Inert Gas Purging

Centrifuges are used to separate heterogeneous mixtures of substances.

In principle, the centrifugation of explosive or flammable substances is not permitted. All centrifuge manufacturers point this out in their operating manuals.

As the use of organic solvents is often unavoidable in laboratories today, in order to make centrifugation possible, inert gas purging was introduced.

Herolab offers nitrogen purging with a complete control system for very high safety requirements:

The system is consisting of an overpressure encapsulation system for nitrogen and an oxygen probe for second control. The two systems are connected to different power supplies. Third important component is a safety relay to switch off all potentially dangerous parts in the machine in case oxygen is given. These three components have SIL 2 Standard, a very high Industrial Standard (see next page).

Before a centrifugation with inert gas purging can be started, the motor and the consumers are first switched off. No ignition can happen in the chamber. Now the centrifuge chamber is flooded with nitrogen from below. Purging with inert gas of the centrifuge chamber is performed. The exhaust air is discharged upwards.

The nitrogen atmosphere is **double monitored** in the Herolab system. On the one hand, an overpressure prevents that there is too little nitrogen in the chamber, while at the same time preventing oxygen from the room atmosphere from entering.

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In addition, as a second safety measure, an oxygen probe is also used to check that no ignitable atmosphere appears.

In case of a wrong connection of gas, compressed air instead of nitrogen, the probe would not give a release. The centrifuge could not be started.

The two systems are connected in series for maximum safety, and with separate power connections. If one of the two systems indicates an error, the centrifugation is stopped.

Both systems, the nitrogen overpressure encapsulation system and the oxygen probe are SIL 2 certified.

The term SIL stands for Safety Integrity Level according to IEC/DIN EN 61508. The IEC is the International Electrotechnical Commission.

The standard considers possible risks and describes the reliability with which a safety-related function actually functions when required (integrity). SIL 2 states that the risk of a dangerous failure of the component is extremely low (PFH probability of failure per hour 10-6 ... 10-7), i.e. that the monitoring function during the centrifugation process is guaranteed with a very high degree of safety in the Herolab system.

Photo: Floor centrifuge HiCen FR with Inert Gas Purging system

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The safety relay also has SIL 2 standard. If one of the SIL 2 systems, each of which has an external power supply, reports a lack of nitrogen concentration or too high an oxygen concentration, this relay switches off all potentially dangerous, current-carrying parts. Ignition or explosion is prevented. The rotor will then also run unbraked until it comes to a standstill. This is to ensure maximum safety.

Very important is as well that in the event of a power failure or if the mains plug is disconnected, the Herolab system initiates an emergency bypass flushing, so that the nitrogen atmosphere in the centrifuge chamber is still present.

Thus, the Herolab inert gas purging system offers the user in the laboratory very high safety standards when working with organic solvents: **The inert gas purging of Herolab is a control system with very high Industrial Standard, SIL 2 components.**

Please, contact us in case of any questions.
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