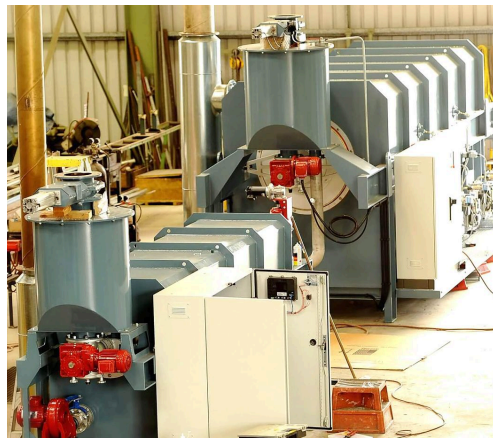




CARBON REGENERATION KILN

Activated Carbon is used in numerous industries as an adsorber of contaminants from waste water, air and slurries. Many users simply dispose of the spent activated carbon but the more savvy or cost sensitive businesses will thermally treat the spent activated carbon in order to regenerate or reactivate it multiple times.

The largest application for the **Stantil HK Series Indirect Fired Rotary Kiln** is the field of carbon regeneration, particularly for the gold mining sector in conjunction with carbon-in-leach and carbon-in-pulp extraction methods.

Activated carbon is utilised to extract gold from a cyanide slurry solution into a highly concentrated electrowinning feed. Unfortunately other contaminants or foulants, particularly organic volatile materials are also captured which will decrease the number of sites or locations on the activated carbon particles for the gold to be adsorbed. After a single cycle through the slurry tanks, the level of activation can drop to 30-50% as compared to fresh activated carbon. This effect is accumulative and after several cycles the ability of the carbon to capture gold will be negligible. This carbon must be reactivated back to as close to new condition as possible for the adsorption process to remain efficient.

In practical terms, three key factors are necessary to reactivate or regenerate carbon:

- Temperature
- High Steam Partial Pressure
- Residence Time

Carbon at 650°C exposed to air will combust.

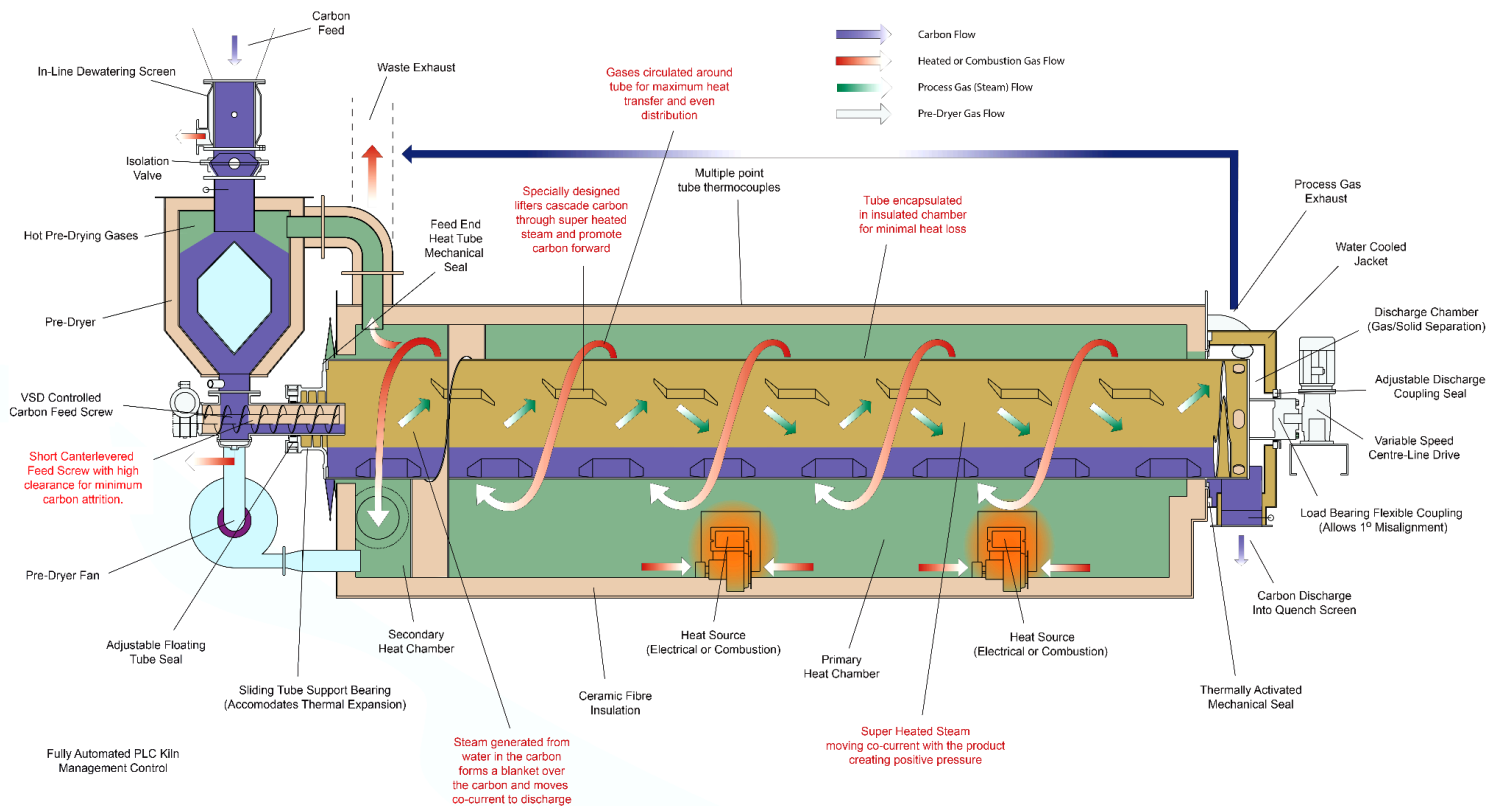
Regeneration, however, requires a special atmosphere of steam and inerts in order to prevent combustion and remove volatiles and foulants. Activated carbon, due to its incredibly porous nature, retains almost its entire weight in water. Even when carbon feels dry, it can still contain well over 35% moisture.

Using this information Ansac has developed a kiln around the principle of co-current self-generating steam. The unique HK Series design utilises a co-current gas flow; the hottest gas now contacts with the coolest carbon as opposed to vice versa, eliminating the risk of the carbon igniting or creating hotspots. The **HK Series Kiln** maximises the performance of the carbon circuit, offering unparalleled carbon regeneration whilst keeping the operating costs to a minimum.

30 years of experience and continuous design improvement have made the **HK Series** the industry standard in efficient carbon regeneration and the most cost effective option in the market.



CARBON REGENERATION KILN FEATURES



CENTRE LINE DRIVE - Supporting force located at central ends of the Heat Tube rather than conventional trunnion or roller arrangements along the body. The design utilises a gear box at the discharge end and a yoke / bearing arrangement at the feed end in order to suspend the Heat Tube. Advantages of this system include:

- Heat Tube is fully enclosable enabling retention of all heat allowing greater thermal efficiency.
- Smooth and quiet operation, eliminates vibration and stress normally associated with rollers and tyres as they wear which results in longer Heat Tube life.
- Heat Tube is able to return to normal proportions with minimal distortion during cooling in the case of power failure.

LIFTERS - Unique lifters built into the Heat Tube gently agitate and promote the delicate carbon particles forward through the chamber aiding higher overall reactivation levels.

THREE STAGE DEWATERING - Enables carbon to enter the kiln with most of the excess free flowing water removed.

PRE-DRYING OPTIMISATION - Utilising low grade heat exiting the combustion chamber to pre-dry the carbon before it is fed into the kiln, decreasing the moisture content of the feed material by 25-30% and saving up to 15% of total fuel consumption.

FEED SCREW EFFICIENCY - Each kiln is fitted with a cantilevered short length screw with complete sealing and high clearances, minimising carbon attrition.

SELF GENERATED CO-CURRENT STEAM SYSTEM - By utilising water captured in the carbon matrix, the kiln creates the necessary superheated steam atmosphere within the heat tube without any need for additional steam injection.

FULLY SEALED PROCESS - Application specific seals including thermally activated mechanical seals to deliver heat retention, process safety and performance and a controlled atmosphere.



AUTOMATED CONTROL - PLC and HMI systems that are designed for ease of operation and maintenance.

MULTIPLE FIRING OPTIONS / CUSTOMISATION - Kilns are able to be supplied with diesel, gas or electric options as well as customised for variances such as specific site voltage and wiring requirement.

BENEFITS / ADVANTAGES

THERMAL EFFICIENCY - Combining the Centre-Line Drive, the Pre-Drying system and the highly effective sealing arrangements lead to increased thermal efficiencies.

EXCELLENT REGENERATION - The innovative design ensures up to 95% activation and removal of foulants.

ECONOMY - Fuel and operating costs have been minimised through innovative design and development with the Ansac HK Series averaging 1kWh/kg of processed material.

COMPACT UNIT - The comparatively small footprint and compact height reduce the need for costly structures.

MINIMAL UTILITY REQUIREMENTS - Only standard plant utilities such as air, fuel, power and water are required - no additional steam, nitrogen or special tools are needed to run the equipment.

MAINTAINABILITY / RELIABILITY - The intrinsic design of the centre-line drive has greatly reduced both the requirement for spare parts whilst increasing the life of individual components.



MODEL SELECTION

The HK Series has been developed over three decades to easily cover the broad range of client requirements. The key criteria to selecting the most suitable model is capacity in dry kg carbon per hour. Stantil are able to expand upon the baseline range with variations to suit the mine site requirements. The following table gives general data for the standard range of kilns, based on the general assumptions of:

- Carbon Bulk Density - approx 470 kg/m³
- Residence Time - 20 minutes
- Operating Temperature - 650-800°C (Max 850°C)

MODEL	HK380	HK510	HK640	HK870	HK1100	HK1300	HK1500
Minimum Feed Rate (kg/hr)	50	100	200	350	600	1000	1500
Maximum Feed Rate (kg/hr)	100	200	300	600	1000	1500	2250
Heat Tube Dimensions (mm)	Ø380 x 3500 x 6	Ø510 x 4000 x 6	Ø640 x 5000 x 6	Ø870 x 5000 x 6	Ø1100 x 6000 x 6	Ø1300 x 7000 x 8	Ø1500 x 8000 x 8
Installed Power (kW)	0.55	0.55	0.75	1.1	1.5	3	4
Diesel option	Yes	Yes	Yes	Yes	Yes	Yes	Yes
LP / Natural Gas option	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Electric option	Yes	Yes	Yes	Yes	Yes	No	No

OPTIONAL ACCESSORIES

In addition to the Carbon Regeneration Kiln, Stantil can also offer the following accessories as part of the system:

CARBON FEED HOPPER - Customised to suit operational needs whether to hold a single batch of carbon or act as a surge bin for continuous systems.

PRIMARY DEWATERING SIEVE BEND - The Ansac dewatering screen is static in design and will effectively remove much of the excess water at the inlet to the feed hopper.

VIBRATING SIZING SCREEN - Includes a quench pan and water seal along with carbon fines removal at the discharge end of the regeneration kiln.

ONGOING EQUIPMENT SUPPORT



Stantil is committed to providing ongoing client support through spare parts supply and technical advice. Site visits can be arranged for commissioning support, service activities or installed equipment assessments.

For all Stantil or Ansac equipment based needs, please don't hesitate to contact enquiries@stantil.com.au