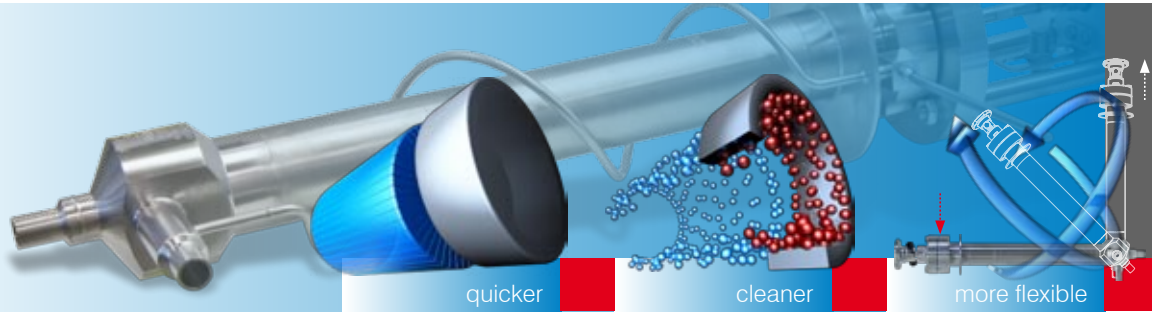


- VALVES AND COMPONENTS FOR GAS,-
- CRYO- AND POWER ENGINEERING
- AIRCRAFT, NAVAL-AND SPACE INDUSTRY



FREES – Flexible, efficient, safe

Conventional cryogenic valves for vacuum insulated pipes offer plant planners only limited flexibility with regard to how the installation can be positioned. For plant operators, too much clearance in the valve represents a safety hazard during start-up and maintenance.

STÖHR's new development, the FREES cryogenic valve, minimizes the clearance volume and thus removes the restrictions plant planners and designers had to work under, thereby offering better performance and improved safety for operators.

The product names given to STÖHR valves, such as AXIUS, UNIVERS and BALANS, indicate their particular functional or application features. The name FREES, an acronym based on the words Free, Efficient and Safe, indicates what was important in developing this new generation of cryogenic valves: namely installation possible in any position, shorter pump cycles, a cleaner medium chamber and a stable vacuum. **With its new patented design, FREES offers** planners and operators three critical benefits along with **an overall performance increase of over 240%** compared with conventional cryogenic valves for vacuum insulated pipes.

Smaller and quicker. FREES shrinks space! The innovative design separating the medium chamber from the evaporation chamber reduces clearance in the FREES cryogenic valve by up to **80%**! And greatly reduced clearance means a much quicker start-up procedure. Less time is required for purging and evacuation. Fewer pump cycles are required and they are shorter and more efficient. For this reason, start-up after maintenance work or product conversion is faster, especially for rows of valves. To make pipe purging even easier for operators, STÖHR also offers the new FREES with an integrated purge connection.

Cleaner and more robust. The reduction of clearance volume in the FREES cryogenic valve is a critical step towards increased safety. **80%** less clearance volume means **80%** less surface space for molecule contact. If the medium chamber has to be purged, inertized or evacuated, the operating medium remains free of foreign molecules and undesirable chemical reactions are prevented. This also significantly reduces the accumulation of dirt particles.

Greater freedom and flexibility. FREES can be installed in any position. This opens up new possibilities for pipe placement, particularly when the space available is restricted. The vertical space gained between a "standing" installation position and a "lying" position is over **80%**. This means that the maximum valve diameter is equivalent to the maximum installation height. With FREES, installation in low spaces is now not only possible, but easy.

FREES, the new generation of valves. More freedom in planning. Greater safety in production.

STÖHR Valves – meet the extremes.

Intrinsic clearance volume

Clearance volume is intrinsic; that means it is unavoidable within the system from a functional point of view.

Nevertheless, clearance volume in a valve is an undesirable phenomenon because a product or contaminant can enter the space and very little or no flow exchange is possible within it.

When we talk of products we mean both the operating medium and the purging medium or even an inert gas that must be introduced because the operating medium has an explosion risk. It can also include the ambient air, with all its usual contaminants, which had been trapped inside during valve assembly. Due to chemical reactions, contamination or changes in condition, products entering into clearances can result in significant follow-up costs.

Keeping it clean. To reduce heat penetration into the medium, cryogenic valves have especially long spindles and clearance volume is therefore large. Air or oxygen molecules and other residues can remain there.

If flammable or corrosive media are used before the initial start-up or after each time maintenance is performed, the pipes and all components that come in contact with the media must be purged and inertized and then evacuated. This also applies to clearance volume in the spindle area for conventional cryogenic valves for vacuum insulated pipes. And this is exactly the area which can only be reached with difficulty or can only be partially reached and to which all the disadvantages discussed above apply. The new FREES cryogenic valve increases performance and improves intrinsic system conditions by reducing clearance volume.

