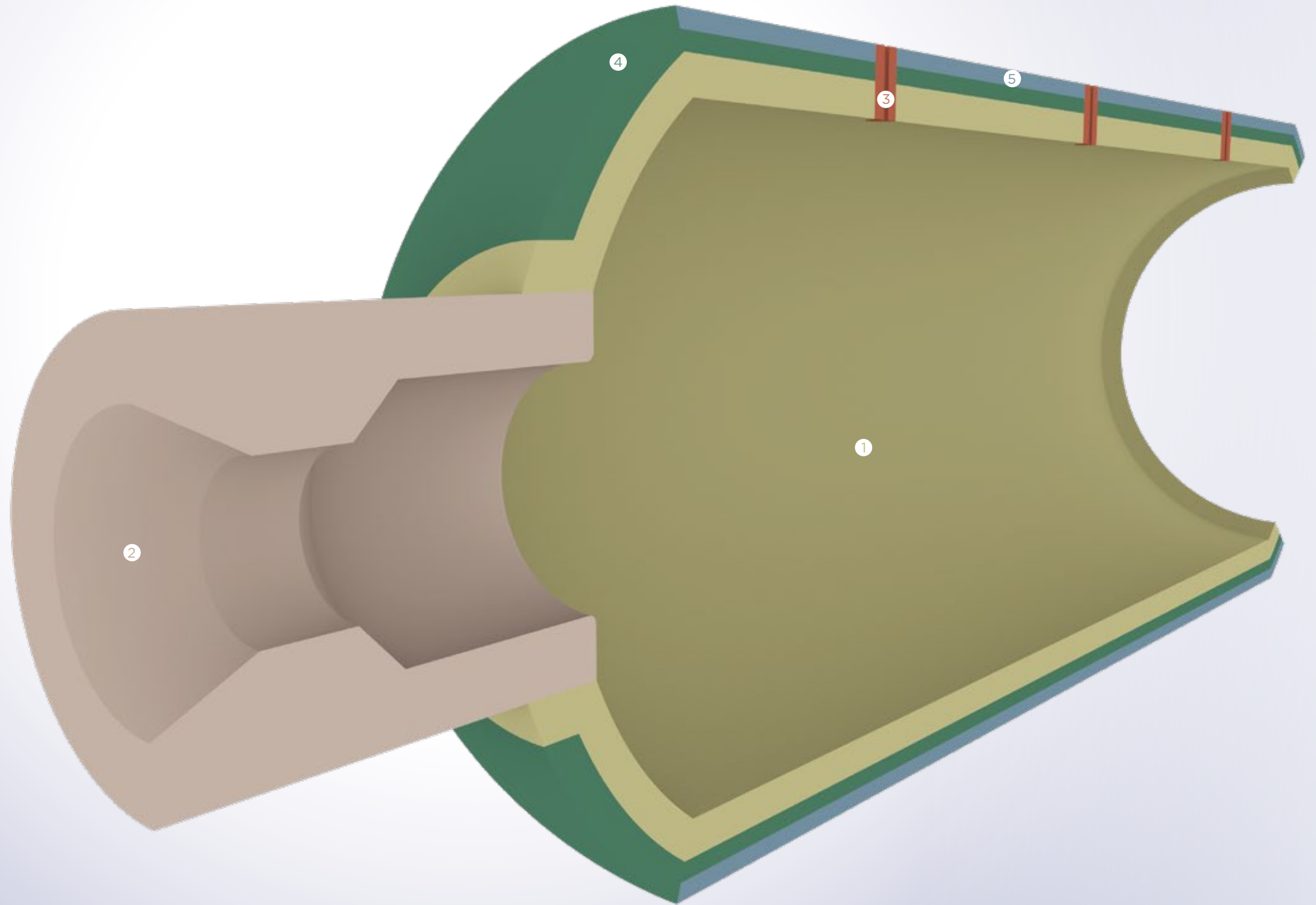
  - IDEAL KA 90
  - MAT RAM 90 C
  - MAT NANO 99 T
  - MAT PLUS 98 ULC T
  
- ② Burner Area

  - MAT PLUS MC 88
  - MAT MICRON 91 C
  - MAT 96 S
  
- ③ Nozzles

  - MAT 96 S
  
- ④ Insulating Lining High Temperature

  - MATH 23
  - MATH 26
  - MATH 28
  
- ⑤ Insulating Lining Low Temperature

  - CALCIUM SILICATE P/HT







# Lime Industry

# Lime Shaft Kiln

**1 Inlet Zone**

MAT PLUS 42
MAT PLUS MC 45
IDEAL M 310
IDEAL M 334
IDEAL M 382
IDEAL MU 48

**2 Refractory Lining**

MAT 35
MAT 42
MAT PLUS 42

**3 Sintering Zone**

IDEAL 2 E
IDEAL 5 E
IDEAL 3
IDEAL A 63
IDEAL B 60
IDEAL B 75

**4 Cooling Zone**

MAT PLUS 42
MAT PLUS MC 45
IDEAL M 310
IDEAL M 334
IDEAL M 382
IDEAL MU 48

**5 Top Insulation**

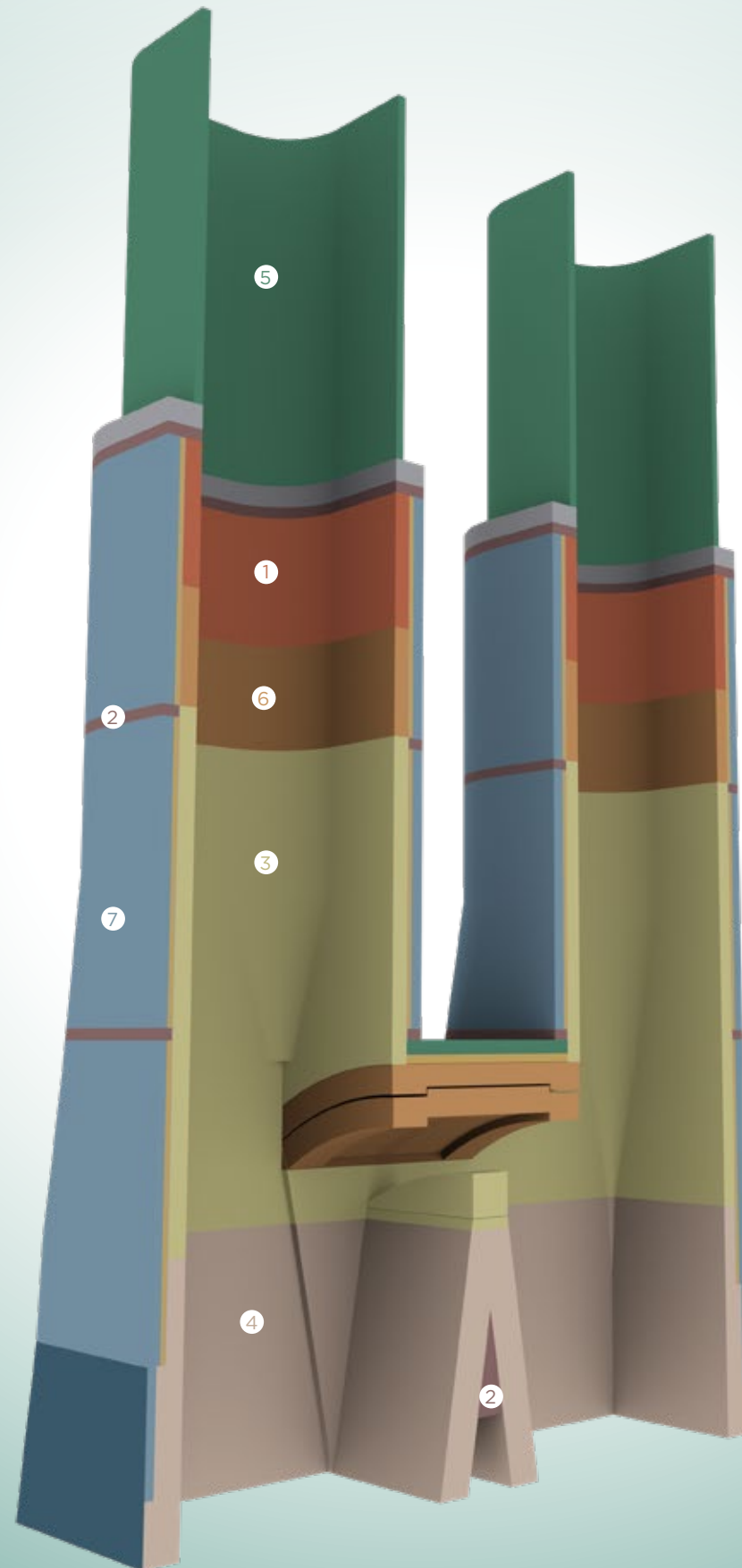
MAT 125 P
MAT 106 P

**6 Burning Zone**

IDEAL 2 E
IDEAL 5 E

**7 Insulating Lining**

MAT MW
MAT 125 P
MAT 106 P
MATH 450
MATH 23 HD
CALCIUM SILICATE N
CERAMIC FIBERS



# Lime Rotary Kiln

**1 Sintering Zone**

MAT PLUS 60 A
MAT PLUS 60 M
IDEAL 5 E
IDEAL 5 H
IDEAL A
IDEAL A 63
MAT MICRON 60 A
MAT MICRON 60 M

**2 Transition Zone**

MAT PLUS 60 A
IDEAL A 63
MAT MICRON 60 A

**3 Calcination Zone**

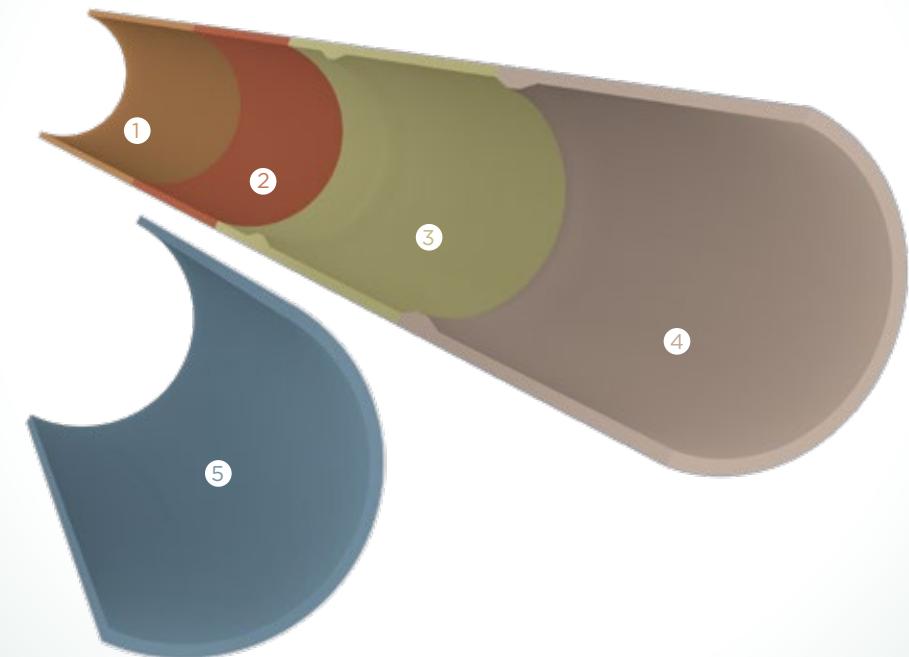
IDEAL MU 48
IDEAL MU 60
MAT MICRON 60 A

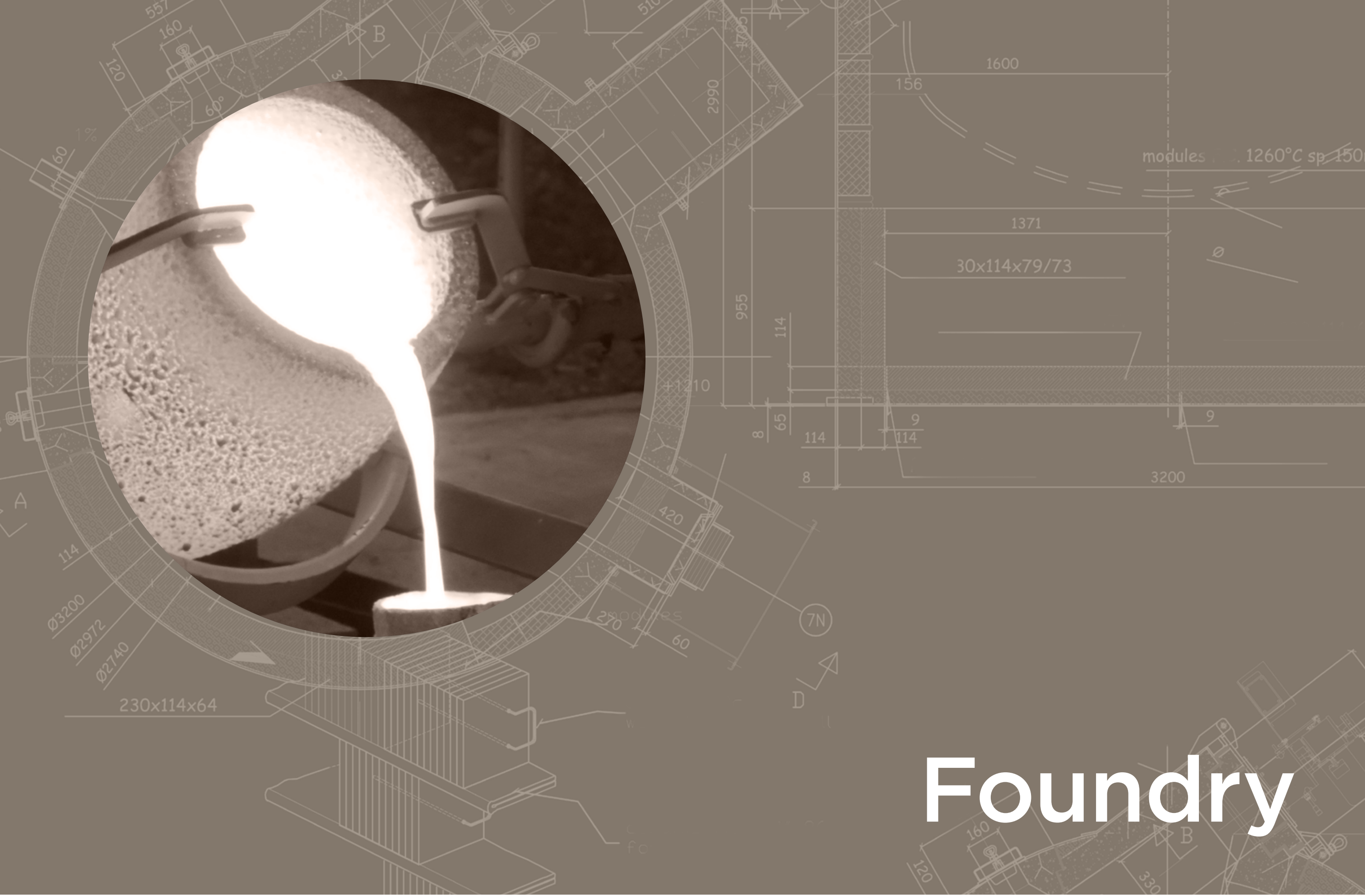
**4 Preheating Zone**

MAT PLUS 50 E
IDEAL M 310
IDEAL MU 42
IDEAL B 50 Z

**5 Cooler**

MAT PLUS MC 50
IDEAL M 310
IDEAL MU 48

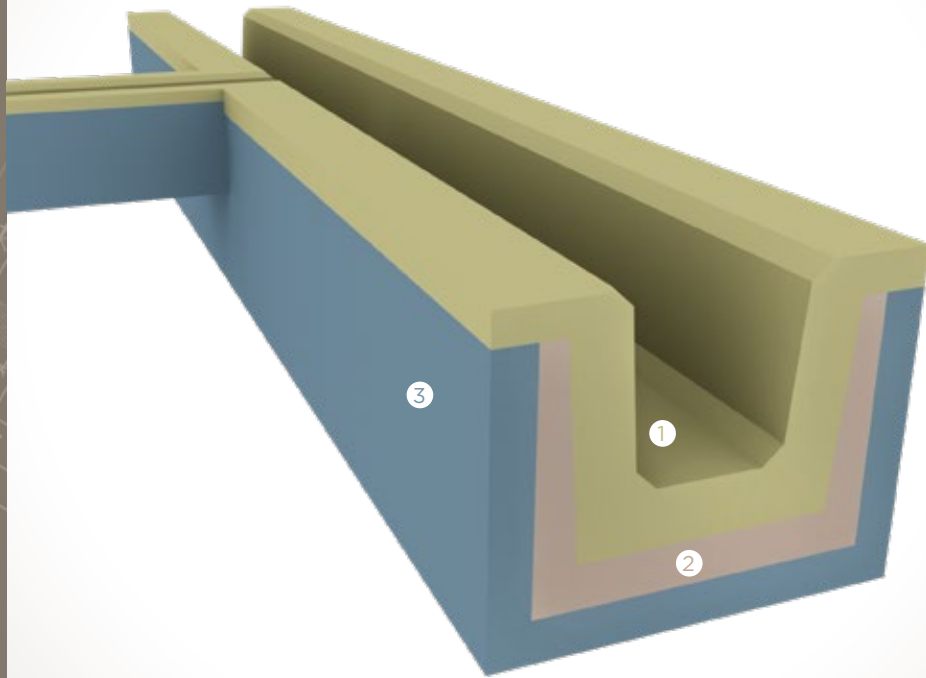




# Foundry

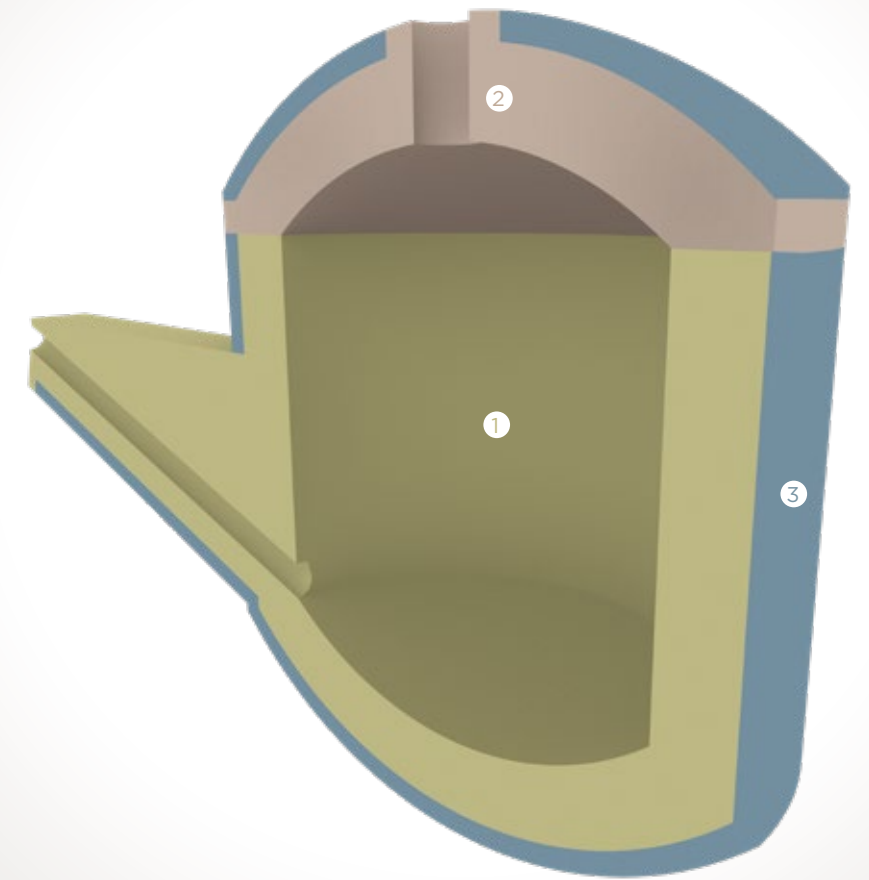
# Runner

- ① **Wear Lining**  
MAT PLUS 93 SP 4  
MAT SF 93 SP
- ② **Safety Lining**  
MAT RAM 50 C  
MAT 96 S
- ③ **Insulation**  
INSULATING MATERIALS



# Receiver

- ① **Metal Bath**  
MAT PLUS 93 SP 4  
MAT SF 93 SP
- ② **Cover**  
MAT RAM 50 C  
MAT 96 S
- ③ **Insulation**  
INSULATING MATERIALS





# Glass Industry

# Regenerator / Melting Furnace

**1 Refractory Castables**

- MAT PLUS 60 M**
- MAT MICRON 80 E**
- MAT 125**

**2 Refractory Safety Lining**

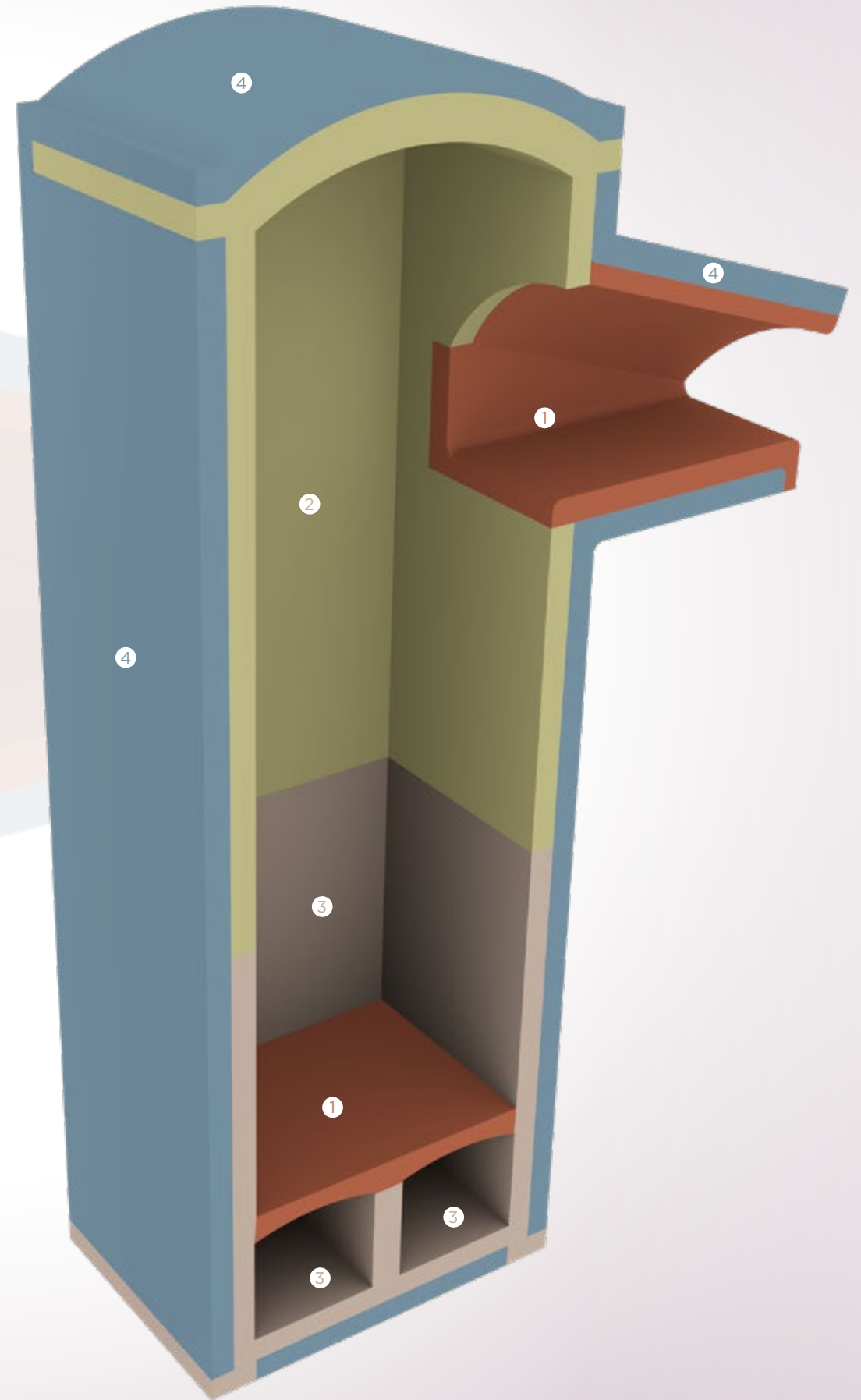
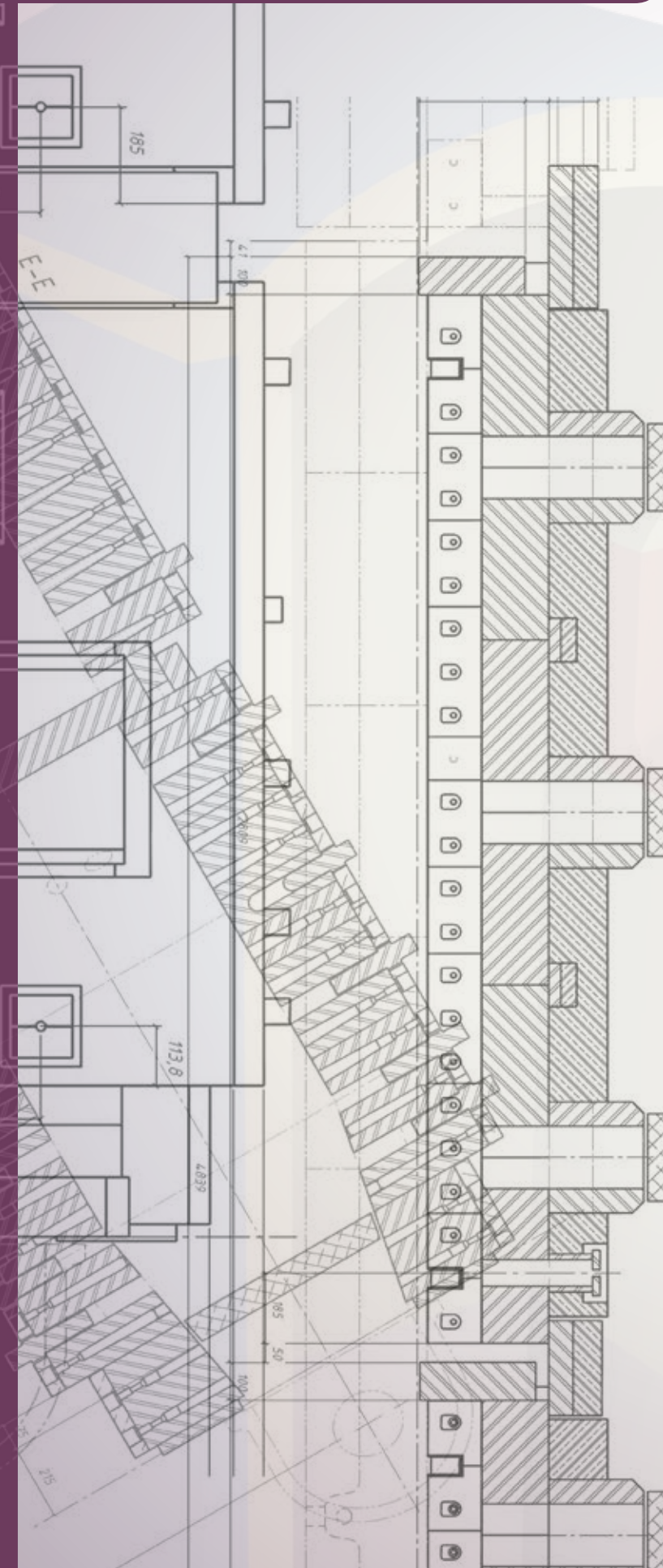
- IDEAL B 60**
- IDEAL MU 60**

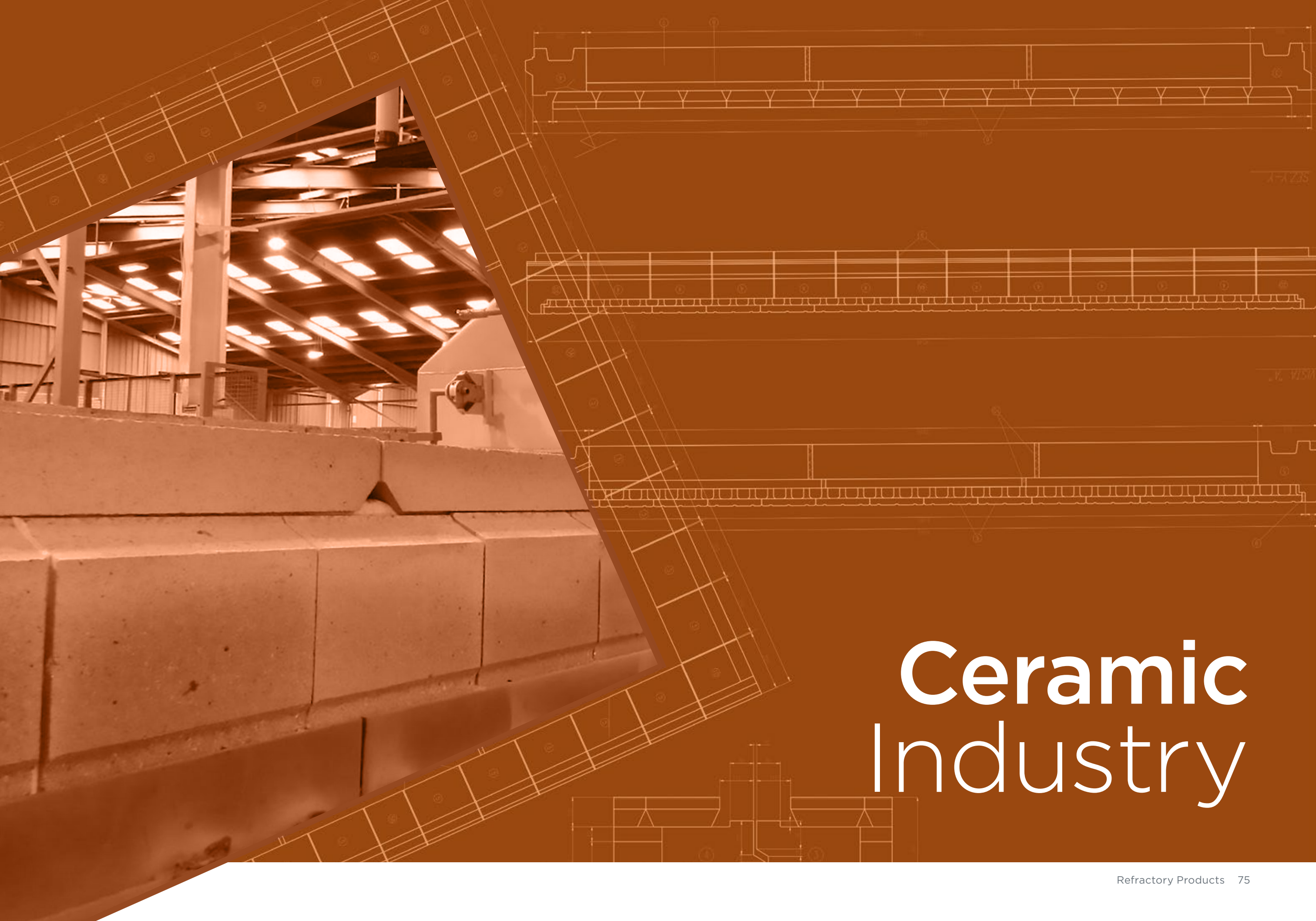
**3 Refractory Bricks**

- IDEAL FC 77**
- IDEAL FM 72**
- IDEAL FM 76**

**4 Insulating Bricks**

- MATH 450**
- MATH 26**
- MATH 28**
- MATH 230**





# Ceramic Industry

# Tunnel Kiln Car

- 1 Refractory Lining**

  - MAT PLUS 42
  - MAT PLUS MC 50
  - IDEAL M 310
  - IDEAL MU 42
  - IDEAL B 60
  
- 2 Prefabricated Shapes**

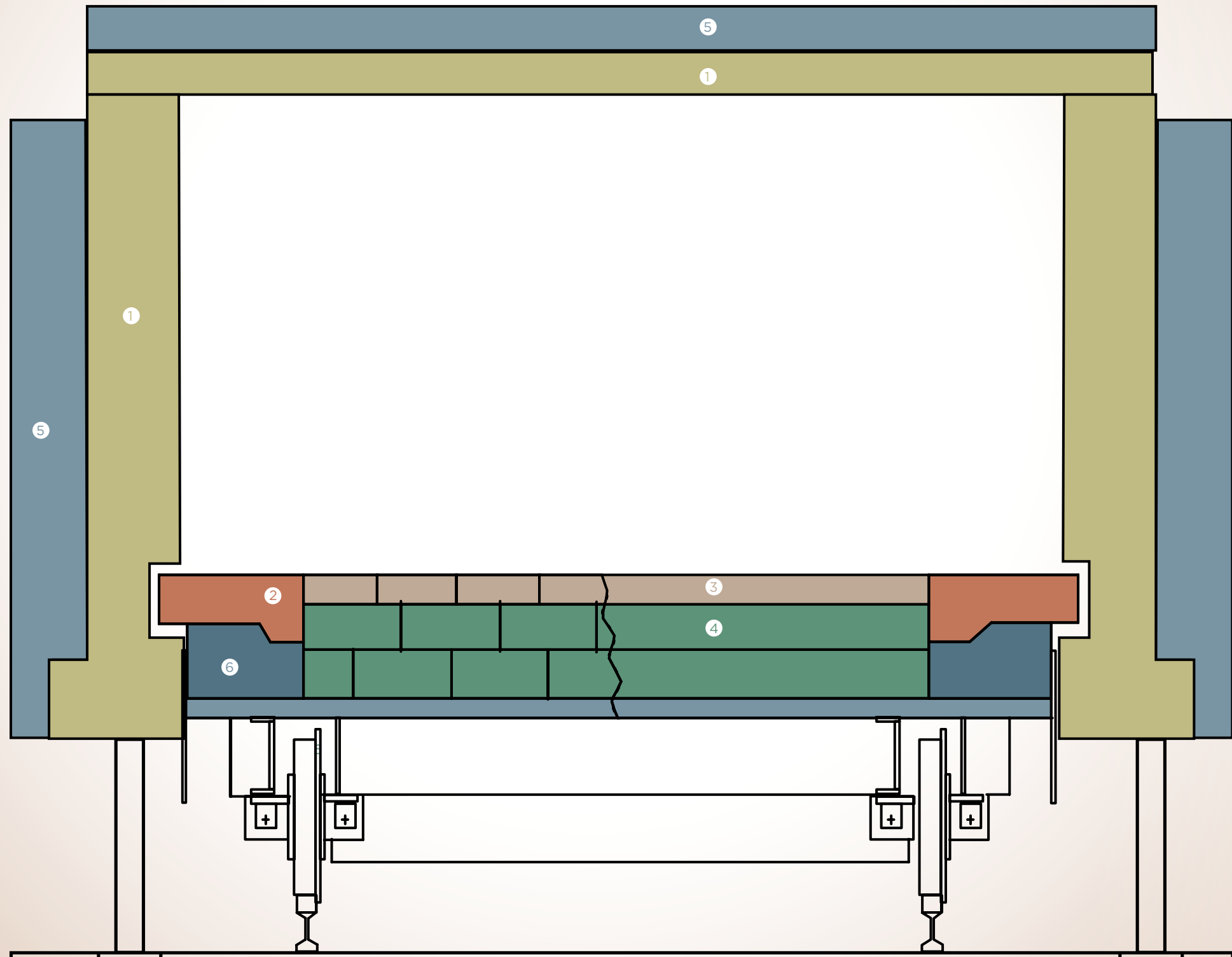
  - MAT PLUS MC 50
  - MAT GR
  - MAT 42
  
- 3 Refractory Lining**

  - MAT PLUS 80
  - MAT PLUS MC 35
  - MAT GR
  
- 4 Insulating Lining**

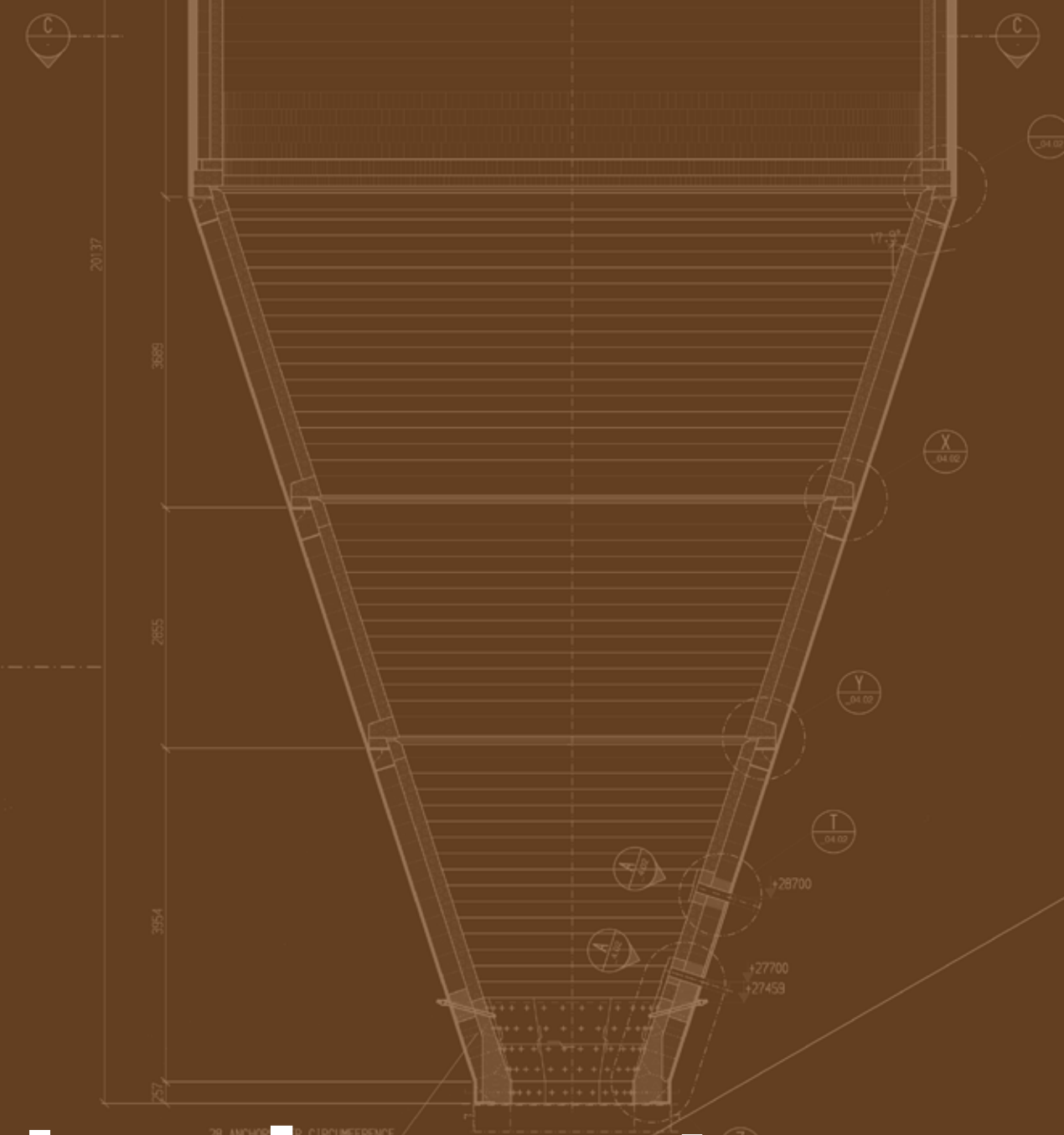
  - MAT 125 P
  - MAT MW
  - VERMICULITE
  - PERLITE
  
- 5 Outside Walls**

  - MAT 106 P
  - MAT 125 P
  
- 6 Insulating Lining**

  - MAT 125 P
  - MAT MW







# Incinerators & Recycling

# Incinerator

**1 Main Combustion Zone**

- IDEAL A 60 CR 2
- IDEAL A 63
- IDEAL MU 60
- IDEAL K 85 CR 10
- IDEAL K 90 CR 5

**2 After Burner Chamber**

- IDEAL 334
- IDEAL 335 SiC 10
- IDEAL MU 40 SiC 10
- IDEAL MU 48
- IDEAL A 63
- IDEAL MU 60

**3 Ash Hopper**

- MAT PLUS 58 M CR 2
- MAT PLUS 60 M

**4 Chimney**

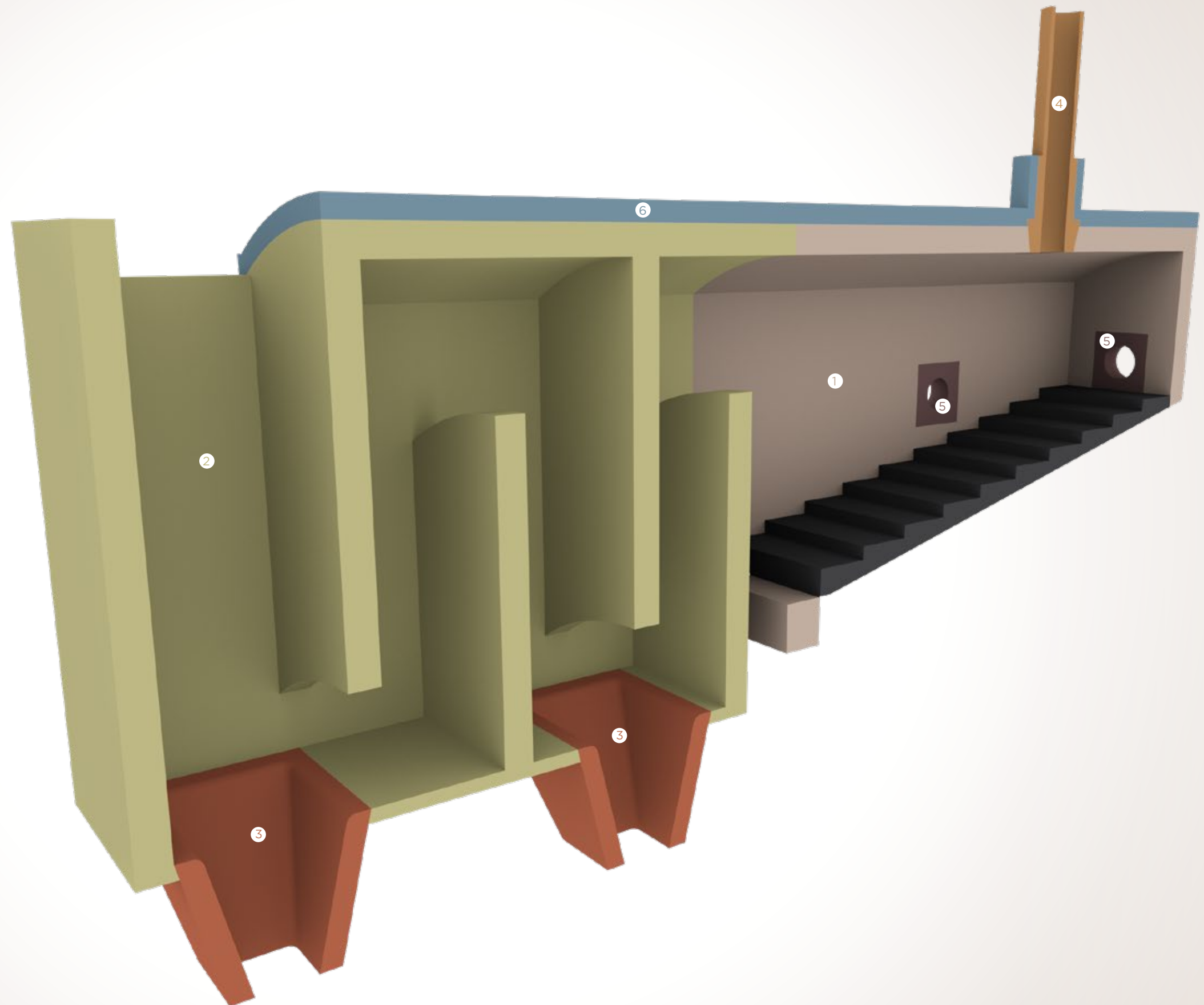
- MAT PLUS 58 M CR 2
- MAT PLUS 60 M

**5 Burner**

- MAT PLUS 58 M CR 2
- MAT PLUS 60 M
- MAT MICRON 60 M

**6 Insulating Lining**

- MAT 124 P
- MAT 125 P
- MAT 125 GP



# Rotary Kiln Incinerator

**1** Nose Ring Discharge  
 MAT PLUS 60 M  
 MAT PLUS 58 M CR 2

**2** Combustion Zone  
 IDEAL K 85 CR 10  
 IDEAL K90 CR 5

**3** After Burner Chamber  
 MAT PLUS 60 M  
 IDEAL M 334  
 IDEAL MU 48  
 MAT 58 M GS

**4** Upper Part  
 MAT PLUS 35  
 MAT PLUS 60 M  
 MAT LG 60 M  
 MAT MICRON 60 M  
 IDEAL M 334  
 MAT 58 M GS

**5** Safety Lining  
 IDEAL M 310  
 IDEAL MU 42

**6** Combustion Zone  
 IDEAL K90 CR 5  
 IDEAL A 60 CR 2

**7** Insulating Lining  
 MAT 125 P  
 MAT 125 GP



# Grate Fired Boiler Waste Incinerator

**1** Chute  
 MAT PLUS 50 AR  
 MAT PLUS 60 M  
 MAT PLUS 82 UHS  
 IDEAL MU 48

**2** Slag Hopper  
 MAT PLUS 80 E  
 MAT PLUS 82 UHS

**3** First Pass  
 MAT PLUS 50 AR  
 MAT PLUS 60 M  
 MAT PLUS 10 SiC M  
 MAT PLUS ZS 10  
 MAT LG 60 M

**4** Boiler Walls  
 MAT PLUS 60 A  
 MAT PLUS 10 SiC M  
 MAT PLUS 58 M CR 2  
 MAT PLUS ZS 10

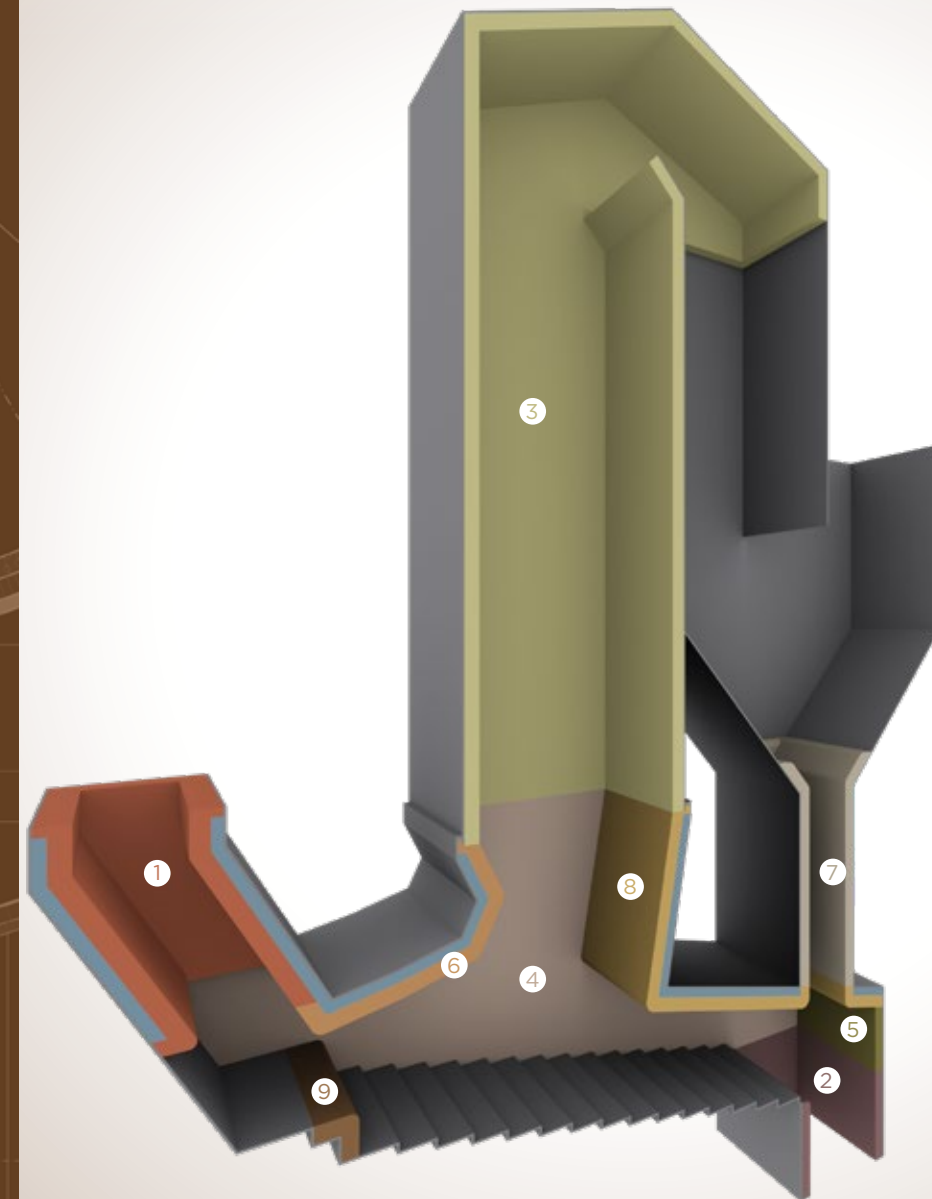
**5** Walls  
 MAT PLUS MC 50  
 MAT 50 GS

**6** Roof  
 MAT PLUS 60 M  
 MAT PLUS 82 UHS  
 MAT 58 M GS

**7** Ash Hopper  
 MAT PLUS MC 45  
 MAT 50 GS

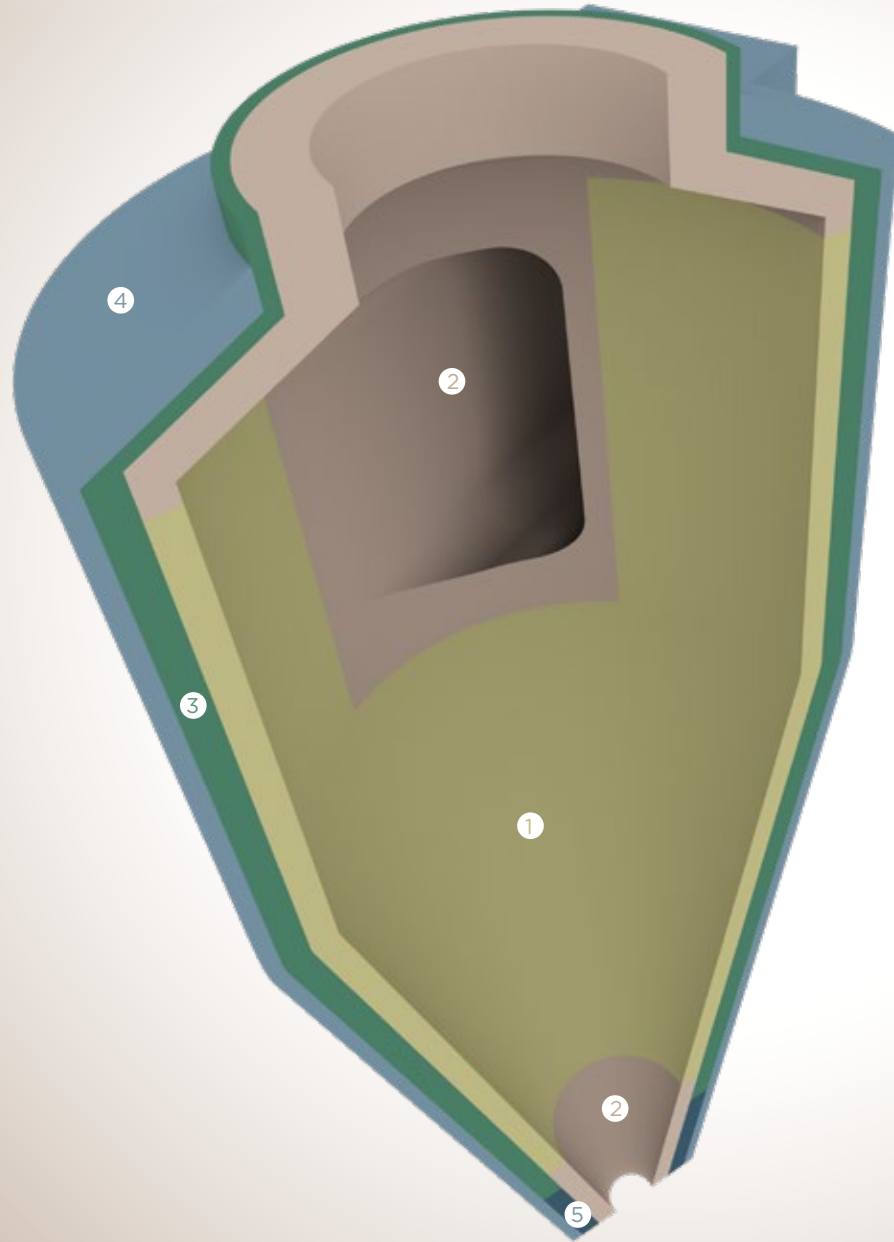
**8** Rear Roof  
 MAT PLUS 60 A  
 MAT PLUS 60 M  
 MAT 58 M GS

**9** Wear Area  
 MAT PLUS 60 M AC  
 MAT PLUS 82 UHS  
 IDEAL MU 48



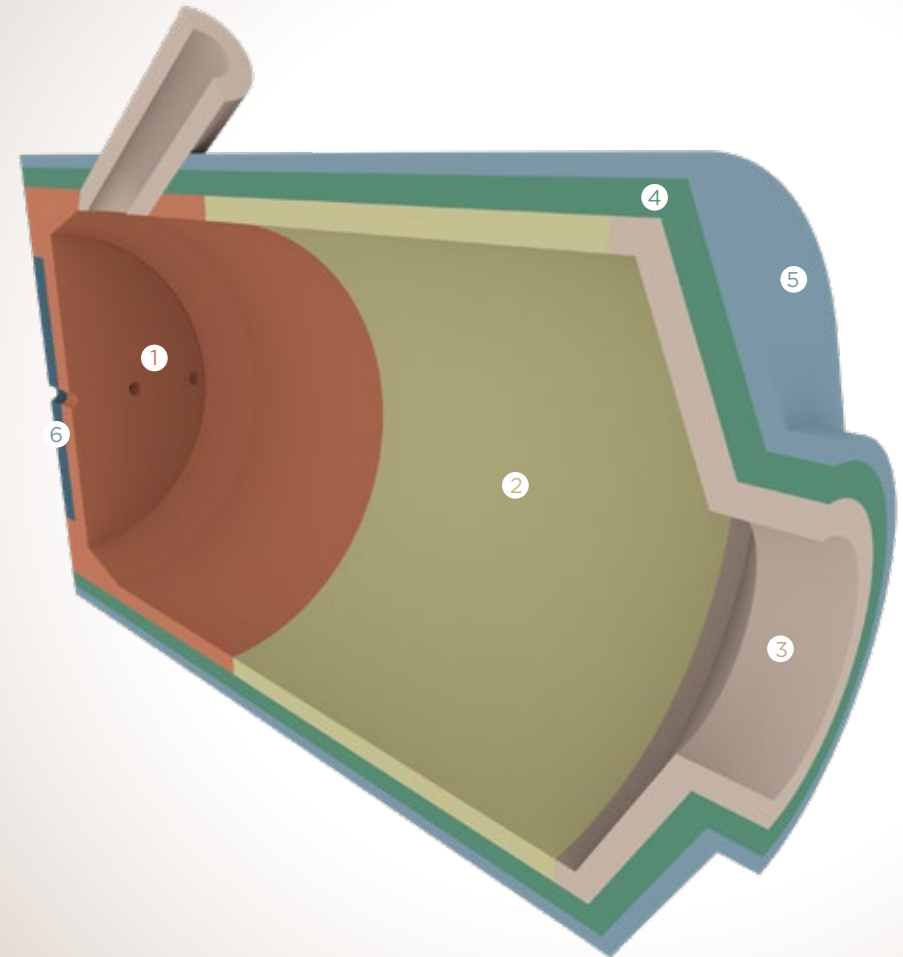
# Reactor Cyclone

- 1 Refractory Lining**  
 MAT PLUS 60 M  
 MAT MICRON 60 M  
 MAT NANO 60 M  
 MAT 58 M GS
- 2 Refractory Lining**  
 MAT PLUS 80  
 MAT PLUS 60 M  
 MAT MICRON 60 M
- 3 Safety Lining**  
 MAT PLUS MC 50  
 MAT 50 GS  
 MAT MICRON 48 EA
- 4 Insulating Lining**  
 MAT 125 P  
 MAT 125 GP
- 5 Insulating Lining**  
 MAT 125 P  
 MAT 125 GP



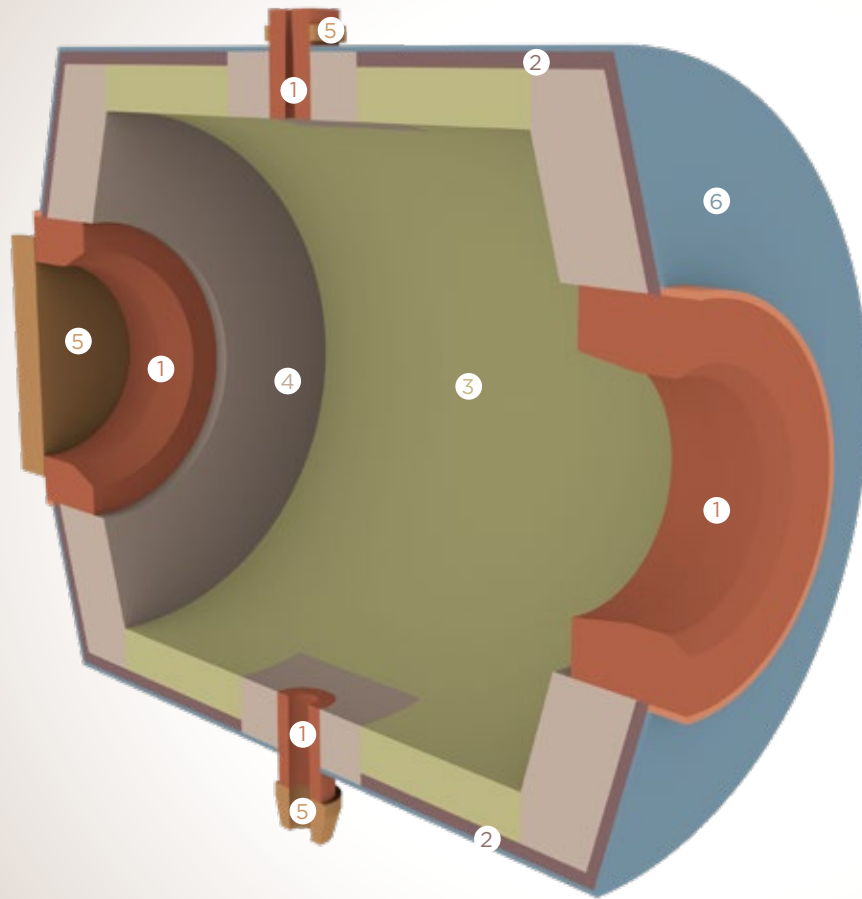
# Reactor

- 1 Refractory Lining**  
 MAT PLUS 60 A  
 MAT PLUS 60 M  
 MAT PLUS 30 SiC M  
 MAT MICRON 60 M  
 MAT NANO 60 M  
 IDEAL A 45 SiC 25
- 2 Refractory Lining**  
 MAT PLUS 60 M  
 MAT MICRON 60 M  
 MAT NANO 60 M  
 MAT 58 M GS
- 3 Refractory Lining**  
 MAT PLUS 80  
 MAT PLUS 60 M  
 MAT MICRON 60 M
- 4 Safety Lining**  
 MAT PLUS MC 50  
 MAT 50 GS  
 MAT MICRON 48 EA
- 5 Insulating Lining**  
 MAT 125 P  
 MAT 125 GP
- 6 Insulating Lining**  
 MAT 125 P  
 MAT 125 GP



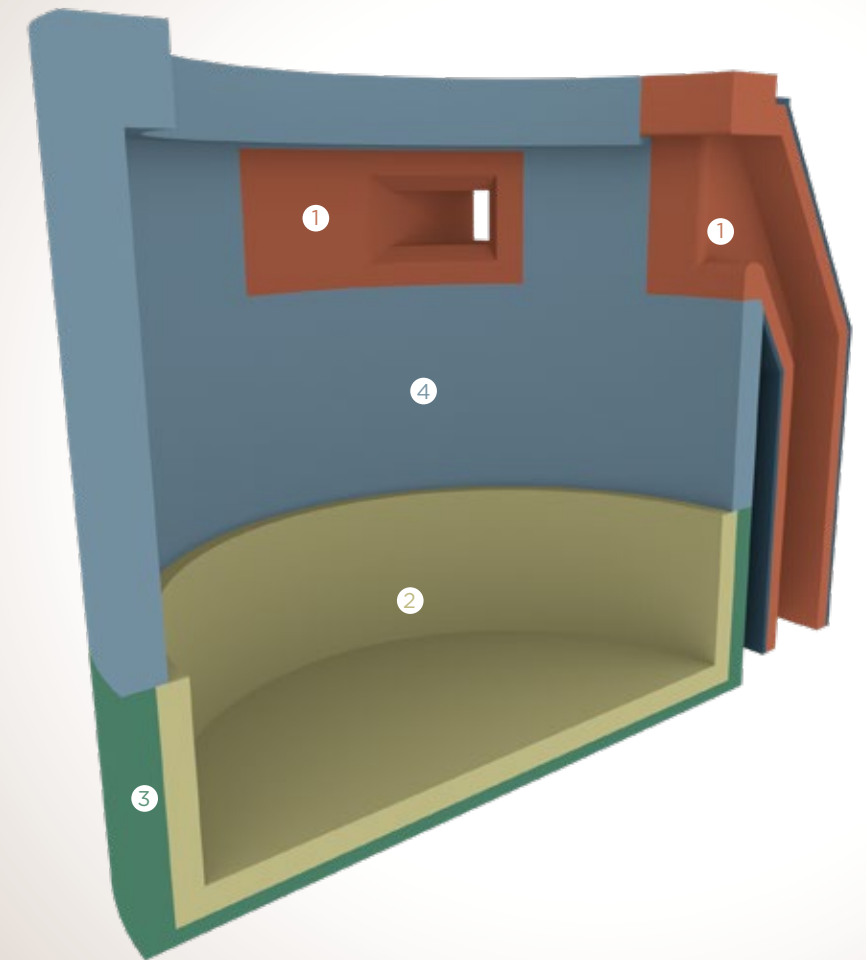
## Lead Rotary Furnace

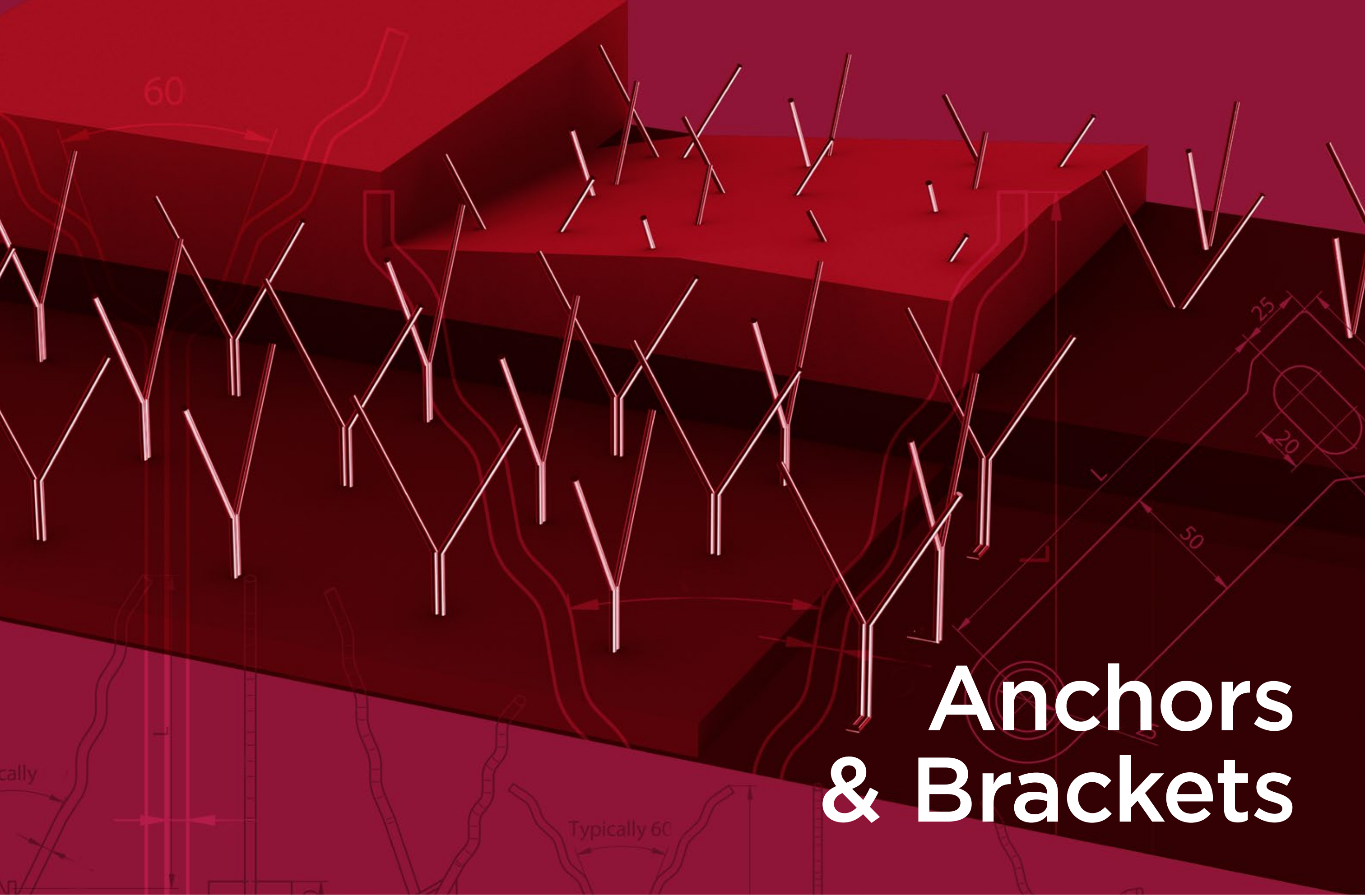
- 1 Burner & Charge Door**  
 IDEAL MC Z 28 P FG  
 IDEAL MC F 25  
 MAT PLUS 60 M AC  
 MAT 58 M GS
- 2 Safety Lining**  
 IDEAL M 310  
 IDEAL A 40
- 3 Rotary Lining**  
 IDEAL MC F 25  
 IDEAL MC Z 28 P FG
- 4 Side Walls**  
 IDEAL MC F 25  
 IDEAL MC Z 28 P FG
- 5 Door**  
 MAT PLUS 60 M AC  
 MAT 58 M GS
- 6 Insulation Lining**  
 CERAMIC BOARD  
 MAT 125 G



## Used Battery Kettle

- 1 Burner**  
 MAT 50 S  
 MAT PLUS MC 50
- 2 Lower Walls**  
 IDEAL M 310  
 IDEAL MU 42
- 3 Insulation Lining**  
 MATH 23  
 MATH 23 HD  
 MAT 106 GP
- 4 Upper Walls**  
 CERAMIC FIBER MODULES





# Anchors & Brackets

# Support Elements

MATHIOS REFRACTORIES is your trusted partner when it comes to metallic support elements.

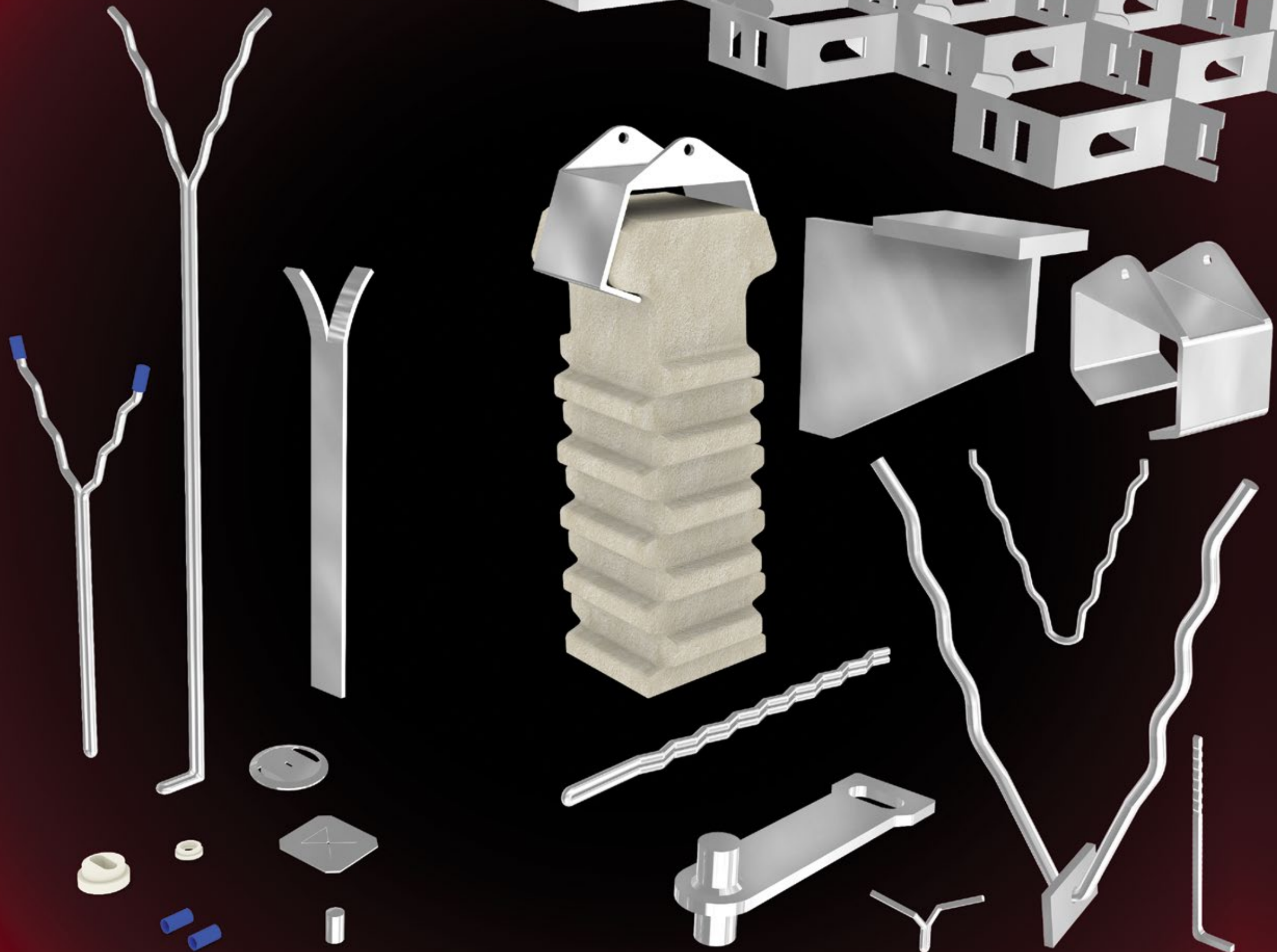
We are capable of delivering a vast variety of different metallic support elements such as, but not limited to, anchors, brackets, retainers, hexagonal meshes and studs both in shape and quality. Anchors can also be supplied with plastic caps.

If required anchors can be pre and / or post forming annealed.

### QUALITIES

EN	AISI
1.4835	253 MA
1.4301	304
1.4307	304L
1.4948	304H
1.4833	309S
1.4828	309
1.4845	310S - 310
1.4841	314
1.4404	316L
1.4864	330

Apart from metallic anchors, we are also capable of supplying ceramic anchor bricks for higher temperatures and special applications such as suspended roofs.





# Technical Data



## Fireclay & High Alumina Refractory Bricks

PRODUCT NAME	Classification	Refractoriness (S.C.)	Refractoriness Under Load °C (T <sub>0.5</sub> )	Raw Material Basis	Bulk Density (g/cm <sup>3</sup> )	Apparent Porosity (% b.v.)	C.C.S. (N/mm <sup>2</sup> )	Chemical Analysis (%)					Thermal Linear Expansion (% at 1000°C)	Thermal Shock Resistance (950°C/Water)
								Al <sub>2</sub> O <sub>3</sub>	SiO <sub>2</sub>	Fe <sub>2</sub> O <sub>3</sub>	P <sub>2</sub> O <sub>5</sub>	Cr <sub>2</sub> O <sub>3</sub> / BaO		
IDEAL 282	FC 30	18	1230	Calcined Fireclay	2.17	13	55	30.0	65.0	1.2	-	-	0.48	5
IDEAL M 382	FC 30	18	1250	Calcined Fireclay	2.16	13	60	31.0	63.5	1.2	-	-	0.48	5
IDEAL M 334	FC 30	18	1280	Calcined Fireclay	2.18	13	70	33.0	61.5	1.4	-	-	0.50	6
IDEAL M 334 AL	FC 30	20	1260	Calcined Fireclay	2.16	14	55	34.0	62.0	1.4	-	-	0.50	8
IDEAL M 335	FC 30	18	1220	Calcined Fireclay	2.18	13	60	33.5	61.0	1.3	-	-	0.50	8
IDEAL M 308	FC 40	31	1315	Calcined Fireclay	2.20	18	50	40.0	55.0	2.1	-	-	0.53	8
IDEAL M 310	FC 40	31	1340	Calcined Fireclay	2.28	16	50	42.0	52.5	1.9	-	-	0.55	20
IDEAL MU 42	FC 40	33	1380	Sintered Fireclay/Mullite	2.30	14	60	42.0	52.5	1.4	-	-	0.58	20
IDEAL B 50	HA 45	31	1370	Bauxite / Calcined Fireclay	2.37	15	60	50.0	44.0	1.8	-	-	0.58	22
IDEAL B 50 Z	HA 45	33	1385	Calcined Fireclay	2.35	17	50	49.0	46.5	1.5	-	-	0.60	20
IDEAL B 60	HA 55	35	1390	Bauxite / Calcined Fireclay	2.52	17	65	60.0	34.5	1.6	-	-	0.62	30
IDEAL B 65	HA 65	36	1410	Calcined Bauxite / Chamotte	2.56	18	65	65.0	29.0	1.7	-	-	0.65	30
IDEAL B 70	HA 65	36	1420	Calcined Bauxite / Fireclay	2.65	19	70	70.0	23.0	1.8	-	-	0.65	30
IDEAL B 75	HA 75	37	1430	Calcined Bauxite	2.70	19	80	75.0	18.0	1.9	-	-	0.66	30
IDEAL B 80	HA 75	37	1470	Calcined Bauxite	2.77	19	85	80.0	13.2	1.9	-	-	0.68	25
IDEAL B 80 C	HA 75	36	1420	Calcined Bauxite / Corundum	2.76	17	90	80.0	11.0	1.8	1.9	-	0.68	30
IDEAL B 83 AC	HA 75	37	1510	Bauxite / Corundum	2.86	15	130	81.5	10.3	1.7	3.8	-	0.68	30
IDEAL B 85	HA 75	37	1500	Bauxite / Corundum	2.85	17	85	82.5	11.5	1.9	-	-	0.70	30
IDEAL BK 85	HA 75	38	1520	Bauxite / Corundum	2.80	18	85	83.0	11.5	1.8	-	-	0.70	30
IDEAL B 85 S	HA 75	38	1540	Bauxite / Alumina	2.92	17	100	83.5	10.2	1.9	-	-	0.70	30
IDEAL B 85 C	HA 75	37	1460	Bauxite / Corundum	2.87	17	120	84.5	9.8	1.9	1.9	-	0.70	30
IDEAL K 85 C AL	HA 75	32	1320	Corundum	3.10	14	80	84.5	6.5	0.8	2.8	- / 3.1	0.70	30
IDEAL K 85 CR 10	HA 85	39	1650	Corundum / Chromium	3.22	15	120	85.0	3.0	0.6	1.6	9.0 / -	0.65	25
IDEAL KA 90	HA 85	40	1680	Corundum	3.10	14	90	88.5	9.3	0.6	-	-	0.72	25
IDEAL K 90 CR 5	HA 85	39	1650	Corundum / Chromium	3.20	14	125	89.0	3.0	0.5	1.6	4.5 / -	0.70	25

## Silicon Carbide Based Refractory Bricks

PRODUCT NAME	Classification	Refractoriness (S.C.)	Refractoriness Under Load °C (T <sub>0.5</sub> )	Raw Material Basis	Bulk Density (g/cm <sup>3</sup> )	Apparent Porosity (% b.v.)	C.C.S. (N/mm <sup>2</sup> )	Chemical Analysis (%)					Thermal Linear Expansion (% at 1000°C)	Thermal Shock Resistance (950°C/Water)
								Al <sub>2</sub> O <sub>3</sub>	SiO <sub>2</sub>	Fe <sub>2</sub> O <sub>3</sub>	P <sub>2</sub> O <sub>5</sub>	SiC		
IDEAL A 45 SiC 25	HA 45	38	1550 (Red)	Andalusite / SiC	2.57	14	60	45.0	26.5	0.9	-	25.0	0.55	100
IDEAL A 52 SiC 15	HA 45	38	1550 (Red)	Andalusite / SiC	2.62	14	75	51.5	30.5	0.9	-	15.0	0.58	100
IDEAL M 335 SiC 10	FC 30	32	1320 (Red)	Chamotte / SiC	2.28	13	65	35.5	49.5	1.1	-	10.0	0.50	20
IDEAL MU-40 SiC 10	FC 30	36	1420 (Red)	Chamotte/Silicon Carbide	2.36	13-14	70	39.0	46.5	1.3	-	10.0	0.58	25
IDEAL MU-50 SiC 10	HA 45	36	1420 (Red)	Chamotte-Mullite-Silicon Carbide	2.42	14-15	60	50	35.5	1.4	-	10.0	0.58	30

## Andalusite / Mullite / Silimanite Based Refractory Bricks

PRODUCT NAME	Classification	Refractoriness (S.C.)	Refractoriness Under Load °C (T <sub>0.5</sub> )	Raw Material Basis	Bulk Density (g/cm <sup>3</sup> )	Apparent Porosity (% b.v.)	C.C.S. (N/mm <sup>2</sup> )	Chemical Analysis (%)					Thermal Linear Expansion (% at 1000°C)	Thermal Shock Resistance (950°C/Water)
								Al <sub>2</sub> O <sub>3</sub>	SiO <sub>2</sub>	Fe <sub>2</sub> O <sub>3</sub>	P <sub>2</sub> O <sub>5</sub>	Cr <sub>2</sub> O <sub>3</sub>		
IDEAL MU 42	FC 40	33	1380	Sintered Fireclay / Mullite	2.30	14	60	42.0	52.5	1.4	-	-	0.58	20
IDEAL MU 44	FC 40	34	1415	Fireclay / Mullite	2.30	14	65	44.0	51.0	1.3	-	-	0.55	20
IDEAL MU 46	HA 45	36	1450	Fireclay / Mullite	2.38	15	70	46.0	50.0	1.4	-	-	0.56	20
IDEAL MU 48	HA 45	37	1450	Fireclay / Mullite	2.34	16	60	47.5	48.0	1.3	-	-	0.58	20
IDEAL MU 60	HA 55	37	1540	Mullite / High Al. Raw Mat.	2.50	14	70	60.0	36.5	1.1	-	-	0.60	30
IDEAL A 60 CR 2	HA 55	38	1625	Andalusite / Chromium	2.62	14	70	60.0	34.0	0.9	-	2.0	0.60	30
IDEAL A 60 CS	HA 55	38	1540	Andalusite	2.52	15	75	60.0	36.5	1.3	0.9	-	0.60	30
IDEAL A 63	HA 55	38	1620	Andalusite	2.58	14	70	62.5	34.5	1.0	-	-	0.60	30
IDEAL MU 65	HA 65	38	1550	Mullite / High Al. Raw Mat.	2.54	17	70	65.0	32.0	1.0	-	-	0.64	30
IDEAL A 65 K	HA 55	39	1660	Corundum / Andalusite	2.72	14	70	64.5	32.5	0.9	-	-	0.60	30
IDEAL MU 72	HA 75	38	1550	Mullite / High Al. Raw Mat.	2.60	18	70	71.0	24.5	1.1	-	-	0.66	30
IDEAL FM 72	HA 75	39	1650	Fused Mullite	2.64	15	90	72.0	26.5	0.4	-	-	0.66	30
IDEAL FM 76	HA 75	40	1700	Fused Mullite / WFA	2.65	15	90	76.0	23.0	0.3	-	-	0.66	30
IDEAL FC 70	HA 75	39	1680	WFA (Corundum) / Andalusite	2.80	14	80	70.0	27.0	0.7	-	-	0.64	20
IDEAL FC 77	HA 75	39	1660	WFA (Corundum) / Andalusite	2.82	15	80	77.0	21.0	0.6	-	-	0.68	30
IDEAL MU 80 S	HA 75	39	1600	Mullite / High Al. Raw Mat.	2.65	17	65	79.0	19.0	0.9	-	-	0.68	30

## Refractory Mortars

PRODUCT NAME	Classification Temperature (EN ISO 1927-1) at °C	Main Raw Material Base (EN 1402-1)	Form of Delivery	Chemical Analysis (%) (EN ISO 12677)				Grain Size (mm) (EN ISO 1927-3)	Approx. water addition (EN 1402-4) (lt/100 kg dry material)
				Al <sub>2</sub> O <sub>3</sub>	SiO <sub>2</sub>	Fe <sub>2</sub> O <sub>3</sub>	SiC/MgO		
MAC I	1350	Quartz	Wet	12.8	81.5	1.0	-	0.5	-
MAC II	1500	Chamotte	Wet	33.0	59.0	1.4	-	1.0	-
FIRECLAY	1350	Chamotte	Dry	30.0	63.0	1.8	-	1.0	23 - 28
MAT MOR 38	1450	Chamotte	Dry	38.0	57.5	1.5	-	0.7	30 - 35
MAT MOR 45	1540	Chamotte / Bauxite	Dry	45.0	49.5	1.6	-	0.6	27 - 35
MAT FIRE	1400	Chamotte	Dry	37.0	48.0	4.2	-	1.0	25 - 30
SUPER	1450	Chamotte	Dry	37.0	58.0	1.8	-	1.0	32
MAT MK 4	1480	Chamotte	Dry	37.0	58.0	1.7	-	0.7	35
MAC D	1500	Chamotte	Dry	35.5	57.0	1.9	-	0.7	25 - 32
MAC 50 D	1500	Chamotte / Bauxite	Dry	50.0	41.5	1.5	-	0.7	25 - 32
MAC 53 M D	1550	Sintered Mullite	Dry	53.0	42.0	1.3	-	0.6	22 - 30
MAC 80 D	1650	Corundum	Dry	80.0	13.0	0.5	-	0.5	20 - 30
SUPER AL	1600	Bauxite	Dry	70.0	23.5	1.7	-	1.0	32
MAT MOR 80 D	1700	Corundum	Dry	80.0	13.0	0.5	-	0.5	20 - 30
MAT HF 4	1650	Corundum	Dry	80.0	13.5	0.9	-	0.7	35
MAT SiC 75	1500	Silicon Carbide	Dry	12.0	4.0	0.1	74.0 / -	0.15	32
MAC ZM1S	1700	Magnesia	Dry	1.5	6.7	2.2	- / 85.7	0.1	35

## Magnesia Spinel

PRODUCT NAME	Chemical Analysis (%)						Bulk Density (EN 1402-6) at 110°C (g/cm³)	Apparent Porosity (%)	C.C.S. (N/mm²)	Refractoriness Under Load °C (T <sub>0.5</sub> )	Thermal Shock Resistance 950 °C / Air	Linear Thermal Expansion (%) 1400°C	Thermal Conductivity (W/mK)		
	MgO	Al <sub>2</sub> O <sub>3</sub>	SiO <sub>2</sub>	CaO	Fe <sub>2</sub> O <sub>3</sub>	ZrO <sub>2</sub>							700°C	800°C	1200°C
IDEAL 11H	87.5	10.7	0.2	0.8	0.5	-	2.95	16.0	60	1700	100	1.70	3.40	-	2.10
IDEAL 8H	90.5	8.5	0.2	0.8	0.5	-	2.95	15.5	70	1700	100	1.71	3.59	-	2.10
IDEAL 5H	93.2	5.0	0.2	0.8	0.5	-	2.96	15.2	60	1700	100	1.69	3.59	-	2.12
IDEAL HF	88.0	10.5	0.2	0.8	0.5	-	2.96	15.5	65	1700	100	1.68	3.40	-	2.10
IDEAL A	87.0	11.3	0.3	0.9	0.5	-	2.90	17.0	70	1700	100	1.68	3.40	-	2.10
IDEAL AZ	82.7	12.0	0.3	0.8	0.5	2.7	2.94	16.5	65	1700	100	1.74	3.46	-	2.42
IDEAL 3	91.0	4.1	1.3	0.6	1.7	-	2.86	19.0	65	1680	100	1.81	-	2.80	2.50
IDEAL 8E	89.0	8.5	0.3	0.9	0.5	-	2.91	17.0	60	1700	100	1.70	3.50	-	2.10
IDEAL 5E	92.4	5.5	0.3	0.9	0.5	-	2.91	16.5	75	1700	100	1.68	3.58	-	2.11
IDEAL 2E	95.5	2.4	0.3	0.9	0.5	-	2.91	16.5	75	1700	100	1.68	3.58	-	-
IDEAL 5NG	92.5	5.5	0.3	0.9	0.5	-	2.92	15.5	65	1700	100	1.68	3.58	-	2.11
IDEAL SF 12	85.1	11.2	1.0	0.6	1.5	-	2.90	18.0	65	1680	100	1.54	-	3.40	2.93
IDEAL SF 7	88.0	7.6	1.0	0.6	1.7	-	2.90	18.0	70	1680	100	1.54	-	3.87	2.97
IDEAL 12	84.1	11.8	1.2	0.5	1.7	-	2.85	19.0	60	1680	100	1.54	-	3.42	2.92
IDEAL 7	87.3	8.0	1.3	0.5	2.0	-	2.85	19.0	70	1680	100	1.52	-	3.84	2.94
IDEAL SF5 NSM	90.9	5.1	1.0	0.5	1.7	-	3.00	13.0	110	1680	100	1.68	3.86	-	-
IDEAL 3 NSM	91.0	4.1	1.3	0.6	1.7	-	2.92	15.0	70	1680	100	1.80	3.80	-	-
IDEAL 5E NSM	92.4	5.5	0.3	0.9	0.5	-	3.00	10.0	110	1700	100	1.68	3.70	-	-
IDEAL 2H NSM	95.5	2.4	0.2	0.8	0.5	-	3.00	10.0	110	1700	100	1.68	3.80	-	-
IDEAL 5H NSM	93.2	5.0	0.2	0.8	0.5	-	3.00	10.0	110	1700	100	1.68	3.80	-	-

## Magnesia Carbon Bricks

PRODUCT NAME	Chemical Analysis (%)			Bulk Density (EN 1402-6) at 110°C (g/cm³)		Apparent Porosity (%)		Cold Crushing Strength (N/mm²)		Carbon Content (%)
	MgO	Al <sub>2</sub> O <sub>3</sub>	Fe <sub>2</sub> O <sub>3</sub>	As supplied	After Coked ASTM C831	As supplied	After Coked ASTM C831	As supplied	After Coked ASTM C831	
MC H 9710 F2	96-98	0.3	0.8	3.01	2.96	6.5	11.5	40	18	9
MC H 9715 F2	96-98	0.3	0.8	2.96	2.93	7.5	12.5	30	15	14
MC H L610	90-94	0.5	1.2	2.85	2.80	8.0	14.0	40	15	9
MC H L605 F2	95-97	0.3	0.8	3.02	2.97	5.5	10.5	50	25	4
MC H L615 F2	95-97	0.3	0.8	2.94	2.91	7.5	12.5	30	15	14

## Magnesia Chrome

PRODUCT NAME	Chemical Analysis (%)						Bulk Density (ISO 5017) at 110°C (g/cm³)	Open Porosity (%) (EN 993-1)	C.C.S. (N/mm²) (ISO 10059-1)	Refractoriness Under Load °C (T <sub>0.5</sub> ) (EN 993-8)	Thermal Shock Resistance 950 °C / Air	Linear Thermal Expansion (%) 1400°C (EN 993-19)	Thermal Conductivity (W/mK) (ISO 8894-1.2)		
	MgO	Al <sub>2</sub> O <sub>3</sub>	SiO <sub>2</sub>	CaO	Fe <sub>2</sub> O <sub>3</sub>	Cr <sub>2</sub> O <sub>3</sub>							700°C	800°C	1200°C
IDEAL MC3	76.8	3.7	2.5	1.4	6.2	8.6	2.90	19.0	35	1580	80	1.64	-	3.80	-
IDEAL MC6	83.0	3.0	2.1	0.5	3.8	6.0	2.90	19.0	60	1680	80	1.57	-	3.80	-
IDEAL MCF25	53.7	6.5	0.7	0.6	12.8	25.0	3.36	13.5	75	1700	-	1.60	3.6	3.4 (1000 °C)	3.6
IDEAL MCZ28PFG	51.0	6.8	1.2	0.7	12.3	28.0	3.30	16.5	70	1700	-	1.50	3.8	3.6 (1000 °C)	3.6

## Magnesia Based Unshaped Materials

PRODUCT NAME	Max Recommended Temperature (°C)	Type of Bond	Chemical Analysis (%)				
			MgO	CaO	Al <sub>2</sub> O <sub>3</sub>	Fe <sub>2</sub> O <sub>3</sub>	SiO <sub>2</sub>
<b>MAT TUN 60</b>	1750	Chemical / Ceramic	59.0	2.3	1.3	5.0	32.5
<b>MAT TUN 80</b>	1750	Chemical / Ceramic	82.0	2.8	0.6	0.5	14.1
<b>MAT TUN 85-L</b>	1750	Chemical / Ceramic	85.0	2.8	0.6	0.6	10.5
<b>MAT GUN 90 S</b>	1750	Chemical / Ceramic	90.1	2.4	1.0	0.2	6.3

## Dense Castables

PRODUCT NAME	Classification Temperature (EN ISO 1927-1) at °C	Main Raw Material Base (EN 1402-1)	Chemical Analysis (%) (EN ISO 12677)			Cold Crushing Strength (N/mm <sup>2</sup> ) (EN ISO 1927-6)		Grain Size (mm) (EN ISO 1927-3)	Permanent Linear Change (%) (EN ISO 1927-6)	Reversible thermal expansion at 1000°C (%)	Material required (kg/m <sup>3</sup> ) (EN ISO 1927-5)	Approx. water addition (EN 1402-4) (lt/100 kg dry material)
			Al <sub>2</sub> O <sub>3</sub>	SiO <sub>2</sub>	Fe <sub>2</sub> O <sub>3</sub>	at 1100°C	at 1500°C					
<b>MAT GR</b>	1300	Chamotte	30	54	2.5	22	-	6	-0.65	0.52	2130	11 - 14
<b>MAT 35</b>	1300	Chamotte	35	49	4.1	22	-	6	-0.40	0.52	2190	10 - 13
<b>MAT 42 C</b>	1350	Chamotte	44	41.5	3.6	27	-	6	-0.15	0.55	2200	11 - 13
<b>MAT 42</b>	1350	Chamotte	40	44.5	4.4	24	-	6	-0.40	0.54	2240	10 - 12.5
<b>MAT 45 TS</b>	1450	Chamotte	45	46.5	1.4	25	-	6	-0.20	0.55	2200	10 - 13
<b>MAT 45</b>	1440	Chamotte	44.5	45	2.3	30	-	6	-0.45	0.58	2200	10 - 13
<b>MAT 50</b>	1480	Chamotte	49	43	1.4	40	-	6	-0.20	0.58	2250	10 - 12
<b>MAT 50 S</b>	1500	High alumina raw materials	50	41	1.4	42	-	6	-0.20	0.60	2250	9.8 - 11.5
<b>MAT 60 TC</b>	1500	Bauxite/Chamotte	60	29	1.3	35	-	6	-0.30	0.62	2250	12 - 14
<b>MAT 60 A</b>	1550	Andalusite	60.5	30	0.8	42	-	6	+0.20	0.65	2550	9 - 12
<b>MAT 60 F</b>	1550	Andalusite	60.5	30	0.8	38	-	3	+0.20	0.65	2550	9 - 12
<b>MAT 75 P</b>	1600	Bauxite	75	13,2	1.4	20	-	6	-0.30	0.65	2530	14-16
<b>MAT 77 TS</b>	1550	Bauxite	76	14	1.7	27 (1000 °C)	-	6	-0.30	0.65	2460	10 - 13
<b>MAT 80 TS</b>	1620	Bauxite	76	15	1.8	24 (1000 °C)	-	6	-0.35	0.65	2480	9 - 12
<b>MAT 80</b>	1600	Bauxite	80	6.9	1.8	35	-	6	-0.20	0.75	2600	9 - 12
<b>MAT 80 S</b>	1630	Bauxite	83	6	1.4	50	-	6	-0.20	0.75	2600	9 - 11
<b>MAT 80 HT</b>	1650	Bauxite	80.5	10.5	1.4	45	-	6	-0.25	0.75	2570	9.5-11
<b>MAT 90</b>	1650	Corundum	90	0.6	0.5	42	60	6	-0.15	0.80	2850	9 - 11
<b>MAT 94</b>	1700	Tabular Alumina	93.5	0.15	0.15	50	60	6	-0.15	0.81	2900	7.5 - 9.0
<b>MAT 95 F</b>	1720	Tabular Alumina	94	0.15	0.1	40	50	3	-0.20	0.82	2800	8 - 10
<b>MAT 95 F PF</b>	1700	Tabular Alumina	94	0.15	0.1	45	50	3	-0.15	0.82	2850	7.5 - 9.0
<b>MAT 96 S</b>	1800	Tabular Alumina	95	0.12	0.1	70	70	6	-0.10	0.82	2930	7.5 - 9.0
<b>MAT 96 W</b>	1750	Corundum	96.0	0.1	0.1	35	-	6	-0.15	0.82	2930	7.5 - 8.5

## Medium Cement Castables

PRODUCT NAME	Classification Temperature (EN ISO 1927-1) at °C	Main Raw Material Base (EN 1402-1)	Chemical Analysis (%) (EN ISO 12677)			Cold Crushing Strength (N/mm <sup>2</sup> ) (EN ISO 1927-6) at 1100°C	Grain Size (mm) (EN ISO 1927-3)	Permanent Linear Change (%) (EN ISO 1927-6) at 1100°C	Reversible thermal expansion at 1000°C (%)	Material required (kg/m <sup>3</sup> ) (EN ISO 1927-5)	Approx. water addition (EN 1402-4) (lt/100 kg dry material)
			Al <sub>2</sub> O <sub>3</sub>	SiO <sub>2</sub>	Fe <sub>2</sub> O <sub>3</sub>						
MAT PLUS MC 35	1320	Chamotte	35.0	58.0	1.5	75	6	-0.45	0.55	2220	5.5 - 7.0
MAT PLUS MC 40	1420	Chamotte	40.0	53.5	1.5	70	6	-0.40	0.53	2260	5.0 - 6.5
MAT PLUS MC 45	1440	Chamotte	45.0	48.5	1.5	75	6	-0.40	0.55	2280	5.5 - 7.0
MAT PLUS MC 50	1500	Chamotte	50.0	43.5	1.4	80	6	-0.35	0.58	2400	5.0 - 6.0
MAT PLUS MC 50 E	1500	Chamotte	50.0	44.5	1.45	90 (1000 °C)	6	-0.20	0.58	2425	5.5 - 6.5
MAT PLUS MC 50 R	1500	Fireclay	50.0	44.5	0.9	90	6	-0.35	0.53	2350	5.0 - 6.5
MAT PLUS MC 58	1550	Bauxite/Chamotte	58.0	35.5	1.9	90	6	-0.35	0.60	2400	6.0 - 7.2
MAT PLUS MC 60 M	1500	Mullite/Bauxite	60.0	31.5	1.8	100	6	-0.30	0.60	2530	4.6 - 6.2
MAT PLUS MC 78	1500	Bauxite	77.5	13.8	1.8	80	6	-0.35	0.70	2800	5.5 - 7.0
MAT PLUS MC 88	1600	Corundum	87.5	7.0	0.8	80	6	-0.15	0.75	3070	5.5 - 7.0

## Silicon Carbide Medium Cement Castables

PRODUCT NAME	Classification Temperature (EN ISO 1927-1) at °C	Main Raw Material Base (EN 1402-1)	Chemical Analysis (%) (EN ISO 12677)					Bulk Density (EN ISO 1927-6) at 110°C (g/cm <sup>3</sup> )	Cold Crushing Strength (N/mm <sup>2</sup> ) (EN ISO 1927-6) at 1100°C	Grain Size (mm) (EN ISO 1927-3)	Permanent Linear Change (%) (EN ISO 1927-6) at 1100°C	Reversible thermal expansion at 1000°C (%)	Material required (kg/m <sup>3</sup> ) (EN ISO 1927-5)	Approx. water addition (EN 1402-4) (lt/100 kg dry material)
			Al <sub>2</sub> O <sub>3</sub>	SiO <sub>2</sub>	Fe <sub>2</sub> O <sub>3</sub>	SiC	ZrO <sub>2</sub>							
MAT PLUS MC 9 SiC E	1480 (Red)	Chamotte / SiC	35.5	48.0	1.3	9.0	-	2.23	80	3	-0.3	0.50	2270	5.5 - 7.0
MAT PLUS MC 30 SiC CH	1430 (Red)	Chamotte / SiC	31.0	36.0	0.8	28.0	-	2.25	80	6	-0.25	0.55	2300	6.0 - 7.0
MAT PLUS MC 46 SiC E	1500 (Red)	Chamotte / SiC	23.0	28.0	1.2	46.0	-	2.46	70	3	-0.35	0.55	2520	5.5 - 7.0
MAT PLUS MC 50 SiC CH	1500 (Red)	Chamotte / SiC	22.5	24.0	0.6	48.0	-	2.35	85	6	-0.20	0.58	2380	6.0 - 7.0
MAT PLUS MC 60 SiC E	1500 (Red)	Chamotte / SiC	17.0	18.0	1.0	58.0	-	2.37	70	3	-0.45	0.56	2420	5.5 - 7.5
MAT PLUS MC 70 SiC E	1500 (Red)	SiC / Fireclay	13.0	15.5	0.8	67.0	-	2.42	75	3	-0.35	0.56	2470	5.5 - 7.0

## Low Cement Castables

PRODUCT NAME	Classification Temperature (EN ISO 1927-1) at °C	Main Raw Material Base (EN 1402-1)	Chemical Analysis (%) (EN ISO 12677)				Cold Crushing Strength (N/mm <sup>2</sup> ) (EN ISO 1927-6)		Grain Size (mm) (EN ISO 1927-3)	Permanent Linear Change (%) (EN ISO 1927-6) at 1100°C	Reversible thermal expansion at 1000°C (%)	Material required (kg/m <sup>3</sup> ) (EN ISO 1927-5)	Approx. water addition (EN 1402-4) (lt/100 kg dry material)
			Al <sub>2</sub> O <sub>3</sub>	SiO <sub>2</sub>	Fe <sub>2</sub> O <sub>3</sub>	ZrO <sub>2</sub> /SiC	at 1100°C	at 1500°C					
MAT PLUS GR	1200	Chamotte	29.0	63.5	1.0	-	80	-	6	-0.40	-	2060	5.5 - 7.0
MAT PLUS 35	1350	Chamotte	35.0	58.5	1.3	-	80	-	6	-0.40	0.55	2190	5.5 - 7.0
MAT PLUS 35 COR 10	1300	Cordierite	35.5	51.0	1.7	-	90 (1000 °C)	-	6	-0.20 (1000 °C)	-	2100	6.0 - 7.0
MAT PLUS 42	1420	Chamotte	42.0	52.5	1.4	-	95	-	6	-0.35	0.57	2290	5.0 - 6.5
MAT PLUS 50	1450	Chamotte	48.0	44.5	1.3	-	50	-	6	-0.15	0.57	2280	5.5 - 7.5
MAT PLUS 50 ML	1500	Chamotte	50.0	45.5	1.4	-	80	-	6	-0.25	0.57	2420	4.6 - 6.2
MAT PLUS 50 ML E	1550	Chamotte / Mullite	50.0	47.0	1.4	-	90	100	6	-0.50	0.60	2350	5.0 - 6.5
MAT PLUS 50 UHS	1500	Calcined Clay	50.0	45.0	1.2	-	135	-	3	-0.25	0.55	2380	4.8 - 5.6
MAT PLUS 50 AR	1520	Chamotte	50.0	45.0	0.7	-	100	-	6	-0.25	0.58	2380	5.0 - 6.0
MAT PLUS 52 A	1530	Andalusite	52.0	42.5	0.7	-	90	100	6	-0.20	0.63	2400	5.0 - 6.5
MAT PLUS 58 A	1650	Andalusite	58.0	38.5	0.8	-	100	100	8	+0.02	0.65	2690	4.8 - 6.0
MAT PLUS 60 A	1670	Andalusite	58.0	38.5	1.0	-	90	100(1400 °C)	6	+0.20	0.62	2600	4.3 - 5.5
MAT PLUS 60 M	1650	Sintered Mullite	60.0	35.0	1.15	-	95	100	6	-0.35	0.60	2460	4.4 - 5.8
MAT PLUS 60 M AC	1700	Sintered Mullite	60.0	35.5	0.9	-	100	110	8	-0.35	0.60	2530	4.8 - 6.0
MAT PLUS 62	1650	Sintered Mullite	62.0	35.0	0.8	-	80	90	6	-0.10	0.65	2600	4.5 - 6.0
MAT PLUS 65 M	1670	Sintered Mullite	65.0	30.0	1.0	-	95	100	6	-0.10	0.65	2550	4.5 - 6.0
MAT PLUS 70	1600	Bauxite - Chamotte	70.0	25.0	1.4	-	80	95	6	-0.20	0.65	2520	5.5 - 7.0
MAT PLUS 75	1550	Bauxite - Mullite	74.0	17.5	2.0	-	100	110	6	-0.10	0.67	2750	4.5 - 6.0
MAT PLUS 80	1600	Bauxite	79.5	13.5	1.6	-	100	100	6	-0.25	0.70	2740	4.5 - 6.0
MAT PLUS 80 PF	1600	Bauxite	79.5	13.5	1.6	-	110	100	6	-0.25	0.70	2740	4.5 - 6.0
MAT PLUS 80 H	1620	Bauxite	84.0	9.8	1.3	-	120	120	6	-0.10	0.70	2950	4.5 - 5.5
MAT PLUS 80 E	1650	Bauxite - Andalusite	79.0	13.5	1.5	-	100	120	6	-0.20	0.65	2750	4.5 - 6.0
MAT PLUS 80 EA	1650	Bauxite - Andalusite	75.0	18.5	1.3	-	100	100	6	0.05	0.65	2800	4.5 - 5.5
MAT PLUS 80 UHS	1580	Bauxite	80.0	12.7	1.5	-	190	170	6	-0.25	0.70	2840	4.0 - 5.0
MAT PLUS 82 UHS	1600	Bauxite	81.5	12.7	1.6	-	150	150	6	-0.35	0.70	2830	4.0 - 5.0
MAT PLUS 83 HS	1600	Bauxite	82.5	10.5	1.6	-	145	145	6	-0.30	0.70	2900	4.0 - 5.0
MAT PLUS 85	1650	Bauxite - Corundum	83.0	11.2	1.3	-	100	100	6	-0.30	0.70	2870	4.3 - 5.8
MAT PLUS 90	1680	Corundum	90.0	4.8	0.5	-	110	110	6	-0.20	0.80	3150	4.0 - 5.5
MAT PLUS 93 SP 4	1800	Sintered Alumina/Spinel	93.0	0.15	0.05	-	100	125	8	-0.05	0.85	3190	4.0 - 5.0
MAT PLUS 95 W	1700	WFA	94.5	3.2	0.15	-	80	100	6	-0.10	0.78	3060	4.0 - 5.5
MAT PLUS 95 T	1750	Sintered Alumina	94.5	3.0	0.1	-	95	100	6	-0.10	0.80	3100	4.0 - 5.5
MAT PLUS 98 T	1860	Tabular Alumina	97.5	0.15	0.1	-	55	80	6	-0.10	0.80	3080	4.0 - 5.5
MAT PLUS 20 ZR	1500	Synthetic Raw Materials	49.5	25.0	0.8	20.0	80	100	6	-0.05	0.68	2900	4.5 - 6.0
MAT PLUS 25 ZR	1600	Synthetic Raw Materials	50.0	20.5	0.5	25.0	110	110	6	-0.20	0.70	3000	4.5 - 6.0
MAT PLUS ZS 10	1500 (Red)	Sintered Mullite - Zircon	50.0	26.0	0.9	9.7/10.0	100	120	6	-0.25	0.60	2700	4.5 - 5.5
MAT PLUS 22 ZR SIC 5	1520	Synthetic Raw Materials	47.0	21.5	0.5	22.0/4.5	90	-	6	-0.10	0.68	2900	4.5 - 6.0

### Silicon Carbide Low Cement Castables

PRODUCT NAME	Classification Temperature (EN ISO 1927-1) at °C	Main Raw Material Base (EN 1402-1)	Chemical Analysis (%) (EN ISO 12677)					Bulk Density (EN ISO 1927-6) at 110°C (g/cm³)	Cold Crushing Strength (N/mm²) (EN ISO 1927-6)		Grain Size (mm) (EN ISO 1927-3)	Permanent Linear Change (%) (EN ISO 1927-6)	Reversible thermal expansion at 1000°C (%)	Material required (kg/m³) (EN ISO 1927-5)	Approx. water addition (EN 1402-4) (lt/100 kg dry material)
			Al <sub>2</sub> O <sub>3</sub>	SiO <sub>2</sub>	Fe <sub>2</sub> O <sub>3</sub>	SiC	ZrO <sub>2</sub>		at 1100°C	at 1400°C					
<b>MAT PLUS 10 SiC</b>	1530 (Red)	Chamotte / SiC	41.0	43.5	0.95	10.0	-	2.35	85	90	6	-0.25	0.60	2385	4.6 - 5.8
<b>MAT PLUS 10 SiC M</b>	1600 (Red)	Sintered Mullite / SiC	52.5	32.5	1.15	10.0	-	2.46	130	130	6	-0.25	0.60	2490	4.0 - 5.0
<b>MAT PLUS 30 SiC</b>	1500	SiC / Chamotte	34.0	33.0	0.3	29.0	-	2.28	100	95	3	-0.20	0.55	2330	5.5 - 6.5
<b>MAT PLUS 30 SiC A</b>	1530 (Red)	SiC / Andalusite	41.5	26.5	0.65	29.0	-	2.65	110	100	8	0.20	0.56	2700	4.2 - 5.0
<b>MAT PLUS 30 SiC M</b>	1540 (Red)	SiC/Sintered Mullite	41.5	26.0	1.1	30.0	-	2.50	130	130	6	-0.25	0.56	2540	4.0 - 5.0
<b>MAT PLUS 32 SiC</b>	1500	SiC / Corundum	57.0	7.0	0.3	31.0	-	2.55	100	95	6	-0.20	0.60	2600	5.5 - 6.5
<b>MAT PLUS 40 SiC</b>	1500	SiC / Chamotte	29.0	27.0	0.2	39.0	-	2.33	100	100	6	-0.20	0.55	2380	5.5 - 6.5
<b>MAT PLUS 50 SiC</b>	1500	SiC / Chamotte	25.0	22.0	0.2	48.0	-	2.38	100	100	3	-0.20	0.55	2420	5.5 - 6.5
<b>MAT PLUS 50 SiC 10 M</b>	1500 (Red)	SiC/Sintered Mullite	50.0	34.0	1.0	10.0	-	2.43	80 (1000°C)	90	8	-0.35 (1000°C)	0.60	2480	4.5 - 6.0
<b>MAT PLUS 60 SiC</b>	1500	SiC / Chamotte	20.5	18.0	0.6	58.0	-	2.42	100	100	3	-0.20	0.56	2460	5.5 - 6.5
<b>MAT PLUS 70 SiC</b>	1500	SiC / Chamotte	16.0	12.0	0.2	68.0	-	2.48	120	100	6	-0.25	0.56	2520	4.3 - 5.8
<b>MAT PLUS 83 SiC</b>	1550	Silicon Carbide	12.0	4.0	0.2	79.0	-	2.50	95	95	3	-0.10	0.78	2550	5.0 - 6.5
<b>MAT PLUS 57 SiC 5</b>	1580	Andalusite / SiC	56.5	36.0	0.8	5.0	-	2.55	90	100	8	-0.15	0.60	2600	4.5 - 6.0
<b>MAT PLUS 55 M SiC 7</b>	1550 (Red)	Sintered Mullite / SiC	55.5	33.0	1.0	7.0	-	2.52	110	120	6	-0.25	0.60	2570	4.5 - 5.5
<b>MAT PLUS ZS 10</b>	1500 (Red)	Sintered Mullite/Synthetic Raw Materials/SiC	50.0	26.0	0.9	10.0	9.7	2.65	100	120	6	-0.25	0.60	2700	4.5 - 5.5

### Chromium Oxide Low Cement Castables

PRODUCT NAME	Classification Temperature (EN ISO 1927-1) at °C	Main Raw Material Base (EN 1402-1)	Chemical Analysis (%) (EN ISO 12677)				Cold Crushing Strength (N/mm²) (EN ISO 1927-6)		Grain Size (mm) (EN ISO 1927-3)	Permanent Linear Change (%) (EN ISO 1927-6)	Reversible thermal expansion at 1000°C (%)	Material required (kg/m³) (EN ISO 1927-5)	Approx. water addition (EN 1402-4) (lt/100 kg dry material)
			Al <sub>2</sub> O <sub>3</sub>	SiO <sub>2</sub>	Fe <sub>2</sub> O <sub>3</sub>	Cr <sub>2</sub> O <sub>3</sub>	at 1100°C	at 1500°C					
<b>MAT PLUS 85 CR 8</b>	1700	Corundum	85.0	0.9	0.5	8.0	80	100	8	-0.15	0.80	3250	4.5 - 6.0
<b>MAT PLUS 88 CR 8 S</b>	1700	Synthetic Raw Materials / Chrome Oxide	87.5	2.4	0.6	8.0	70	100	10	-0.15	0.82	3130	4.5 - 6.0
<b>MAT PLUS 88 CR 8</b>	1700	Sintered Alumina / Chrome Oxide	88.0	2.1	0.1	8.0	80	110	6	-0.15	0.82	3130	4.5 - 6.0
<b>MAT PLUS 90 CR 4</b>	1700	Sintered Alumina / Chrome Oxide	91.0	2.2	0.1	4.0	80	110	6	-0.15	0.82	3070	4.5 - 6.0
<b>MAT PLUS 90 CR 4 S</b>	1700	Synthetic Raw Materials / Chrome Oxide	90.0	2.8	0.7	4.0	85	90	6	-0.15	0.83	3050	4.5 - 6.0
<b>MAT PLUS 94 CR 2</b>	1700	Sintered Alumina / Chrome Oxide	93.5	2.2	0.1	2.0	90	85	6	-0.15	0.83	3040	4.5 - 6.0
<b>MAT PLUS 95 QC</b>	1750	Sintered Alumina	95.0	3.0	0.1	2.0	95	95	6	-0.10	0.80	3000	4.5 - 6.0
<b>MAT PLUS 58 M CR 2</b>	1650	Sintered Mullite	58.0	35	1.0	2.0	90	100	6	-0.20	0.64	2560	4.5 - 6.0

### Anti-Wetting Low Cement Castables

PRODUCT NAME	Classification Temperature (EN ISO 1927-1) at °C	Main Raw Material Base (EN 1402-1)	Chemical Analysis (%) (EN ISO 12677)				Cold Crushing Strength (N/mm²) (EN ISO 1927-6)	Grain Size (mm) (EN ISO 1927-3)	Reversible thermal expansion at 1000°C (%)	Material required (kg/m³) (EN ISO 1927-5)	Approx. water addition (EN 1402-4) (lt/100 kg dry material)
			Al <sub>2</sub> O <sub>3</sub>	SiO <sub>2</sub>	Fe <sub>2</sub> O <sub>3</sub>	BaO					
<b>MAT PLUS 60 M AL</b>	1420	Sintered Mullite	57.0	33.5	1.0	3.0	80	6	0.63	2500	4.5 - 6.0
<b>MAT PLUS 77 UHS AL</b>	1320	Bauxite	77.0	10.2	1.4	3.0	160	8	0.65	2880	4.3 - 5.0
<b>MAT PLUS 80 UHS AL</b>	1320	Corundum	80.0	8.3	0.8	3.0	170	6	0.67	3070	4.2 - 5.2
<b>MAT PLUS 80 EA AL</b>	1250	Bauxite - Andalusite	73.0	16.0	1.3	3.0	85	6	0.65	2800	4.5 - 6.0
<b>MAT PLUS 80 AL</b>	1200	Bauxite	76.0	10.7	1.4	5.0	90	8	0.67	2950	4.0 - 5.5

### Ultra Low Cement Castables

PRODUCT NAME	Classification Temperature (EN ISO 1927-1) at °C	Main Raw Material Base (EN 1402-1)	Chemical Analysis (%) (EN ISO 12677)				Cold Crushing Strength (N/mm <sup>2</sup> ) (EN ISO 1927-6)		Thermal Conductivity (W/mK) (EN 993-14)	Grain Size (mm) (EN ISO 1927-3)	Permanent Linear Change (%) (EN ISO 1927-6)			Reversible thermal expansion at 1000°C (%)	Material required (kg/m <sup>3</sup> ) (EN ISO 1927-5)	Approx. water addition (EN 1402-4) (lt/100 kg dry material)
			Al <sub>2</sub> O <sub>3</sub>	SiO <sub>2</sub>	Fe <sub>2</sub> O <sub>3</sub>	Cr <sub>2</sub> O <sub>3</sub>	at 1100°C	at 1500°C			at 800°C	at 1100°C				
<b>MAT CAST 58 ULC A</b>	1700	Andalusite	58.0	38.0	0.7	-	65	90	1.74	6	+0.05		0.65	2650	4.5 - 6.0	
<b>MAT CAST 85 ULC E</b>	1700	Bauxite - Corundum	84.5	9.0	1.4	-	60	110	2.25	10	-0.05		0.70	2950	4.5 - 5.5	
<b>MAT CAST 95 ULC CR1</b>	1800	Sintered Alumina	95.0	2.2	0.1	1.0	55	80	2.92	6	-0.10		0.80	3120	4.0 - 5.5	
<b>MAT CAST 97 ULC T</b>	1800	Sintered Alumina	97.0	2.6	0.1	-	55	80	2.92	6	-0.10		0.80	3130	4.0 - 5.5	

### Micron Ultra Low Cement Castables

PRODUCT NAME	Classification Temperature (EN ISO 1927-1) at °C	Main Raw Material Base (EN 1402-1)	Chemical Analysis (%) (EN ISO 12677)						Bulk Density (EN ISO 1927-6) at 110°C (g/cm <sup>3</sup> )	Cold Crushing Strength (N/mm <sup>2</sup> ) (EN ISO 1927-6)					Thermal Conductivity (W/mK) (EN 993-14)	Grain Size(mm) (EN ISO 1927-3)	Permanent Linear Change (%) (EN ISO 1927-6)			Material required (kg/m <sup>3</sup> ) (EN ISO 1927-5)	Reversible Thermal Expansion at 1000°C (%)	Approx. water addition (EN 1402-4) (lt/100 kg dry material)
			Al <sub>2</sub> O <sub>3</sub>	SiO <sub>2</sub>	Fe <sub>2</sub> O <sub>3</sub>	ZrO <sub>2</sub>	SiC	BaO		at 110°C	at 800°C	at 1100°C	at 1400°C	at 1500°C			at 800°C	at 110°C	at 1100°C			
<b>MAT MICRON 48 EA</b>	1580	Chamotte	47.5	49.5	1.0	-	-	-	-	65	115	110	-	120	1.28	10	-0.05	-0.30	-	2440	0.55	4.5 - 5.2
<b>MAT MICRON 60 M</b>	1650	Sintered Mullite	60.0	35.0	1.1	-	-	-	2.50	60	90	110	-	110	1.85	10	-0.05	-0.25	-0.05	2540	0.60	4.0 - 5.0
<b>MAT MICRON 60 A</b>	1670	Andalusite	60.0	36.5	0.7	-	-	-	2.64	70	75	90	-	100	1.75	10	-	0.25	-	2700	0.65	4.0 - 4.8
<b>MAT MICRON 80 E</b>	1660	Bauxite	77.5	17.5	1.4	-	-	-	2.78	70	100	130	-	135	2.28	10	-0.05	-0.35	0.20	2840	0.72	4.0 - 5.0
<b>MAT MICRON 80</b>	1620	Bauxite	80.0	11.0	1.5	-	-	-	2.87	75	100	125	-	135	2.25	10	-	-0.40	-0.70	2940	0.68	4.2 - 4.8
<b>MAT MICRON 80 AL</b>	1320	Bauxite	80.0	10.2	1.4	-	-	2.5	2.83	65	100	120	-	-	2.24	10	-0.05	-0.30	-	2890	0.72	4.0 - 4.8
<b>MAT MICRON 91 C</b>	1750	Corundum	90.0	7.5	0.1	-	-	-	2.90	85	140	140	-	140	2.44	8	-	0.3	0.9	2980	0.65	4.0 - 4.8
<b>MAT MICRON 55 A SiC7</b>	1530 (red)	Andalusite - SiC	55.0	33.0	0.7	-	7.0	-	2.68	60	85	90	-	90	3.35	10	-	0.50	-	2740	0.63	4.0 - 4.8
<b>MAT MICRON 10 SiC M</b>	1530 (red)	Sintered Mullite - SiC	55.0	30.5	0.9	-	9.5	-	2.55	60	90	110	-	110	3.50	10	-	-0.25	-	2620	0.60	4.0 - 4.8
<b>MAT MICRON 10 ZS M</b>	1520 (red)	Sintered Mullite - SiC	52.0	24.5	0.8	9.7	9.5	-	2.72	60	90	110	-	110	3.45	10	-	-0.25	-	2770	0.58	4.0 - 4.8



## Self Flowing Low & Ultra Low Cement Castables

PRODUCT NAME	Classification Temperature (EN ISO 1927-1) at °C	Main Raw Material Base (EN 1402-1)	Chemical Analysis (%) (EN ISO 12677)					Cold Crushing Strength (N/mm <sup>2</sup> ) (EN ISO 1927-6)			Grain Size (mm) (EN ISO 1927-3)	Permanent Linear Change (%) (EN ISO 1927-6)	Reversible thermal expansion at 1000°C (%)	Material required (kg/m <sup>3</sup> ) (EN ISO 1927-5)	Approx. water addition (EN 1402-4) (lt/100 kg dry material)
			Al <sub>2</sub> O <sub>3</sub>	SiO <sub>2</sub>	Fe <sub>2</sub> O <sub>3</sub>	SiC	MgO	at 1100°C	at 1400°C	at 1600°C					
MAT SF 50	1500	Chamotte	50.0	47.0	1.0	-	-	60	100	-	3	-0.40	0.55	2230	6.5 - 7.5
MAT SF 56	1500	Chamotte	56.0	42.5	1.0	-	-	60	100	-	3	-0.35	0.55	2250	6.5 - 7.5
MAT SF 92W	1720	Corundum	91.5	6.1	0.1	-	-	150	150	-	6	-0.10	0.82	3070	4.8 - 5.7
MAT SF 30 SiC	1500	Silicon Carbide	37.0	29.0	0.9	30.0	-	120	-	-	3	-0.25	0.60	2490	5.5 - 6.7
MAT SF 61 SiC	1500	Silicon Carbide	27.0	6.0	0.2	59.0	-	95	95	-	3	-0.10	0.55	2550	5.0 - 6.5
MAT SF 60 SiC 10 M	1600 (Red)	Mullite / Silicon Carbide	58.0	26.5	0.9	10.0	-	105	110 (1500°C)	-	3	-0.25	0.57	2470	6.0 - 7.0
MAT SF 60M ZR 10	1650	Sintered Mullite / Synthetic Raw Material	60.0	25.5	0.7	-	-	120	-	-	6	-0.25	0.65	2750	6.0 - 6.8
MAT SF SiC 70	1500 (Red)	Silicon Carbide	20.0	7.0	0.7	70.0	-	115	120	-	6	-0.30	0.58	2650	5.5 - 6.5
MAT SF ZS 10	1600 (Red)	Synthetic Raw Material	60.0	16.5	0.6	10.0	-	120	120	-	6	-0.25	0.60	2700	4.2 - 6.2
MAT SF 93	1700	Sintered Alumina	93.0	2.5	0.5	-	-	70	100 (1500°C)	-	10	-0.10	0.82	3100	4.5 - 5.5
MAT SF 93 SP	1700	Sintered Alumina / Spinell	93.0	0.5	0.1	-	4.0	70	100	120	6	-0.10	0.85	3150	4.5 - 5.5
MAT SF 97 T HA	1760	Sintered Alumina	97.0	1.0	0.05	-	-	80	120	130	6	-0.10	0.81	3150	4.5 - 5.5

## Nano Bonded Refractory Materials

PRODUCT NAME	Classification Temperature (EN ISO 1927-1) at °C	Main Raw Material Base (EN 1402-1)	Chemical Analysis (%) (EN ISO 12677)						Bulk Density (EN ISO 1927-6) at 110°C (g/cm <sup>3</sup> )	Cold Crushing Strength (N/mm <sup>2</sup> ) (EN ISO 1927-6)				Thermal Conductivity (W/mK) (EN 993-14)	Grain Size (mm) (EN ISO 1927-3)	Permanent Linear Change (%) (EN ISO 1927-6)			Material required (kg/m <sup>3</sup> ) (EN ISO 1927-5)	Reversible Thermal Expansion at 1000°C (%)	Approx. gel addition (EN 1402-4) (lt/100 kg dry material)
			Al <sub>2</sub> O <sub>3</sub>	SiO <sub>2</sub>	Fe <sub>2</sub> O <sub>3</sub>	ZrO <sub>2</sub>	SiC	BaO		at 110°C	at 800°C	at 1100°C	at 1500°C			at 800°C	at 1000°C	at 1100°C			
MAT NANO 40	1400	Chamotte	40.0	55.0	1.05	-	-	-	2.18	45	40	-	-	1.09	6	-0.35	-	-	2230	0.53	7.0 - 8.5
MAT NANO 50 R	1560	Chamotte	50.0	45.0	1.0	-	-	-	2.36	35	75	95	-	1.23	6	-	-0.25	-	2400	0.56	6.0 - 7.5
MAT NANO 60 M	1650	Sintered Mullite	62.0	32.5	1.1	-	-	-	2.40	35	80	80	90	1.80	6	-	-0.40	-0.7	2440	0.60	6.7 - 8.2
MAT NANO 70 M	1650	Sintered Mullite	69.0	27.0	1.0	-	-	-	2.50	30	70	75	80	1.78	6	-	-0.45	-0.85	2570	0.65	6.5 - 7.0
MAT NANO 85	1600	Bauxite	84.0	10.6	1.6	-	-	-	2.75	30	70	90	90	2.32	6	-	-0.60	-	2800	0.70	6.5 - 7.0
MAT NANO 80 AL	1300	Bauxite	80.0	10.8	1.6	-	-	2.5	2.74	28	70	80	-	2.32	6	-	-0.50	-	2800	0.70	6.5 - 7.8
MAT NANO 90 AL	1300	Sintered Alumina	88.0	0.5	0.1	-	-	0.6	3.03	25	60	70	-	2.41	6	-	-0.50	-	3100	0.72	6.5 - 7.0
MAT NANO 99 T	1860	Sintered Alumina	99.0	0.10	0.07	-	-	-	3.06	40	65	130	140	2.90	6	-	-0.25	-0.80	3100	0.80	5.2 - 6.4
MAT NANO 55 M SiC 10	1500 (red)	Sintered Mullite - SiC	55.0	31.0	1.0	-	10.0	-	2.38	28	65	80	80	3.50	6	-	-0.25	-	2420	0.60	6.5 - 7.0
MAT NANO 25SiC M	1500 (red)	Sintered Mullite - SiC	47.5	27.0	0.9	-	24.0	-	2.48	25	60	70	80	4.1	6	-	-0.30	-	2540	0.58	6.5 - 7.0
MAT NANO ZS 10 M	1500 (red)	Synthetic Raw Materials	54.0	25.0	0.9	9.5	10.0	-	2.62	28	70	80	80	3.48	6	-	-0.15	-	2660	0.58	6.5 - 7.0

## Medium Cement Gunning Materials

PRODUCT NAME	Classification Temperature (EN ISO 1927-1) at °C	Main Raw Material Base (EN 1402-1)	Chemical Analysis (%) (EN ISO 12677)					Cold Crushing Strength (N/mm <sup>2</sup> ) (EN ISO 1927-6)		Grain Size (mm) (EN ISO 1927-3)	Permanent Linear Change (%) (EN ISO 1927-6)	Reversible thermal expansion at 1000°C (%)	Material required (kg/m <sup>3</sup> ) (EN ISO 1927-5)	Approx. water addition (EN 1402-4) (lt/100 kg dry material)
			Al <sub>2</sub> O <sub>3</sub>	SiO <sub>2</sub>	Fe <sub>2</sub> O <sub>3</sub>	ZrO <sub>2</sub>	SiC	at 1100°C	at 1400°C					
MAT 32 GS	1320	Chamotte - Synthetic Raw Materials	32.0	58.5	1.0	-	-	60	1300 (60)	6	-0.50	0.50	2100	At nozzle
MAT 40 GS	1350	Chamotte	40.0	53.0	1.5	-	-	60	1300 (50)	6	-0.65	0.54	2150	At nozzle
MAT 48 GS	1470	Chamotte	48.0	44.5	1.3	-	-	50	60	6	-0.55	0.60	2230	At nozzle
MAT 50 GS	1500	Chamotte	50.0	42.5	1.5	-	-	40 (1000 °C)	55	6	-0.40	0.58	2270	At nozzle
MAT MC 55 G	1550	High Alumina Raw Materials	55.5	39.0	0.8	-	-	1200 °C (14)	18	6	-0.50 (1200 °C)	0.60	2230	At nozzle
MAT 57 GS	1500	Chamotte - Sintered Mullite	57.0	37.5	1.1	-	-	50	65	6	-0.50	0.58	2350	At nozzle
MAT 57 A GS	1520	Andalusite	56.0	37.5	1.0	-	-	50 (1000 °C)	60	6	-0.25 (1000 °C)	0.58	2440	At nozzle
MAT 58 M GS	1500	Sintered Mullite	58.0	33.5	1.0	-	-	40	-	6	-0.40	0.58	2450	At nozzle
MAT 58 M CR 2 GS	1500	Sintered Mullite	57.0	33.5	1.0	-	-	40	-	6	-0.40	0.58	2450	At nozzle
MAT 60 GS	1550	Sintered Mullite	58.5	33.5	1.1	-	-	55	-	6	-0.50	0.60	2250	At nozzle
MAT 74 GS	1450	Bauxite - Mullite	73.5	15.5	2.1	-	-	40	-	6	-0.40	0.65	2570	At nozzle
MAT 78 GS	1500	Bauxite	78.0	11.5	2.2	-	-	50 (1200 °C)	-	6	-0.30	0.74	2560	At nozzle
MAT 80 GS	1500	Bauxite	75.0	15.0	1.8	-	-	45 (1000 °C)	60	6	-0.30	0.74	2560	At nozzle
MAT SiC 68 GS	1500	Silicon Carbide	18.0	8.0	0.9	-	-	60	-	3	-0.20	0.55	2500	At nozzle
MAT SiC 72 GS	1500	Silicon Carbide	16.0	7.4	0.9	-	-	60	-	3	-0.20	0.55	2500	At nozzle
MAT 56 ZR 10 GS	1600	Andalusite	56.0	28.0	0.6	-	-	65	-	6	-0.30	0.58	2600	At nozzle
MAT 57M SiC 5 GS	1500 (red)	Sintered Mullite/SiC	57.0	30.0	0.9	-	-	60	90	6	-0.25	0.58	2430	At nozzle
MAT 92 GS	1700	Tabular Alumina	92.0	3.0	0.2	-	-	45 (1000 °C)	50 (1500 °C)	6	-0.20 (1000 °C)	-	2810	At nozzle
MAT ZS 10 GS	1500 (Red)	Synthetic Mullite/Synthetic Raw Material/SiC	49.0	24.5	1.0	10.0	9.5	-	50	6	-0.55	0.57	2520	At nozzle
MAT 45 M SiC 5 GS	1480 (Red)	Synthetic Mullite/Chamotte/SiC	44.5	43.5	1.1	-	5	50	-	6	-0.35	0.57	2270	At nozzle

## Low Cement Gunning Materials

PRODUCT NAME	Classification Temperature (EN ISO 1927-1) at °C	Main Raw Material Base (EN 1402-1)	Chemical Analysis (%) (EN ISO 12677)					Cold Crushing Strength (N/mm <sup>2</sup> ) (EN ISO 1927-6)		Grain Size (mm) (EN ISO 1927-3)	Permanent Linear Change (%) (EN ISO 1927-6)	Reversible thermal expansion at 1000°C (%)	Material required (kg/m <sup>3</sup> ) (EN ISO 1927-5)	Approx. water addition (EN 1402-4) (lt/100 kg dry material)
			Al <sub>2</sub> O <sub>3</sub>	SiO <sub>2</sub>	Fe <sub>2</sub> O <sub>3</sub>	ZrO <sub>2</sub>	SiC	at 1100°C	at 1500°C					
MAT LG 50	1500	Chamotte	48	45.2	0.9	-	-	60	-	6	-	-	2300	At nozzle
MAT 50 LCG	1500	Chamotte	50	44.0	1.4	-	-	80	90	6	-0.35	0.62	2300	At nozzle
MAT LG 60 M	1600	Mullite	61	31.2	0.8	-	-	77	-	6	-	-	2300	At nozzle
MAT LG 80	1600	Bauxite	80	10.5	1.5	-	-	70	85	6	-0.25	0.64	2500	At nozzle
MAT 80 LCG	1600	Bauxite	81	11.5	1.5	-	-	80	90	6	-0.35	0.74	2720	At nozzle
MAT 86 LGP	1700	Corundun	86	6.2	0.1	-	-	80	-	6	-0.10	-	2800	At nozzle
MAT LGP	1700	Corundun	90	6.2	0.1	-	-	80	-	6	-0.10	-	2800	At nozzle
MAT LG 40 SiC M	1500 (Red)	Silicon Carbide	38	10.4	0.4	-	39	75	80 (1300°C)	6	-0.25	0.56	2450	At nozzle
MAT LG 60 SiC M	1500 (Red)	Silicon Carbide	25	10.4	0.4	-	59	70	75 (1300°C)	6	-0.25	0.56	2520	At nozzle
MAT LG 58 M SiC 6	1560 (Red)	Sintered Mullite / SiC	58	30.5	1.1	-	5.8	80	95	6	-0.25	0.60	2400	At nozzle

## Conventional Gunning Materials

PRODUCT NAME	Classification Temperature (EN ISO 1927-1) at °C	Main Raw Material Base (EN 1402-1)	Chemical Analysis (%) (EN ISO 12677)			Cold Crushing Strength (N/mm <sup>2</sup> ) (EN ISO 1927-6)	Grain Size (mm) (EN ISO 1927-3)	Permanent Linear Change (%) (EN ISO 1927-6)	Reversible thermal expansion at 1000°C (%)	Material required (kg/m <sup>3</sup> ) (EN ISO 1927-5)	Approx. water addition (EN 1402-4) (lt/100 kg dry material)
			Al <sub>2</sub> O <sub>3</sub>	SiO <sub>2</sub>	Fe <sub>2</sub> O <sub>3</sub>						
MAT GR G	1270	Chamotte	30.0	52.5	3.6	20	6	-0.7	0.50	2100	At nozzle
MAT 35 G	1280	Chamotte	34.5	50.0	2.8	18	6	-0.45	0.52	2130	At nozzle
MAT 40 G	1320	Chamotte	41.5	45.0	2.1	28	6	-0.40	0.55	2200	At nozzle
MAT 44 G	1350	Chamotte	44.0	46.5	1.4	25	6	-0.30	0.60	2200	At nozzle
MAT 48 G	1460	Chamotte	48.0	41.5	1.4	45	6	-0.35	0.60	2250	At nozzle
MAT 50 G	1480	Chamotte	48.5	42.0	1.4	23	6	-0.30	0.60	2200	At nozzle
MAT 50 SMG	1500	Fireclay	50.0	39.5	1.3	41	6	-0.35	0.58	2300	At nozzle
MAT 50 HG	1500	Chamotte	48.5	41.5	1.2	65 (1000 °C)	6	-0.35	-0.60	2220	At nozzle
MAT 57 HG	1470	Hight Alumina Raw Materials	56.0	34.5	1.2	48	6	-0.3	0.58	2290	At nozzle
MAT 60 G	1560	Andalusite	59.5	32.0	1.1	24	6	+0.20	0.60	2300	At nozzle
MAT 60 SMG	1500	Bauxite	62.0	28.5	1.5	18	6	-0.20	0.60	2300	At nozzle
MAT 70 G	1500	Bauxite	69.0	15.0	2.5	32 (1000 °C)	6	-0.4	0.70	2400	At nozzle
MAT 80 G	1580	Bauxite	75.5	13.0	1.7	45 (1000 °C)	6	-0.30	0.70	2520	At nozzle
MAT 80 SPDG	1600	Bauxite	80.0	8.2	1.3	42	6	-0.20	0.75	2600	At nozzle
MAT 90 G	1650	Corundum	87.7	2.8	0.5	24	6	-0.15	0.80	2900	At nozzle
MAT 95 G	1700	Tabular Alumina	95.0	0.15	0.15	40	6	-0.15	0.81	2800	At nozzle

## Special Gunning Materials

PRODUCT NAME	Classification Temperature (EN ISO 1927-1) at °C	Main Raw Material Base (EN 1402-1)	Chemical Analysis (%) (EN ISO 12677)					Cold Crushing Strength (N/mm <sup>2</sup> ) (EN ISO 1927-6)	Grain Size (mm) (EN ISO 1927-3)	Permanent Linear Change (%) (EN ISO 1927-6)	Reversible thermal expansion at 1000°C (%)	Material required (kg/m <sup>3</sup> ) (EN ISO 1927-5)	Approx. water addition (EN 1402-4) (lt/100 kg dry material)
			Al <sub>2</sub> O <sub>3</sub>	SiO <sub>2</sub>	Fe <sub>2</sub> O <sub>3</sub>	SiC	ZrO <sub>2</sub>						
MAT 20 ZR G	1450	Zircon Based Raw Materials	50.0	19.5	0.65	-	22.0	60	6	-0.35	0.70	2670	At nozzle
MAT 30 ZR G	1380	Zircon Based Raw Materials	39.0	20.0	1.0	-	30.0	45	6	-0.60	0.73	2830	At nozzle
MAT GUN 10 SiC	1500	SiC / Chamotte	42.0	39.2	0.5	9.5	-	50	6	-0.05	0.48	2250	At nozzle
MAT GUN 30 SiC	1500	SiC / Chamotte	35.0	28.0	0.2	29.0	-	47	6	-0.05	0.50	2300	At nozzle
MAT GUN 50 SiC	1550	SiC / Chamotte	26.0	17.0	0.2	48.0	-	48	6	-0.05	0.53	2400	At nozzle
MAT GUN 70 SiC	1550	SiC / Chamotte	17.0	7.0	0.2	68.0	-	45	6	-0.05	0.55	2450	At nozzle

## Ramming Materials

PRODUCT NAME	Classification Temperature (EN ISO 1927-1) at °C	Main Raw Material Base (EN 1402-1)	Chemical Analysis (%) (EN ISO 12677)			Cold Crushing Strength (N/mm <sup>2</sup> ) (EN ISO 1927-6) at 1100°C	Grain Size (mm) (EN ISO 1927-3)	Permanent Linear Change (%) (EN ISO 1927-6) at 1100°C	Reversible thermal expansion at 1000°C (%)	Material required (kg/m <sup>3</sup> ) (EN ISO 1927-5)
			Al <sub>2</sub> O <sub>3</sub>	SiO <sub>2</sub>	Fe <sub>2</sub> O <sub>3</sub>					
<b>PYROPLASTIC SUPER</b>	1450	Chamotte	37.0	58.0	1.8	16	6	-1.40	0.55	2300
<b>PYROPLASTIC SUPER 80</b>	1620	Bauxite	72.5	20.5	1.7	18	6	-1.40	0.72	2650
<b>MAT RAM 50 M</b>	1600	Chamotte / Mullite	53.0	42.0	0.8	18	6	-0.15	0.55	2250
<b>MAT RAM 50 C</b>	1550	Chamotte	50.0	43.0	1.2	65	6	-0.25	0.55	2350
<b>MAT RAM 60 C</b>	1600	Chamotte / Bauxite	60.0	32.5	1.4	65	6	-0.35	0.57	2450
<b>MAT RAM 70 C</b>	1600	Bauxite / Corundum	70.0	21.0	1.3	65	6	-0.25	0.58	2640
<b>MAT RAM 70 CM</b>	1650	Mullite / Corundum	70.0	23.0	1.0	65	6	-0.20	0.58	2600
<b>MAT RAM 80</b>	1650	Bauxite	77.0	16.0	1.6	40	6	-0.25	0.72	2750
<b>MAT RAM 80 C</b>	1650	Bauxite / Sintered Alumina	80.0	13.5	1.3	70	6	-0.15	0.72	2750
<b>MAT RAM 90 C</b>	1750	Corundum	89.0	5.5	0.5	60	6	-0.15	0.72	2950

## Special Ramming Materials

PRODUCT NAME	Classification Temperature (EN ISO 1927-1) at °C	Main Raw Material Base (EN 1402-1)	Chemical Analysis (%) (EN ISO 12677)				Cold Crushing Strength (N/mm <sup>2</sup> ) (EN ISO 1927-6) at 1100°C	Grain Size (mm) (EN ISO 1927-3)	Permanent Linear Change (%) (EN ISO 1927-6) at 1100°C	Reversible thermal expansion at 1000°C (%)	Material required (kg/m <sup>3</sup> ) (EN ISO 1927-5)
			Al <sub>2</sub> O <sub>3</sub>	SiO <sub>2</sub>	Fe <sub>2</sub> O <sub>3</sub>	SiC					
<b>MAT RAM 85 SiC P</b>	1550	Silicon Carbide	6.0	5.0	0.2	83.0	80	3	0.10	0.68	2650
<b>MAT RAM 90 SiC P</b>	1550	Silicon Carbide	1.5	5.5	0.1	89.0	70	3	0.15	0.72	2550

## Patching Materials

PRODUCT NAME	Classification Temperature (EN ISO 1927-1) at °C	Main Raw Material Base (EN 1402-1)	Chemical Analysis (%) (EN ISO 12677)				Cold Crushing Strength (N/mm <sup>2</sup> ) (EN ISO 1927-6) at 1100°C	Grain Size (mm) (EN ISO 1927-3)	Permanent Linear Change (%) (EN ISO 1927-6) at 1100°C	Reversible thermal expansion at 1000°C (%)	Material required (kg/m <sup>3</sup> ) (EN ISO 1927-5)
			Al <sub>2</sub> O <sub>3</sub>	SiO <sub>2</sub>	Fe <sub>2</sub> O <sub>3</sub>	SiC					
<b>MAT 86 RT</b>	1530 Red	Corundum /SiC	85	6.5	0.3	4.5	55	3	-0.25	0.60	2850
<b>MAT P 90 C</b>	1700 Red	SiC	3.5	4.3	0.9	86.5	50	3	-0.25	0.60	2520

## Insulating Castables

PRODUCT NAME	Classification Temperature (EN ISO 1927-1) at °C	Main Raw Material Base (EN 1402-1)	Chemical Analysis (%) (EN ISO 12677)				Cold Crushing Strength (N/mm <sup>2</sup> ) (EN ISO 1927-6)		Thermal Conductivity (W/mK) (EN 993-14)	Grain Size (mm) (EN ISO 1927-3)	Permanent Linear Change (%) (EN ISO 1927-6)			Material required (kg/m <sup>3</sup> ) (EN ISO 1927-5)	Approx. water addition (EN 1402-4) (lt/100 kg dry material)
			Al <sub>2</sub> O <sub>3</sub>	SiO <sub>2</sub>	Fe <sub>2</sub> O <sub>3</sub>	BaO	at 1000°C	at 1100°C			at 800°C	at 800°C	at 1000°C		
MAT 105 LI P	1050	Perlite	36.0	37.5	3.2	-	1.3 (800 °C)	-	0.20	6	-0.65	-	-	830	65-75
MAT 106 LP	1000	Perlite	37.5	33.0	5.2	-	0.8	-	0.18	6	-1.3	-	-	650	80-95
MAT 106 L	1000	Vermiculite	34.0	26.5	6.0	-	0.7	-	0.17	6	-0.75	-	-	650	80-95
MAT 106 P	1020	Perlite	34.0	30.5	6.5	-	0.9	-	0.20	6	-1.40	-	-	800	70-80
MAT 106	1030	Vermiculite	35.0	22.0	8.1	-	1.3	-	0.19	6	-0.75	-	-	800	70-80
MAT 106 HT P	1200	Lightweight Raw Material-Perlite	35.0	42.5	2.5	-	0.9	-	0.20	6	-	-1.10	-	740	65-70
MAT 126 P	1050	Perlite	32.0	35.0	7.5	-	1.6	-	0.22	6	-0.65	-	-	780	53-63
MAT 125 P	1080	Perlite/Expanded Clay	34.5	35.5	5.0	-	2.3	-	0.26	6	-0.40	-	-	1000	38-48
MAT 125	1100	Vermiculite / Expanded clay	27.0	33.5	12.0	-	-	2.8	0.30	6	-0.40	-0.75	-	1000	40-50
MAT 125 HT P	1250	Lightweight Raw Material-Perlite	40.0	38.0	2.9	-	2.5	-	0.28	6	-0.40	-0.60	-	1030	42-48
MAT 124 P	1150	Perlite / Calcined Clay	30.0	43.5	5.5	-	3.0	2.5	0.42	6	-0.40	-	-	1250	35-45
MAT 124	1160	Vermiculite / Calcined Clay	30.0	38.5	7.5	-	2.8	3.5	0.40	6	-0.35	-	-	1240	35-45
MAT 124 LP	1060	Lightweight Raw Material-Perlite	27.0	44.5	7.3	-	2.2	-	0.30	6	-0.4	-	-	1050	50-60
MAT 135 LI P	1340	Light Weight Chamotte	49.0	32.0	1.6	-	6.5	-	0.42	6	-0.3	-	-	1420	35-40
MAT MW L	1280	Lightweight Chamotte	38.0	42.5	6.5	-	6.5 (800 °C)	-	0.47	6	-0.2	-	-0.40	1580	24-30
MAT MW	1300	Lightweight Chamotte	38.0	42.5	6.2	-	6.0	-	0.54	6	-0.25	-	-	1640	23-30
MAT MW HS	1350	Lightweight Chamotte	45.0	44.0	1.7	-	-	23	0.87	6	-	-	-0.70	2050	12-16
MAT MW AL	1200	Lightweight Chamotte	41.5	34.0	2.2	6.0	20	22 (800 °C)	0.60	6	-0.25	-	-	1740	18-24

## Insulating Gunning Materials

PRODUCT NAME	Classification Temperature (EN ISO 1927-1) at °C	Main Raw Material Base (EN 1402-1)	Chemical Analysis (%) (EN ISO 12677)			Cold Crushing Strength (N/mm <sup>2</sup> ) (EN ISO 1927-6)		Thermal Conductivity (W/mK) (EN 993-14)	Grain Size (mm) (EN ISO 1927-3)	Material required (kg/m <sup>3</sup> ) (EN ISO 1927-5)	Approx. water addition (EN 1402-4) (lt/100 kg dry material)
			Al <sub>2</sub> O <sub>3</sub>	SiO <sub>2</sub>	Fe <sub>2</sub> O <sub>3</sub>	at 1000°C	at 1100°C				
MAT 106 L GP	1000	Perlite	34.5	32.5	5.5	0.9	-	0.18	6	680	At nozzle
MAT 106 GP	1030	Perlite	36.0	26.0	6.5	1.0	-	0.21	6	850	80-95 / At nozzle
MAT 106 G	1030	Vermiculite	32.0	20.5	13.5	1.3	-	0.21	6	850	70-85 / At nozzle
MAT 126 G-P	1040	Perlite	30.0	36.0	8.8	1.7	-	0.22	6	800	At nozzle
MAT 125 GP	1080	Perlite / Expanded clay	35.0	36.0	4.8	2.8	2.9	0.28	6	1030	At nozzle
MAT 125 G	1120	Vermiculite / Expanded clay	28.0	37.0	9.5	-	2.7	0.27	6	1030	40-55 / At nozzle
MAT 124 GP	1100	Perlite / Double Process Porcelain	31.0	46.0	3.7	-	2.7	0.40	6	1250	35-45 / At nozzle
MAT 124 G	1120	Vermiculite / Recycled Porcelain	27.0	43.0	7.8	-	3.6	0.39	6	1250	35-45 / At nozzle
MAT 135 LI GP	1280	Lightweight Chamotte	48.0	32.5	1.7	-	5.5	0.42	6	1440	At nozzle
MAT MW G	1300	Lightweight Chamotte	38.0	44.0	2.6	-	5.5	0.54	6	1650	At nozzle
MAT MW HG	1300	Lightweight Chamotte	46.0	43.5	1.5	30	-	0.8	6	1950	At nozzle

### Insulating Firebricks

PRODUCT NAME	Classification Group (ISO 2245)	Classification Temperature at °C	Density (ASTM C-134) kg/m <sup>3</sup>	Cold Crushing (ASTM C-93-84) MPa	Modulus of Rapture (ASTM C-93-84) MPa	Specific Heat (kJ/kgK) at 1000 °C	Thermal Conductivity (ASTM C-182) W/mK						Chemical Analysis (%)						
							at 400°C	at 600°C	at 800°C	at 1000°C	at 1200°C	at 1400°C	Al <sub>2</sub> O <sub>3</sub>	SiO <sub>2</sub>	Fe <sub>2</sub> O <sub>3</sub>	TiO <sub>2</sub>	CaO	MgO	Na <sub>2</sub> O+K <sub>2</sub> O
MATH 23	125-0.5-L	1260	480	1.2	1.0	1.05	0.12	0.14	0.17	0.19	-	-	37.0	44.4	0.7	1.2	1.2	0.3	1.1
MATH 23 HD	125-0.5-L	1260	580	1.2	0.9	-	0.19	0.23	0.27	0.30	-	-	45.0	50.0	1.0	-	-	-	1.6
MATH 25	135-0.8-L	1350	800	2.5	-	-	0.24	0.28	0.32	0.37	-	-	50.0	-	0.9	-	-	0.2	-
MATH 25 A	135-0.8-L	1350	820	2.5	-	-	0.24	0.28	0.32	0.37	-	-	34.0	57.0	1.2	-	-	-	-
MATH 25 B	135-0.9	1350	900	4.0	-	-	0.27	0.30	0.35	0.40	-	-	34.0	57.0	1.2	-	-	-	-
MATH 25 CA	135-1.1	1350	1100	5.4	-	-	0.32	0.36	0.40	0.45	-	-	34.0	57.0	1.2	-	-	-	-
MATH 25 HS	135-1.1	1350	1100	6.0	3.1	-	0.32	0.36	0.40	0.45	-	-	50.0	-	0.9	-	-	0.2	-
MATH 26	140-0.8-L	1430	800	1.6	1.5	1.10	0.25	0.27	0.30	0.33	0.35	-	58.0	39.1	0.7	0.1	0.1	0.2	1.7
MATH 26 HS	140-0.9-L	1430	870	4.0	-	-	0.29	0.32	0.35	0.38	0.41	-	54.0	-	0.8	-	-	0.2	-
MATH 28	150-0.9-L	1540	890	2.1	1.8	1.10	0.30	0.32	0.34	0.36	0.38	-	67.1	31.0	0.6	0.1	0.1	0.1	0.9
MATH 30	160-1.0-L	1650	1020	2.2	2.1	1.10	0.38	0.39	0.40	0.41	0.42	-	73.4	25.1	0.5	0.1	0.1	tr	0.9
MATH 32	170-1.2-L	1760	1250	3.5	2.1	1.10	0.49	0.50	0.51	0.53	0.56	0.60	77.0	21.5	0.3	tr	tr	0.1	0.9

### Insulating Firebricks - Calcium Silicate Insulating

PRODUCT NAME	Max Service Temperature °C	Density (ASTM C-134) kg/m <sup>3</sup>	Cold Crushing (ASTM C-133-93) MPa	Total Porosity (ISO 5017)%	Specific Heat (kJ/kgK) at 1000 °C	Thermal Conductivity (ASTM C-182) W/mK				Chemical Analysis (%)						
						at 200°C	at 400°C	at 600°C	at 1000°C	Al <sub>2</sub> O <sub>3</sub>	SiO <sub>2</sub>	Fe <sub>2</sub> O <sub>3</sub>	TiO <sub>2</sub>	CaO	MgO	Na <sub>2</sub> O+K <sub>2</sub> O
MATH 450	900	425	1.3	82	-	0.10	0.12	0.14	0.19	14.8	66.5	4.1	0.5	5.0	2.1	6.5
MATH 550	900	500	2.5	81	-	0.12	0.14	0.16	0.37	14.8	66.5	4.1	0.5	5.0	2.1	6.5
MATH 750 S	900	750	7.0	68	0.80	0.15	0.17	0.19	0.37	9.0	77.0	7.0	0.7	0.8	1.3	2.0
MATH AB 70	1050	700	6.0	72	-	0.18	0.20	0.22	-	18.5	62.7	3.1	-	-	-	-
CALCIUM SILICATE N	950	245	0.9	-	0.75	0.07	0.10	0.14	0.40	0.49	44.1	0.09	-	42.7	0.3	0.12
CALCIUM SILICATE P	950	290	1.15	-	0.75	0.08	0.10	0.14	0.45	0.49	44.1	0.09	-	42.7	0.3	0.12
CALCIUM SILICATE HT	1050	290	1.9	1.5	0.80	0.07	0.10	0.14	0.45	0.40	46.9	0.09	-	43.2	-	0.01

## Ceramic & High Temperature Soluble Insulation Fibers

PRODUCT NAME	Type of Product	Max Service Temperature at °C	Density (kg/m <sup>3</sup> )	Tensile Strength (kPa)	Compressive Strength (MPa)	Specific Heat (kJ / kgK)	Thickness (mm)	Thermal Conductivity (ASTM C-182) W/mK					Chemical Analysis (%)					
						at 1090°C		at 200°C	at 400°C	at 600°C	at 800°C	at 1000°C	Al <sub>2</sub> O <sub>3</sub>	SiO <sub>2</sub>	Fe <sub>2</sub> O <sub>3</sub> + TiO <sub>2</sub>	ZrO <sub>2</sub>	CaO + MgO	Na <sub>2</sub> O+K <sub>2</sub> O
CERAMIC BLANKET	Blanket	1260	96	70	-	1.13	13-25-38-50	0.06	0.11	0.16	0.23	0.32	44.0	56.0	-	0.15	0.05	0.10
			128	90	-			0.06	0.10	0.15	0.20	0.27						
CERAMIC BLANKET HT		1425	96	70	-	1.13	13-25-38-50	0.06	0.11	0.16	0.23	0.32	35.0	50.0	15	0.15	0.09	0.10
			128	90	-			0.06	0.10	0.15	0.20	0.27						
SW HT*		1300	96	50	-	1.13	13-25-38-50	0.05	0.10	0.19	0.32	0.48	0.3	70.0-80.0	-	-	18.0-25.0	-
			128	75	-			0.04	0.08	0.14	0.23	0.34						
CERAMIC BOARD 100	Panels	1260	310	-	0.35	-	6-10-13-25-50	-	0.08	0.11	0.15	0.20	44.0	54.0	-	1.0	1.0	1.0
CERAMIC BOARD 115		1400	310	-	0.30	-	6-10-13-25-50	-	0.08	0.11	0.15	0.20	44.0	54.0	-	1.0	1.0	1.0
CERAMIC PAPER	Papers	1260	210	750	-	-	1-2-3-4-5-6	0.06	0.09	0.13	0.20	-	47.0	52.0	-	-	-	-
SW HT PAPER*		1300	210	450	-	-	1-10	0.04	0.07	0.10	0.14	0.19	-	70.0-80.0	-	-	18.0-25.0	-
CERAMIC FIBER	Bulk Fibers	1260	-	-	-	1.13	-	-	-	-	-	-	44.0	56.0	-	0.15	0.05	0.10

\*Exonerated from any carcinogenic classification under nota Q of directive 97/69 EC

## Mineral Fibers

PRODUCT NAME	Type of Product	Max Service Temperature at °C	Density (kg/m <sup>3</sup> )	Thermal Conductivity (W/mK)			Thickness (mm)
				at 100°C	at 200°C	at 350°C	
BLANKET	Blanket supported with wire mesh	700	60	0.045	0.066	0.113	30 up to 100
			90	0.042	0.059	0.097	
			120	0.042	0.057	0.092	
FIBER BOARDS	Panel	700	40	0.050	-	-	30 up to 100
			50	0.049	-	-	
			75	0.048	-	-	
			100	0.045	0.086	-	
BULK FIBERS	Bulk Fibers	800	150	0.045	0.080	-	-
			-	0.043	-	-	

### Reinforcement Stainless Steel Fibers

PRODUCT NAME	Melting Temperature at °C	Critical Oxidation Temperature (%)		Chemical Composition (%)		Coefficient of Thermal Expansion (870 °C ) at 10 <sup>-6</sup> / °C
		Cycling Heating	Continuous Service	Cr	Ni	
<b>304</b>	1400-1455	870	980	18-20	8-12	20.2
<b>310</b>	1400-1455	1040	1150	24-25	19-22	18.5
<b>330</b>	1345-1425	1050	1165	17-19	34-36	17.6
<b>430</b>	1480-1530	850	815	14-18	-	13.7
<b>446</b>	1425-1510	1205	1200	23-27	-	13.1
<b>METAL X</b>	1480-1530	1250	1300	23	0.5	15.0

### Calcium Aluminate Cements

PRODUCT NAME	Pyrometric cone equivalent at °C	Chemical Analysis (%) (EN ISO 12677)			Bulk Density (EN 1402-6) at 110°C (g/cm <sup>3</sup> )
		Al <sub>2</sub> O <sub>3</sub>	SiO <sub>2</sub>	Fe <sub>2</sub> O <sub>3</sub>	
FONDU	1270 - 1290	37.0	6.0	18.5	1.10
SECAR 51	1430 - 1450	50.0	6.0	2.8	0.90 - 1.00
SECAR 71	1590 - 1620	68.5	0.8	0.4	0.90
SECAR 80	1770 - 1810	79	0.4	0.3	0.70 - 0.80
ALAG	1270 - 1290	36.0	6.0	18.5	1.60 - 1.70

### Exfoliated Vermiculite

PRODUCT NAME	Grain Size(mm)	Fusion Point at °C	Density at kg/m <sup>3</sup>	Thermal Conductivity (under ambient conditions)	Water Absorption Capacity (% b.v.)	pH	Chemical Analysis (%)				
							Al <sub>2</sub> O <sub>3</sub>	SiO <sub>2</sub>	Fe <sub>2</sub> O <sub>3</sub>	CaO+K <sub>2</sub> O	MgO
<b>SUPER FINE</b>	0-2	1200-1320	95-105	0.063-0.069	20-50	6.5-7.5	9-10	39-40	7-13	9-11	22-25
<b>FINE</b>	0-3	1200-1320	85-110	0.063-0.069	20-50	6.5-8.5	10-16	38-46	6-13	2-11	16-35
<b>MEDIUM</b>	1-4	1200-1320	80-100	0.063-0.069	20-50	6.5-8.5	10-16	38-46	6-13	2-11	16-35
<b>LARGE</b>	5-8	1200-1320	70-90	0.063-0.069	20-50	6-9	10-16	38-46	6-13	2-11	16-35

### Perlite

PRODUCT NAME	Grain Size(mm)	Fusion Point at °C	Density at kg/m <sup>3</sup>	Thermal Conductivity (under ambient conditions)	Water Absorption Capacity (% b.v.)	pH	Chemical Analysis (%)				
							Al <sub>2</sub> O <sub>3</sub>	SiO <sub>2</sub>	Fe <sub>2</sub> O <sub>3</sub>	CaO+K <sub>2</sub> O	MgO
<b>SUPER FINE</b>	0.25-2	890-1100	55-75	0.035-0.040	-	6.5-8.5	10-16.5	74-78	0.5-2	1-6	0-1
<b>FINE</b>	0.5-2	890-1101	60-80	0.035-0.040	-	6.5-8.5	10-16.5	74-78	0.5-2	1-6	0-1
<b>MEDIUM</b>	0.25-3	890-1102	65-85	0.035-0.040	-	6.5-8.5	10-16.5	74-78	0.5-2	1-6	0-1
<b>LARGE</b>	0.5-5	890-1103	60-80	0.035-0.040	-	6.5-8.5	10-16.5	74-78	0.5-2	1-6	0-1



## Acid - Proof Cement & Concretes

PRODUCT NAME	Density (g/cm <sup>3</sup> )	Compressive Strength (N/mm <sup>2</sup> ) (After 28 days)	Flexural Strength (N/mm <sup>2</sup> )	Tensile Strength (N/mm <sup>2</sup> )	Adhesion to. (N/mm <sup>2</sup> )		Flexibility 10 (N/mm <sup>2</sup> )	Thermal Conductivity (W/mK)	Thermal Linear Expansion (10 <sup>-6</sup> 1/K)	Thermal Resistance up to (°C)
					Ceramic	Steel Concrete				
ASPLIT ET	2.05	100	30	40	40	10	1.4	1.7	45	120
ASPLIT CN 916	1.45	60	-	-	-	-	-	1.6	-	180
MAC ACID	2	35	6	-	-	1.2	1.0	1.2	12	900
MAT ACID GS	2.15	50	-	-	-	-	-	-	-	1100

## Acid - Resistant Tiles - Bricks

PRODUCT NAME	Density (g/cm <sup>3</sup> )	Compressive Strength (N/mm <sup>2</sup> )	Water Absorption (w.t%)	Acid Solubility (% b.w)	Chemical Analysis (%)		Type of Bonding	Thermal Shock Resistance (Cycles as per EN 993-11)	Open Porosity (% b.v)
					Al <sub>2</sub> O <sub>3</sub>	SiO <sub>2</sub>			
IDEAL ACID 20	2.1	75	6.8	2.5	20	73.5	Ceramic	12	12
IDEAL ACID SUPER	2.12	65	5.5	1.2	19.5	74	Ceramic	7	11
IDEAL ACID SUPER DT	2.14	70	5.5	0.85	21.5	72	Ceramic	7	11



**Vermiculite** is a hydrous phyllosilicate mineral which undergoes significant expansion (exfoliation) when heated. It is very lightweight and mixes easily with other mediums. Due to its properties, Vermiculite has a remarkably wide range of applications. Low bulk density, low thermal conductivity, odor-free, chemical inertness, easy handle and fire resistance are the features that render Vermiculite a highly versatile and promising material.

Among others, **Vermiculite** can be used as **high-temperature insulating refractory material**. On top of that, when it is combined with other aggregates such as expanded shale, clay and slate produces **refractory concretes** and **insulation materials**.

**Vermiculite** has been successfully used as soil improver in Horticulture and Agriculture helping the plants to thrive.

- It increases **aeration** and **moisture retention**, saving **30-50% water**.
- Through its high Cation-Exchange Capacity (CEC), Vermiculite **minimizes fertilizer leaching**.
- It is an **excellent carrier** and **extender for fertilizer and pesticides** and works well as **packing material for bulbs and tubers**.
- Vermiculite helps plants growing faster and it is ideal for **transplanting, flowers arranging, newly seeded lawns and roots cutting**.
- Exfoliated Vermiculite by Mathios Refractories is **Asbestos free, non-toxic and environmentally safe**.



**Perlite** is a form of amorphous volcanic glass with the unusual property of greatly expanding when heated sufficiently. Its unique characteristics enable its applications to extend over many industries, including construction, horticulture, industrial, and many others.

In **industrial settings**, Perlite is often used as high-temperature insulation in foundry cores, molds, and ovens, and as a crucible topping. In addition, it is commonly mixed into masonry products such as lightweight plasters, ceiling tiles and others for stability or as an insulator - but to **gardeners**, it's an essential ingredient to use.

Perlite is an ideal compost additive for healthy root development. Due to its features, it helps to retain air in the fertilizer and stores nutrients and moisture. It creates the ideal balance of air and water, and minimises root damage when transplanting. It accelerates rooting and reduces the risk of fungal diseases.

- **Aerates soil and promotes root growth**
- **Non-toxic, Clean and Disease-free**
- **Helps loosen heavy soils**
- **Prevents compaction**
- **Lightweight soil conditioner**
- **Loosens clay soil**
- **Improves drainage and aeration**
- **Helps plants thrive**
- **Improves soil structure**
- **Extremely lightweight and easy to work with**
- **Keeps soil workable for years**

## The Perfect Combination

When comparing vermiculite versus **Perlite**, **Vermiculite** is very moisture retentive. It will absorb water and nutrients and keep them in the soil, which makes it perfect for seed starting blends or for plants that prefer lots of water.

When combining with Perlite, Vermiculite will absorb water and nutrients to feed your plants, while Perlite will help drain the excess water away. So both Vermiculite and Perlite are not interchangeable but they have their own significant place in the garden, even in the same container or bed.

# Vermiculite

# Perlite

# CERTIFICATE



Management System as per  
EN ISO 9001 : 2015

In accordance with TÜV AUSTRIA procedures, it is hereby certified that



**MATHIOS REFRACTORIES S.A.**

Headquarters: 5, Epidavrou Str., GR-182 33 AG. IOANNIS RENTIS, ATHENS, GREECE  
Factory 1: 16<sup>th</sup> Km. O.N.R. Chalkida – Athens, GR-341 00 AVLIDA, CHALKIDA, GREECE  
Factory 2 – Mathios AD: 9, Nikola Malashevski Str., 2600 DUPNICA, BULGARIA

Applies a Quality Management System in line with the above Standard for the following Scope

**RESEARCH, DEVELOPMENT, PRODUCTION AND TRADING OF REFRACTORY, ANTI-ACID, INSULATING, BUILDING CHEMISTRY CONSTRUCTION MATERIALS AND PRODUCTION OF STONE VENEERS. REFRACTORY, ANTI-ACID AND BUILDING CONSTRUCTIONS.**

Certificate Registration No.: 011610005343

Valid until: 2021-09-15  
Initial certification: 2010-06-02

Haralabos Ageloudis  
Deputy General Manager  
Certification Body  
at TÜV AUSTRIA

Athens, 2015-10-02

This certification was conducted in accordance with TÜV AUSTRIA auditing and certification procedures and is subject to regular surveillance audits.

TÜV AUSTRIA HELLAS  
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TÜV AUSTRIA  
GROUP

Management System Certificate



Partner for progress

91605

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Certificate

**SCC\*\***  
Unlimited Certificate

Kiwa International Cert GmbH  
certifies that the company

**Mathios Refractories S.A.**

Epidavrou st. 5  
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for the scope

**research, development, production and sale of refractory-, acid resistant-, insulating-, construction-, building-, materials. Production of refractories and stone veneer and installation, design and engineering**

has implemented a SHE-management system in compliance with the SCC\*\* unlimited certificate standard and this meets the set of normative regulations for the "Safety Checklist Contractors" (SCC), version 2011.

With the proof of the standard SCC\*\* is also included the proof of the standard SCC\*.

Kiwa International Cert GmbH

Managing Director

Kiwa International Cert GmbH

SCC Coordinator



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# Certificates

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