ROLE OF SEPARATORS IN MARGINAL OIL FIELD DEVELOPMENT

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Introduction

HORIZONTAL SEPARATOR: may vary in size from 10 or 12 in. in diameter and 4 to 5 ft seam to seam (S to S) up to 15 to 16 ft in diameter and 60 to 70 ft S to S. Manufactured with monotube and dual-tube shell

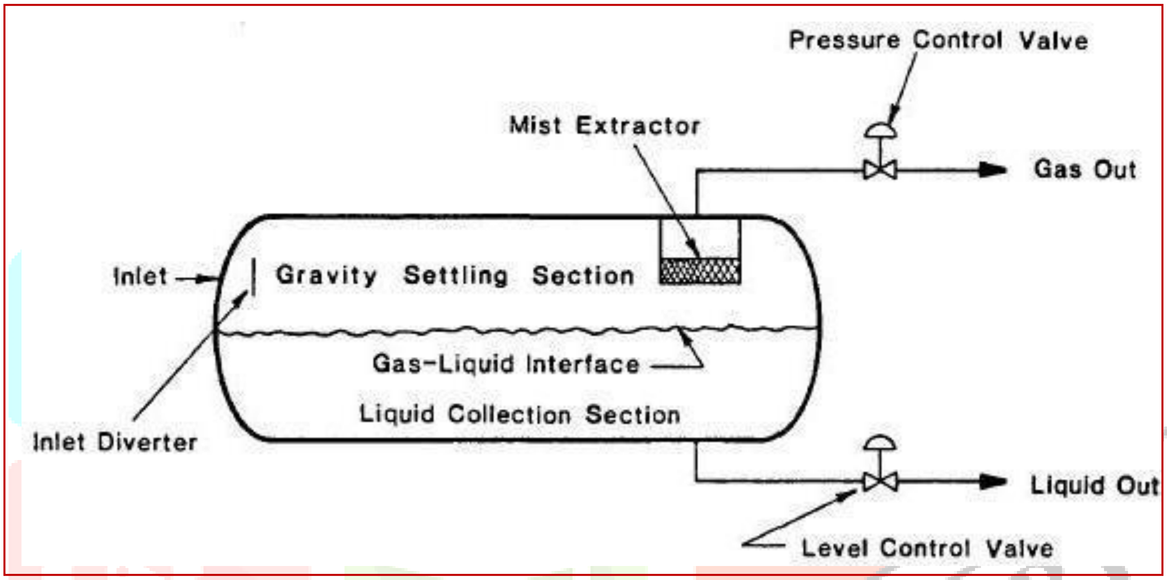

FIG 11 : TYPICAL HORIZONTAL SEPARATOR

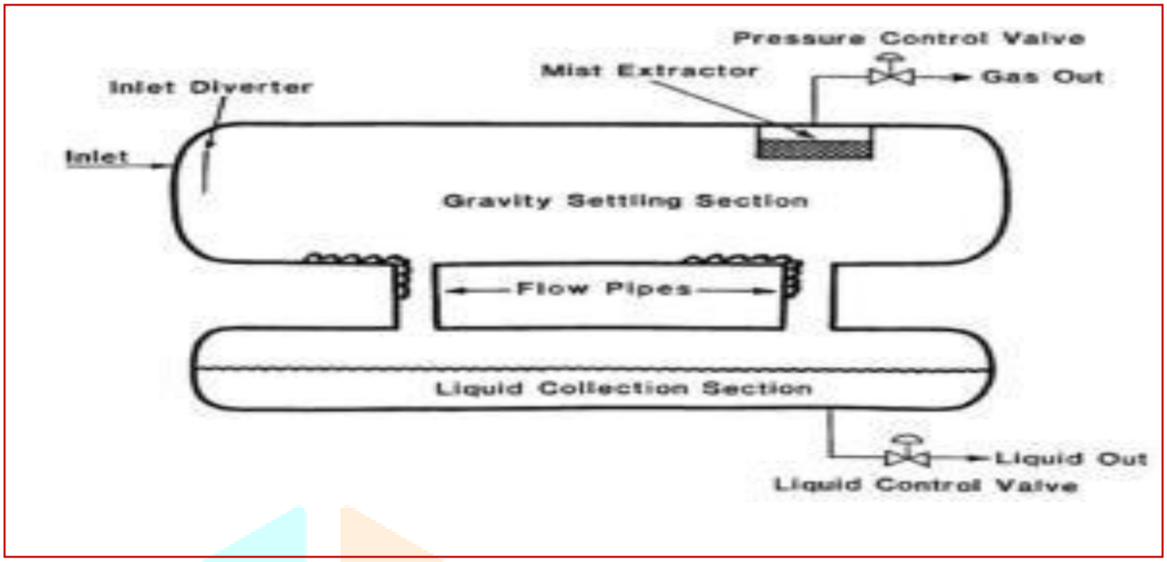

FIG 12 : DUAL-TUBE HORIZONTAL SEPARATOR

VERTICAL SEPARATOR: Vary in size from 10 or 12 in. in diameter and 4 to 5 ft S to S up to 10 or 12 ft in diameter and 15 to 25 ft S to S.

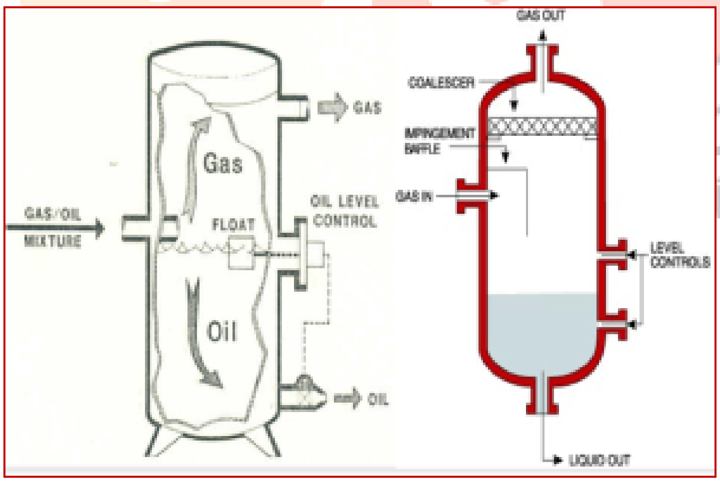

FIG 13 : VERTICAL SEPARATOR

SPHERICAL SEPARATOR:

Usually available in 24 or 30 in. up to 66 to 72 in. in diameter

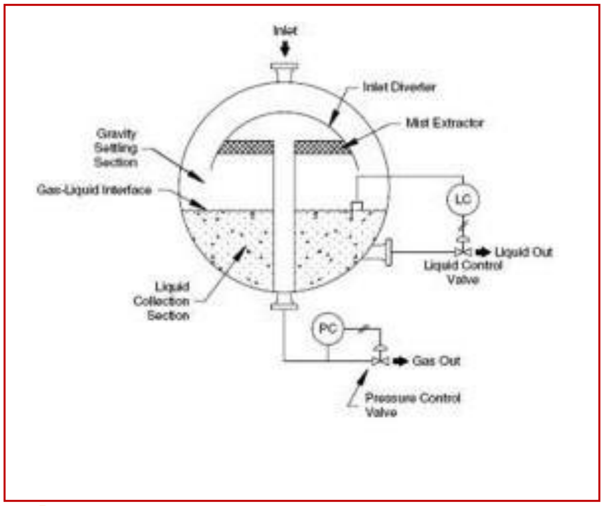

FIG 14 :Spherical Separator

CLASSIFICATION BY FUNCTION-

TWO PHASE SEPARATOR: Gas is separated from the liquid with the gas and liquid being discharged separately.

THREE PHASE SEPARATOR: In three-phase separators, well fluid is separated into gas, oil, and water with the three fluids being discharged separately

SEPARATOR COMPONENTS

- ✓ The main components of a separator, shown in Figure , are the feed pipe, inlet device, gas gravity separation section, mist extractor and the liquid gravity separationsection.
- ✓ The gas/liquid separator components will be briefly discussed in regards to theireffects on gas/liquid separationperformance.
- ✓ These effects need to be understood and quantified in order to troubleshoot separator operations, and to identify modifications that can be made to improveperformance.

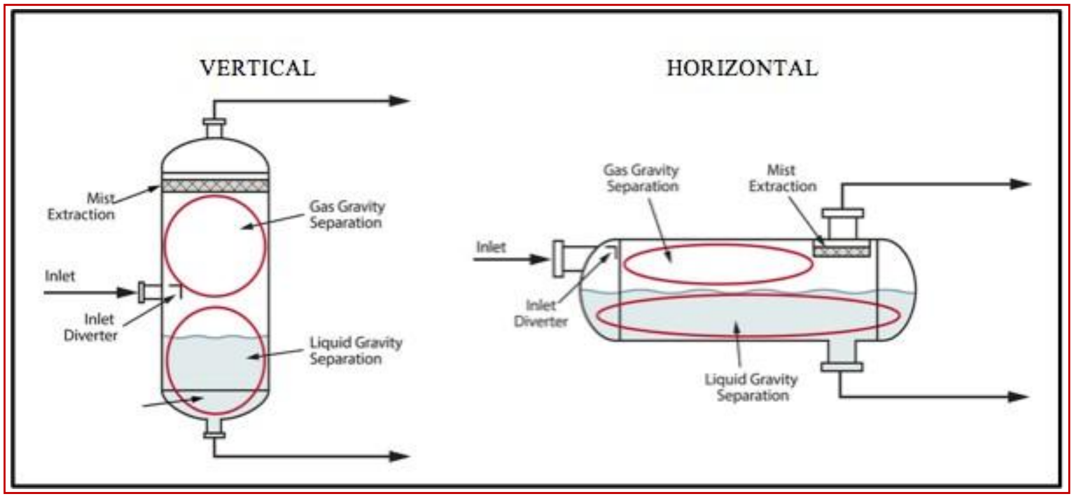

FIG 15 :Parts of a Conventional Separator

INLET FEED PIPE

- ✓ The inlet feed pipe sizing and geometry is important as it is desired to keep the multiphase flow pattern "stabilized" in the piping to minimize the production of small liquid droplets, and liquid entrainment into the gas phase. Fig shows the effect offeed pipe velocity on liquid entrainment. Figure demonstrates how quickly the liquid entrainment increases once the entrainment inception point isreached.

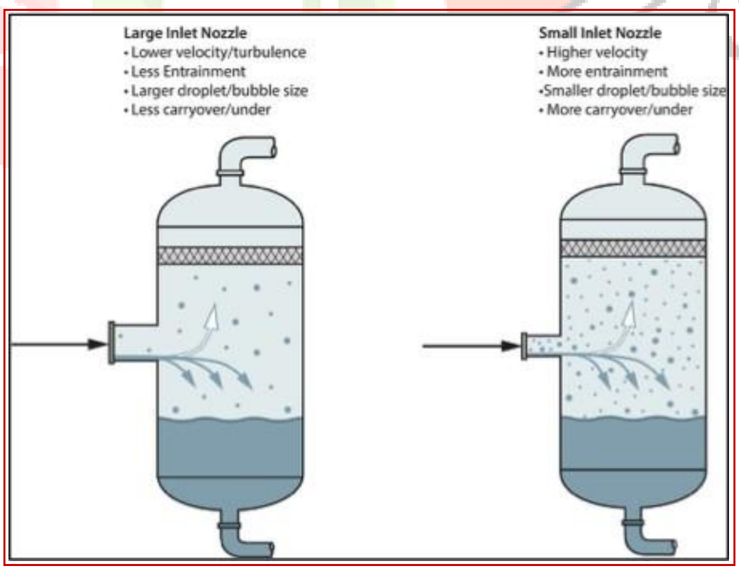

FIG 16 : EFFECT OF FEED PIPE VELOCITY ON LIQUID ENTRAINMENT

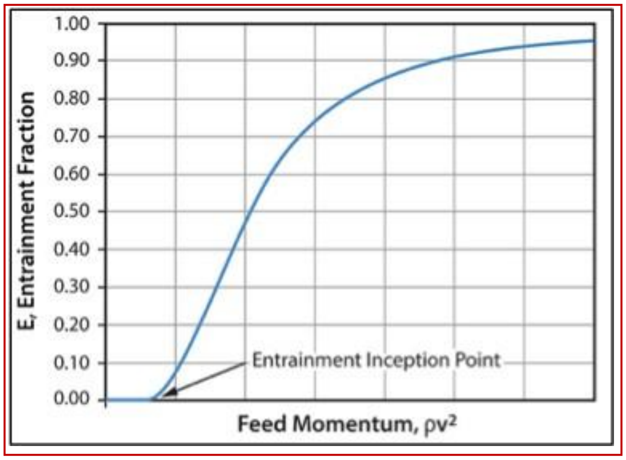

FIG 17 EXAMPLE OF LIQUID ENTRAINMENT BEHAVIOR IN A GAS-LIQUID SYSTEM

some general guidelines for inlet piping to minimize liquid entrainment are:

Provide 10 diameters of straight pipe upstream of the inlet nozzle without valves, expansions/contractions or elbows.If a valve is required, only use full port gate or ball valves.

INLET DEVICE

- ✓ The main purpose of an inlet device is to improve separation performance. This is achieved by maximizing the amount of gas-liquid separation occurring in the feed pipe, minimizing droplet shearing, and optimizing the downstream velocity distributions ofthe separated phases into the separator. Schematics for inlet devices are shown in Figure . In large capacity, more critical separation applications, the vane-type and cyclonic inlet devices are commonly used. The simpler, and less expensive, impact (or diverter plates) are often used where the separation performance is lesscritical

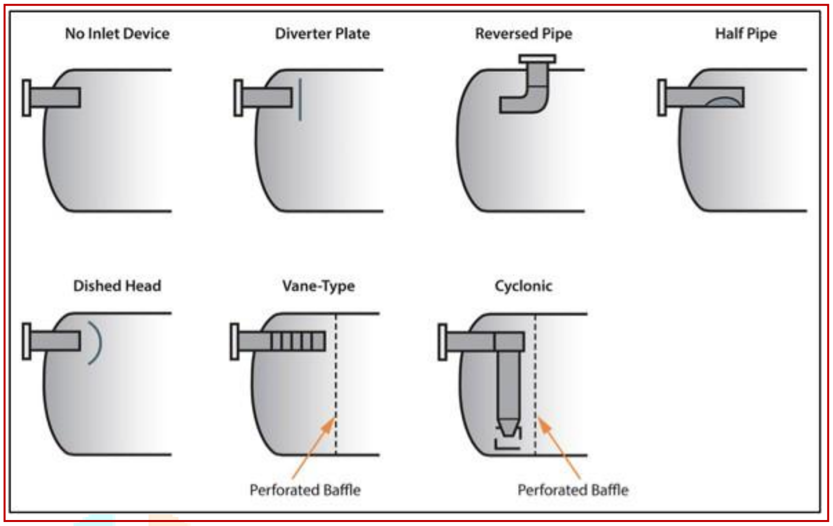

FIG 18 : VARIOUS INLET DEVICES

Function	None	Diverter plate*	Half Pipe	Vane Type	Cyclonic
Momentum Reduction	Poor	Average	Good	Good	Good
Bulk Liquid Separation	Poor	Poor	Average	Good	Good
Prevent re-entrainment	Poor	Poor	Average	Good	Average-Good
Minimize droplet shattering	Poor	Poor	Average	Good	Good
Defoam	Poor	Poor	Poor	Average	Good
Low pressure drop	Good	Good	Good	Good	Average
Ensure good gas distribution	Poor	Poor	Poor	Good	Average

* Diverter plate performance applies to reverse pipe and dished head inlet devices

Table1 . Comparison of inlet devices

✓ The inlet momentum ($\rho_m V^2_m$ – density*velocity^2 of the mixture) of the feed stream is typically used to select and size inlet devices. Table 3 provides the suggested upperlimits of inlet momentum values. For conditions where it is not practical to avoid higher feed pipe velocities, it must be recognized that failure to do so will result in higher entrainment loads, smaller droplet sizes, and more difficult separationconditions.

Inlet Device Type	ρV^2, lb/ft-sec^2
No Inlet Device	700
Diverter Plate	950
Half-pipe	1400
Vane-type	5400
Cyclonic	10 000

TABLE 2 INLET DEVICE PV^2 UPPER LIMITS

Conclusion:

Because information given about every instrumental operations in field in both theory andfield observation. As it is good to know these operations as crude coming from well to separator and loading is carried in a same place. We can see everything in same place and feel it.

References :

CAIRN MANUALS

PETROWIKI

WEB SITES REGARDING

EQUIPMENTS FIELD NOTES