



SPHERION

Ceramic Sphere Regeneration
System

The background features a light gray grid of dashed lines. Overlaid on this grid are several overlapping circles and arcs, some solid and some dashed, creating a complex geometric pattern. A prominent solid gray arc is visible on the left side, curving upwards and to the right.

SPHERION is the ROINVENT system dedicated to the regeneration of ceramic spheres used in regenerative burners of melting furnaces.

Thanks to a fully dry, closed, and controlled process, SPHERION restores the permeability of the ceramic bed and improves the furnace's energy efficiency, reducing consumption, emissions, and operating costs.

Vision

Regenerative burners recover heat through a bed of ceramic spheres that store energy from flue gases and transfer it to the combustion air.

Major manufacturers report:

- fuel consumption reduction up to 40–50%
- thermal recovery above 80–90%
- more stable and uniform process
- significant reduction of NOx emissions

These performances are maintained only if the ceramic spheres are clean, permeable, and intact.

The thermal recovery of your furnace depends on the ceramic spheres. Their efficiency depends on SPHERION.

Degradation and Loss of Efficiency

Over time, the spheres become coated with metallic dust, oxides, carbon particulates, and residues generated by the thermal cycle. This buildup reduces heat exchange capacity and hinders the proper flow of combustion air.

The consequences are multiple: combustion air preheating may decrease by up to 100°C, gas consumption may increase by 15–25%, combustion becomes less stable, emissions rise, and the service life of the spheres is reduced.

Ceramic Bed Regeneration — Key Benefits

SPHERION is designed to regenerate the ceramic bed, restoring optimal operating conditions. The process takes place in a fully closed and automated manner, without the use of fluids.

- recovery of ceramic sphere permeability
- immediate reduction in gas consumption
- improved stability of the thermal process
- increased combustion air preheating temperature
- selection of non-compliant spheres
- overall improvement of furnace sustainability



Technology

Fully Dry Process

No use of water, solvents, or compressed air. Total absence of sludge and liquid waste, ensuring clean and simple management.

Closed Treatment Chamber

Material handling takes place inside a sealed chamber designed to contain dust, reduce emissions, and ensure a safe working environment.

Waste Management

During treatment, dust, micro-fragments, and damaged spheres are collected at the bottom in a removable container. The container can be handled by forklift for discharge into bulk bags.



Technology

Extraction System (Optional)

For high-throughput plants, SPHERION can be equipped with an extraction system that automatically conveys fine particulate into dedicated bulk bags.

Soundproof Structure

Sound-insulated panels, reduced vibrations, and low noise levels.

Automatic Control

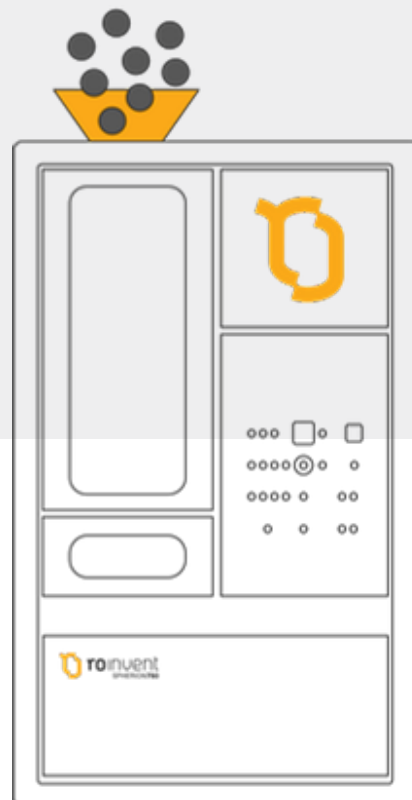
Intuitive touch interface, fully automated cycle management, parameter traceability, and network-ready connectivity.



How It Works

1

Loading



Ceramic spheres are introduced into the upper hopper. The operator activates the transfer command: SPHERION automatically moves the material into the treatment chamber.

2

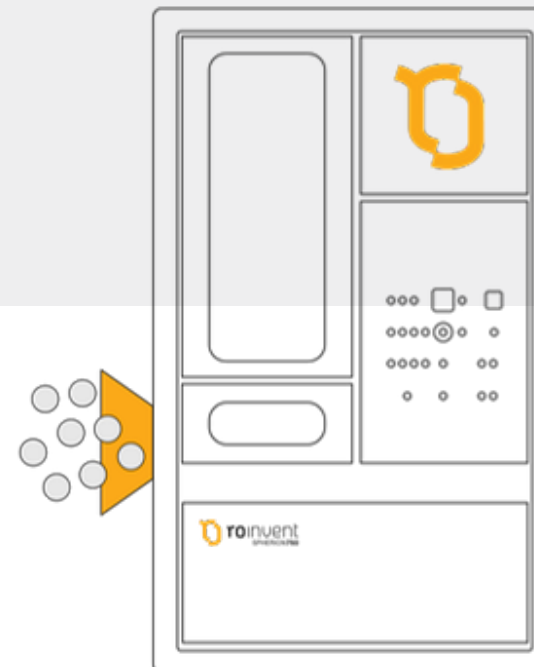
Treatment



Once the spheres are transferred, the operator starts the automatic cycle. The process takes place entirely with the machine closed, under constant internal monitoring. At the end of the cycle, SPHERION signals completion.

3

Discharge



The operator positions the container in the collection area and activates the discharge command. Regenerated spheres are conveyed in a controlled manner into the container, always with the machine closed. Once full, the container is removed and replaced.

New treatment cycle



After unloading is completed, SPHERION is immediately ready for a new treatment cycle.

Industry 4.0

Connectivity and Digital Supervision

- load cells for monitoring processed material and waste
- network connection for remote supervision
- digital dashboard with cycle history and parameters
- automatic exportable reports
- ROINVENT remote assistance

Industry 5.0

Safety, Sustainability and Resilience

Human-Centric

Dry process, closed chamber, reduced dust exposure, ergonomic waste handling.

Sustainability

Zero fluids, zero sludge, lower gas consumption, lower emissions, longer sphere life.

Resilience

Consistent permeability, more stable combustion, reduced energy variability, operational continuity.



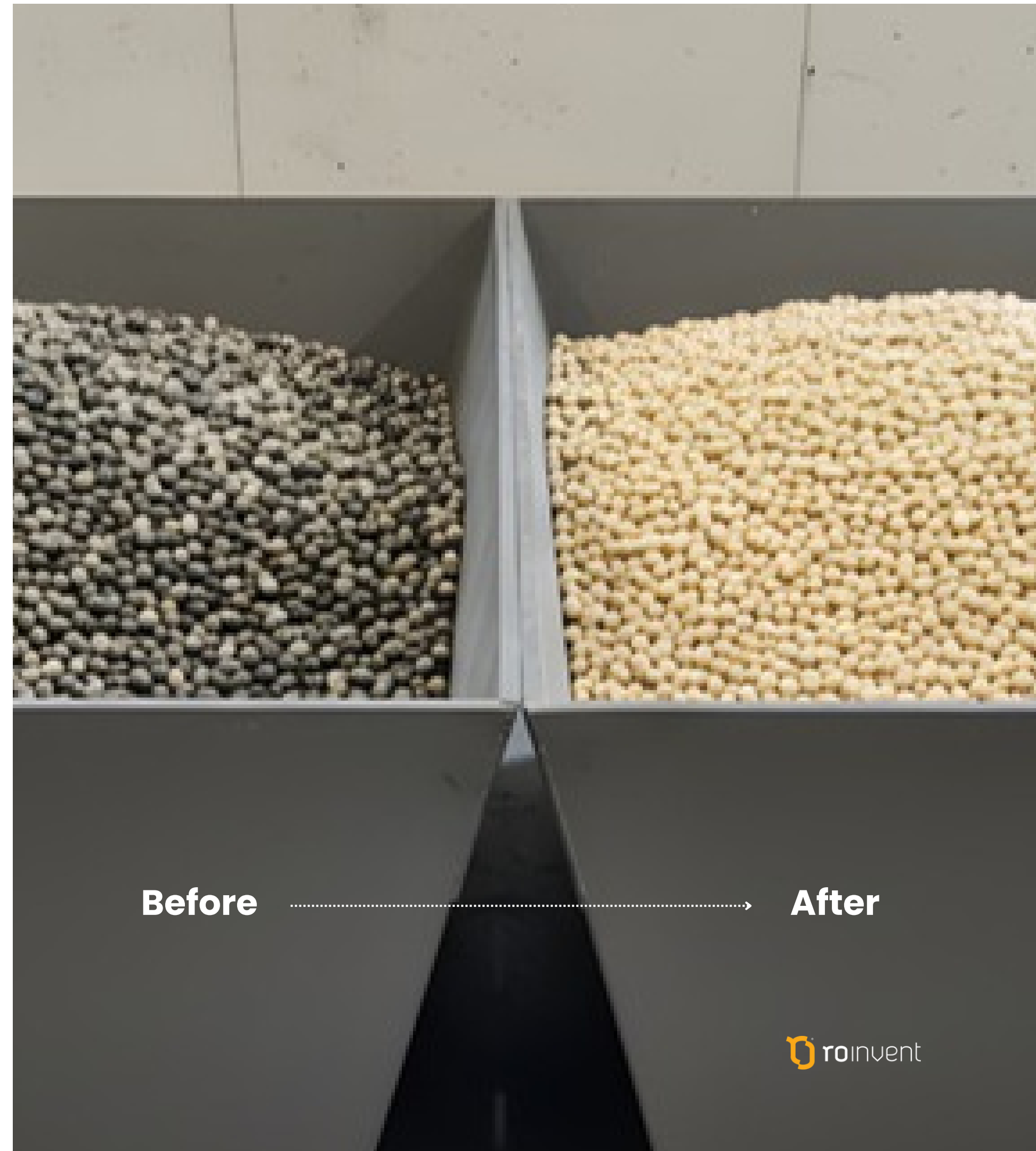
Economic Value for the Customer

A dirty bed can generate significant additional annual costs, with consumption increases of up to 15–25%.

SPHERION restores the efficiency of the regenerative system, enabling:

- reduced consumption
- greater operational stability
- lower emissions
- payback typically between 6 and 12 months

SPHERION is not a cleaning machine: it is an energy efficiency technology for regenerative furnaces.



Performance and Operational Advantages

- immediate energy savings
- improved thermal recovery
- more stable process
- reduced emissions
- longer ceramic sphere lifetime
- safer and cleaner environment
- lower operating costs

Available Versions

SPHERION 350

- Capacity up to 350 kg per cycle
- Ideal for medium-production plants

SPHERION 750

- Capacity up to 750 kg per cycle
- Ideal for high-throughput plants

Maximum efficiency,
controlled costs, and a
more sustainable and
safer plant.

ROINVENT Design Philosophy



ROINVENT® develops industrial solutions focused on efficiency, safety, ease of maintenance, and long-term reliability.

- **SPHERION** is the result of an engineering approach focused on the real needs of modern foundries: performance, robustness, and operational simplicity.

Every ROINVENT machine is born from the combination of operational experience, engineering analysis, and maintenance-oriented design.



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