

CASE STUDY

SONAE ARAUCO | Puerto Piray, Argentina | 2018

Hurricane HR System

to reduce emissions
from a 170t/h pinhole
fixed grate boiler burned
wood waste



FOREWORD

ACS designed and supplied a Hurricane HR Cyclone System to Arauco Argentina, a division of Arauco.

Arauco's facility in Puerto Piray uses a biomass boiler burning waste wood to create steam, which is subsequently utilized to power the facility's entire infrastructure, including the primary panelboard production line.

The Hurricane HR system guarantees that emissions from the biomass boiler are kept to a minimum. By capturing unburned particles, ACS's cutting-edge cyclones help to reduce visible emissions while maintaining regulatory compliance. They enable Arauco Argentina to generate the energy required to run its operations from a sustainable and renewable fuel source, reducing its environmental impact.

IDENTIFYING THE PROBLEM AND SOLUTION

When Sonae Arauco Argentina's 170t/h pinhole fixed grate boiler burned wood waste, there was a serious concern since the visible emissions from the axial multicyclone were polluting the environment. The health and welfare of the local population as well as the compliance with legislation became mandatory.

ACS helped to find a solution, using a 80-cyclone Hurricane HR-type system with 1000mm diameter cyclones to successfully trap fly ash and a significant portion of unburned debris, preventing its escape into the environment. Only the fine component that eluded the pre-deduster was treated by the system, which was installed after the already-existing horizontal multicyclones. Arauco studied an Electrostatic precipitator but ultimately decided in favor of the ACS cyclones because of its significantly lower investment cost.

However, there were challenges with this solution as well. A new stack was needed for the new cyclone installation, and it was placed further away from the original configuration. Two booster fans were added to guarantee the system operated effectively and efficiently in order to counter the additional pressure drop.

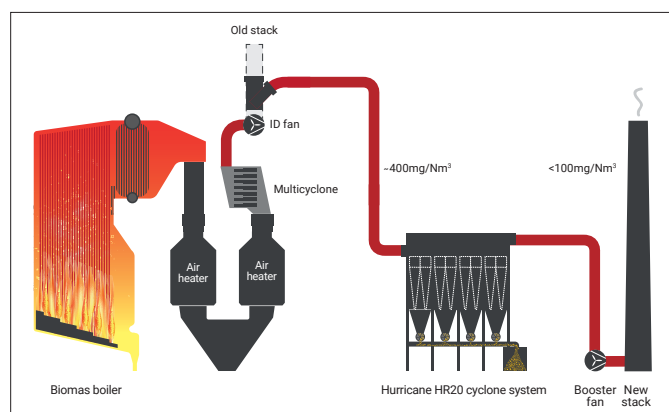
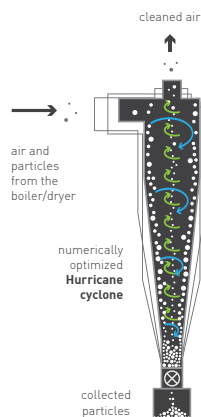


Fig. 1 – Process flow diagram from existing installation

ABOUT HURRICANE CYCLONES



Hurricane cyclones are patented numerically optimized cyclones. **Hurricane** geometries maximize powder collection for each different application, while minimizing reentrainment and keeping pressure drop at reasonable levels. Hurricane cyclones demonstrate impressive efficiencies in capturing very fine powders with a Volume Median Diameter (VMD) of less than 5µm.

These cyclones are the output of nonconvex nonlinear problems formulated and solved after years of work in partnership with the Faculty of Engineering of Porto and incorporate the most recent findings of the impact of agglomeration in the cyclone collection efficiency (Chemical Engineering Journal 162 (2010) 861–876).

A single Hurricane is more efficient than any other known cyclone available in the market for the same pressure drop.

Fig. 2 – Hurricane Cyclone

DESIGN BASIS

• Solids	[Forestry Biomass]
• Particle size distribution	[Fig.3]
• Temperature (°C)	[173]
• Actual flow rate (m³/h _{wet})	[524 023]
• Normalized flow rate (Nm³/h _{dry})	[318 509]
• Moisture content in gas (%H ₂ O v/v)	[21.5]
• Concentration at 6%O ₂ into final system (mg/Nm³ _{dry})	[532]

SYSTEM SPECIFICATIONS | EMISSIONS

• Expected emissions (mg/Nm³ _{dry} at 6% O ₂)	[<77]
• Guaranteed emissions (mg/Nm³ _{dry} at 6% O ₂)	[<100]
• Guaranteed pressure drop at design point (kPa)	[1.58]

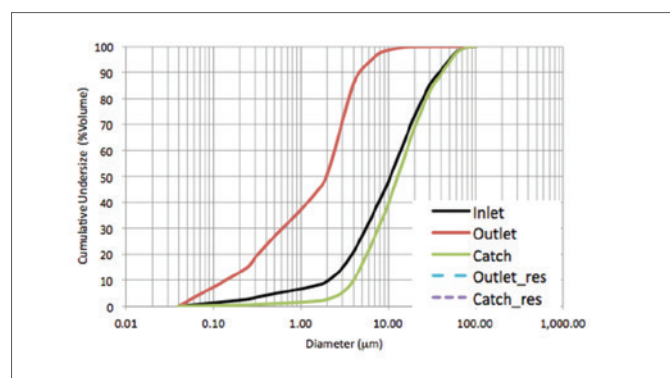


Fig. 3 – Particle size distribution used in simulation

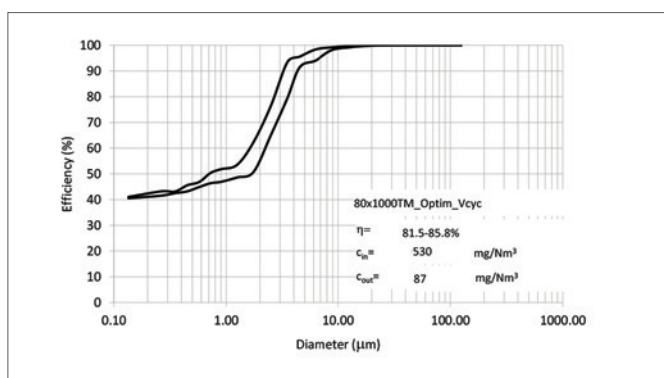


Fig. 4 – Predicted maximum and minimum grade efficiency curves with corresponding global efficiency values

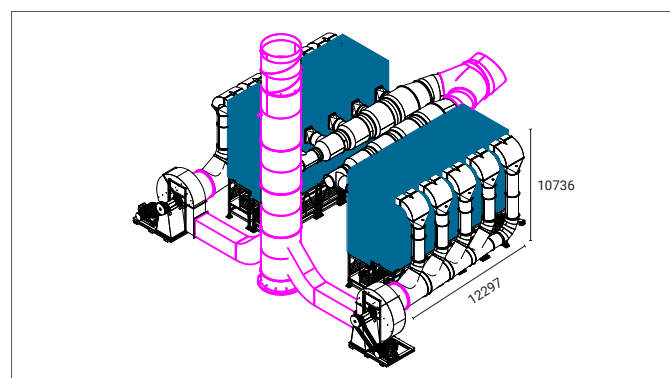


Fig.5 – ACS solution [80 HR ø1000]

CONCLUSIONS

Arauco is pleased with both the overall performance and the outcomes. ACS cyclones guarantee Arauco's commitment to minimizing environmental impact.

Overall, by installing a Hurricane Cyclone, Arauco Argentina was able to recognize and address a serious issue with their boiler emissions. In addition to assisting them in complying with requirements, this solution showed their dedication to sustainability and ethical environmental practices.