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SICO

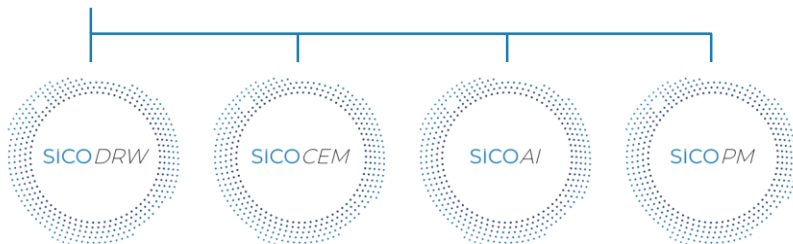
COMBUSTION
TECHNOLOGY



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The SiCO Combustion Technology focuses on improving solid fuel combustion through the combined power of temperature, pressure and flow modulated HRG injection and AI assisted semi- automatic control of the whole combustion system.



SiCODRW

SiCODRW are highly modular and scalable reactors that produce hydrogen rich gas (HRG) using the latest and most efficient technologies in hydrogen and oxygen production, capable of gas pressures up to 20 Bar and temperatures controlled between 0-80°C in single point controlled injectors placed along the transport and primary to quaternary combustion air conduits. The HRG is adsorbed by the solid fuel particle during transportation, which forms a thin layer that react at a lower temperature upon entering the combustion chamber. Oxygen is compensated for local depletion phenomena. The combined effect is the improvement of the rates of devolatilisation and the reactivity of the char residue, thus enhancing the combustion process.

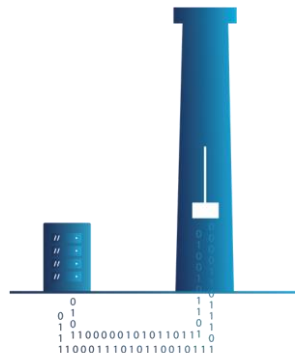




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SiCOCEM

SiCOCEM focuses on continuous emissions monitoring that feed the AI using the latest technologies in emissions analysis - Quantum Cascade Laser (QCL) and Tunable Diode Laser (TDL) - providing a greater insight of the combustion process while promoting the optimization routines of the AI and feeding the real-time models of the combustion for greater analysis capabilities.

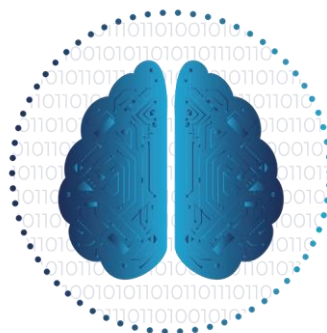


SiCOPM

SiCOPM is the interconnection platform between the SiCO system and the Supervisor system that also includes **SiCODRW** predictive maintenance and system monitoring for stable operation guarantying maximum up time. The software package is prepared as cross-platform providing flexibility and easy implementation.

SiCOAI

SiCOAI is the main driver of the SiCO combustion technology. Using machine learning, evolutionary optimization algorithms and intrinsic mathematical models in an HPC framework, together with a network of real-time sensors based in the latest IoT technology and the integration of production data, the **SiCOAI** platform is capable of reaching high levels of process optimization while predictively determining the best control strategies for the combustion system. Coupling this high degree combustion analysis and management with the intelligent control of HRG injection by **SiCOAI**, this system empowers users to make faster, better and more accurate decisions that maximize operational results.





SiCO HARDWARE TECHNICAL SPECS

SiCODRW	DRW5	DRW50	DRW200
HRG Injection flow modulation range (@STP conditions)	0.2 - 12 m3/h	10 - 125 m3/h	40 - 500 m3/h
HRG composition modulation range	0-45% H2 in HRG 0-55% O2 in HRG		
HRG Injection pressure modulation range	0.25 - 20 Bar		
HRG Injection temperature modulation range	0 - 80°C		
Number of modulated injector ports	Up to 6	Up to 10	Up to 12
Power Requirements	~3,09 kWh per m3 HRG		
Water requirements	~1,2 kg/h per m3 HRG		
Interface communication protocol supported	Ethernet IP, Modbus TCP, Profinet ou Ethercat		
AI Server communication protocol	OPC UA (Encrypted)		
Communication technology supported	3G/4G, Satellite, Other Internet Connection		
Dimensions	Iso Container 10' 3.07x2.44x2.59m	Iso Container 20' 6.06x2.44x2.60	Iso Container 40' 12.2x2.44x2.60



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SiCOCEM	PERFORMANCE
Sample gas temperature	Up to 450°C (customizable)
Measured gas species and concentration range	
CO	0-1400 ppmv
CO2	0-25% vol.
NO	0-1000 ppmv
NO2	0-300 ppmv
O2	0-25% vol.
SO2	0-1000 ppmv
H2O	0-25% vol.
Linearity	R2 > 0.999
Accuracy	±1% of reading
Measurement rate	1 Hz



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