

HFS/004B-02/12



REPCo S.p.A.

Horizontal Gas Filter/Separator



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General Principle of Operation

The REPCo's Horizontal Filter/Separator is designed for the high efficiency removal of liquids and solids from a gas stream. The filter/separator is particularly suitable for the removal of small liquid droplets.

In order to remove these small droplets (less than 5 microns) one stage of REPCo's Horizontal Filter/Separator is designed for agglomeration purpose by using special fibreglass elements. The principle of operation of the REPCo's Horizontal Filter/Separator is better explained by subdividing the operations in the following three different stages of separation:

- FIRST STAGE OF SEPARATION

As fluid enters the filter/separator vessel the gas velocity is decreased and the larger liquid droplets and solid particles are removed by the mechanism of gravity and impingement on element carriers.

- SECOND STAGE OF SEPARATION

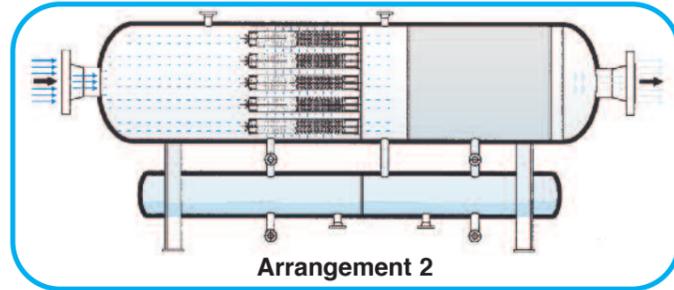
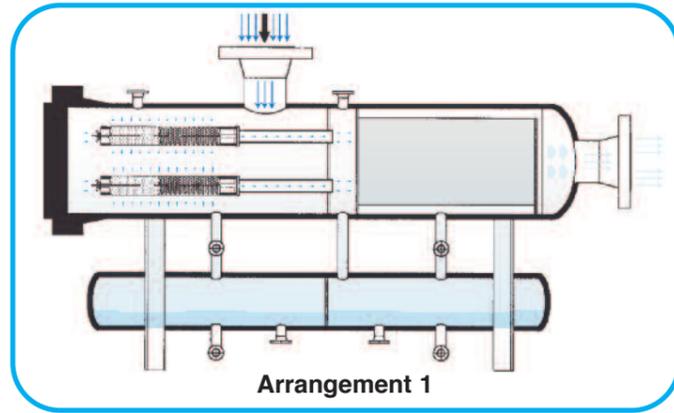
The gas passes through the filter section (comprising one or more fibreglass cartridges) where solid particles are removed and liquid particles are coalesced into larger droplets. The coalesced droplets range from 100 to 200 times larger than their original size at the inlet of filter elements. The moulded fibreglass cartridges used are the standard REPCo's RFG Series (see relevant bulletin).

- THIRD STAGE OF SEPARATION

This separation mechanism involves the removal of the coalesced droplets through the REPCo's Vane Type Mist Eliminator, which offers a high efficiency with a good resistance to fatigue.

It consists of a multiple number of uniformly spaced vanes of REPCo's special design and arrangement. The Vane Type Mist Extractor operates on impingement, centrifugal motion and surface tension to obtain its guaranteed efficiency. Initially as the gas enters the unit, it is subjected to multiple changes of direction as it passes through the vane bundle. The liquid droplets, being heavier than the gas, are subjected to inertial forces which throw them against the walls of vanes. The entrained liquid adheres to the vane surfaces and moves into the vane pockets and so out of the gas stream. This fluid is then drained by gravity from the vane elements into the liquid reservoirs (sumps).

The REPCo's Horizontal Filter/Separator is available in vertical (RVFS model) or in horizontal (RHFS model) solution, with various configurations to cover all ranges of process data.



EFFICIENCY

Solids Removal

The REPCo's Horizontal Filter/Separator is guaranteed to remove 100% of all solid particles down 3 microns.

Liquid Removal

The REPCo's Horizontal Filter/Separator is guaranteed to remove 100% of all droplets down 8-10 microns and 99½% wt of those droplet sizes 1 to 8 microns (size upstream coalescing section).

PRESSURE DROP

At clean condition the REPCo's Horizontal Filter/Separator is normally designed to give values between 100 to 150 mbar of pressure drop (nozzle to nozzle). During operation the pressure drop will increase and, when the pressure differential reaches 0,8 to 1 bar, the cleaning or replacement of the filter element is recommended. Collapsing value of pressure drop is around 2,5 to 3,0 bar. The elements are easily removed and replaced during change-outs.

APPLICATION

The REPCo's Horizontal Filter/Separator has an ideal performance where a high degree of separation is required, both for solid particles and liquid droplets. These units are an integral part of all compressor station, underground storage projects, industrial plants which utilize large amounts of gas, city gate distribution, refining, petrochemical and natural gas processing plants.

Specific applications are as follows:

- Suction side of compressor to prevent wear from solids and liquids entrained in the gas stream.
- Discharge side of compressor to remove lubricating oil from gases prior to process the gases themselves.
- At city gate distribution before metering and reducing stations.
- Gas dehydration and treating plants to remove solids and free liquids in order to prevent fouling of process equipment.
- Filtering of fuel gas to engines, gas and steam turbine power plants and industrial plants.

INSTRUCTIONS

The following instructions are valid for all REPCo's Horizontal Filter/Separator whether vertical or horizontal.

A) Installation

- Connect the filter with the relevant piping, observing proper inlet/outlet positioning, as indicated in the drawings and in the separator itself.
- Verify that all the pressure indicator connections, vents, drains, etc. have been assembled in the proper way and are ready for use.
- Give pressure to the separator and verify the total absence of leaks
- Put the separator into service
- Check the pressure drop across the filtering section or across the complete unit (nozzle to nozzle) in order to record the value in the clean condition by using the installed differential pressure indicator.

B) Operating/Maintenance

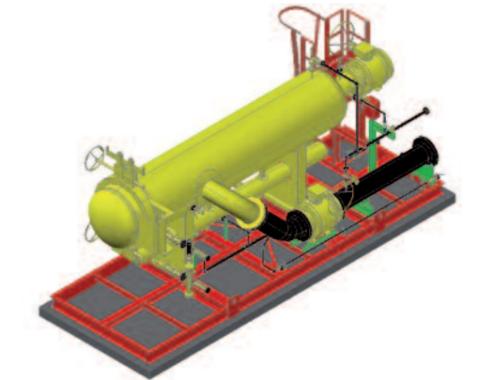
REPCo's Horizontal Filter/Separators are designed to operate unattended for long periods of time depending on gas contaminations/characteristics.

These units require only periodic inspection to check differential pressure value and liquid level into vessel, if the unit is not equipped with automatic drain system and/or differential pressure transmitter.

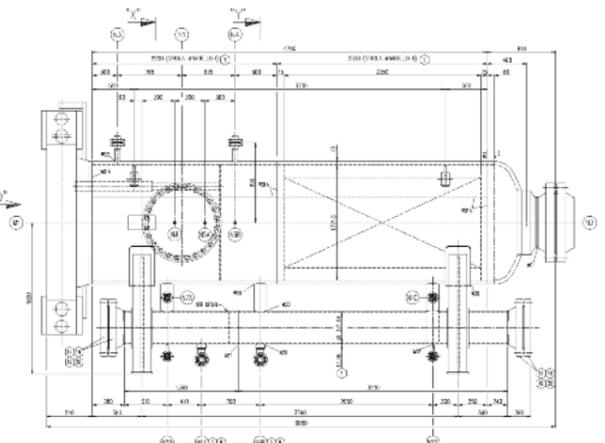
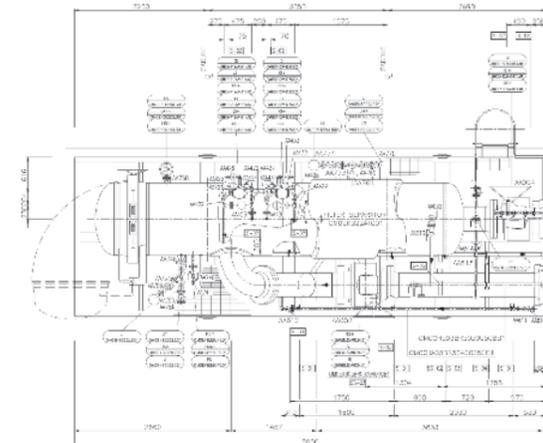
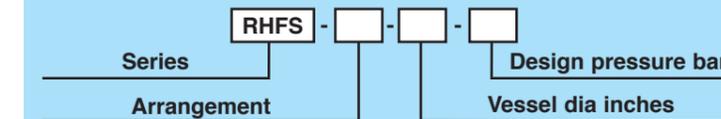
Normal maintenance requires only infrequent element changes and is to be performed as follows:

- When the pressure drop reaches an excessive value (1 bar), take the unit out of service by using the line block valves.
- Vent the unit completely and verify, through the manometer, that there is no more pressure inside.
- Open the filter/separator through the full diameter access or man ways and check the filter elements to verify their dirty conditions. If the cartridge clogging is not too great, it may be possible to remove the dirt by washing (Carry out this operation with caution). Should the cartridges be uncleanable, they must be replaced with new ones.
- Reinstall the filter elements and put the unit into service again, following the above instructions.

NOTE: If the unit is equipped with a REPCo's quick opening closure (optional item), please refer to the dedicated operating and maintenance manual.



FILTER/SEPARATOR MODEL SPECIFICATION (HORIZONTAL)



Horizontal Gas Filter Separator