SULZER

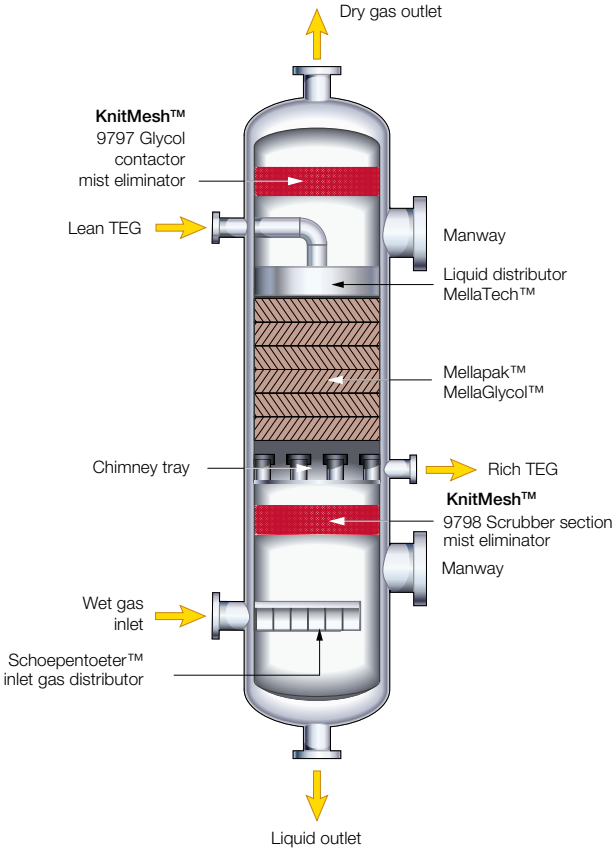
CASE STUDY

KnitMesh™ 9797 in Glycol Contactors

Traditional operational guidelines for knitted mesh mist eliminators stipulate outlet entrainment levels of 0.1 US gallons per million standard cubic feet of gas. However, many offshore operators believe that this level is very costly in terms of lost glycol and downstream maintenance problems. The reduction of glycol losses from glycol contactors in gas dehydration systems is one critical area highlighted recently where these guidelines have proven insufficient.

The challenge

They are also an imprecise yardstick for mist eliminator design as the figure is used without reference to droplet sizes. Evidence suggests that droplets from glycol contactors are very small - often in a range of 3 to 10 microns - and conventional mist eliminators do not achieve optimum efficiency. This is particularly true in old design contactors fitted with bubble-cap trays where liquid entrainment from the top tray can be comparatively high. Using modern structured packings instead of trays reduces the entrainment problem but droplet sizes are still extremely fine.



Typical layout of Glycol dehydration column

The solution

A new design from Sulzer Chemtech addresses this problem and is capable of reducing entrainment levels to less than 0.05 USgal/MMscf of gas - even at the droplet size distribution experienced in the contactors.

Known as Type 9797, this KnitMesh mist eliminator utilizes new computer modelling techniques which enable accurate prediction of performance curves for known inlet droplet size distributions. The key to the method is the ability to predict outlet concentrations which can then be easily measured - as opposed to the conventional approach which gives a simple droplet cut-off size.

The model simulates capture, collection, coalescence and drainage of droplets as they enter and pass through the pad.

It is also possible to predict liquid hold-up characteristics within the mist eliminator so flooding and re-entrainment problems can be avoided. The result is a composite mesh medium optimized to suit the application.

Additionally, careful choice of materials allows the use of polymers such as PTFE to improve wetting characteristics and capture efficiency in the high efficiency section of the mist eliminator design. With most applications there is a degree of uncertainty in the specification of the inlet drop size distribution but in the case of glycol contactors, it is comparatively well documented. Consequently, the prediction techniques can be very confidently applied.

This new design is also sufficiently robust to cater for variations in process conditions such as flowrate and inlet entrainment loading. Its application is not restricted to glycol contactors and other projects include the reduction of liquid entrainment emission into the environment and product losses.

Benefits

- Entrainment reduced by 50 %
- Effective prediction of performance
- Equipment built to individual specifications
- Flooding and re-entrainment avoided
- Robust design
- Suitable for several applications

Gas composition (mole %)

Water	0.05
Nitrogen	0.28
Carbon dioxide	6.04
Methane	80.34
Ethane	7.75
Propane	3.58
i-Butane	0.41
n-Butane	0.95
i-Pentane	0.23
n-Pentane	0.31
Light C6+	0.06
Hydrogen sulfide	60 ppm

Typical process data

Flowrate	710 MMSCFD
Temperature	21 °C
Liquid density	1150 kg/m^3
Gas density	73.67 kg/m^3
Pressure	69 bara
Molecular weight	20.8 kg/kmol
F-factor glycol contactor	2.9 √Pa
Mist eliminator dimension	3250 mm diameter x 230 mm thick

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