

# IRON INDUSTRY

TAP HOLE CLAY  
REFRACTORY CONCEPT SOLUTIONS

**TOGETHER**  
FOR **MORE**



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

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

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

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

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

Over 2,500 employees across

**31 COUNTRIES**

**3 R&D CENTERS**

and 11 Design & Engineering Centers

**18 PLANTS**

in 15 Countries

Annual Revenue of over

**500 MILLION EUROS**

Wholly-owned Subsidiary of

**IMERYS GROUP**

# PARTNERING YOU IN THE IRON SECTOR FOR MORE

Calderys is a leading provider of refractory solutions and services to the Iron industry. We are present in over 100 main runners, we are plugging over 65 tap holes, and we have made around tens of blast furnace repairs over the last years and all of this across more than 20 countries. Our global network of industry experts ensure that we propose the most suitable products based on your requirements and deliver to you superior refractory performance and reliable services. We are able to do so by combining our innovative product range and pioneering implementation techniques with end-to-end project management services. We deliver the following value proposition to iron makers:



## INCREASED PRODUCTIVITY

By extending the service life thanks to increased availability of the production equipment and by reducing maintenance downtime

## IMPROVED COST EFFECTIVENESS

By reducing unit cost of hot metal thanks to continuous optimization of the refractory solutions by our industry experts

## ENHANCED SAFETY AND COMPLIANCE

By improving the health and safety conditions in your plants thanks to our safe installation practices and our environmentally friendly refractory products for example our resin-bonded tap-hole clays

### OUR END-TO-END PRODUCT AND SERVICE OFFER DEDICATED IRON INDUSTRY ENCOMPASSES:

#### PRODUCT PORTFOLIO

Our comprehensive product portfolio for iron industry includes alumina, carbon and silicon carbide based products. It includes dense castables, self-flowing castables, dry gunning and shotcreting materials, ramming and plastic mixes, dry vibrating mixes, injection and grouting products, taphole clays and precast ready shapes. It covers every step of the iron making process - from coke oven and sinter plant, to blast furnaces, casthouse floor and finally hot metal transport and treatment.

#### DESIGN

We provide customized solutions including complete refractory lining design, thermal profiling, product selection, job quotation, development of innovative installation techniques, dry-out and start-up/operating instructions.

#### INSTALLATION

We carry out high-quality installation services using in-house equipment and through use of optimal installation techniques. This ensures best installation and dry-out of the refractory so that the customer gets maximum performance in terms of reduction in time required, reduction in energy requirements, low wastage and optimal performance of our refractory products.

#### MAINTENANCE

We offer permanent on-site refractory service including regular and predictive maintenance and repair. We also provide rapid round-the-clock response to emergencies as required.

#### PROJECT MANAGEMENT

We provide complete project management services including consultation, planning, delivery scheduling, supervision, site management and also direct training for customer personnel. Be it large, small or turnkey projects - our end-to-end project management services ensure on-time and on-budget completion.

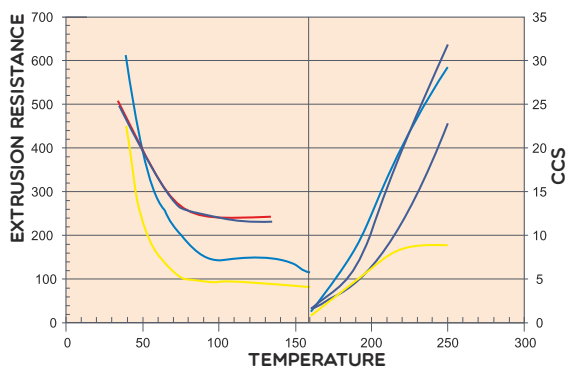
# Refractory Solutions for Blast Furnace Tap-holes

## Our Experience at Your Service

To match specific requirements, our product offer is combined with a wide and adapted offer of services:

- Engineering
- Installation & Supervision
- Innovation

### SOFTENING & HARDENING KINETICS

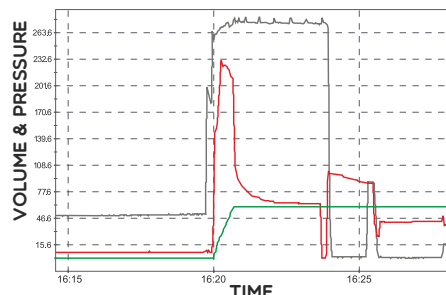


#### Engineering

Calderys' engineering teams, dedicated to the development of tap-hole clay solutions, help customers to meet their specific needs depending on the furnace process and the casthouse equipment and practices.

#### Installation & Supervision

Calderys provides expert technical guidance to ensure the best tap-hole clay performance during service, with specialised technical support, including refractory, blast furnaces processes and casting operation knowledge, and experienced supervisors.



#### Innovation

Calderys' continuous innovation process is based on a world class R&D, in collaboration with all the ironmaking dedicated teams, resulting in the design of customised tap-hole clay solutions and the anticipation of future needs. Personalised training programs are also organised in our plants and contribute to a closer cooperation with our customers.



## Our Innovative Product Range

# CALDE™ TAP

**Combining different technologies, the CALDERYS comprehensive tap-hole clays range for blast furnaces offers the advantage of being adaptable to any type of blast furnace and casthouse operative conditions: CALDE™ TAP**

The development of our tap-hole clays is driven by the objective of responding, with performance and consistency, to the technical and economic requirements of today's increasingly modern blast furnaces, which have higher productivity rates, reduced production unit costs, and which operate under severe environmental regulation.



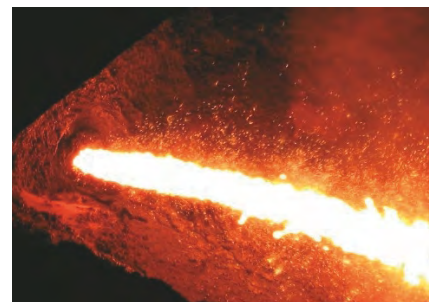
To reach these objectives, our CALDE™ TAP tap-hole clays are based on various types of time-tested and innovative raw materials bases (i.e.: silico-alumina aggregates, carbon, carbides, nitrides...) and binding systems (i.e.: resins and carbonaceous binders based on [BaP] free organic mixes), giving the products their unique properties.

These properties combined with a quality consistency philosophy enable the best performances even in severe conditions while lowering the specific clay consumption and enabling furnace productivity increases.

### Health & Safety

Calderys pays special attention to Health & Safety issues and our products are all formulated to give reduced gas emissions at the furnace opening and during the handling of the warm product.

All CALDE™ TAP tap-hole clays have extremely low PaH & BaP values.



# Refractory Solutions for Blast Furnace

## Mini & small blast furnaces

< 3000 tons/day

- CALDE™ TAP 110 QSX
- CALDE™ TAP 220 QES
- CALDE™ TAP 221 QEHH

## Medium blast furnaces

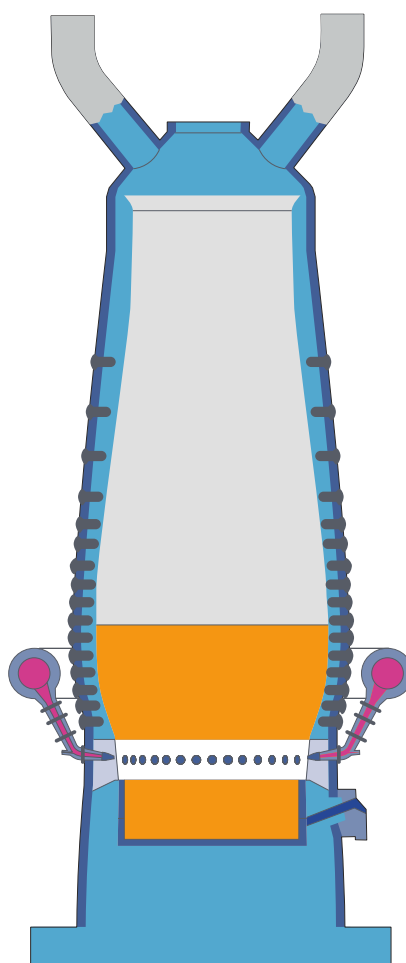
< 5500 tons/day

- CALDE™ TAP 218 BQH
- CALDE™ TAP 219 BQHH
- CALDE™ TAP 222 BQHH
- CALDE™ TAP 223 BQH
- CALDE™ TAP 225 BQH
- CALDE™ TAP 321 BQH
- CALDE™ TAP 325 BQH
- CALDE™ TAP 330 BAMH
- CALDE™ TAP 331 BAX

## Large blast furnaces

> 5500 tons/day

- CALDE™ TAP 236 BEX
- CALDE™ TAP 239 BEX
- CALDE™ TAP 240 BEX
- CALDE™ TAP 335 CMS
- CALDE™ TAP 337 CEMS
- CALDE™ TAP 339 BEX
- CALDE™ TAP 341 CEM
- CALDE™ TAP 341 CES
- CALDE™ TAP 344 CEMH
- CALDE™ TAP 345 CRMS



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# Refractory Solutions for Tap-holes Repairs & Maintenance

Like every key zone of a refractory lining, the blast furnace tap-hole requires particular attention and needs therefore regular maintenance to ensure that the productivity level and service life are kept in line with targets.

## The necessity of tap-hole repairs appears in general:

- when gas tracking appears on the taphole face, disturbing the hot metal flow and then causing the deterioration of the whole casting, hearth emptying and production processes;
- when cracks are present or created in the tap-hole funnel mushroom, leading then to gas tracking or hot metal infiltration;
- when plugging and leaving the tap-hole at the end of the runner's campaign, thus inducing increased wear of the tap-hole mushroom.

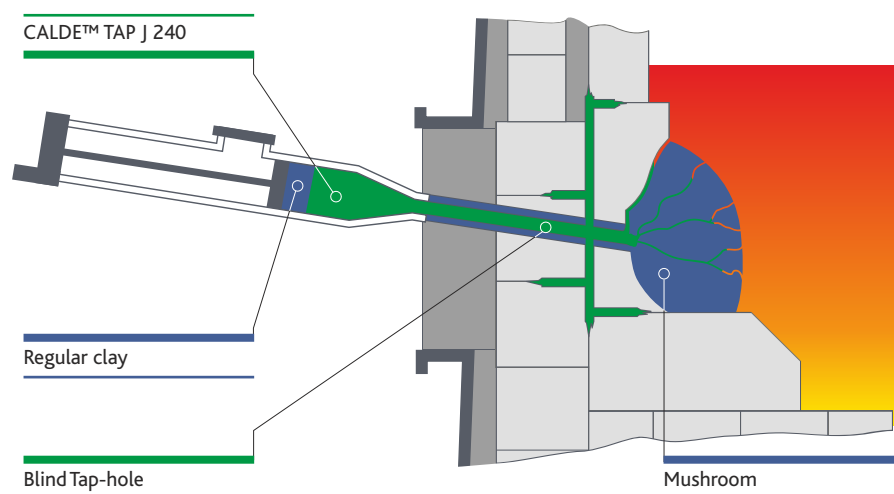
To answer these requirements, Calderys has developed the CALDE™ TAP J 240, a special tap-hole clay dedicated to maintenance by injection with the mudgun. This material is today referenced in more than 20 blast furnaces all over the world.

- In case of alternate tapping conditions, CALDE™ TAP J 240 can be applied by injection into a blind tap-hole drilled beyond the infiltration area;
- When alternate tapping is not possible, even for 1 or 2 casts, CALDE™ TAP J 240 can also be used as a mix with the regular tap-hole clay.

The CALDE™ TAP J 240 technology allows repairs of the tap-hole without stopping the blast furnace.

Whatever the type of tap-hole clay used in your blast furnace, the maintenance by CALDE™ TAP J 240 will provide a regular and clean liquid stream and consequently a considerable improvement of the casting conditions, such as:

- easy and smooth opening;
- reduction of the blast furnace fumes at the opening;
- reduction of the gas tracking effect in the tap-hole;
- regular and well calibrated hot metal stream;
- longer tap-hole and stronger tap-hole mushroom;
- less wear of the trough in the impact zone.



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