PCO

Reliable Refractory Materials

Our offer for energy and thermal waste processing industry

Polska Ceramika Ogniotrwała „Żarów" | 2025

Our offer for the power generation sector and thermal waste treatment

Reliable refractory solutions

Modern power generation units utilizing the heat of combustion and waste processing operate under some of the most demanding thermal and chemical conditions in industry. Combustion chambers, burners, and flue gas handling systems are continuously exposed to high temperatures, alkaline slags, aggressive vapors, and extreme thermal cycling.

Regardless of whether the process involves the combustion of fossil fuels, biomass, or various types of waste, refractory linings play a critical role in ensuring the safety, efficiency, and long service life of industrial units. Typical applications include coal-fired and biomass boilers, grate-fired, rotary, and fluidized bed units used for thermal waste treatment.

The incineration of hazardous waste involves even more complex thermal and chemical operating profiles. By selecting appropriate refractory materials – including bricks, castables, and prefabricated elements – PCO aims to extend lining service life, improve thermal efficiency, and reduce unplanned downtime.

For over a decade, the PCO Group has been developing specialized refractory materials, designing tailored lining concepts, and providing installation services adapted to these demanding operating conditions.

How can we help?

Design

- Preparation of furnace commissioning documentation and installation guidelines for refractory masons, including anchoring and expansion joint calculations, as well as recommended lining dry-out and heat-up curves
- Design of ceramic prefabricated shapes together with full technical documentation for manufacturing either at the producer's plant or directly on-site (combustion chamber walls, lining of pipes and flue gas ducts, rings, suspended roofs and vaults)
- Preparation of detailed workshop drawings and material take-off calculations for complete refractory lining projects
- Thermal flow calculations for each refractory lining layer and for every zone of the boiler, heater, or furnace

Manufacture and supply

- Fireclay, high-alumina, and insulating refractory bricks – covering all lining layers from the working lining to the outer insulation layers
- Cast and pre-fired concrete prefabricated elements (up to 600 °C), manufactured at the PCO plant and delivered ready for on-site installation
- Specialized refractory grades designed for operation in aggressive environments (chemical attack, thermal shock, waste combustion by-products)
- Arch shapes and wedge bricks for the construction of upper and intermediate vaults, cylindrical chamber walls, and grate-adjacent zones
- A proven and comprehensive range of refractory castables and gunning mixes developed for operation in power boilers and biomass combustion units

Installation services

- Extensive experience of PCO Serwis S.A. in the installation of refractory linings for professional power generation and heat-producing units
- Inspections and expert assessments of lining condition, site survey reports, preparation of design and as-built documentation
- Dismantling works and disposal of worn linings, installation and initial drying of new refractory linings
- Manufacturing and supply of all required heat-resistant steel components (anchors, electrodes, brackets, supports)
- Technical consultancy as well as warranty and post-warranty service

We are a refractory materials manufacturer

We are a Polish manufacturer of refractory ceramics and specialists in delivering comprehensive refractory solutions. Our refractory manufacturing team consists of over 200 professionals in technology, engineering, and the production of aluminosilicate products.

The company's headquarters and production plant are located in Żarów, Poland, at the heart of continental Europe. We supply over 60,000 tons of refractory products yearly in over 180 unique varieties.

Our product portfolio includes refractory materials, such as refractory bricks, shapes, concrete, and insulating materials. We complement our product range with design and installation services for ceramic linings.

Our comprehensive approach allows us to deliver turnkey solutions, from the technical concept of the installation through the supply of necessary materials to execution.

250
Employees

55 000
Tons of refractories produced each year

35 000+
Brick shapes available to produce for our customers

60+
Million Euro annual turnover

3
Tunnel kilns

13
Industries served

180
Product brands in our portfolio

20
Automated and friction presses

17 000 m²
Warehouse space

1
Production plant

14 000 000+
EUR invested in acquisitions and modernization of our production park

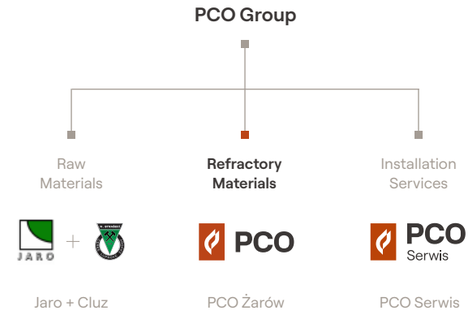
We are a part of PCO Group

Synergy effect

Polska Ceramika Ogniotrwała "Żarów" sp. z o.o. is an integral part of the refractory ceramics segment of the LODE Group.

This segment consists of four key units: the producers of refractory raw materials JARO S.A. and České lupkové závody, a.s., the producer of refractory materials PCO "Żarów", and the service and installation company PCO Serwis S.A.

These four entities cover successive stages of the supply chain – the production of raw materials, refractory materials, and the provision of service and installation services.



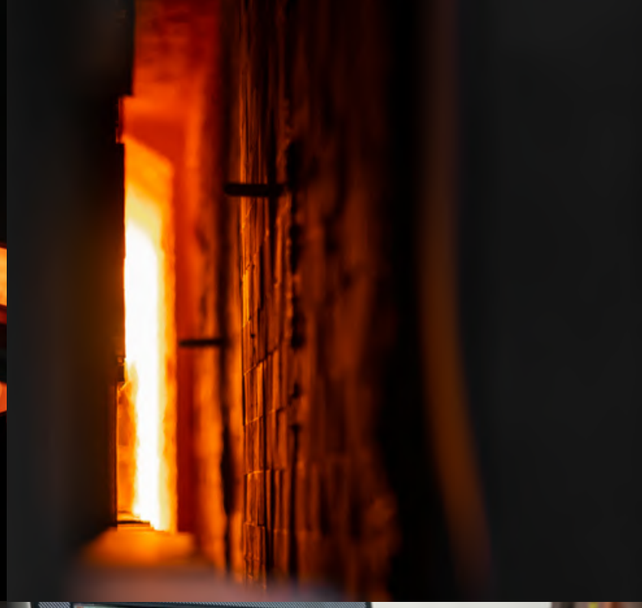
LODE Group

Since 2018 PCO is part of the LODE Group. LODE is the largest producer of building materials in Central and Eastern Europe, employing over 900 people across 9 production plants in Poland and Latvia.

LODE Group specializes in ceramics and products such as ceramic blocks, clinker bricks and pavers, as well as concrete prefabricates and blocks. The well-known product brands include: LODE, Keraterm, LHL Klinkier, Patoka, Cerpol, and TAB.

The experience, knowledge, and resources provided by PCO's membership in the LODE family support the improvement of our refractory solutions. The intensive development of the plants and the expansion of the group's refractory division through acquisitions mean that every year PCO's offering is expanded with additional elements that increase benefits for our clients.

1. **Lode** Warszawa, PL
2. **Cerpol** Kozłowice, PL
3. **Cerpol** Gozdnica, PL
4. **Jaro** Jaroszów, PL
5. **PCO Żarów** Żarów, PL
6. **PCO Serwis** Żarów, PL
7. **Patoka** Ciasna, PL
8. **TAB** Sierakowice, PL
9. **TAB** Nasielsk, PL
10. **KERA-TERM** Ane, LV
11. **Lode, LHL Klinkier** Liepa, LV
12. **Cluz** Nové Strašecí, CZ




LAEIS
1600


LAEIS

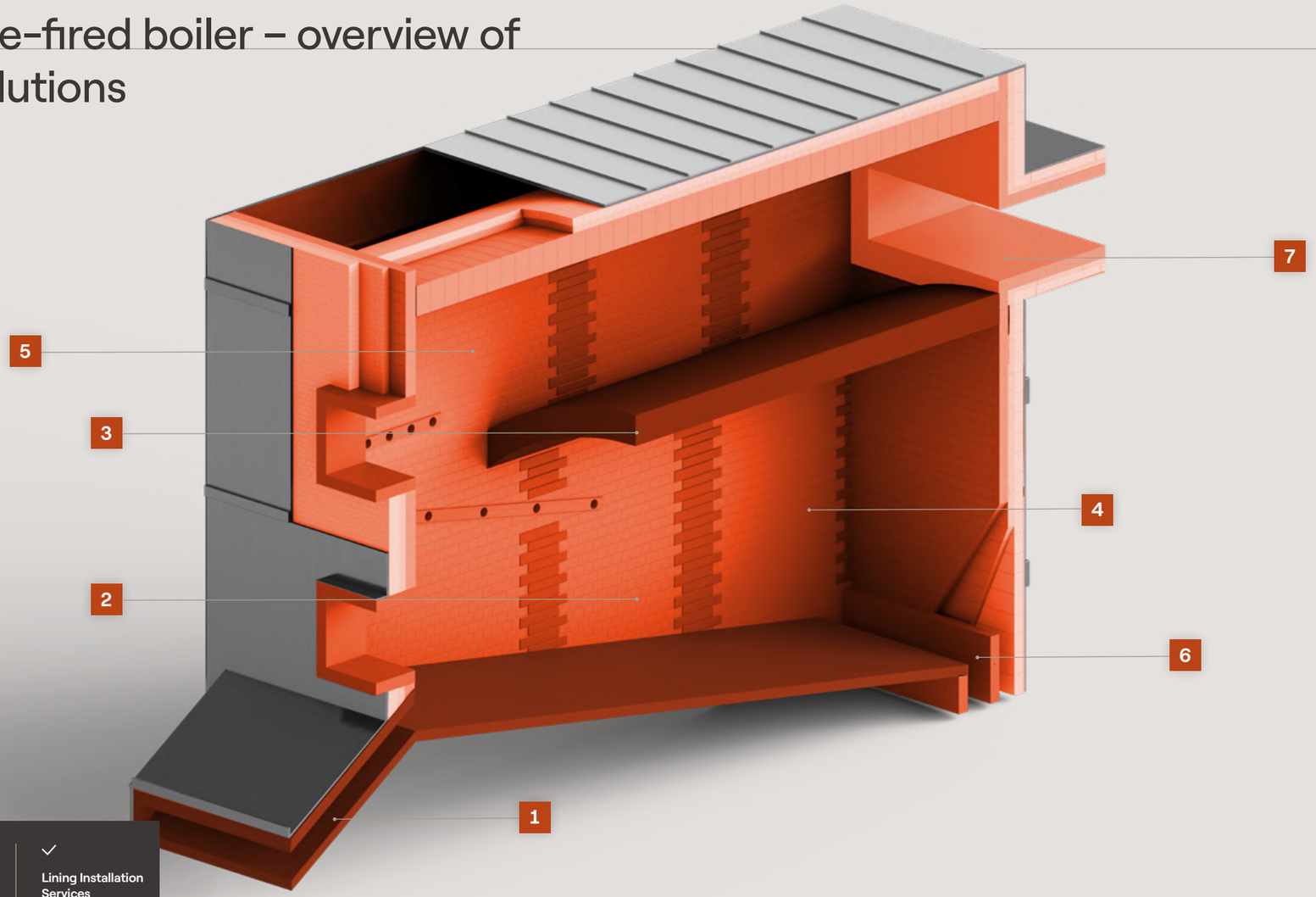

EIRICH


DMG MORI
X -392.600
Y 1.150
Z -1.140


CERIC
WISTRA

Our product offering for power boilers and waste processing units

Biomass grate-fired boiler – overview of refractory solutions



✓ Lining Design

✓ Refractory Products Supply

✓ Lining Installation Services

Our products in use:

1 SUPERTON AL44
ISOLUX L5s
PCOCAST BM145R

2 ABRAL A35s10
ABRAL A50s15
ISOLUX LA8s
PCOCAST BM145R
MULCAST BN50 MZr
ISOCAST BI11/0,9

3 ANDALUX A50
ANDALUX A60

4 ANDALUX A45
ANDALUX A50
ANDALUX A55
MULCAST BN50M
PCOGUN 150M
ISOCAST BI12/09

5 SUPERTON AL44-2
ISOLUX LA8s
PCOGUN 150M

6 SUPERTON AL44-2
MULCAST BN50M

7 MULCAST BN50M
PCOGUN 150M

ⓘ The full technical specifications of our products can be found at the end of the catalog.

Description:

In biomass grate-fired boilers, refractory ceramic linings play a key role in protecting the steel structure against high temperatures and aggressive biomass combustion by-products. During operation, temperatures inside the boiler typically range from 800 to 1200°C, requiring the use of refractory materials with high thermal resistance. The lining must also prevent the accumulation of ash and aggressive chemical compounds that can lead to corrosion or surface wear. The design of refractory linings for biomass boilers focuses on selecting ceramic materials characterized by high resistance to thermal shock and variable flue gas composition, ensuring long-term operation with minimal risk of material degradation.

Due to the need to ensure sufficient residence time of flue gases in hot zones, boilers are divided into:

a combustion zone, characterized by intensive combustion processes and high temperatures, with clearly defined working areas where various lining technologies are applied (prefabricated elements, cast-in-place concretes, fired products),

a heat recovery zone, where the refractory lining mass is relatively limited and the primary objective is rapid heat transfer and further cooling of the flue gases.

Legend:

1 **Fuel inlet area**

2 **Grate-adjacent zone**

3 **Intermediate vault**

4 **Combustion zone**

5 **Post-combustion zone**

6 **Ash / slag discharge zone**

7 **Outlet from the adiabatic chamber**

Coal-fired grate boiler – overview of solutions

Our products in use:

1. ABRAL A50s15
   MULCAST BN50MZr
   MULCAST BN80MZr
   PCOCAST BNAK160
   ISOCAST BI12/09
   PCOCAST BN135N
2. PCOCAST BOS145
3. NORMATON A30t
   PCOCAST BN135N
4. ANDALUX A60H
   ABRAL A50s15
   ISOLUX LA8s
   PCOCAST BNA

The full technical specifications of our products can be found at the end of the catalog.

- ✓ Lining Design
- ✓ Refractory Products Supply
- ✓ Lining Installation Services

Description:

In coal-fired grate boilers, where the combustion process takes place directly on the grate, refractory ceramic linings are exposed to highly variable operating conditions, combining high temperatures—typically in the range of 1000–1300°C—with intensive mechanical and chemical impact.

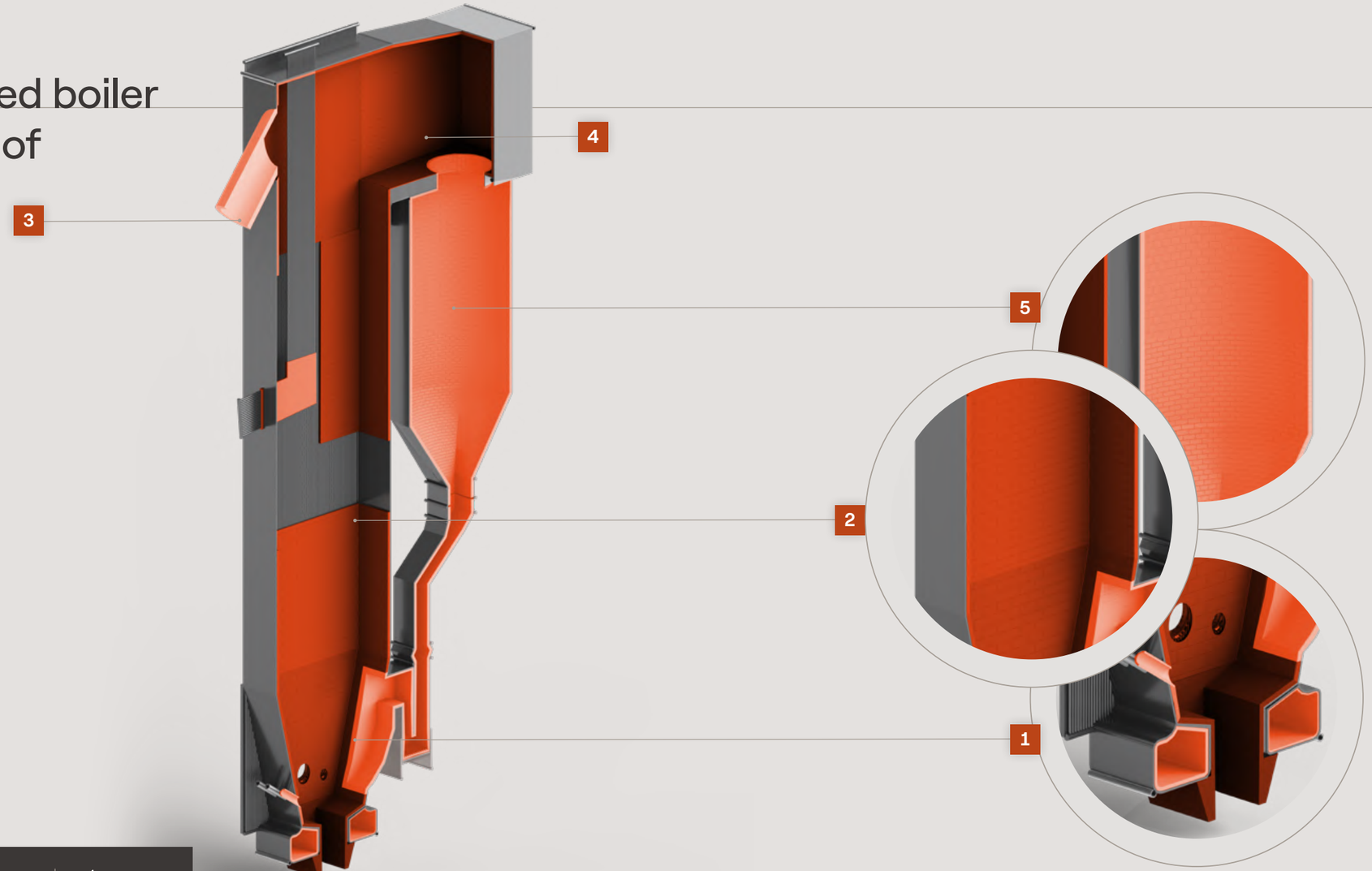
The lining in such units must withstand continuous contact with the fuel bed, ash, and other combustion by-products, which requires high resistance to abrasion and chemical corrosion. In addition, rapid temperature fluctuations and direct contact with the grate necessitate the use of specialized refractory compositions characterized by sufficient flexibility and the ability to absorb thermal stresses.

A key factor is the precise selection of refractory materials that not only maintain the integrity of the lining under severe operating conditions, but also ensure energy efficiency and stable combustion performance

Legend:

1. Ignition vault
2. Deflections of membrane wall tubes
3. Boiler walls
4. Grate-adjacent zone

Fluidized bed boiler – overview of solutions



Our products in use:

1. PCOCAST BM145R
2. PCOCAST BNA FI
   PCOCAST BN80M FI
3. ANDALUX A60
   PCOCAST BNAB
   PCOCAST BNAK160
   PCORAM BNAB
4. ANDALUX A60
   PCOCAST BMAB 160
   PCOCAST BNAK160
   PCORAM BNAB
5. ANDALUX A65
   PCOCAST BMAB 160
   PCOCAST BNAK160
   PCORAM BNAB

The full technical specifications of our products can be found at the end of the catalog.

- Lining Design
- Refractory Products Supply
- Lining Installation Services

Description:

In fluidized bed boilers, refractory ceramic linings must withstand highly specific operating conditions resulting from the presence of a moving fluidized bed, which generates intense mechanical and chemical interactions. Operating temperatures in fluidized boilers typically range from 850 to 1100°C, while the linings are continuously exposed to abrasion, chemical erosion, and the impact of solid particles carried within the gas stream.

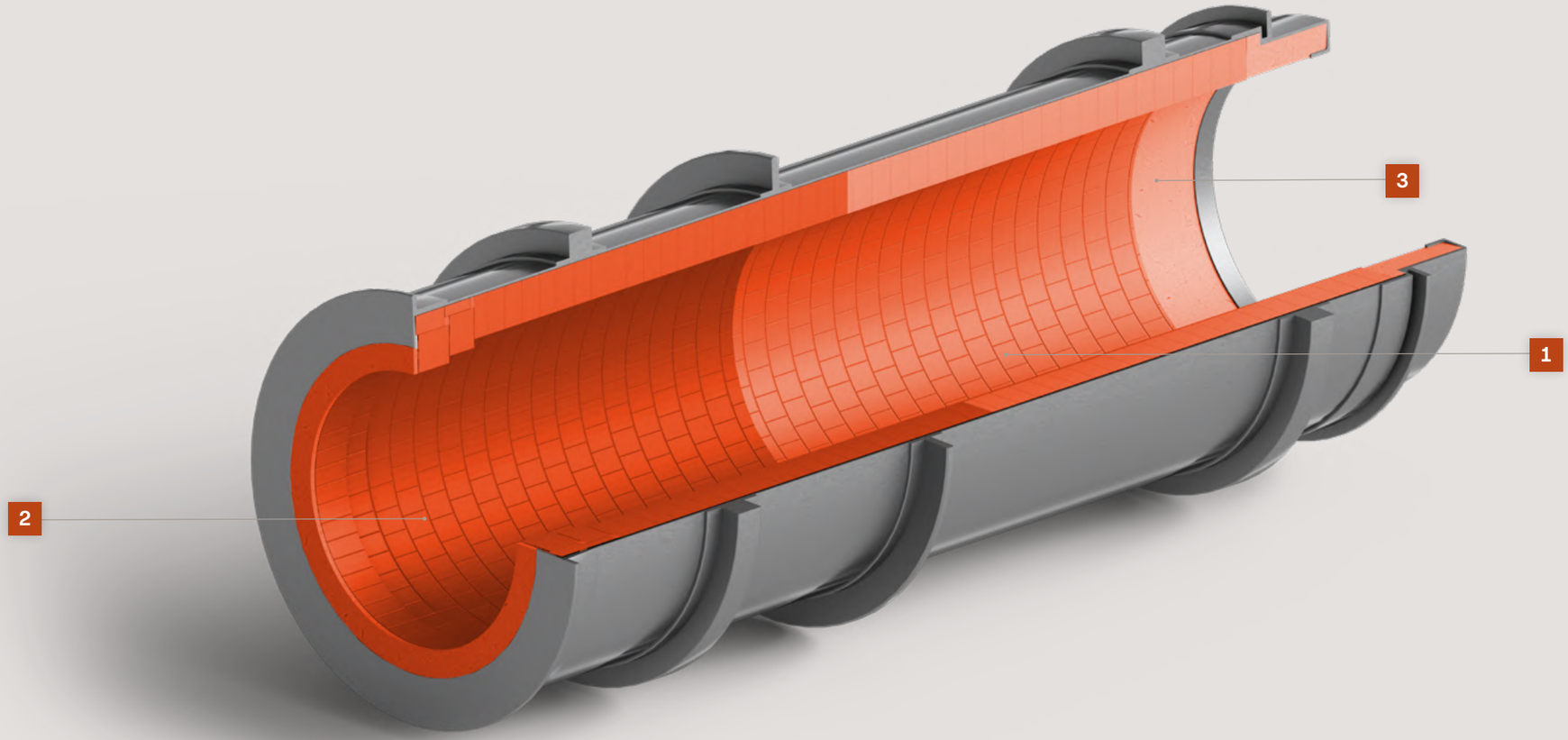
This requires the use of specialized refractory compositions that provide high abrasion resistance while enabling efficient heat dissipation and reduction of thermal stresses.

The optimization of refractory lining design in fluidized bed boilers focuses on ensuring uniform heat distribution and minimizing localized overloads, which is essential for maintaining operational stability and combustion efficiency.

Legend:

1. Nozzle floor
2. Combustion chamber walls
3. Flue gas ducts
4. Inlet to cyclones
5. Separators / cyclones

Rotary kilns – overview of solutions



Our products in use:

1 ANDALUX A60H
CORALEX AK75
CORALEX AK90
PCOCAST BNAK160

2 ANDALUX A60H
CORALEX AK75
CORALEX AK90

3 PCOCAST BOK160
PCOCAST BNAK160

The full technical specifications of our products can be found at the end of the catalog.

- Lining Design
- Refractory Products Supply
- Lining Installation Services

Description:

Rotary kilns for waste treatment operate under highly complex process conditions, where refractory ceramic linings must withstand not only high temperatures—often in the range of 1200–1450°C—but also the aggressive impact of chemically diverse waste streams and their combustion by-products.

In such units, the refractory lining is exposed to variable and frequently rapid thermal cycles, as well as direct contact with corrosive substances. This necessitates the use of ceramic linings with enhanced resistance to thermal shock, chemical erosion, and abrasion.

A key challenge in the design of rotary kilns for waste treatment is ensuring a uniform heat distribution within the refractory lining while minimizing the influence of aggressive process-related factors.

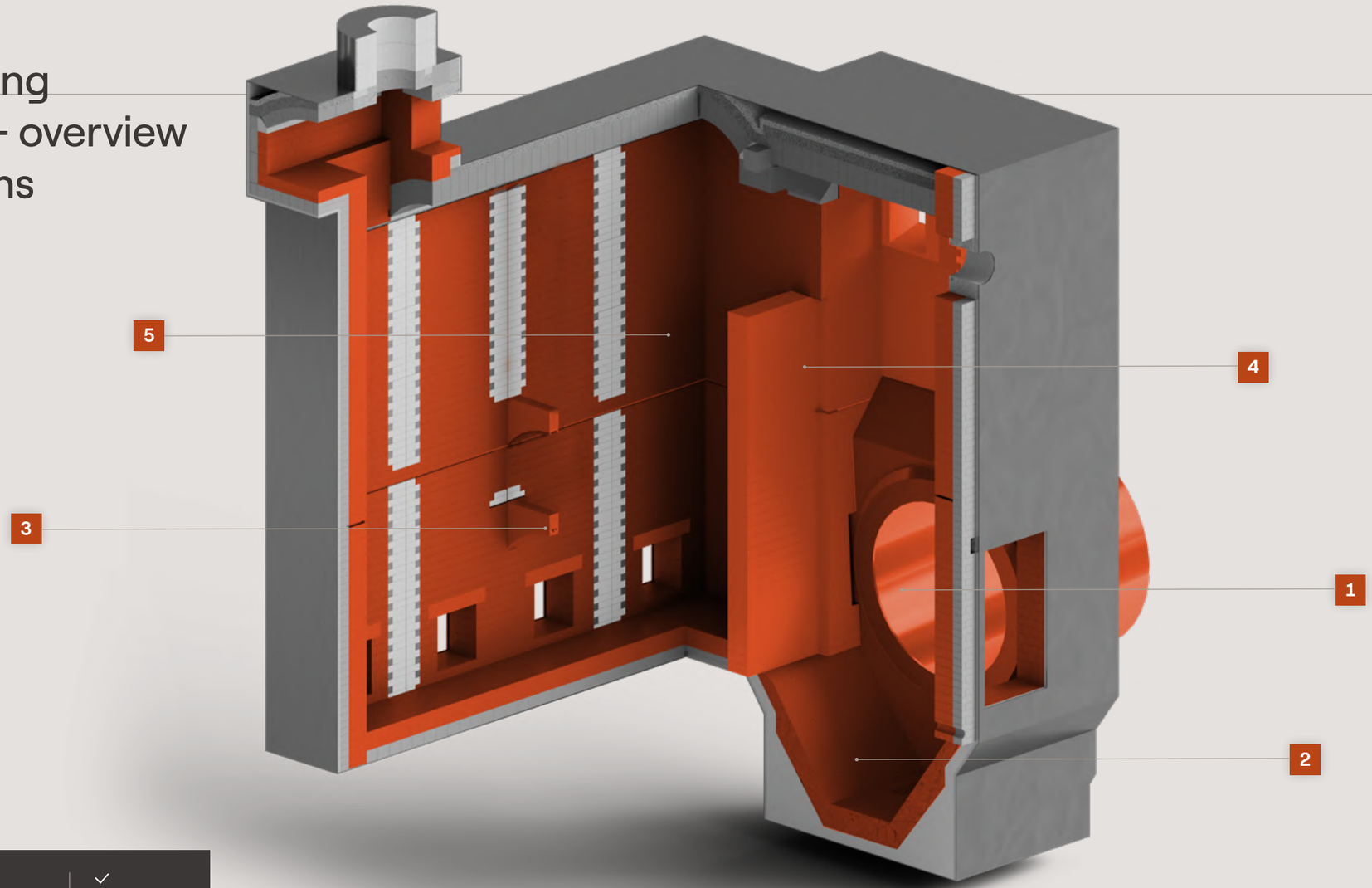
Legend:

1 Main shell

2 Conical transitions

3 Kiln front / kiln inlet section

Afterburning chamber – overview of solutions



Our products in use:

1. MULCAST BN50M
   MULCAST BN80MZr
2. MULCAST BN50MZr
   MULCAST BNAK160
3. ABRAL A50s15
   BNSiC 40/40
4. ABRAL A50s15
   BNSiC 40/40
5. ABRAL A50s15
   ABRAL A45s25

The full technical specifications of our products can be found at the end of the catalog.

- ✓ Lining Design
- ✓ Refractory Products Supply
- ✓ Lining Installation Services

Description:

The afterburning chamber is a unit that enables the next stage of the waste combustion process downstream of the rotary kiln, namely the afterburning of gasification products and carbonates. Combustion in the rotary kiln takes place under oxygen-deficient conditions, whereas in the afterburning chamber additional air is supplied and the process atmosphere becomes oxidizing. This requires the use of a different type of refractory lining, as these two atmospheres affect furnace ceramics in different ways.

Depending on the zone, the chamber is subjected to conditions promoting mechanical erosion (feed impact), chemical corrosion (gas atmosphere), and thermal shock caused by the introduction of combustion air. The ceramic lining throughout the entire process length is constructed using high-alumina refractory products.

Legend:

1. Inlet from the rotary kiln
2. Fluidized bed
3. Mixing baffles
4. Combustion zone
5. Afterburning zone

Technical specifications

Dense alumina firebricks

Our brand	Refractory type	Chemical composition			Physical parameters				Resistance		TC (conductivity) [W/mK]		
		AL_2O_3 [%]	Fe_2O_3 [%]	Other [%]	BD [g/cm³]	OP [%]	CCS [MPa]	Other	RuL $T_{0,5}$ [°C]	TSR: air/ water [n]	800°C	1100°C	1400°C
		ISO 12677	ISO 12677	ISO 12677	EN 993-1	EN 993-1	EN 993-5	–	EN ISO 1893	DIN 51068-1	EN 993-15	EN 993-15	EN 993-15
ABRAL A35s10	Andalusite firebrick	32	1,5		2,25	13	60		1300	Water – 15	0,3	0,5	-
NORMATON A30t	Fireclay brick	35	2,5		2,05	20	30		1200	Water – 10	1,3	1,4	
SUPERTON AL44	Dense firebrick	44	2,1		2,2	20	35		1300	Water - 20	1,55	1,65	
ABRAL A45s25	Andalusite firebrick	45	1,3	-	2,65	12	65		1520	Water – 30	3,2	3,6	3,8
EXTRATON A45	Fireclay brick	46	1,4		2,35	16	45		1400	Water - 25	0,5	0,6	0,8
SUPERTON AL44 - 2	Dense firebrick	46	1,7		2,25	18	45		1300	Water - 25	1,55	1,65	-
ABRAL A50s15	Andalusite firebrick	50	1,3		2,55	13	70		1500	Water – 30	2,6	2,9	3,1
ANDALUX A50	Andalusite firebrick	50	1,4		2,4	17	50		1500	Water - 25	1,75	1,9	
ANDALUX A55	Andalusite firebrick	56	1,4		2,45	17	55		1520	Water – 30	1,8	1,95	
ANDALUX A60	Andalusite firebrick	60	1,2		2,55	16	65		1550	Water – 30	1,85	2	
ANDALUX A60H	Andalusite firebrick	61	1,1		2,6	14	70		1580	Water – 30	1,85	2	
ANDALUX A65	Andalusite firebrick	64	1,15		2,6	16	70		1580	Water – 30	1,85	2	
CORALEX AK75	Andalusite-co-rundum bricks	75	0,6		2,8	15	80		1650	Water – 30	2,1	2	1,95
CORALEX AK90	Andalusite-co-rundum bricks	91	0,35		3	18	75		1650	Water – 30	2,5	2,3	2,2

Insulating refractory bricks

Our brand	Refractory type	Chemical composition			Physical parameters				Classification		TC (conductivity) [W/mK]		
		AL_2O_3 [%]	Fe_2O_3 [%]	Other [%]	BD [g/cm³]	OP [%]	CCS [MPa]	Other	Temp. limit [°C]	ASTM [n]	600°C	800°C	1000°C
		ISO 12677	ISO 12677	ISO 12677	EN 993-1	EN 993-1	EN 993-5	–	–	–	EN 993-15	EN 993-15	EN 993-15
ISOLUX L5s	Fired insulating brick	31	3,0		0,59		2,8		1260	23	0,31	0,35	0,40
ISOLUX LA8s	Fired insulating brick	41,5	1,6		0,88		4,5		1350	25	0,35	0,39	0,42

Refractory castables and masses, insulating castables

Our brand	Refractory type	Chemical composition				Physical parameters			
		AL_2O_3 [%]	Fe_2O_3 [%]	CaO [%]	Other [%]	BD @110°C [g/cm3]	CCS @110°C [MPa]	Appl. temp. limit [°C]	Grain size [mm]
		PN EN ISO 1927-3	PN EN ISO 1927-3	PN EN ISO 1927-3	PN EN ISO 1927-3	PN EN ISO 1927-6	PN EN ISO 1927-6	–	PN ISO 2591-1
ISOCAST BI11/0,9	Insulating castable	25	7,5	-	-	0,95	60	1100	0 – 4
ISOCAST BI12/0,9	Insulating castable	35	9,5	-	-	0,95	40	1200	0 – 4
BNSiC BN40/40	Cement castable	38	0,5	1,6	-	2,55	85	1500	0 – 4
PCOCAST BOS145	Cement castable	42	2,5	7,5	-	2,05	40	1450	0 – 5
PCOCAST BNA	Cement castable	42	2,5	7,5	-	2,05	40	1450	1 – 5
PCOCAST BN135N	Cement castable	47,5	1,1	2,6	-	2,25	55	1420	0 - 5
MULCAST BN50 MZr	Cement castable	48	0,8	1,6	-	2,45	75	1500	0 - 5
PCOCAST BM145R	Cement castable	50	0,8	4,2	-	2,3	85	1480	0 - 5
MULCAST BN50 M	Cement castable	50	0,9	1,6	-	2,3	80	1500	0 - 5
PCOGUN 150M	Gunning mix	52	1,1	6,5	-	2,05	60	1500	0 - 5
PCORAM BMAB	Cement castable	66	1	4,2	-	2,45	60	1550	0 – 5
PCOCAST BNAB 160	Cement castable	67	0,8	3,8	-	2,6	85	1500	0 – 5
PCOCAST BNAK160	Cement castable	68	0,7	1,6	-	2,7	70	1600	0 - 3
PCOCAST BN ABFL	Cement castable	68	1,2	1,8	-	2,65	85	1550	0 – 6
PCOCAST BN80M FI	Cement castable	68	1,2	1,8	-	2,65	85	1550	0 – 6
PCOCAST BNAK160	Cement castable	68	0,7	1,6	-	2,7	70	1600	0 – 3
MULCAST BN80MZr	Cement castable	70	0,9	1,6	-	2,7	80	1600	0 – 5
PCOCAST BOK160	Cement castable	88	0,6	6	-	2,85	55	1600	0 – 5

Why choose PCO?

We manufacture complex-shaped refractory elements and prefabricates for easy installation

We are capable of manufacturing even the most complex refractory brick shapes and cast concrete prefabricated elements. PCO Żarów operates its own CNC-equipped machine shop as well as a dedicated prefabrication department with a batch furnace (drying kiln). Thanks to our in-house specialists, we are able to design, manufacture, and refurbish all necessary press tools and molds. Mold components are stored indefinitely in our warehouse, allowing once-produced tooling to be reused for many years.

All bricks, mortars, and castables from a single manufacturer

Power generation units as well as waste incineration plants require multilayer refractory lining systems. PCO Żarów manufactures complete lining solutions for both brickwork and monolithic refractory structures. This approach simplifies the work of project managers and procurement teams, as all ceramic products can be sourced from a single manufacturer. Our portfolio includes high-alumina products resistant to combustion by-products and thermal shock, heavy self-flowing castables, and concrete prefabricates for segmented lining of furnace shafts and flue gas ducts.

Simplified project management and reduced risk – one supplier of refractory materials and services

For over 20 years, PCO has been supplying refractory materials and services for the power generation and waste incineration sectors in Poland. Our offering includes dense and insulating aluminosilicate products, as well as refractory castables and mortars. We provide consultancy and design complete lining systems. PCO Serwis S.A. delivers turnkey projects, including refractory lining installation and the manufacturing of all required heat-resistant steel components.

Why choose PCO?

Product portfolio developed together with industry practitioners

Refractory ceramics operating in biomass boilers and waste incineration plants are exposed to highly unstable conditions, including thermal shock, localized overheating, feed-related build-ups, chemical attack, and cyclic operation with frequent cooling and reheating. Our bricks and castables intended for the working lining layer have been developed specifically for the most demanding operating conditions and their performance has been proven through many years of industrial application.

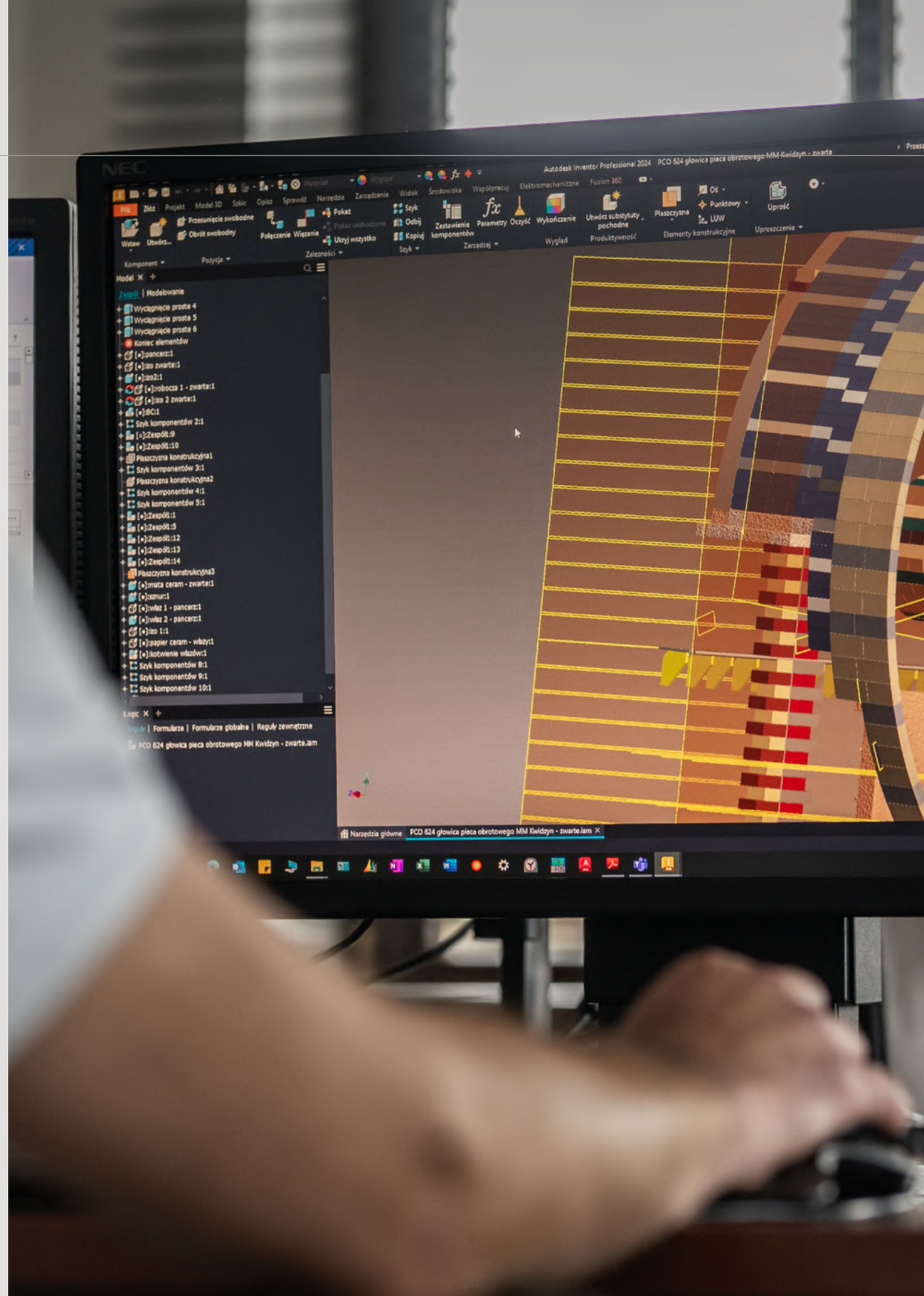
A problem-solving approach to refractory lining performance

Thanks to extensive experience in both the design and installation of refractory linings for the power generation sector, PCO specialists are able to identify root causes and propose solutions to atypical lining performance issues, such as excessive wear, chemical corrosion, material build-ups, excessive heat losses, or difficulties during maintenance shutdowns.

Our own team of designers and engineers

PCO Żarów specialists are highly experienced in the design of refractory linings for power boilers and assist in selecting optimal solutions even for hard-to-access areas.

When delivering a complete project, we optimize the lining design to minimize total costs, including tooling costs. We work with industry-standard software such as AutoCAD, Inventor, Creo, and Simu-Therm.



Selected Products and Services

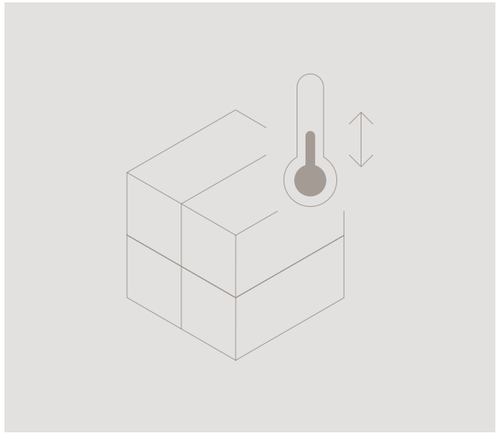
Consultancy in refractory lining projects

Service

PCO Żarów specializes in the design of refractory linings for the power generation sector. We provide tailored solutions for each individual unit.

Why?

One of PCO's key strengths is experience — for over a decade we have been designing refractory lining systems, providing technical consultancy, and improving the performance of linings in our customers' boilers. We are able to develop lining concepts regardless of the geometry of the existing masonry, even in cases where historical documentation is incomplete. Our specialists prepare solutions based on site inspections and interviews with plant operators, ensuring optimal refractory performance for each boiler.



PERLITEX LPN™

Product

Lightweight, unfired insulating bricks, intended for installation as a layer on a steel casing.

Why?

PERLITEX LPN™ are unfired insulating bricks developed for the final insulation layer of power boilers. Thanks to their raw material composition and a production process without kiln firing, they provide excellent thermal insulation performance and a low carbon footprint. This layer significantly reduces the temperature on the boiler steel shell.

Low-cement castables based on silicon carbide (SiC)

Product

We have developed a product offering excellent resistance to chemical corrosion, abrasion, and thermal shock.

Why?

Low-cement castables based on silicon carbide (SiC) provide excellent resistance to abrasion, chemical attack, and thermal shock in highly aggressive operating conditions. The dense structure of the lining limits the penetration of corrosive media and, at elevated temperatures, forms a protective glassy layer on the working surface, significantly reducing wear and extending lining service life.

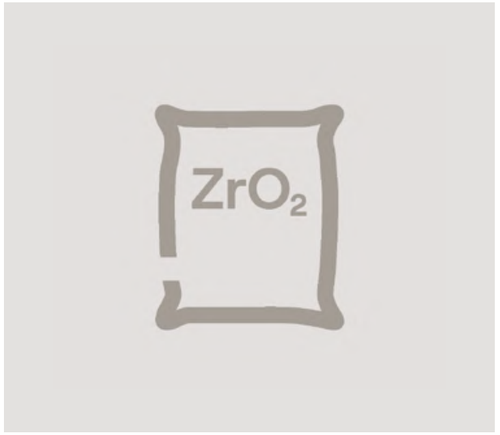
On-site presence and technical support of a PCO specialist during refractory lining overhauls

Service

Along with the supply of our castables, we provide technical consultancy on proper mix preparation and application during overhaul works.

Why?

Refractory castables, especially low-cement and cement-free grades, can be challenging to install if the work is not carried out by specialized masons. Proper preparation and casting of the lining are critical for the subsequent drying and heat-up process and ultimately determine the correct performance of the refractory lining. We therefore offer the on-site presence of PCO specialists during refractory lining overhauls.



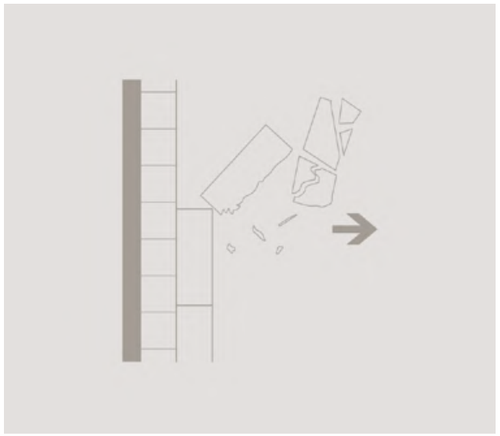
Zircon-enhanced refractory castables and gunning mixes

Service

We have developed refractory castables designed for the working lining layers in waste incineration plants.

Why?

Low-cement castables enhanced with zircon perform exceptionally well under aggressive chemical conditions typical of thermal waste treatment. Linings based on this type of material wear more slowly, as the zircon content reduces wetting of the lining surface by molten slags, limiting the extent of corrosion. The high hardness of the zircon component provides additional abrasion resistance, further extending the service life of the refractory lining.



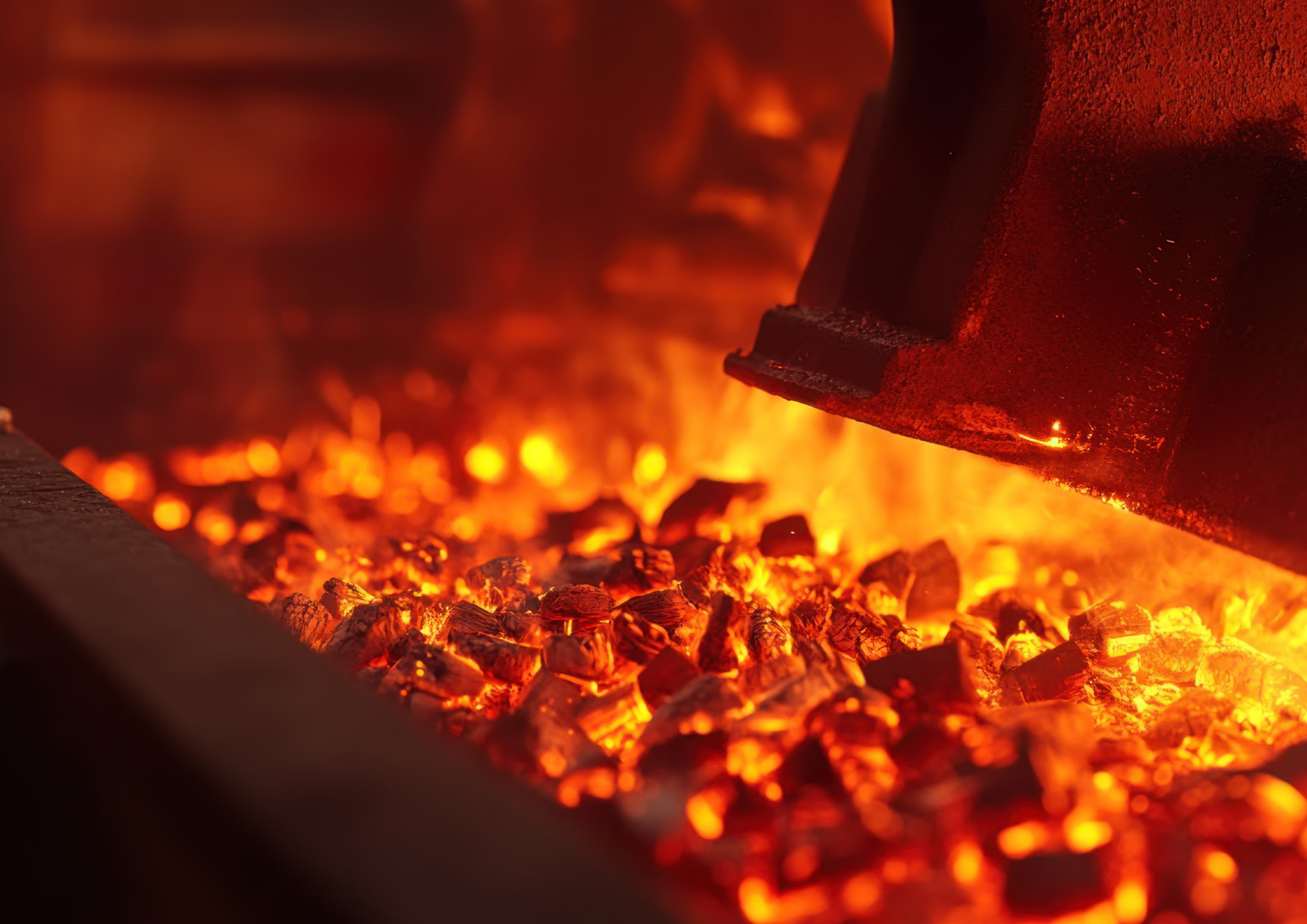
Collection and disposal of spent refractory linings from waste incineration plants

Service

PCO Serwis S.A. holds all required permits for the collection and disposal of spent furnace ceramics (end-of-life refractory linings).

Why?

Prior to overhaul works, our specialists dismantle the worn refractory lining and prepare the unit for the installation of a new lining. We collect furnace waste ranging from municipal to medical applications, allowing our customers to avoid contracting separate companies and incurring additional costs for the transport and disposal of spent refractory materials.



PCO

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