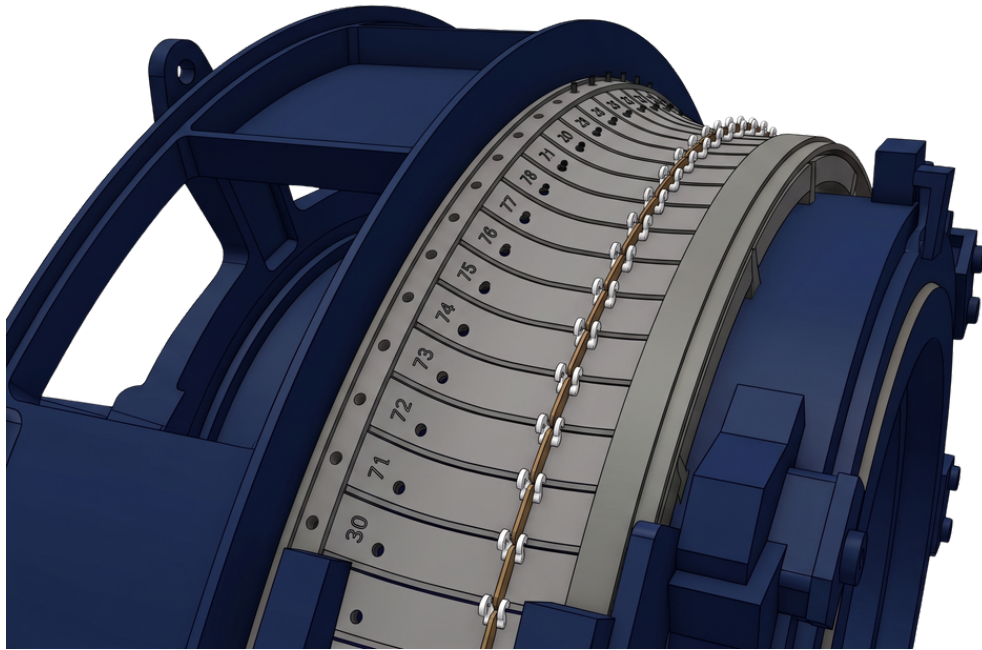


OSWAL

kiln seals



**Kiln Outlet
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 Outlet Sealing Systems

The kiln outlet represents one of the most mechanically and thermally aggressive zones in the entire pyroprocessing system — where extreme temperatures, continuous clinker discharge, abrasive dust, and dynamic kiln movement converge.

This zone operates at the interface between the rotary kiln and the cooler, directly influencing secondary air flow, combustion stability, clinker cooling efficiency, and overall energy balance. Any compromise in sealing integrity at this point leads to uncontrolled false air ingress, destabilized hood draft, inefficient heat recovery, and increased fuel consumption.

Conventional outlet sealing systems often struggle to withstand the combined effects of thermal shock, abrasive clinker contact, radial shell expansion, axial displacement, and pressure fluctuations. Over time, this results in rapid wear, loss of sealing effectiveness, and increased maintenance requirements.

Oswal Kiln Seal has developed kiln outlet sealing systems engineered specifically for extreme operating environments — not ideal conditions.

By integrating reinforced structural design, abrasion-resistant materials, and controlled sealing pressure mechanisms, the system ensures durable sealing performance under continuous clinker discharge and high thermal stress, maintaining stable process conditions and long-term operational reliability.

Key Advantages

- High durability under extreme temperature and abrasion
- Effective reduction of false air ingress at discharge zone
- Stable kiln hood draft and combustion balance
- Improved clinker cooling efficiency
- Reduced fuel consumption and energy loss
- Extended sealing system lifespan with low maintenance

Engineering Concept

The kiln outlet requires a sealing system that can operate reliably under simultaneous thermal, mechanical, and abrasive stress conditions.

Oswal's outlet sealing system is designed with:

- Continuous sealing contact under dynamic kiln movement
- Reinforced structure to withstand clinker impact and abrasion
- Controlled pressure distribution for stable sealing performance

This ensures consistent sealing integrity under the harshest operating conditions.

The Principle of Extreme Environment Sealing

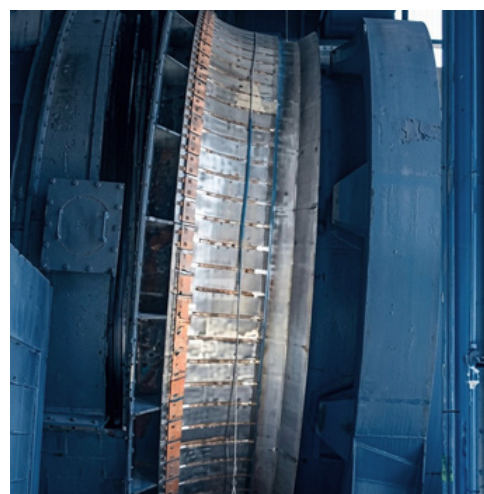
Critical conditions at the outlet:

- Direct exposure to hot clinker discharge
- Severe abrasion from particulate flow
- Sudden thermal variations and shock
- Axial and radial kiln movement
- Draft pressure fluctuations in kiln hood

The system ensures:

- Sealing integrity under continuous material flow
- Resistance to thermal and mechanical stress
- Stable draft and airflow conditions

Result: Reliable sealing performance in the most demanding kiln zone



Kiln Outlet System Operation

Continuous sealing maintained during:

- Clinker discharge cycles
- Thermal expansion and contraction
- Axial kiln displacement
- Shell ovality variations

Adaptive response to:

- Hood draft pressure fluctuations
- Process disturbances
- Abrasive material flow

Outcome:

Stable sealing performance ensuring controlled airflow and process consistency.

Structural Design & Reinforcement

- Heavy-duty support frames for mechanical stability
- Reinforced sealing interfaces for high-load conditions
- Optimized pressure distribution geometry
- Designed for continuous operation under extreme stress

Abrasion-Resistant Construction

- Wear-resistant materials for extended durability
- High-temperature resistant sealing elements
- Replaceable wear components for easy maintenance
- Controlled friction interfaces to minimize degradation

Draft & Process Impact

- Stabilized kiln hood draft conditions
- Improved secondary air flow balance
- Enhanced clinker cooling efficiency
- Consistent combustion performance
- Reduced process fluctuations

False Air Control Performance

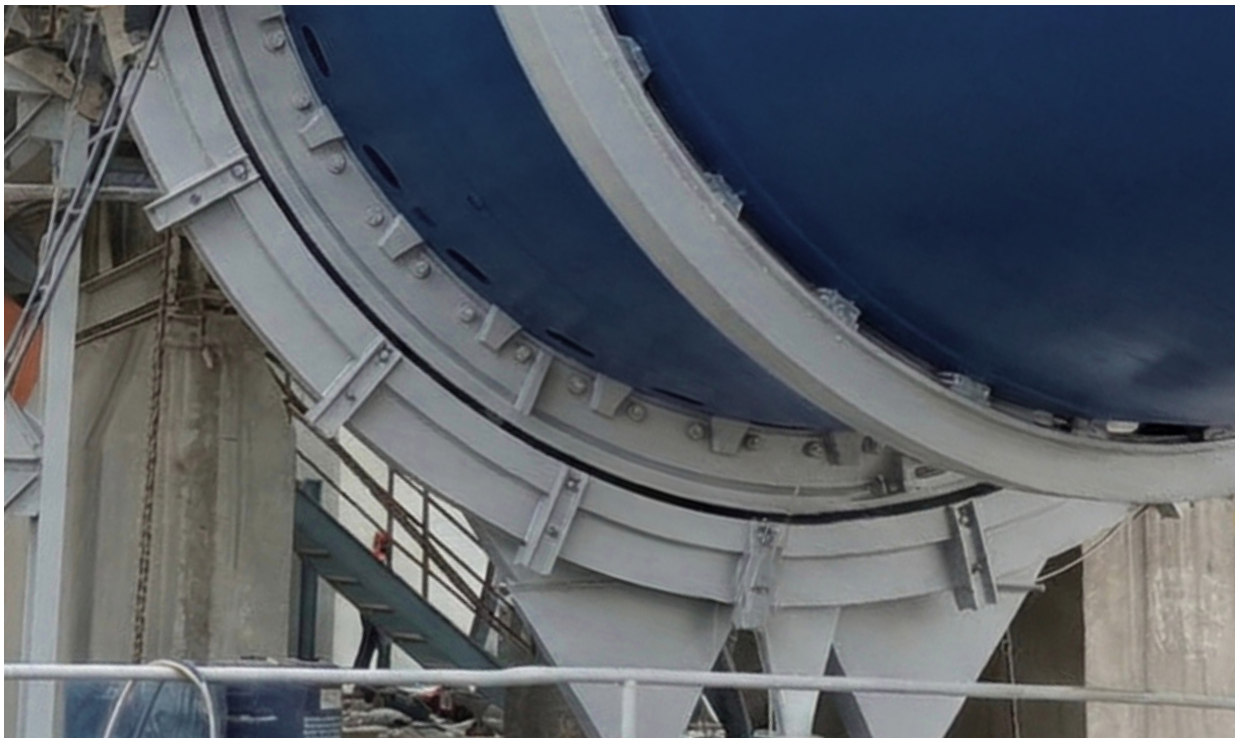
- Significant reduction in air leakage at outlet
- Improved thermal efficiency and heat recovery
- Reduced fuel consumption
- Lower ID fan load
- Controlled temperature variations

Operational Advantages

- Continuous sealing under heavy dust and clinker load
- Reduced maintenance frequency
- Extended sealing component life
- Increased kiln reliability and uptime
- Improved overall plant efficiency

Typical Applications

- Cement rotary kilns
- High-temperature clinker discharge systems
- Lime and mineral processing kilns



Problem vs Solution

The Challenge

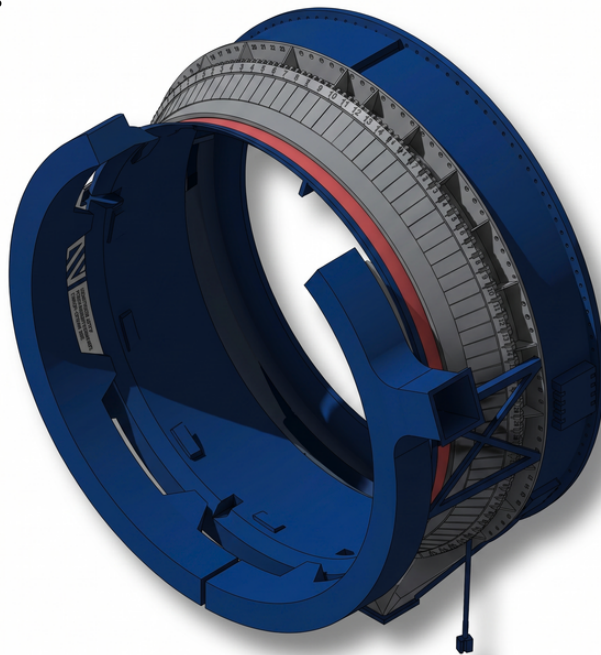
- Extreme temperature and thermal shock
- Severe abrasion from clinker discharge
- False air ingress at outlet
- Draft instability and energy loss

Proven Industry Impact

- Improved hood draft stability
- Reduced energy losses
- Enhanced clinker cooling performance
- Increased process reliability
- Lower overall operational costs

Oswal Radial Seal Solution

- High-temperature resistant elements and reinforced structural design.
- Abrasion-resistant sealing system with controlled friction interfaces.
- Continuous contact mechanisms cutting air leakage to minimal rates.
- Controlled pressure distribution and adaptive sealing layouts.



Engineering Outcome

Controlled hood draft.

Reduced false air ingress.

Stable clinker discharge under extreme temperature.

Kiln Outlet Sealing Systems by Oswal Kiln Seal deliver durable sealing performance in the harshest thermal environments — ensuring reliable operation, optimized energy efficiency, and long-term system integrity.

Oswal's outlet sealing system introduces a highly robust mechanical architecture designed with:

- Continuous sealing contact under dynamic kiln movement.
- Reinforced structure to withstand clinker impact and abrasion.
- Controlled pressure distribution for stable sealing performance.

SUSTAINABILITY IMPACT

Reducing Energy Loss at the Source

False air ingress is a major hidden driver of excess fuel consumption in rotary kilns.

Oswal's outlet sealing minimize uncontrolled air entry, directly reducing the thermal load on the kiln.

Result:

- Lower coal and fuel consumption
- Improved thermal efficiency
- Reduced CO₂ emissions per ton of clinker

Energy Efficiency & Power Optimization

By stabilizing seal pressure and airflow, the system enables:

- Reduced ID fan speed
- Lower electrical power consumption
- Optimized fuel-to-output ratio

Mechanical precision translates into measurable energy savings.

Aligned with Global Sustainability Goals

Oswal's outlet sealing systems support industry-wide initiatives focused on:

- Energy efficiency improvement
- Emission reduction
- Operational excellence in cement manufacturing

Emission Control & Environmental Performance

Effective sealing improves process control and reduces environmental impact:

- Lower NOx and CO variability
- Reduced dust leakage at kiln interfaces
- Improved particulate containment

Supports compliance with modern environmental standards.

Process Stability & Resource Efficiency

Stable combustion and controlled draft conditions lead to:

- Consistent clinker quality
- Reduced process fluctuations
- Lower material wastage

Improved process efficiency supports sustainable production.



Lower fuel consumption. Reduced emissions. Optimized energy use.
Oswal's outlet sealing enable more sustainable and efficient kiln operation.



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