

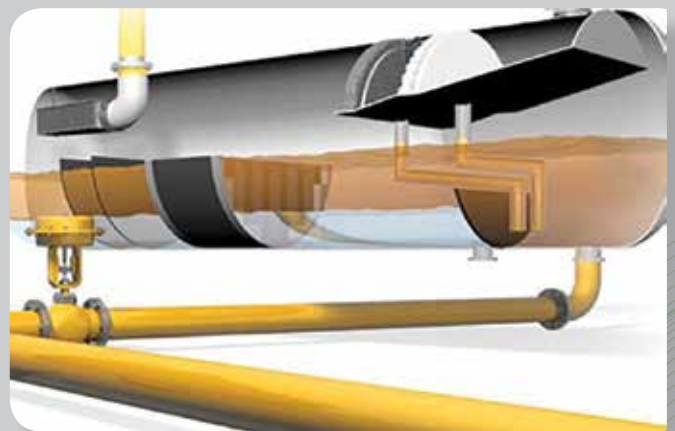


OIL & GAS INTERNALS

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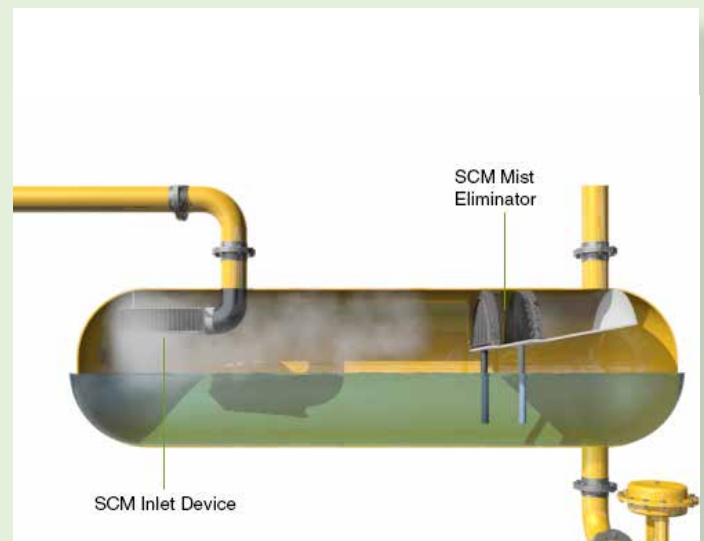
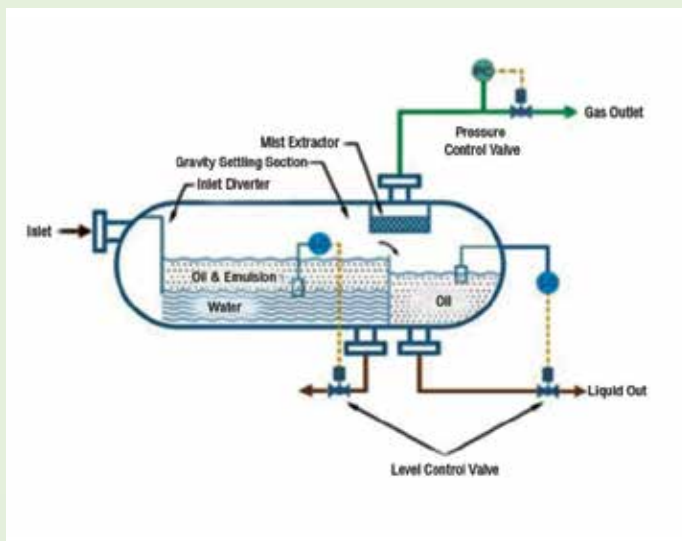
OIL & GAS INTERNALS OVERVIEW

Separators are the devices that are used in Oil-Gas Separation from the liquid in the well stream. Its basic working principle is related to the different densities of all three phases. This separator vessel consists of different parts or can also be called Separator Internals. Based on different priorities these vessels are classified into many configurations.

MAJORLY THESE VESSELS CAN BE CLASSIFICATION BY:

- SEPARATION OPERATION
- VESSEL CONFIGURATION
- OPERATING PRESSURE
- USES/APPLICATION

THREE-PHASE SEPARATOR IMAGE



1. SEPARATION OPERATION:

- **Two-Phase Separators:** Designed specifically for oil and gas. The well stream enters the separator and strikes an inlet deflector which diverts the liquid and gas downstream to the liquid section where it begins to separate.
- **Three Phase Separators:** Designed specifically for oil, gas, and water. Essentially the same as a two-phase separator except the separator has an internal inlet down comer, which carries the fluid to the bottom of the vessel for added retention and separation time. Splitting oil-gas water into its main form is the only purpose of the 3 Phase separator. Separation effectiveness and efficiency are depending upon the fluid's physical parameters like density, viscosity, etc. S-Cube Mass Transfer Pvt Ltd. provides the expertise engineering solutions along with fabrication, design of the drum, and required internals as well.

2. VESSEL CONFIGURATION:

Vertical separators are designed primarily for intermediate gas-oil ratios, while horizontal separators are suited for high gas-oil ratios and constant flow well-streams. These high-pressure separators are available in vertical or horizontal configurations, with a wide range of sizes and capacities.

We specialize in filling the needs of the petroleum industry, with products designed to withstand the rigors of oil and gas production. We understand that the ability to separate oil, gas, and water in oilfield operations is critical; that's why we provide a wide range of robustly engineered 2 and 3 phase separators.

3 TYPES ACCORDING TO OPERATING PRESSURE:

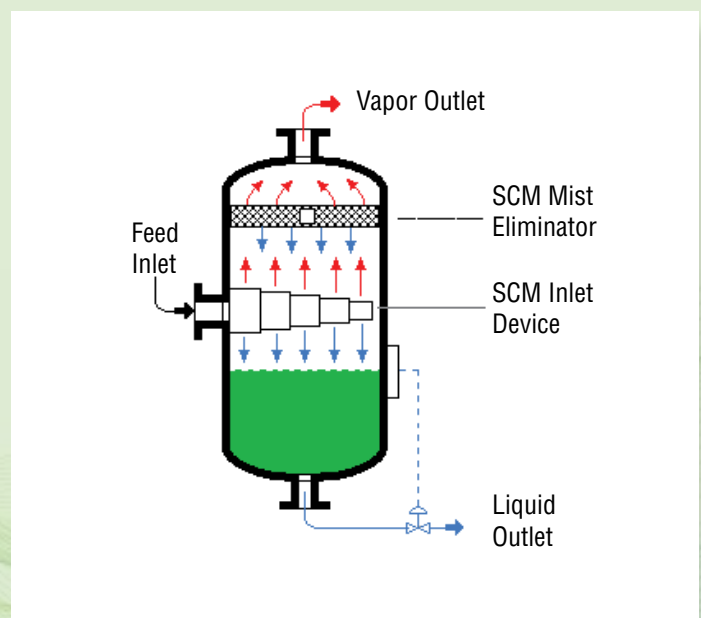
These vessels can be classified by the pressure level they are operating at viz. higher medium and lower. All these ranges of pressure vary from 10 to 20psi up to 750 to 1500psi. In the case of a high vacuum, it can operate between the pressure range of 4000-5000psi

4. TYPES ACCORDING TO USES/APPLICATION:

- **Low-Temperature Separator:** In this type of separator, a high-pressure well stream is jetted through a pressure-reducing valve so that the actual temperature of the separator will go below the actual temperature of the Well Fluid.
- **Production Separator:** Separation of produced well fluid from well or group of wells can be achieved by Production separator. It can be Vertical, Horizontal, and Spherical and can be in two-phase or three-phase.
- **Test Separator/ Well Tester:** Separation and Metering of well fluids can be done by using Test Separators. It has main advantage of portability on a skid or it can be trailer mounted.
- **Metering Separators:** These are specially designed for metering foaming and more of the viscous oils.

SCM KNOCKOUT DRUM

It's a vessel generally used to remove the combined liquids from the gaseous stream. Its fabrication and configuration are depending on the separation efficiencies and flow rates of the streams which have been described as per operational procedures. It can be available with both horizontal and vertical configurations. While entering the stream into the vessel, the fluid gets knocked out by the various internals mounted on the inlet distribution zone while the remaining fluid gets removed from the fine separator zone of the knockout drum to drain it.



PARTS OF SEPARATORS

SCM CYCLONE INLET DEVICE:

S-Cube Mass Transfer Pvt Ltd. is the leading manufacturer of Cyclone Inlet Device.

Fabrication using the highest quality raw materials according to industrial guidelines always makes us offer the perfect solution to the client. The Inlet stream which enters from the nozzle is introduced tangentially into a vertical cyclone tube to create a centrifugal separation effect for gas/liquid.

The liquid stream hits against the cyclone walls and falls, entering the bulk fluid phase via a cross baffle to absorb the momentum and the gas leaves out from the top. This device is very effective as a foam eliminator.

SCM VANE INLET DEVICE:

The inlet stream entering through the inlet nozzle is smoothly divided into a number of equal streams each of which is deflected through approximately 90° to create a centrifugal gas/liquid separation effect. The streams then impinge against the vessel walls and enter the bulk fluid phases to absorb the momentum. This may be a top or end entry design.

SCM BI-VANE INLET DISTRIBUTOR:

Bi-Vane Inlet Distributor is a low inlet momentum device which is manufactured by S-Cube Mass Transfer Pvt Ltd.

The inlet stream entering through the inlet nozzle is smoothly divided into two equal streams each of which is deflected through 90° to create a centrifugal gas/liquid separation effect. The Streams then impinge against the vessel walls and enter the bulk fluid phases to absorb the momentum. This may be a top or end entry design.

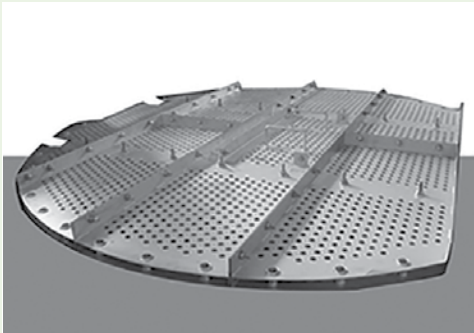


S-CUBE DISTRIBUTION BAFFLES



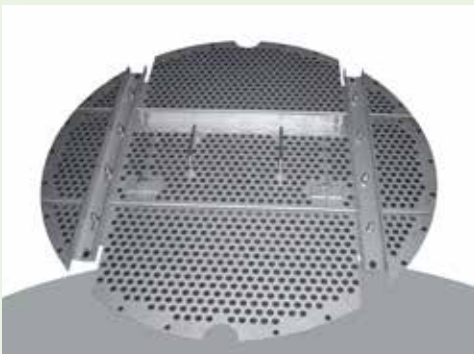
Inlet Distribution Baffles are provided inside the shell to increase the residential time for air. Liquid passes through the distribution baffle which is either in a single or matched pair of transverse perforated plate baffles in the liquid zone.

Its primary purpose is to provide a barrier and distribute the liquid evenly from the turbulent inlet zone into the calm separator zone. The distributor also acts to dampen adverse liquid waves and surges which may be caused by incoming slugs. Occasionally, for long separators and/ or where the gas velocity is high, additional baffle plates (wave breakers) are installed at the gas/ liquid interface along the vessel to prevent wave build-up.



SCM DUAL PERFORATED BAFFLE PLATE:

Dual Perforated Baffle Plate is a pair of perforated baffles with typically 15%-30% open area extending from the base of the vessel to the HLL or HHLL. It is used in more difficult separator applications or where the liquid velocity is excessive.



SCM SINGLE PERFORATED BAFFLE PLATE:

Single Perforated Baffle Plates are used in various industries in liquid-liquid separation when it is essential to achieve laminar flow through vessels.

This is a perforated baffle with typically 25-30% open area extending from the base of the vessel to the HLL or HHLL. It is used in standard separator applications. The Single Perforated Baffle Plate comes in various housings and armatures for different workloads. They can also be customized on orders that happened at a very reasonable price.

S-CUBE OIL - WATER COALESCING INTERNALS (COALESCER PACK)



1. SCM MATRIX COALESCER PACK

These devices are manufactured in corrugated sheets which makes them strong and light and well suited for this application. Liquid droplets directly impinge on the irregular surfaces allowing coalescence to take place. The larger droplets then flow either up or down through the packing and separate out into their respective phases. Packs are typically 210 mm deep and 2 to 5 packs are used.



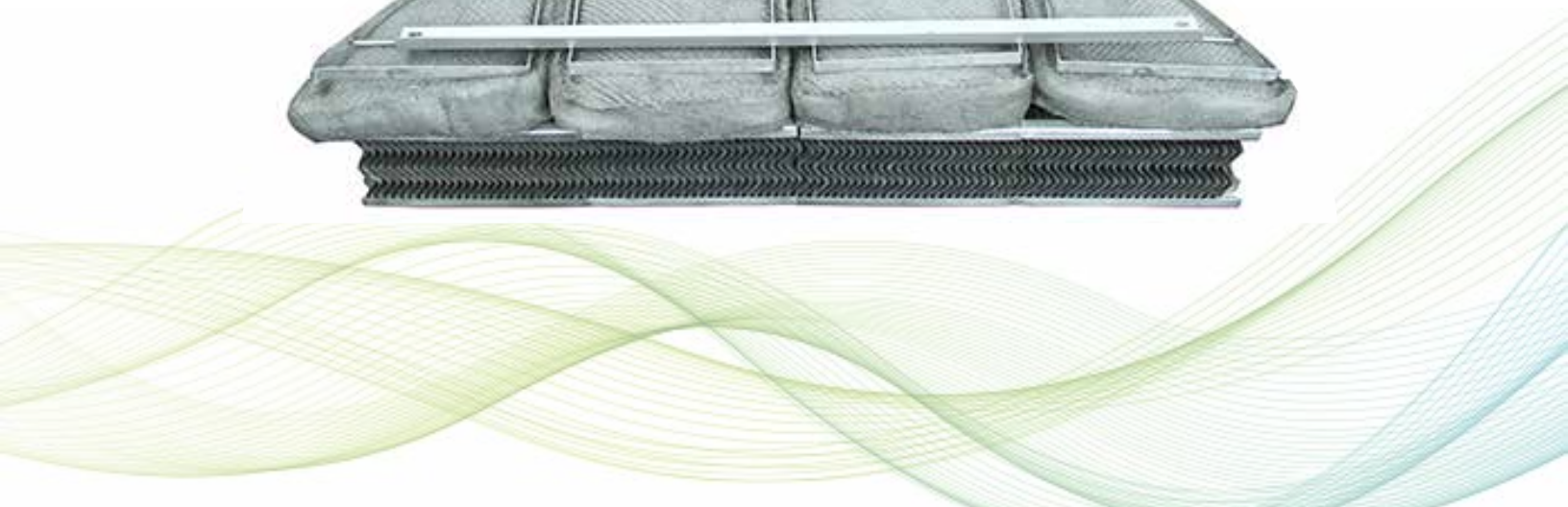
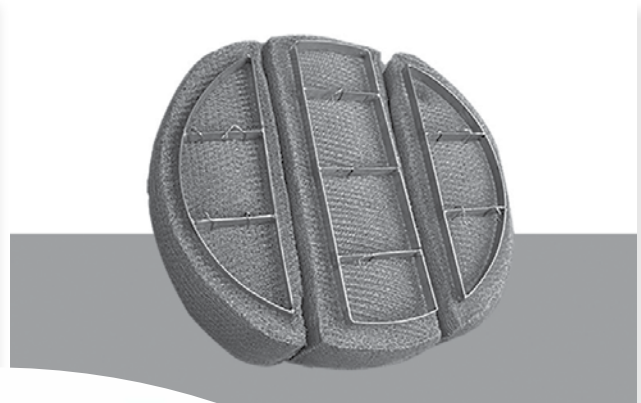
2. SCM FLAT PLATE PACK

We are specialized in manufacturing a wide range of Flat Plate Pack. The main advantages of Flat Plate Pack are acclaimed for their longer service life, robustness, and consistent performance. Flat Plate Packs achieve good coalescing performance and are resistant to fouling and so is the normal first choice for coarse separation performance in production separators. Packs are constructed in modular units up to 1m long and bolted together to provide a large flow face area. Various styles are available to suit the service including a special fouling resistant style.

S-CUBE MIST ELIMINATOR



Mist elimination, or the removal of entrained liquid droplets from a vapor stream, is one of the most commonly encountered processes regardless of unit operation. Unfortunately, mist eliminators are often considered commodity items and are specified without attention to available technologies and design approaches. The engineered mist eliminator may reduce liquid carryover by a factor of one hundred or more relative to a standard unit, drop head losses by 50% or more, or increase capacity by factors of three or four. This manual summarizes cost effective approaches to reducing solvent losses or emissions, extending equipment life and maintenance cycles using proven and cost effective technologies and techniques.



SUB TYPES OF MESH TYPE DEMISTER PAD

Style	Material	Application	Wire Diameter mm	Mesh density Kg/m ³	Surface Area m ² /m ³	Voidage %	Nominal Micron Rating*
SCM-A1	Metals	Very high efficiency in clean service	0.15	195	650	97.5	3μ
SCM-A2	Metals	Fine droplet removal in clean service	0.15	145	480	98.2	4μ
SCM-A3	Metals	General purpose, clean service	0.15	112	375	98.6	5μ
SCM-B1	Metals	Optimum efficiency & pressure drop	0.275	195	355	97.6	5μ
SCM-B2	Metals	General purpose, not totally clean	0.275	170	310	97.9	6μ
SCM-B3	Metals	Heavy duty e.g. oil & gas separators	0.275	145	265	98.2	8μ
SCM-C1	Metals	Light fouling	0.275	110	200	98.6	10μ
SCM-C2	Metals	Moderate fouling	0.275	80	145	99	12μ
SCM-C3	Metals	Heavy fouling e.g. evaporators	0.275	50	90	99.4	15μ
SCM-PP1	Polypropylene	Acid mists	0.25	75	1120	93	3μ
SCM-PP2	Polypropylene	Chemical Scrubber towers	0.25	50	750	95.3	6μ
SCM-T	Teflon	Very corrosive services	0.25	64	480	97	8μ
SCM-PP3	Polypropylene	Low pressure drop e.g. air scrubbers	0.25	33	490	96.9	10μ
SCM-A1X	Metal/PP Mix	Mist removal of polar/Non- polar mixtures	0.25	200	625	95.6	5μ

For the separation of entrained liquid, a variety of mist eliminators are offered. The four basic droplet capture mechanisms should be considered when selecting the proper equipment.

- Diffusional Deposition is only useful for separating very finely distributed aerosols with droplets typically smaller than 1μm - tiny enough to be impacted by Brownian Motion.
- Direct Interception posits that a droplet of a certain diameter and mass follows the stream line around the target' wire or fibre and is separated as it comes into contact with the target or collection fibre.
- Inertial Interception takes into account the mass of the droplet and forecasts how momentum will cause it to stray from the gas stream.
- Gravitational Deposition is based on the idea that under gravity, huge, slow-moving droplets can detach from a gas stream. Huge droplet sizes and low surface gas velocities are required for this, making separator dimensions excessively large and uneconomical.

For a given application, the droplet size distribution is crucial to each mechanism. Droplet size distributions in gas drying applications using glycol contactors, for example, are frequently in the range of 5-25 m, and excellent separation efficiency is important.

VANE TYPE MIST ELIMINATOR

In Mist Eliminator device, more the passes, more will be the efficiency of separation. That's why different types of the devices can be a choice as per the process requirement.

SCM PLAIN VV



Comprises plate type vanes for entrained droplet separation.

SCM SINGLE HOOKED V



Comprises one extra vane for better effective mass transfer.

SCM DOUBLE HOOKED V



Comprises two extra supporting vane plates with respect to angle of vanes to get more optimized results.

S-CUBE MULTI-CYCLONE DEVICE

The SCM multi-cyclone features twin, opposing inlet ports to boost the capacity of the Cyclone and offer improved vortex balance. This affords a high diploma of separation of liquid droplets and stable particles even at excessive operating pressures. Tubes are Placed vertically inside a separator vessel, among seal plates. Our precise brief-installation layout means that the SCM tubes may be fitted later Within the manufacturing phase, both inside the workshop or at the site. They may be without problems Eliminated for inspection, cleaning or replacement. They also can be welded-in, if desired. Multi-cyclones are perfect for packages where gasoline float is surprisingly consistent, however Infection may be either liquids and/or solids, which can also occur in lengthy pipelines. Also they're used extensively as pre-separators earlier than cartridge filter out-Coalescers. The SCM multi-cyclone is very green, commonly doing away with over 99% of Contaminants above particle sizes of 9-10 microns at a stress drop around 0.5% of the inlet pressure at layout situations.



COMPARISON OF MIST ELIMINATOR:

	VANE	CYCLONE	WIRE MESH
Droplet Handling	10-40µm	7-10µm	3-10µm
Maintenance	Easy To Maintain	Easy To Maintain	Need Replacement
Solid Handling	Good	Best	Average
Pressure Drop	<1-9 mbar	20-24mbar	<2.5 mbar
Overall	Good at handling liquid load	High efficiency for high gas capacity	Easy to install ideal for solids

We are here to help your facility with all its mist removal needs. If you need quality demister pads, contact our engineers at S-Cube Mass Transfer Pvt Ltd. We have patented technologies for distillation and column internals.

WEIRS TO CONTROL LIQUID LEVEL:

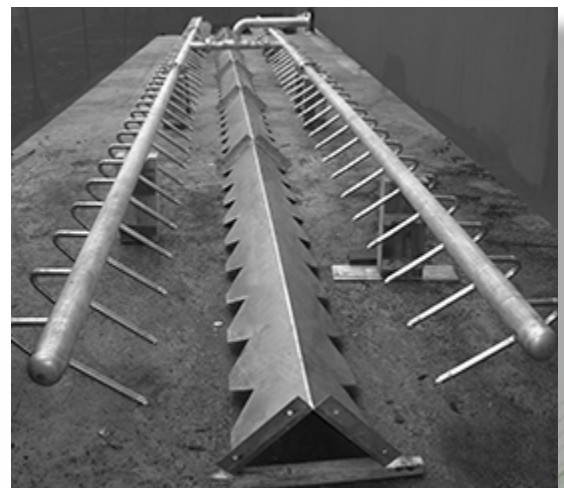
In the separator, the weir plate runs the entire length of the unit. This reduces unwanted surges within the unit, which can be detrimental to the system's efficiency. The skim pipes must be set correctly to prevent excessive, unwanted surging, otherwise no oil will enter the oil-holding tank. The skim pipes must be set properly if skim pipes will be used in the future, or if flow rates will fluctuate.

VORTEX BREAKER:

This is a simple design that helps in preventing the formation of vortex while emptying the tank or reservoir. In the case of oil-gas separators, the well fluid needed to be managed in such a way that no formation of the vortex can affect the process. This effective vortex breaker ensures that no oil-water or gas-liquid mixture can get contaminate each other's flow.

SCM SAND JETTING SYSTEM:

In the case of the oil and gas industry, sand or sludge removal is one of the major issues. Such deposition of solids or sand can be hectic or often problematic to the industry. After the dedicated hard work and research S-Cube came up with a hard-core solution for such problems. S-Cube designed Sand Jetting System, promises high standard designs that cover a major portion of the vessel and prevent erosion of vessel wall.



S-CUBE SCM GAS TREATMENT



The gaseous phase of saturating gases must be dehydrated to remove water and other impurities. Gas dehydration is an important process in gas processing operations. The gas processing system will suffer serious corrosion and gas hydrate build-up if the stream is not cleaned. A smooth pipeline processing process can be achieved if the gas dehydration guidelines are followed.

One of the popular systems for removing water from a gas stream is the triethylene glycol (TEG) dehydration unit, which can also remove other volatile components, such as toluene, ethylbenzene, and benzene, etc. Various hydrocarbons, such as hydrogen sulphide and carbon dioxide, can be found in the natural gas stream, causing corrosion to carbon steel and other types of equipment. An AMINE contractor can be able to stop this corrosion from happening.

● SCM AMINE CONTACTORS:

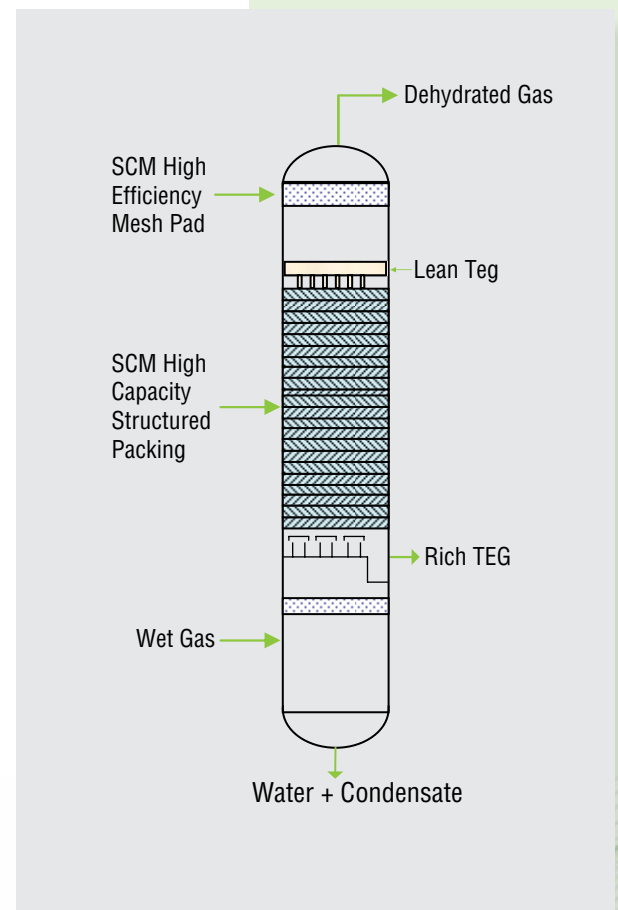
Natural gas streams can contain CO₂, H₂S, and other corrosive gasses which need to be removed before the downstream processing.

The sour gas will rise from the bottom while the amine solution flows in the reverse direction to absorb the corrosive gases. Purified gases will leave the contactor from the top. Amine solution strips the CO₂ and H₂S, then it will be regenerated to get recycled.

● SCM TRIETHYLENE GLYCOL (TEG) CONTACTORS

TEG contactors are used to avoid corrosion in the pipeline and the blocking of pipes by the hydrate formation. Treating gases with amine contractors will lead saturate the gases with water and which must be dehydrated before the fluid enters into the pipeline to avoid corrosion.

Wet gas contacts with dry glycol which captures the moisture and the dry glycol will get separated. The absorption tower principle is being used here. Wet gas from the bottom while the dry glycol gets reacts and absorbs the water. S-Cubes structured packing will be used to get efficient moisture removal.





S-CUBE SUPPLIES INTERNAL SUITABLE LIKE:

- 1) *SCM high efficiency structured packing*
- 2) *SCM mist eliminator – mesh pad/ Vane Type*
- 3) *Random Packing (like Pall Ring, Saddle etc.)*
- 4) *Inlet Device*
- 5) *Chimney Tray*
- 6) *Tray like Bubble Cap, Valve Tray, etc...*

S-Cube Mass Transfer Pvt Ltd. is the fastest-growing company ensuring customers with the finest product line and high-end patented technology. Our work is followed by our passion which reflects in the perfection of our service line. Our Vision is to exceed the expectations of our partners and clients by keeping quality and ethical dealing as a priority. More often vision exceeds to reducing carbon emission and solvent purification without contaminating any essentials a bit. After all Company Does Stands for its quote:

**‘Driven By Values,
Delivering On Vision’**

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