

HASLE Ceramic Vortex Finder

3rd Generation



REFRACTORIES

WE PROTECT YOUR PROCESS

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HASLE Refractories develops, manufactures and supplies unique refractory materials for high-temperature industries. We serve the cement, power, waste, biomass, steel, glass and paper industries.

It is our mission to offer the best castable- and precast solutions to enable high-temperature industries improve their run factor, energy efficiency and lower their carbon footprint. Our solutions also help increase process performance and profitability, with reduced downtime and lower operational costs.

Since the beginning in the year 1843, we have grown our company based on high quality, flexibility and quick response times, because we know your downtime means a loss. In close collaboration with installers and our customers, we continuously improve our materials and solutions in order to be at the leading edge.

We take pride in our reputation. In order to be the preferred supplier to high temperature industries around the world, we source only the very best raw materials from trusted suppliers. Our work is based on our own secret recipes. We use solely virgin materials and test all raw materials going into our plant. All products are furthermore tested in our laboratory to secure a consistent high quality.

We look forward to ensuring also your company the best high-temperature solution.

Traditional steel dip tubes are challenged at high temperatures

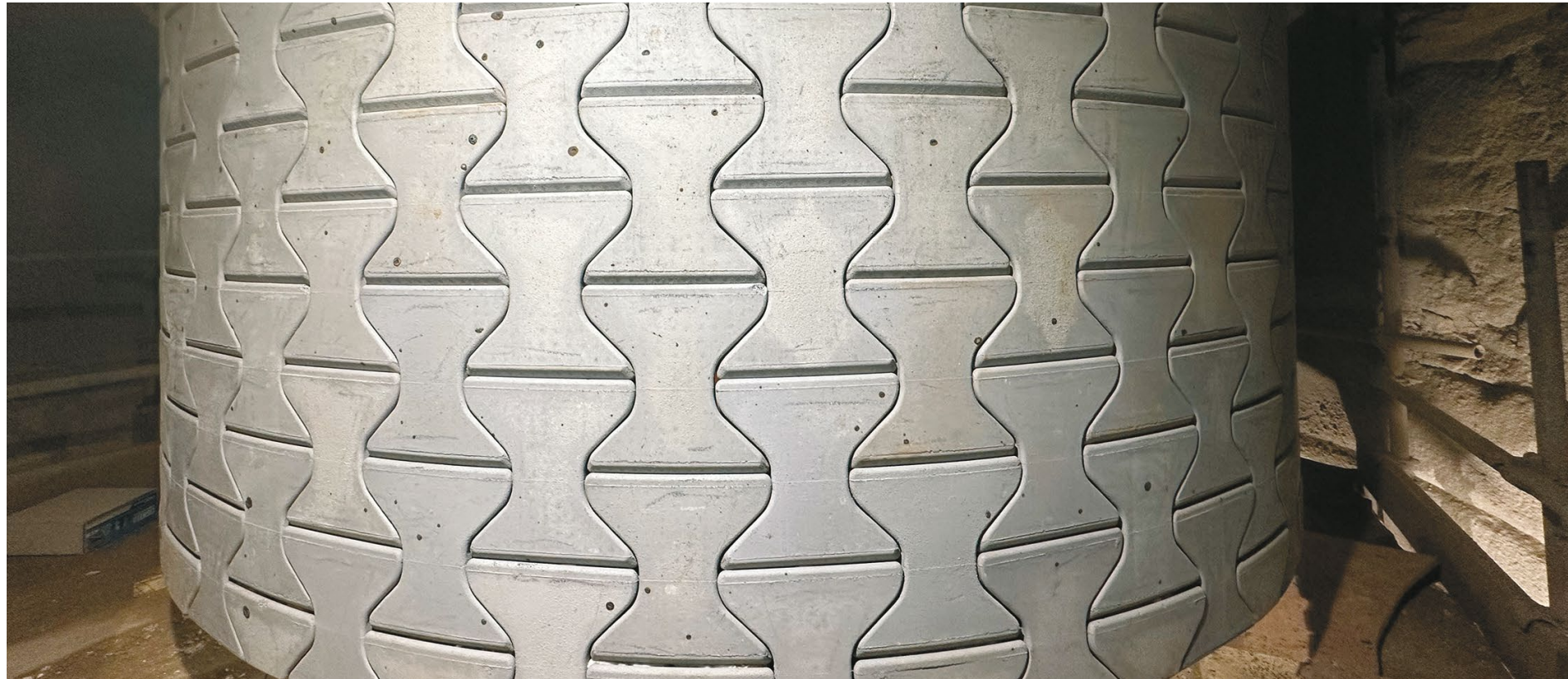


The HASLE Ceramic Vortex Finder (CVF) is designed to improve operations in industrial cyclones at elevated temperatures and provides an alternative to traditional steel dip tubes.

It is assembled on-site by individual ceramic elements, which interlock to form a stable tube hanging from a steel ring welded to the roof casing of the cyclone.

- Withstand temperatures up to 1200 °C / 2200 °F
- No corrosion - Excellent resistance to chemical attacks
- Does not buckle – dimensional stability
- High abrasion resistance
- Smooth surface - Minimal build-up and coating
- Ceramic elements are Chromium-free
- Easy and quick to install

Engineered to withstand harsh conditions at elevated temperatures and the burning of alternative fuels



Keep the process running with high efficiency! The smooth surface of the ceramic elements reduces build-up and coating. Additionally, the ceramic material is corrosion-resistant and has high dimensional stability, meaning the CVF will not buckle.



Due to the low weight of 6-19 kg of the individual elements, **no heavy lifting equipment is required** for handling and it is possible to use the existing manholes for the installation.



The small-sized ceramic elements mean **minimum risk of cyclone blockage** if any of the elements fall down, as they can pass through the feed pipe and allow operations to continue.

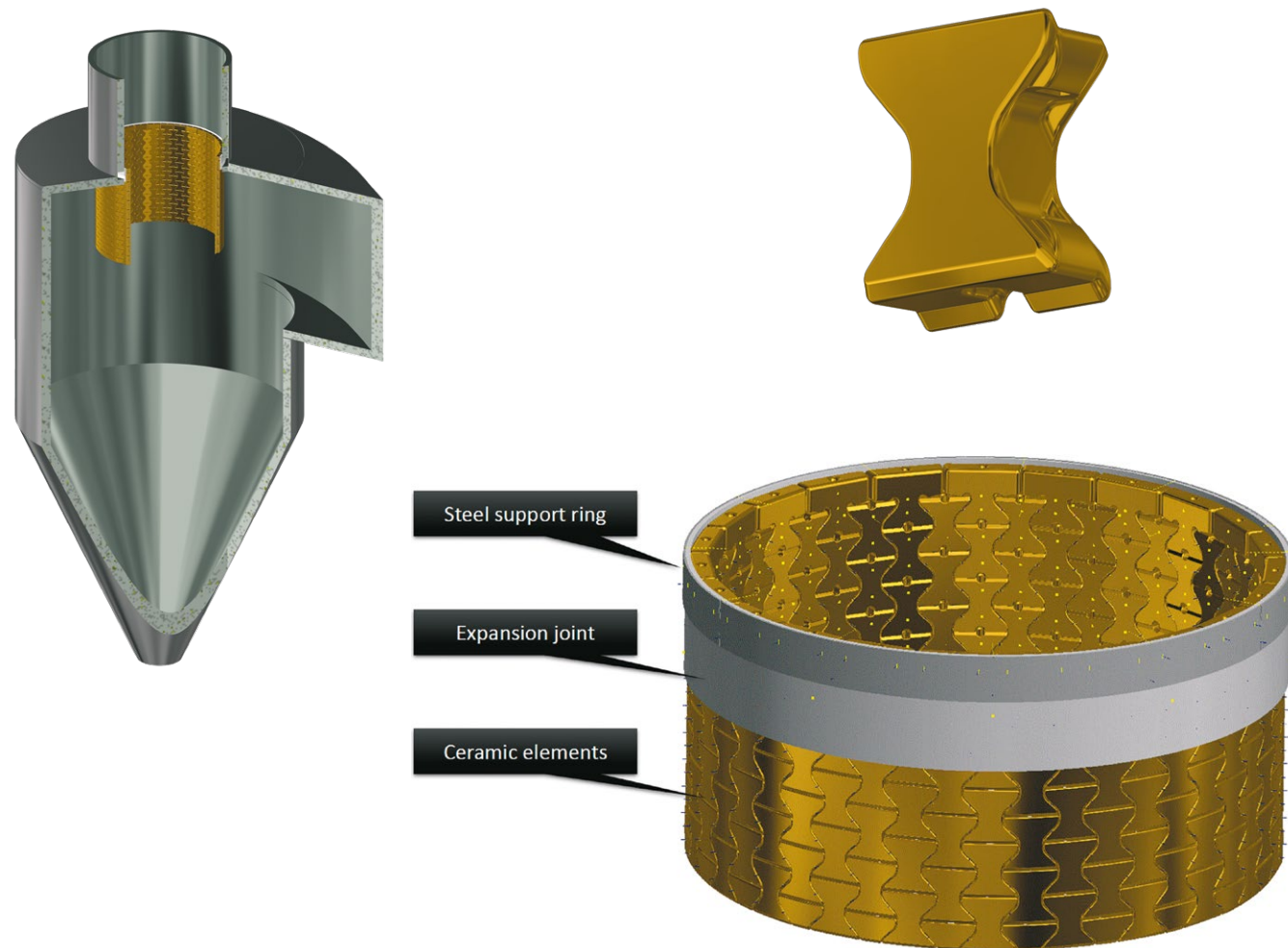
Vortex finders* are installed in cyclones to improve dust separation between the raw meal and the hot gas, thereby increasing the efficiency and hence reducing fuel consumption, usually in the range of 1-2%.

Originally developed in the 1980s, the latest generation 3 of the HASLE

Ceramic Vortex Finder is completely re-engineered with an optimized element design system. It is furthermore manufactured from a new non-cement castable developed to withstand the aggressive environment found in cyclones operating at high temperatures, including the burning of alternative fuels.

* Also known as center pipes, dip tubes, immersion tubes, and thimbles.

Designed for longevity and to streamline your process



The HASLE Ceramic Vortex Finder (CVF) is based on a modular system of ceramic elements, which makes it possible to tailor the installation to individual operating conditions and cyclone dimensions.

The CVF system consists of standardized shapes in different angles which interlock via advanced tongue-and-groove joints, allowing:

- Variable diameter options: 1,5 m to 7,5 m
- Lengths up to 5 m (can easily be adjusted to suit changes in the process)

High-performance materials

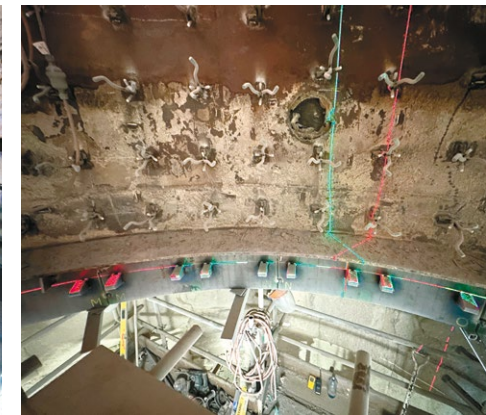
The ceramic elements are manufactured from a high-grade castable with pure synthetic and high-performance raw materials to ensure no impurities. Nanoparticles are included for high fracture toughness and optimal strength – even at elevated temperatures. In addition, the materials used are providing high resistance to chemical attacks, making the CVF suitable for plants burning alternative fuels.

Carefully manufactured for maximum strength

To achieve maximum strength, the ceramic elements are manufactured under strictly controlled conditions at our factory in Denmark; first, the shapes are carefully cast and cured in specialized molds to obtain a smooth surface and sustain their unique profile. Subsequently, they are pre-fired to elevated temperatures.



1. A steel support ring is welded to the roof casing of the cyclone.



2. The alignment and level of the brackets on the steel support ring are verified.



3. Ceramic fiber blankets are placed against the steel support ring to ensure sufficient space for thermal expansion.



4. Assemble the CVF; The top row of ceramic elements is placed on the brackets on the steel support ring. The remaining elements hang from the elements in the top row.



5. The final row of elements is locked in place using a heat-resistant sealant.



6. Completed CVF installation.



Scan me for installation video.

Selected references

Germany – cement plant · 2nd lowest cyclone · Operating temperature: Up to 850 °C



After 1 year



After 2 years

Germany – cement plant
Lowest stage cyclone
Operating temperature: Up to 1050 °C



After 6 months.

*Lifetime achieved: 1 year (3 times longer
compared to the steel dip tube previously used)*

Spain – cement plant
Middle stage cyclone
Operating temperature: 700 °C



After 3 years

For more references please contact us

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