



**STIRLING**  
CRYOGENICS

## Stirling CryoFan Range

Providing cold gas flow for closed loop cooling

### Thermally connecting cold source and application

Through years of experience Stirling Cryogenics has developed a lot of cryogenic knowledge. Especially regarding handling cold and delivering this to the customers' application. This results in one of Stirling's leading-edge products, the CryoFan, created and optimized for efficient cold transport by a cryogenic gas flow.

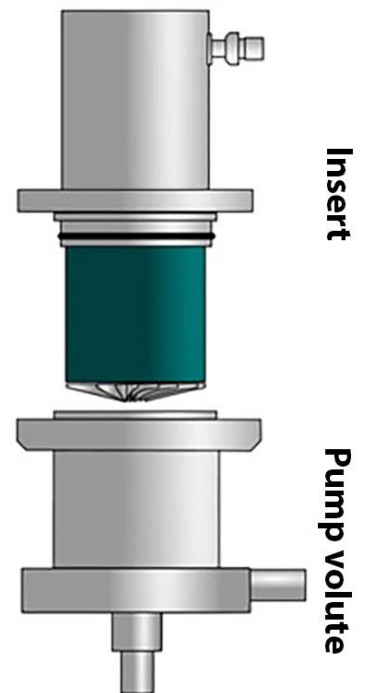
### High efficiency gas flow for closed loop cooling systems

Stirling Cryogenics offers a range of gas circulation pumps branded CryoFans. These centrifugal gas pumps provide a gas flow (usually helium or nitrogen) that thermally connects the application to a cryocooler.

This cold source can therefore be installed at an adequate distance and position from the application. Heat losses of the application are transferred to the cryocooler by the circulating gas.

For any cryogenic system requirement and set-up there is a combination of volumetric flow and pressure drop resulting in its optimal functionality of that system. Based on the system data, this dP/V combination is determined and the selected CryoFan will efficiently match these parameters.

Stirling Cryogenics has developed a range of standard high efficiency CryoFans. Should a standard CryoFan not be applicable, Stirling will specifically design an impeller and pump volute combination that will have its working point meeting the application requirements.



### Heat-exchangers for cryocoolers

Most cryocoolers on the market are not designed to cool a flow of gas. Stirling Cryogenics has therefore designed dedicated clip-on heat exchangers for a wide variety of cryocoolers ensuring a highly efficient heat flow from the pressurized gas to the cryocooler.

This results in a dT between gas and cooler of down to 1 K, ensuring maximum available cooling capacity.



## Design concept of the CryoFan

All CryoFans have the same generic design concept. Like all centrifugal pumps, the main parts are the impeller and volute. Their dimensional shape determines the functionality and efficiency of the fan.

The impeller is driven by a high rpm electric motor providing labor to the gas. All components are placed within a single housing since in the CryoFan design the motor is installed within the pressurized gas volume. This solution does not have a rotating seal so there is no possibility of leakage.

In order to create a thermal barrier between the motor at ambient temperature and the cold impeller, the latter is mounted on a long thin stainless-steel shaft. This cantilever set-up with a high-precision balanced shaft and impeller, is used to avoid the necessity of a cold bearing. This set-up ensures a MTBM of over 20.000 hours.

The CryoFan concept allows for easy integration into a system cryostat. Only a central bore with a flange pattern is needed. This pattern can be machined in the cryostat flange or in an ISO-K or CF blind flange. Then the pressure housing with pump volute is mounted inside the cryostat and the circuit lines are connected. The motor with shaft and impeller can now be mounted from the outside. This means that the complete impeller unit can be removed without breaking the vacuum of the application.



## Maximum capacity curves of the different CryoFans

