SEPARATORS

WHY ARE LIQUID SEPARATORS NEEDED ?

Where does moisture in gas come from?

Most gases contain some moisture, either in the form of free liquid or in the form of a mist suspended homogeneously in the gas stream. The free liquid will drain by gravity to the drip legs but the mist will be carried along at velocities far too high to permit it to settle out on its own. This mist must be removed from the gas stream with the aid of a separator.

An Armstrong separator will remove from gas, air or steam lines, liquid entrainment, scale and any other contaminant larger than 8 - 10 micron, with minimal pressure drop, when correctly sized.

Why is there moisture in steam?

Saturated steam from any industrial boiler contains an appreciable percentage of entrained water as it leaves the steam drum. This may be as low as a few percent or as high as 15% to 20% depending on boiler type and operating conditions. Part of this water is present in the form of minute droplets or mist, suspended homogeneously in the steam and may even contain boiler treatment chemicals. If this liquid entrainment is not removed it will be carried along with the steam at high velocity causing erosion in pipes, valves, heat exchangers and anything else it comes into contact with. Consequently this moisture must be removed as soon as practical after leaving the boiler.

As heat is lost through radiation additional moisture will form in the steam distribution system, this condensate forms a film of water on the inner pipe surface, most of which runs by gravity to the pipe bottom and is collected in drip legs for removal by the steam traps. However, if steam velocity in the pipe is high some of this water may become re-entrained as droplets and be carried along with the steam.

Any condensate that enters heat exchange equipment cannot contribute anything to heat input, it is merely an added liability on process economy and reduces heat exchange efficiency.

In some processes and especially where steam is injected or sprayed directly onto a product, even a small amount of water may spot or damage the product. It is therefore important to install a steam separator prior to the heat exchange equipment to ensure only clean dry steam enters the process.

Why is there moisture in compressed air ?

All air has a certain amount of water in solution. How much however, depends on temperature, relative humidity and specific volume of the air. Reduction of air specific volume by compression raises relative humidity and water leaves solution.

Reduction of temperature in intercoolers, aftercoolers, refrigerated dryers and distribution lines also reduces the amount of water that can be held by a specific volume of air.

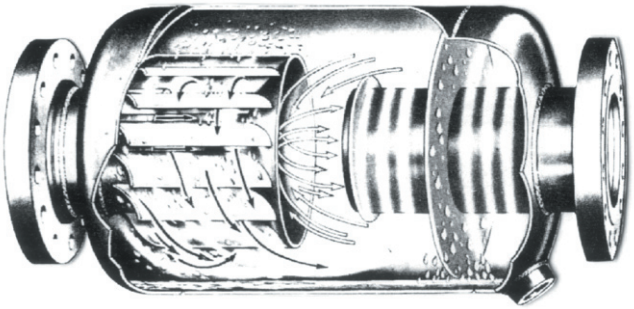
In both cases, the resulting water mist carried along at high velocity with air damages pipes, valves, instruments,tools and product that it contacts.

Some water will collect with sufficient mass to settle to the bottom of containers or lines where it can be removed by gravity to liquid drainers. However, a substantial amount is suspended as a mist of fine droplets which are light enough to be carried along through compressor stages and distribution lines. Some means of liquid separation should be provided before air using equipment and processes.

ULTRADRY SEPARATORS

Armstrong - Steam & Engineering manufacture a range of both “Inline” and “Crossline” Centrifugal Separators. These separators incorporate a unique three stage diffuser vortex which ensures true separation of all liquid above 10 microns. This is achieved with minimal pressure drop.

SIZES: 1/2” TO 24” 15mm to 600 mm
RATINGS: ANSI 150# to ANSI 600#
1035 kPa to 8000 kPa



INLINE

CROSSLINE

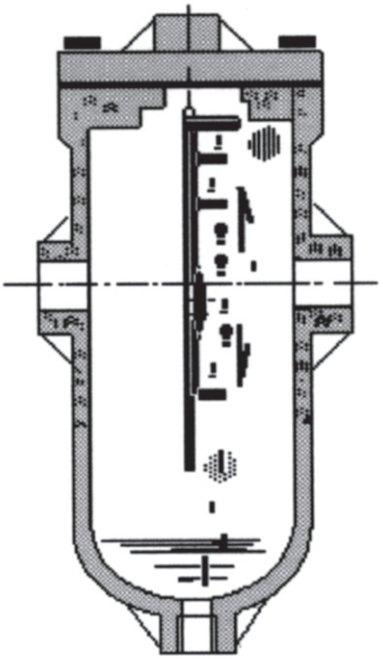
These separators can also be designed with collection chambers for ‘slug’ catching. When equipped with our specialty blowdown systems for critical liquid evacuation applications such as steam turbine protection they offer virtually foolproof mechanical proctection.
Please consult our sales engineers with your specific applications.

BAFFLE TYPE SEPARATORS - CAST

ASE-16G are baffle type separators used for the removal of moisture from steam and compressed air pipelines. While the least expensive type of separator they are also the least effecient and will also give a relatively high pressure drop.

Please consult our sales engineers before choosing this separator for your application.

The separator helps to eliminate downtime and costs associated with particulate damage in system equipment, separating the particles with a heavier specific gravity, such as water and oil droplets, moisture in suspension, dirt and scale.
The condensate collected at the bottom of the separator, must be automatically drained by a suitable steam or compressed air trap.



SIZES: 1/2” to 2” 15 mm to 25 mm
RATINGS: 1600 kPa @ 198 Deg C