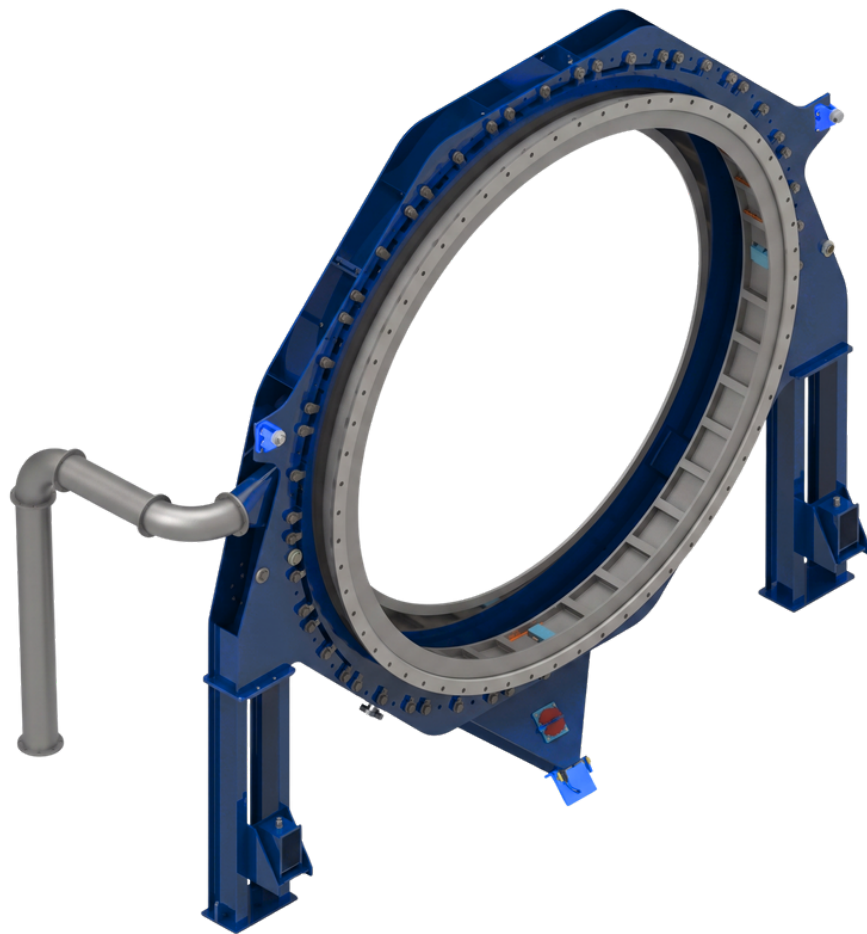


**OSWAL**  
kiln seals



**Kiln Inlet  
Sealing Systems**

# Global Leader in Cement Process Technology Since 1985

Since 1985, Oswal kiln seal has specialized in precision-engineered systems for the cement industry, focusing on process stability, material handling, and quality control. With deep domain expertise and a process-driven approach, the company delivers reliable solutions that enhance efficiency, reduce variability, and ensure consistent plant performance aligned with global standards.

## Key Benefits

■  
Industry  
Leadership

■  
Pioneering  
Innovation

■  
Maximise energy  
efficiency

■  
Optimise  
performance

■  
Safety and  
Reliability

# Kiln Inlet Sealing Systems

The kiln inlet is one of the most critical interfaces in the entire pyroprocessing system — where **combustion dynamics, calcination efficiency, and draft stability** converge.

Unlike other zones, the inlet operates under a highly sensitive balance of thermal gradients, airflow distribution, and material feed behavior. Even minor disturbances in this region can propagate across the kiln, directly impacting flame stability, fuel consumption, and clinker quality.

Conventional sealing systems often fail to address the combined effects of high temperature, axial kiln movement, shell expansion, ovality, and dust loading. The result is uncontrolled false air ingress — leading to flame distortion, unstable draft conditions, increased ID fan load, and inefficient heat utilization.

Oswal Kiln Seal has developed kiln inlet sealing systems that are engineered for real operating conditions — not theoretical alignment.

By integrating adaptive sealing geometry, controlled pressure distribution, and movement compensation, the system ensures precise air ingress control, enabling stable combustion, optimized heat transfer, and consistent process performance.

## Key Advantages

- Precise control of false air ingress at the kiln inlet
- Improved flame stability and combustion efficiency
- Reduced specific fuel consumption
- Stable draft conditions across the system
- Lower ID fan load and energy consumption
- Increased process reliability and operational consistency

## Engineering Concept

The kiln inlet is exposed to simultaneous thermal and mechanical stresses. A static sealing approach leads to leakage and instability.

Oswal's system is based on an adaptive sealing principle:

- Continuous sealing contact under movement
- Controlled sealing pressure without excessive friction
- Compensation for both axial and radial kiln behavior

This ensures that sealing performance is maintained independent of kiln distortion and operating variability.

## The Principle of Controlled Air Management

Key process variables at the inlet:

- Combustion air balance
- Draft pressure stability
- Flame shape and position
- Calcination temperature profile

The sealing system ensures:

- Controlled air ingress
- Stable combustion zone conditions
- Uniform heat distribution

Result: **Predictable and efficient kiln operation**



# Kiln Inlet System Operation

## Continuous sealing under:

- Axial kiln displacement
- Radial shell expansion
- Thermal growth cycles
- Ovality fluctuations

## Adaptive response to:

- Draft pressure variations
- Process disturbances
- Feed variability

## Outcome:

Stable sealing performance ensuring consistent combustion behavior.

## Engineering Design Principles

- Axial movement compensation
- Radial expansion adaptation
- Controlled sealing pressure distribution
- Long-term wear resistance under abrasive conditions
- Low friction operation with high sealing integrity

## Mechanical Design Features

- Robust sealing structure for high-temperature zones
- Optimized contact interface for continuous sealing
- Heavy-duty mounting arrangement for stability
- Modular design for ease of retrofit and maintenance
- Designed for extended service life

## Combustion & Process Impact

- Stabilized flame behavior
- Improved calcination efficiency
- Consistent heat distribution across kiln inlet
- Reduced process fluctuations
- Enhanced clinker formation consistency

## False Air Control Performance

- Significant reduction in air leakage
- Improved thermal efficiency
- Reduced fuel consumption
- Lower ID fan operating load
- Enhanced draft control across kiln system

## Operational Advantages

- Increased kiln reliability
- Reduced maintenance requirements
- Extended seal life
- Improved overall plant efficiency
- Stable upstream and downstream process conditions

## Retrofit Compatibility

- Suitable for existing kiln geometries
- Compatible with various inlet hood configurations
- Adaptable to different kiln diameters

Applicable for:

- Dry process kilns
- Preheater / precalciner systems

## Typical Applications

- Cement rotary kilns
- Lime kilns
- High-temperature pyroprocessing systems



# Problem vs Solution

## The Challenge

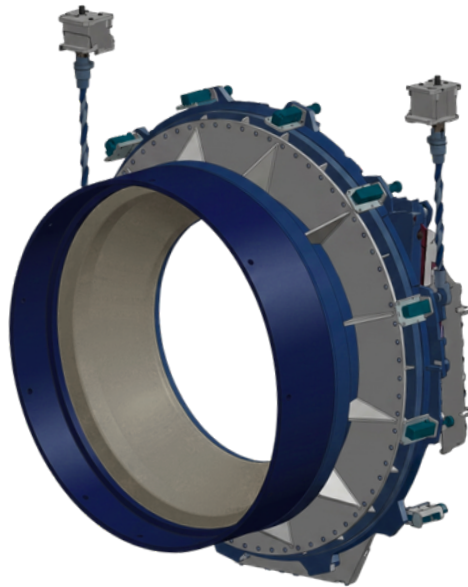
- False air ingress at kiln inlet
- Flame instability
- High fuel consumption
- Draft imbalance

## Oswal Inlet Sealing Solution

- Adaptive sealing system
- Controlled air management
- Axial & radial compensation

## Proven Industry Impact

- Improved combustion stability
- Reduced energy consumption
- Stabilized kiln draft
- Enhanced production consistency
- Optimized thermal performance



# Engineering Outcome

**Controlled air ingress.**

**Stable combustion.**

**Optimized thermal efficiency.**

Kiln Inlet Sealing Systems by Oswal Kiln Seal deliver precision draft control at the most critical zone of the kiln — ensuring efficient combustion, reduced energy losses, and long-term process stability.

The Oswal Kiln Seal Inlet Sealing System introduces a highly robust, process-optimized mechanical architecture engineered with:

- Dynamic Axial Tracking & Continuous Radial Contact
- Thermally Reinforced, Wear-Resistant Structure
- Self-Regulating Tensioning & Counter-Pressure Management

# SUSTAINABILITY IMPACT

## Eliminating Thermal Loss at the Source

Inadequate kiln inlet sealing introduces massive volumes of cold false air into the system, destabilizing the thermal profile and leading to excessive fuel consumption in the preheater and kiln.

### Result:

- Significant reduction in specific heat consumption (kcal/kg clinker).
- Enhanced fuel-to-clinker efficiency by maintaining optimal, stable calcination temperatures.

## False Air Mitigation & Fan Power Optimization

Equipped with an advanced mechanical, multi-layered sealing design, the system minimizes the entry of parasitic ambient air.

- Optimized Induced Draft (ID) Fan Demand
- Reduced Volumetric Gas Load

## Aligned with Global Sustainability Goals

Oswal sealing systems support global, industry-wide initiatives focused on sustainable resource management, carbon footprint reduction, and automated, maintenance-free operational excellence in heavy pyro-processing.

## Emission Control & Environmental Performance

Maintaining a completely sealed kiln inlet interface is critical for eliminating back-venting, fugitive dust emissions, and hazardous gas leakages at the kiln entry. The Oswal Kiln Seal system's robust, dust-tight construction ensures that fine raw meal and hot gases are fully contained during active kiln rotation.

- Zero Raw-Mix Spillage
- Enhanced Workplace Safety & Ambient Air Quality

## Process Stability & Resource Efficiency

By eliminating erratic temperature drops caused by false air spikes, the system secures a consistent, high-quality clinker mineralogy.

- Stable Kiln Hood & Inlet Draft
- Reduced Process Fluctuations & Coating Formations
- Minimized Heat and Material Wastage



**Zero thermal wastage. Absolute particulate containment. Optimized fan power consumption. Oswal Sealing Systems enable cleaner, more efficient, and resource-responsible pyro-processing operations.**



**OSWAL GROUP OF INDUSTRIES company**

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