

TAP-HOLE CLAY





CALDERYS

150+ years of combined experience

6,500+ people and contractors in over 30 countries

50 plants in the 5 continents

One of the world's largest supplier in high temperature solutions

Enlarged portfolio of solutions from refractory bricks and monolithics to steel casting fluxes and green molding sand solutions

Calderys is a leading global provider for industries operating in high temperature conditions. We specialize in thermal protection for industrial equipment with a wide range of refractory products, and advanced solutions to enhance steel casting, metallurgical fluxes and molding processes.

In 2023, Calderys joined forces with HarbisonWalker International, the largest supplier of refractory products and services in the United States.

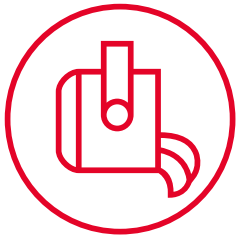
Together, we form a high-growth, customer-centric provider with a comprehensive offering and a truly global reach. Drawing on over 150 years of combined experience, we support our customers in their energy transition needs. We count more than 6,500 people and contractors, in over 30 countries.

Our international network of experts ensures an end-to-end offer with tailored services.

We are constantly developing innovative products and techniques in order to **optimize costs and performance**, combining world-class Research & Development and technical experts, as well as responsive supply chain and sales departments.

Our global structure allows us to design the customized solutions of today while **anticipating the industries' needs of tomorrow**. Calderys pays particular attention to the industry's impact on the environment and has a sustainability program articulated around three pillars: supporting our customers in their energy transition needs, improving our environmental footprint and being committed to people and local communities.

Health and safety is an integral part of how we do business. The same attention to detail that helps us provide personalized products and solutions is also applied to our rigorous health and safety criteria. Our activities require the highest level of professionalism to carry out our projects. To guarantee the strictest standards, Calderys employs a number of safety, occupational health and environmental protocols across all its entities worldwide — applicable to both our own employees as well as subcontractors and temporary workers.



OUR VALUE TO THE IRON & STEEL INDUSTRY

As a prominent ally to the Iron & Steel industry, Calderys has steadily enlarged its service solutions from ironmaking, liquid steel processing, continuous casting, reheat furnaces and other equipments. With innovation and sustainability as fundamental parts of our DNA, we have pioneered a tremendous number of new applications, such as pitch-free tap-hole clay for blast furnaces and our cutting-edge mold fluxes. Through the combination of HarbisonWalker International and Calderys' expertise, the company is offering complementary product portfolios and total care services, bringing a vast array of solutions to support customer needs in all refractory and casting fluxes applications.

What we bring to the Iron & Steel industry

- Close watch over ESG topics, such as product CO₂ footprint calculation, proposing a large range of refractory products resistant to H₂; as well as Environment, Health and Safety (EHS) concerns like the reduction of respirable crystalline silica (RCS) and Phenol (PaH).
- Complete portfolio of customized solutions from ironmaking, liquid steel processing, continuous casting, reheat furnaces and other equipment.
- Full set of refractory services: from engineering & design, installation, project management, dry-out & commissioning, to maintenance and refractory assessments.
- Process analysis including fluid flow and numerical simulations.
- Technical support from trial to after sales.



OUR VALUES FOR **TAP-HOLE CLAY APPLICATIONS**



Calderys is a leader in providing refractory solutions and services for both iron making and ferroalloys industries. Our company combines innovative products, techniques, engineering know-how, project management and installation services. We have been building successful partnerships with hundreds of customers across the world.

Day by day, we are working with our customers as one team, continuously improving the relationship, always focused on high performance, reliability, adapted solutions and the safety of all our customers' sites whatever the industry we serve: Aluminium, Cement, Foundry, Iron, Petrochem, Power or Steel.

Our market leadership in tap-hole clay is mainly based on the following highlights:

SAFETY CULTURE AND COMPLIANCE

One of our ongoing aims is to improve the health and safety conditions at your plant. Safety is ensured by the safe installation of our products, our safety installation protocols and practices as well as a robust product to avoid self-opening, reducing gas emissions at the furnace opening and during the handling of the warmed-up tap-hole clay.

Health is also a key point of our technology and mindset, as seen in our resin-bonded tap-hole clay. Our whole range of tap-hole clay has extremely low PAH & BaP values. In addition we pay attention to the nature of the binders to limit other critical substances (e.g. free phenol and free formaldehyde).

In parallel, we have always been proactive in providing adequate training concerning all kinds of PPE protection and the right behaviours to follow in order to reduce the exposure to any encountered risks.

FOCUS ON INNOVATION

We are constantly developing innovative products and techniques in order to optimise costs and performance, combining world-class R&D, a Center of Excellence regrouping technical experts, and responsive supply chain and sales departments. Those developments include the adaption of our THC's to changing legislations such as REACH to guarantee the latest health and safety standards.

Our desire is to improve your casting performance and to work hand-in-hand with you through an innovative and pioneering path as one team: designing customised tap-hole clay solutions, and anticipating future needs and personalised training programs for you.

PRODUCT PORTFOLIO AND NETWORK

Tap-hole clay represents a part of our comprehensive product portfolio for the iron industry, including alumina, carbon and silicon carbide based products. This portfolio includes dense castable, self-flowing castable, dry gunning and shotcreting materials, ramming and plastic mixes, dry vibrating mixes, injection and grouting products, Tap-Hole Clay and precast ready shapes.

The Calderys portfolio 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.

All our products are dedicated to optimise your high productivity with a cost effectiveness strategy.

In parallel, our global network of industry experts ensures that we propose the most suitable products based on your requirements and deliver to you superior refractory performance and reliable services.

OUR SERVICES



ANALYSIS OF THE PROCESS

Before the beginning of a project, a deep analysis of the blast furnace or the ferroalloys furnaces is carried out in order to well understand the process, all the available equipment, and various conditions on site. This strategy leads to an adapted solution, focused on the customer's needs.



CUSTOMER NET

As a worldwide and valued company, Calderys proposes a digital device regrouping access to:

- A large catalogue of products (names and characteristics) with the Technical Data Sheets (TDS), Safety Data Sheets (SDS) and Installation Guidelines;
- A technical library for documentation, brochures or certificates;
- A thermal calculator tool in order to obtain heat transfer calculations.



DESIGN

Based on the extensive analysis, the tap-hole clay is adapted to you with optimised parameters for plugging, casting and removing of the material.



INSTALLATION AND SUPERVISION

Calderys provides expert technical guidance to ensure the best tap-hole clay performance during service, offering specialised technical support on refractory, blast furnace processes and casting operation knowledge, as well as experienced supervisors and engineers.

This ensures the best installation of the tap-hole clay so that the customer gets maximum performance in terms of reduction of downtime, reduction in energy requirements, low wastage and optimal performance of our refractory products.



LOGISTICS

Calderys logistics personnel look after the timely delivery of our products to your sites, ensuring tracking and monitoring after delivery. Our strong network of logistics partners enables us to produce and deliver orders even on short notice.



PROJECT MANAGEMENT AND ENGINEERING

We provide complete project management services including consultation, planning, delivery scheduling, supervision, site management and also direct training for customer personnel. The complete project is driven by highly specialised and skilled teams having the ability to manage projects of all sizes and complexities. Be it large, small or turnkey projects - our end-to-end project management services ensure on-time and on-budget completion.

All the 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 available casthouse equipment and practices.



QUALITY CONTROL

Quality control, including the reliability of all our products, is a major target of our strategy. Strict tests and procedures are performed for the tap-hole clay system as well as for raw materials. This paradigm is a worldwide one for all of Calderys.

THE PRODUCT RANGE FOR TAP-HOLE CLAY: CALDE® TAP

Combining different technologies, Calderys comprehensive tap-hole clay range for blast furnaces offers the advantage of being adaptable to any type of blast furnace and casthouse operating conditions whatever the size or the daily production of the furnace.



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. Considering the increasingly modern blast furnaces, which have higher productivity rates, reduced production unit costs, and which operate under severe environmental regulation, we are able to propose or adapt our products to all these constraints.

In order to reach these objectives, our CALDE® TAP range is based on various types of time-tested and innovative raw materials (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 quality consistency, enable the best performance even in severe conditions while lowering the specific clay consumption and enabling furnace productivity increases.

Working Conditions on site	Our product range
Standard	OPTI, MULTI, MAXI
Difficult	HIFAST, HIFLEX, HIMAX
Very Difficult	OPTIMAX

QUICK DRILLING ADVANTAGES



QUALITY

- Ensure a regular profile to the tap-hole (without cracks) by limiting hammering: better hearth drainage, less gas leakage.
- Maintain the hole diameter along the entire length of the tap-hole for optimal casting.

SAVINGS

- Limit the additional costs associated with difficult drilling, especially the over-consumption of drill bits and oxygen lances: **up to 20% savings**.

PRODUCTIVITY

- **30% reduction of the opening time** compared to a traditional tap-hole clay.
- No production delays due to opening.

ADAPTABILITY

- Calderys fine-tunes its tap-hole clays to your constraints in order to provide a fully satisfactory product customised for your process.

QUICK DRILLING AT YOUR SERVICE

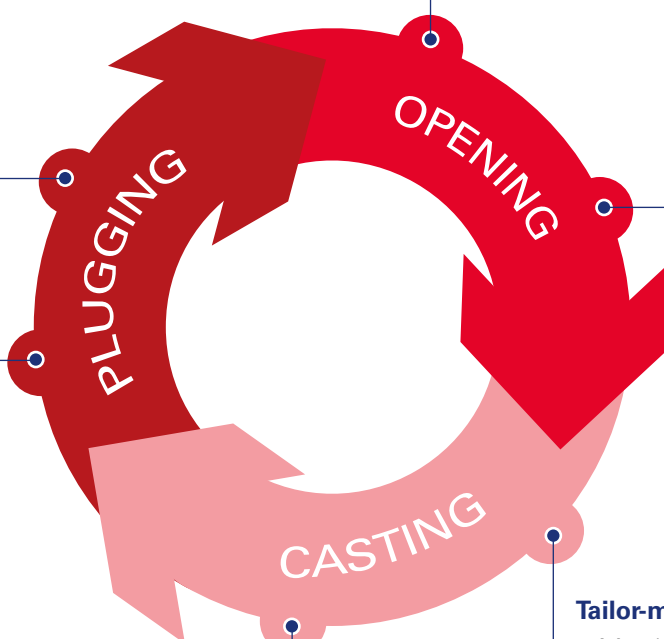
The quick drilling line integrates with the Calderys range of tap-hole clays for blast furnaces. Each product has a high performance level and provides you with essential benefits for the performance of your process.

Controlling the setting of binders used

- No self-opening or spitting at the beginning of the cast.
- Adaptation to the mud gun holding time.

Fast-setting binders

- No accidental degassing during piercing in the case of short tap-to-tap time.



Easy drilling

- Avoid the need to hammer: maintain regularity of the hole and lack of cracks.
- No over-consumption for drill bits and oxygen lance.
- Ensure a just-in-time opening.

Tailor-made tap-hole clay composition

- Matching the blast furnace constraints and tap-hole clay properties.

Non-toxic raw materials

- No mandatory labelling: above regulatory standards.
- No severe inconvenience for operators.

Controlled erosion at slag arrival

- Controlled drainage of the hearth without slowing down.

DISCLAIMER: Calderys does not warrant the accuracy, fitness for purpose or update of any information disclosed herein. The recipient shall refer to the present content as indicative only. For any instructions or advice, please address formal request to Calderys. This document and the information contained herein are the exclusive property of Calderys. Reproduction, alteration, copy, release, publication or distribution, in whole or in part, is not allowed. References, trademarks and specifications of the products may vary according to the geographical area to be supplied. For any inquiries regarding supply of products, please liaise with Calderys nearest sales contact. Errors and omissions excepted.



