Mechanical Cleaning of Ceramic Filters

What It Does

Mechanical cleaning of a ceramic filter (1) is an alternative method of detaching the accumulated solids from the surface of the filter elements (2). The more common detachment method is reverse pulse cleaning (3) which uses pulses of compressed air or gas to the top of the element to create to create a reverse gas flow through the element. When this reverse flow passes through the accumulated layer of solids it drags the solids from the surface of the element. Whatever the detachment method, the solids then drop to the bottom of the hopper, from where they can be discharged.

The mechanical method of detaching the solids from the filter elements involves scraping the surface of the elements with metal rings. The edges of the rings push flakes of the solids away from the element and they drop into the collection hopper.

How It Works

The **filter elements** hang vertically in the **dirty side** of the filter, suspended from the **header plate**. **Dirty gas** passes into the filter, then through the filter elements and up into the **clean side** of the filter. The suspended particles of solid cannot pass through the elements and are trapped on the surface. As the solids build up they form a filter cake that, from time to time, must be removed to prevent the pressure drop going too high.

There are a number of **cleaning rings** around each of the elements. These rings are moved up and down to scrape the accumulated filter cake off from the element. Several rings are fitted to each element so that the travel of an individual ring is quite small. All of the rings on all of the elements are fitted on a **frame** so that a single **drive** can be used to achieve the required oscillatory movement. The frame is located in **guides** so it can move only as required.

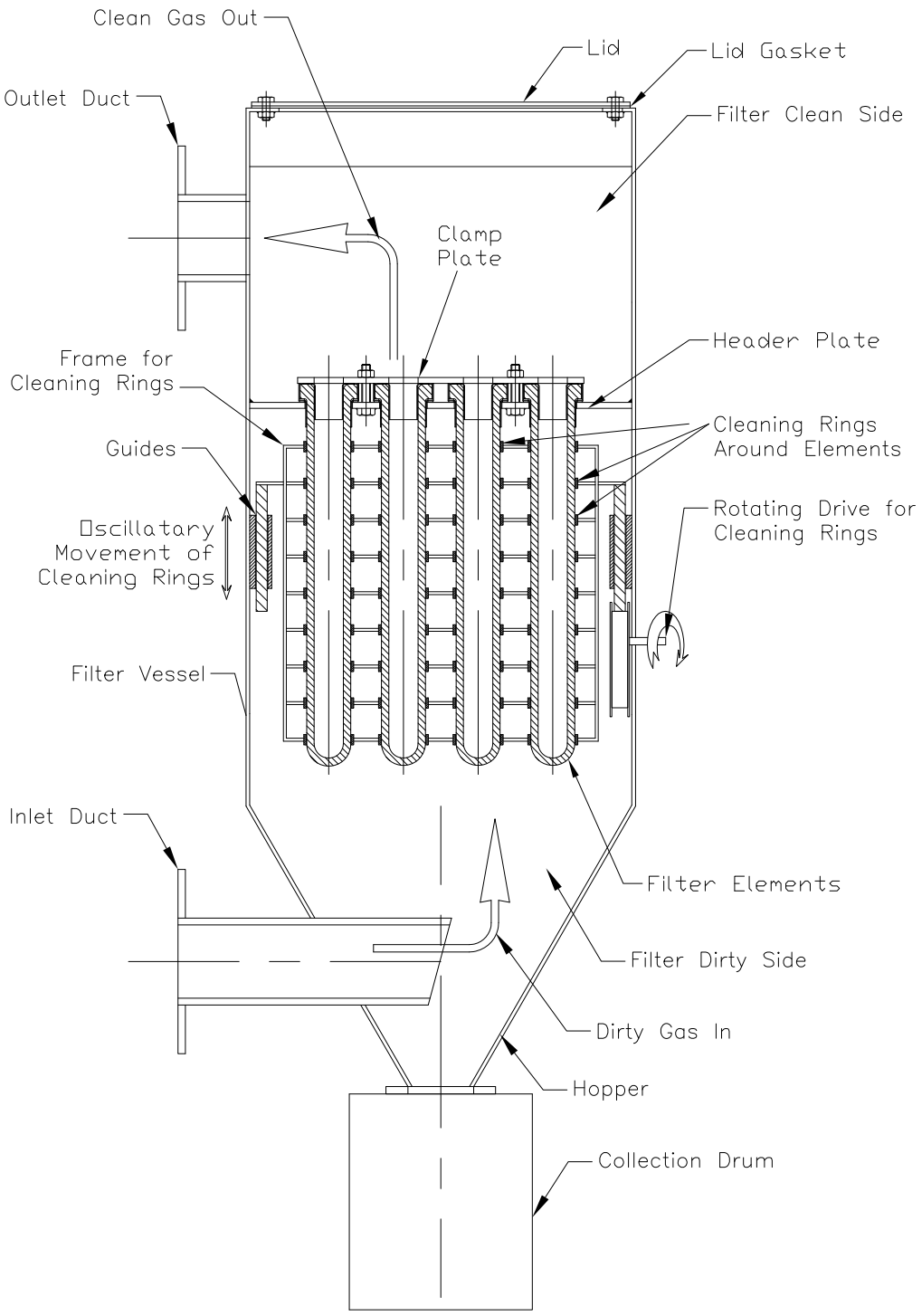
The drive can be achieved by a cylinder, either hydraulic or pneumatic, mounted outside the vessel. Alternatively a **rotating** shaft can be used as a crank to achieve the required reciprocating movement. Whichever method is used there will be a requirement for a seal where the drive passes through the vessel wall.

Advantages and Disadvantages of Mechanical Cleaning

- for fuel gases, there is no addition of air to cause combustion
- for condensable gases, there is no addition of cold gas to cause condensation
- for sensitive upstream processes, there is no reverse pulse to interrupt the process gas flow
- the guides and drive seal must function in a hot and dirty environment, which may lead to reduced reliability
- the construction of the mechanically cleaned filter is more complex and potentially more expensive

References

1. Caldo data sheet DS001 ‘Ceramic Filters – Product Data’
2. Caldo data sheet DS002 ‘Ceramic Filter Elements – Product Data’
3. Caldo data sheet DS004 ‘Reverse Pulse Cleaning System – Product Data’



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Project Data Sheets	
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