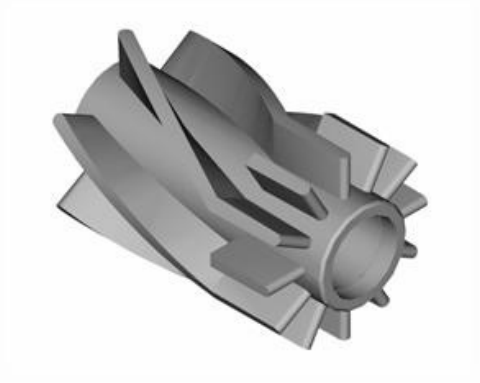
OIL & GAS PRODUCTION & TREATMENT TECHNOLOGIES

INTRODUCING OUR

CYCLONE INTERNALS FOR SEPARATORS

Part of the K-SEP™ range



KIRK PROCESS SOLUTIONS

www.kirkprocess.com

3 DECADES OF EXPERIENCE IN OIL & GAS SEPARATION

WE HAVE BEEN INVOLVED IN THE DESIGN OF THOUSANDS OF COST EFFECTIVE SOLUTIONS FOR THE INTERNATIONAL UPSTREAM OIL AND GAS INDUSTRY FOR OVER 30 YEARS

KIRK Process Solutions offers a range of products and services to support customers needing to separate typical oil and gas streams.

This separation expertise is evidenced by hundreds of operational vessels installed world-wide, spanning the full spectrum of operating pressures and environments and featuring many state-of-the art separation technologies and components in their design.

Our KSEP™ range of cyclones has a proven track record meeting difficult challenges.

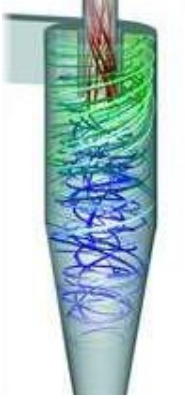
KCID Inlet cyclone cluster for bulk separation and de-foaming in horizontal oil/gas separators

KSME Axial cyclones for fine mist removal (< 10 microns) and low pressure drop with light solids capability

KCID Multi-cyclones for bulk gas / solids separation and mist elimination (< 10 microns) with moderate pressure drop

"... a proven track record meeting difficult challenges...

CYCLONES FOR PHASE SEPARATION & MIST ELIMINATION



We offer 2 designs of cyclone for phase separation duties, SIDE ENTRY and AXIAL.

SIDE ENTRY - MEDIUM CAPACITY

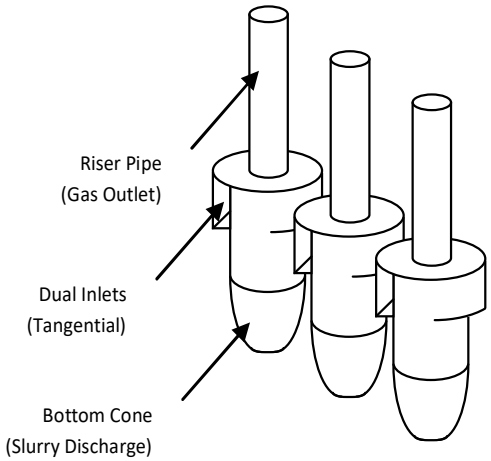
KMCE™ MULTI-CYCLONE ELEMENTS
for solids separation with some liquid
REMOVABLE OR WELDED DESIGNS

Each cyclone element starts with an outer tube with one or more integral swept inlet nozzles to initiate the spin.

In the initial region the inlet fluid is accelerated at high speed into a cyclonic swirl so that the liquid droplets and any solids are flung to the tube wall where they impinge and are swept downwards with the gas.

The core of this element is fitted with a central vortex finder/gas outlet pipe so that the gas reverses its flow to rise up this tube, leaving behind the liquid and solid contaminants that cling to the cyclone wall.

These contaminants continue their path downwards into the lower section of the cyclone where they exit into the main chamber of the vessel for drainage.



Performance depends on cyclone size; for mini multi-cyclones typically >99.9% removal of liquids and solid particles above 8-10 microns at a pressure drop of 0.1~0.2 bar.

AXIAL FLOW - HIGH CAPACITY

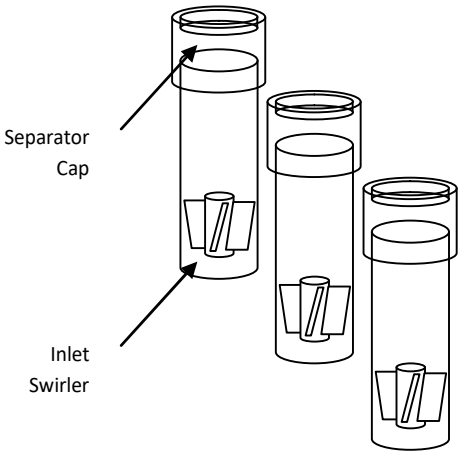
KSME™ AXIAL SWIRL MIST ELIMINATOR
for liquid separation with some solids
REMOVABLE DESIGN

Each separating element consists of an outer tube, the inlet end of which is fitted with a special swirler internally to initiate the spin.

In this region the gas and liquid droplets are accelerated at high speed into a cyclonic swirl so that the liquid droplets are flung to the tube walls where they impinge and are swept upwards with the gas.

The top of this element is supplied with a centrifugal separator cap which captures the liquid film and sends it falling to the tray deck outside the element tube.

Captured liquid drains from the tray deck via a down-comer pipe into the vessel's liquid sump for disposal.



Performance is typically >99.9% removal of liquid particles above 10 microns at a pressure drop around 0.05 bar.

CYCLONES FOR FOAM ELIMINATION IN OIL/GAS SEPARATORS

KCID™ CYCLONE INLET DEFOAMERS for bulk separation and foam reduction

Developed originally in the 1960's for the treatment of foamy crude oil in production equipment, early inlet cyclone devices suffered from a range of mechanical and fluid instability problems, and were not widely adopted.

Development work continued, however, and the design of the inlet cyclones evolved over the next 30 years from short, fat, single or dual cyclones into tall, thin, multi cyclone arrangements. The characteristics of these devices became better understood, and reliable performance envelopes were developed.

A characteristic of the cyclones is their high flow capacity, meaning that more throughput is possible through any given size separator.

Defoaming Mechanism
The primary purpose of the KCID™ inlet cyclone is that of foam elimination inside a separator. Many crude oils exhibit moderate or severe foaming tendency and the traditional approach to these problems is through a combination of oversized equipment using foam breaking packs and chemicals.

Inlet cyclones work on the principle of enhanced gravity separation by accelerating any incoming foam to high g-force, when it breaks down into separate liquid and gas phases.

The oil is flung to the perimeter of the cyclone tubes and flows down them into the bulk oil layer, whilst the gas forms a central vortex core and escapes through a top outlet hole into the gas space. Special features ensure minimal liquid carryover in the gas and gas carryunder in the liquid.

There are many factors to take into account when designing these devices so please refer to KPS for sizing confirmation.

Easy to Install
Manufactured as components that fit through a standard manway, KCID™ inlet cyclones comprise pre-stiffened cylinders and manifolds, requiring only simple supports and assembly within the vessel to achieve a secure fit.

Wide Performance Range
KIRK will design the cyclone cluster to meet your specific requirements, but the design envelope of the whole separator usually means that performance can be guaranteed all the way down to zero turndown. In many cases there will be little loss in performance also should an additional 10-20% flow be required through the system.

BENEFITS OF INLET CYCLONES

- High throughput and inlet momentum
- High gas / liquid pre-separation
- No operational pressure limit
- Elimination of foam, thus dramatically cutting usage of anti-foam chemicals
- Effectively handles slugs and surges
- Handles high inlet velocity and allows a greater fluid throughput in a revamp project
- Easy to install
- High sand loading capability and can be designed for solids removal with cone outlet
- No moving parts - no maintenance

A pair of cyclones during manufacture

CONTACT

KIRK PROCESS SOLUTIONS LTD
KIRK HOUSE
161 PARK CLOSE
WALTON-ON-THAMES
SURREY KT12 1EW
UK

TEL +44 (0)1932 250300

E-MAIL mkirk@kirkprocess.com

WEB www.kirkprocess.com