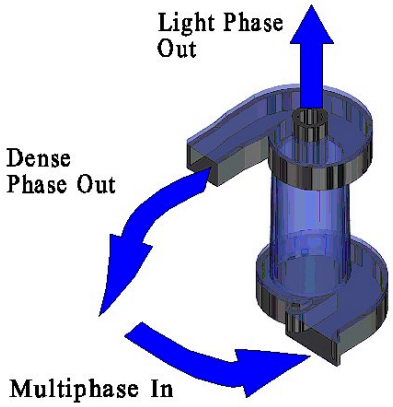
The I-SEP

Dual Involute Separator

The CALTEC I-SEP is a patented low footprint, low cost separation device capable of handling the separation duties of a conventional two phase separator more than fifty times larger in volume.

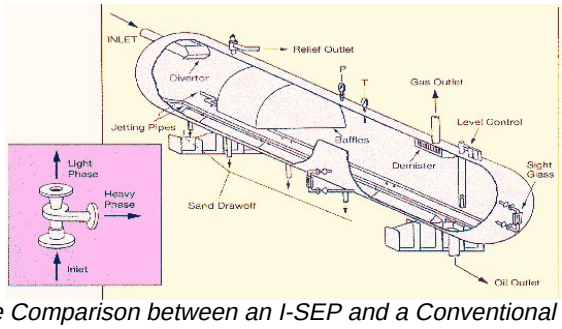
On entry, the multiphase fluids are subject to high 'g' forces which separates the 'light' and 'dense' phases. The fluid mixture could be gas, oil, water, sand or dust – or any mixtures of fluids with differing densities.



General arrangement of an I-SEP

Applications

- primary gas/liquid or gas/oil separation
- knock out of liquids from wet gases
- gas-oil/water separators on platforms subject to dynamic motions
- retrofitting on gas outlets of conventional separators for the removal of excessive liquid carryover
- debottle necking by retrofitting I-SEP upstream of existing gravity separations. This enables separated gas to bi-pass the existing separator thus improving its performance
- liquid recirculation for multiphase pumps
- partial oil water separation
- multiphase metering
- sand or solid separation from gas or liquid phase
- dust removal
- underbalanced or normal drilling



Size Comparison between an I-SEP and a Conventional Separator

If separation of more than two phases is required, for example, gas, liquid and sand, two units operating in series can be used.

I-SEP can be used onshore, offshore, subsea and deepwater. A miniaturised version is currently being developed for down-hole use.

Benefits

- very small footprint, typically more than fifty times smaller than a conventional two phase gravity separator
- very light weight, typically several tens of kilos
- not sensitive to motion, therefore ideal for floating production units
- tolerant to flow fluctuations and turn down
- no moving parts
- no active level control
- very low inventory leading to increased safety
- ideal for high pressure wellhead applications

Size

I-SEP can be supplied in a range of sizes from 2” to 10” nominal inlet flange size. The footprint of this range is 350 x 350 mm to 950 x 950 mm. Size selection is based on mixture density, gas volume fraction and the acceptable pressure drop. For the sizes quoted, the maximum flowrates are 3,000 – 66,000 barrels/day, depending on gas volume fraction of the liquids. For higher flow rates, more than one unit may be used in parallel.

Pressure Rating

I-SEP can be designed economically for high pressure applications such as at wellheads where the design pressure could be 10000 psig or higher. The unit can meet pressure vessel code requirements including BS5500 and ASME8.

Control and Instrumentation

I-SEP is simple to operate under a wide range of operating conditions. No active pressure or level control is required. In order to maximise performance over a wide range of production conditions, the use of pressure control valves on each outlet is recommended.

CALTEC Services

CALTEC is the leading specialist in this technology. The I-SEP compact separator is protected by patents worldwide.

CALTEC provides.

- Feasibility studies
- System design and supply
- Commissioning
- Through-life service

I-SEP

A typical I-SEP unit, capable of handling 6,000 barrels of oil per day

Free Service: CALTEC offers free initial assessment of your field applications.

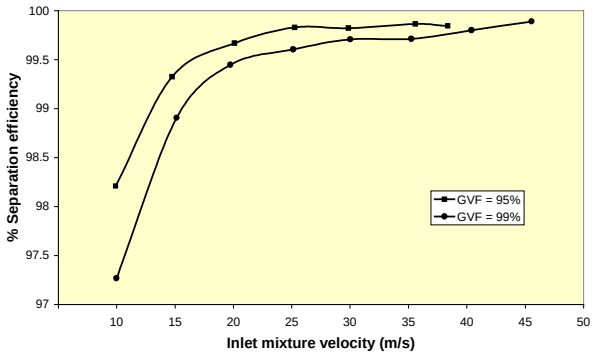
Please complete the attached questionnaire and return to sales@caltec.com

Performance

Separation efficiency exceeding 99% have been demonstrated at high gas volume fractions (GVF). It is possible to design and operate the unit so that a preferred phase can be virtually pure with negligible carry over.

Typical pressure loss through the separator is ½ to 2 bar, depending on mixture density and flow rates.

Typical turndown is 7:1. If it is necessary to cover a wider range of production flowrate, two or more units in parallel can be specified.



Typical Liquid Separation Efficiency

High Efficiency I-SEP

In applications where significant flow fluctuations are expected and high purity of separated gas is desired, an add-on compact knock-out vessel mounted on top of I-SEP ensures that the liquid carry-over in the separated gas phase is fully removed. The unit shown is rated to 10,000 psi and is capable of handling approx. 50 MMSCFD and upto 15,000 bbls of liquids and solids/day.

The purity of the liquid phase is also high with average gas carry-under below 1% or 2% by volume.

I-SEP package

I-SEP package (shown) supplied to a major UK operator is a part of an underbalanced drilling system. The dual I-SEP system used here handles gas, liquid, sand and drill cuttings. The gas is separated to a very good quality and the liquids and solids are sent to another device to remove the solids from the liquids.

Dual I-SEP Package

For further information contact:

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CALTEC

I-SEP-Compact Separator: DATA REQUEST QUESTIONNAIRE

Company:.....Contact Name…..……

Tel.....…….....…… .Fax……...……..…. E-mail…….

Field/Well/Cluster Ref. :.....CALTEC Ref :.....…...

Date:..... Fax Back at : 00 +44 1234 756057 or E-mail sales@caltec.com

Please quote the relevant production conditions (with appropriate units). Blank spaces are given for any additional data.

General Duty Requirement (e.g. gas/liquid separation etc.): .....

A. Flow Conditions available at Compact Separator Inlet

		DATA	UNITS
1.	Operating pressure (bara, barg, psia, psig)		
2.	Gas flowrate (Sm^3/d, MMscf/d)		
3.	Oil flowrate (m^3/d, bbl/d)		
4.	Water flowrate (m^3/d, bbl/d)		
5.	Operating temperature (^oC, ^oF)		
7.	Flow regime type (e.g. Mist flow)		
8.	Gas specific constant (J/kgK) or molecular weight		
9.	Gas specific heat ratio Cp/Cv		
10.	Oil density (kg/m^3) or Specific Gravity		
11.	Sand flowrate (lb/d or kg/d) if any		
12.	Solid particle size range (mm, inch)		
13.			

B. Compact Separator Performance Requirements

1.	Allowable % gas in liquid (gas carry-under)		
2.	Allowable % liquid in gas (liquid in gas carry-over)		
3.	Acceptable pressure drop across separator (bar, psi)		
4.			

C. Other Data (Optional at this initial stage)

1.	Material of construction		
2.	Pressure rating		
3.	Proposed layout of the unit in the process flow diagram (PFD)		
4.	Inlet pipe diameter (mm, inch)		
5.	PVT analysis of the hydrocarbons involved		