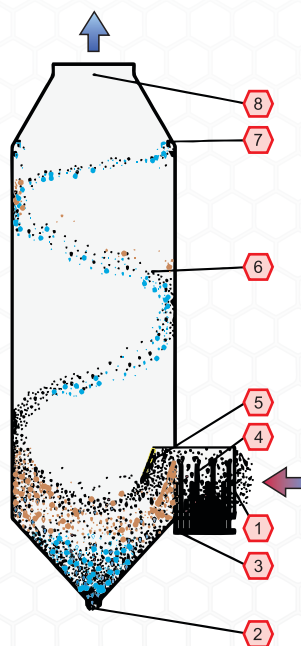


CYCLONIC SCRUBBER DUST COLLECTOR

Design Features

- High efficiency of up to 98% in the 1 to 5-micron range.
- Tangential entry of the pre-cleaner section provided dust drop-out.
- No moving parts & low maintenance.
- Pressure plate design is critical for the efficiency.
- Gas capacities of 1 000 to 500 000 Am³/hr.



Legend

1. Bottom Inlet Section
2. Slurry Outlet
3. Water supply header
4. Flat spray nozzles
5. Throat damper blade
6. Cyclonic separator
7. Anti-creep Ring
8. Scrubber Clean Gas Outlet

Figure 1. Cyclonic Scrubber Exploded View

Operation

- Dirty Gas enters the inlet tangentially dropping out heavier dust particles.
- The inlet section has multiple high impact flat fan spray nozzles.
- Nozzles are at 90° to the gas flow, and are fitted for efficient wetting of the off-gas
- Gas/water is accelerated into the throat section breaking-up the water particles.
- The impingement takes place in the narrowed inlet section
- Continuous modulating adjustable throat blade controls the pressure setpoint and efficiency required.
- Cleaned gas and mist cyclonically moves toward the cyclonic separator.
- Clean gas discharges through the top outlet of the scrubber.
- Slurry discharge is through the bottom cone.

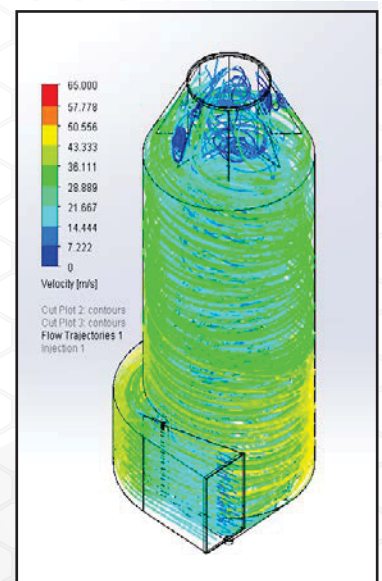


Figure 2.

CFD of Cyclonic Scrubber Operation

Benefits

- Flow straighteners close to the gas outlet removes the swirl and improves flow into the ID Fans.
- Larger scrubbers are manufactured in sections for ease of transport.
- Pressure loss over the scrubber could be between 1,5 to 3,0 kPa depending on application.
- Material of construction to suit application.
- 15 to 200 tph Steam Boiler applications



Figure 3.
Cyclonic Scrubber Render

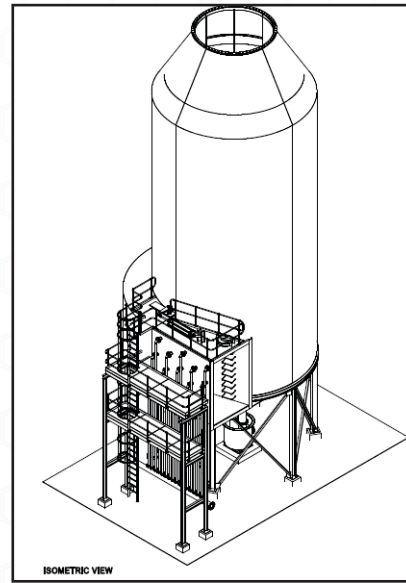


Figure 4.
Arrangement drawing of Cyclonic Scrubber

CASE STUDY 1 – CYCLONIC SCRUBBER

Table 1. Specifications & Performance: South African Plant Cyclone Scrubber

Boiler MCR Capacity	80 tph with Bagasse Fuel
Boiler fuel	Bagasse and Coal fired
Gas Volume – Bagasse (MCR)	175 083 Nm ³ /hr
Gas Volume – Coal (MCR)	91 650 Nm ³ /hr
Inlet Dust Load - Bagasse	8.5 g/Nm ³
Inlet Dust Load - Coal	5.0 g/Nm ³
Outlet emission - Bagasse	120 mg/Nm ³
Outlet emission - Coal	120 mg/Nm ³
Collector	Cyclonic Scrubber
Collector size	Ø5 350 mm
Scrubber water requirement	215 m ³ /hr
Pressure drop – Bagasse (MCR)	2 000 Pa
Pressure drop – Coal (MCR)	2 600 Pa
Emission – Bagasse (Tested)	20 mg/Nm ³
Emission – Coal (Tested)	110 mg/Nm ³

CASE STUDY 2 – CYCLONIC SCRUBBER

Table 2. Specifications & Performance: South African Plant Cyclone Scrubber

Boiler MCR Capacity	150 tph with Bagasse Fuel
Boiler fuel	Bagasse and Coal fired
Gas Volume – Bagasse (MCR)	253 829 Nm ³ /hr
Gas Volume – Coal (MCR)	159 041 Nm ³ /hr
Inlet Dust Load - Bagasse	10.0 g/Nm ³
Inlet Dust Load - Coal	7.0 g/Nm ³
Outlet emission - Bagasse	120 mg/Nm ³
Outlet emission - Coal	120 mg/Nm ³
Collector	Cyclonic Scrubber
Collector size	Ø6 680 mm
Scrubber water requirement	312 m ³ /hr
Pressure drop – Bagasse (MCR)	2 000 Pa
Pressure drop – Coal (MCR)	2 600 Pa
Emission – Bagasse (Tested)	
Emission – Coal (Tested)	



Picture 1. Cyclonic Scrubber Inlet Section