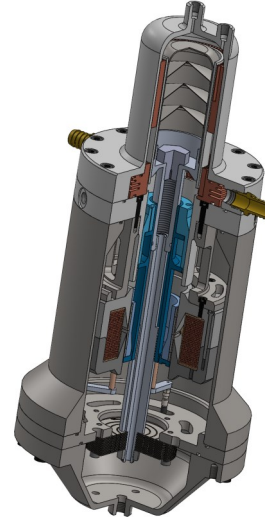


Characteristics

Type: Electric Motor-Generator

STIRLING

Series: PHR-STIRLING



PROCESS

Foundries, and copper foundries in particular, have a large number of pipelines that transport hot gases, either to be expelled outside the foundry or to carry out cleaning processes.

In each case, it is necessary to extract heat from the gases to reduce the temperature at which they are released into the environment, or because the processes require the gases to be at an appropriate temperature to carry out the required reaction.

The STIRLING engine is directly integrated into the hot spots, converting heat into electrical energy, which ensures early and substantial temperature reductions and a straightforward transport of useful energy.

Additionally, STIRLING products distributed throughout the foundry provide power (either direct or as backup) to various operations as needed.

OPERATION

It is well known that gases expand significantly when heated and contract when cooled. Performing this process repeatedly allows a piston to be moved solely by the pressure difference. In a STIRLING engine, a gaseous fluid is forced to expand and contract repeatedly by applying and removing heat.

In a STIRLING cycle engine, combustion takes place outside the engine, heating the gas inside the engine using various heat sources, including solid elements such as wood, coal, and agricultural residues, liquids like alcohols and petroleum derivatives, gases such as natural gas, biogas, and others.

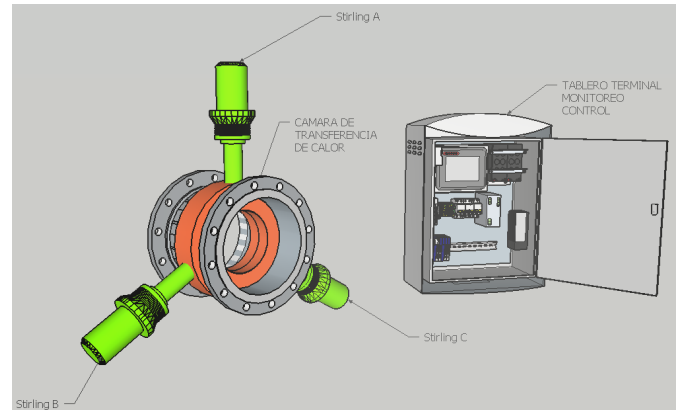
The PHR-STIRLING developed by Ambar S.A. obtains heat directly from hot gases circulating inside the pipelines, harnessing temperatures exceeding 150°C and potentially reaching as high as 1,000°C.

STIRLING generator for pipelines

Characteristics

Type: Electric Motor-Generator STIRLING

Series: PHR-STIRLING



| PHR - STIRLING SPECIFICATIONS | |
|----------------------------------|---|
| 1. PROCESS | |
| Gas type | According to process |
| Gas temperature | >150 [°C] |
| Available heat | >2000 [W] |
| 2. CTC (of heat transfer) | |
| Spool material | According to existing piping |
| Diameter | Standard starting from 8" |
| Length | 3 times of diameter (Typical) |
| Flange | Standard |
| Central element material | Copper |
| Central element size | By design |
| Vibration dampening support | Yes |
| 3. STIRLING ENGINE | |
| Diameter | By power |
| Total length | By power |
| Operating frequency | 50 - 60 [Hz] (Typical) |
| Piston displacement | 10 [mm] (Typical) |
| Gas inside | Nitrogen or Helium |
| Gas pressure | 40 [bar] maximum |
| Mechanical Power | By design |
| 4. GENERATOR | |
| Voltage | 220/110 [VAC]; 50 - 60 [Hz] |
| Electrical Power | By design (300[W], 800[W], 1500[W] typical) |