

TECHNOLOGY BROCHURE · 2026

02 REFINERY PROJECTS & MASS TRANSFER

PETROLEUM · CRUDE OIL · MIXED HYDROCARBON

Compact refineries for light crude, gas condensate and mixed or contaminated hydrocarbons, built around distillation columns we design and fit with our own internals.

- Light crude oil refinery
- Light gas condensate refinery
- Mixed hydrocarbon refinery
- Solvent & aromatics recovery
- Glycol (MEG/DEG/TEG) separation
- Packings, trays & internals

DIVISION
hitorq.in

GROUP
www.specxtech.com

EMAIL
connect@specxtech.com

PHONE
+91 7600 12 1222

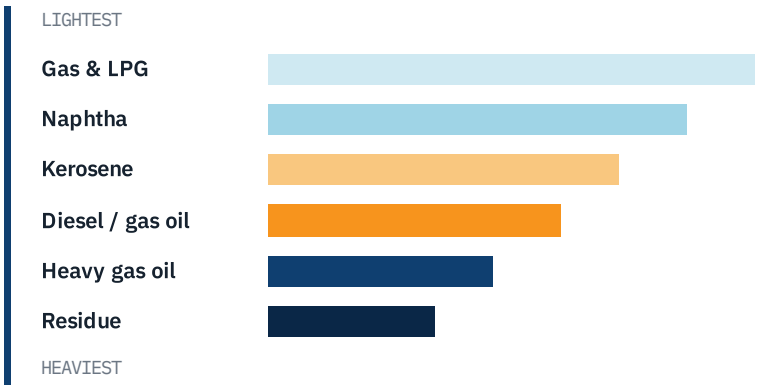
COMPACT REFINERIES

TURNING HYDROCARBON FEEDS INTO SALEABLE CUTS

Not every refinery needs to be a giant. Light crudes, gas condensates, off-spec fuels and recovered solvents can be processed profitably in compact plants close to where the feed is produced or collected. The core of each plant is the same: heat the feed, separate it by boiling range, then treat each cut to specification.

Crude oils differ mainly in density (API gravity), sulphur content and acidity. Lighter, sweeter feeds give more naphtha, kerosene and diesel and need less downstream treatment, which is why they suit smaller plants. We design around a full assay of your feed, not a generic crude.

TYPICAL CUTS BY BOILING RANGE



Illustrative order of cuts from top to bottom of a column. Cut points are set per project.

TABLE 2.1 REFINERY PROJECT TYPES WE ENGINEER

PROJECT	TYPICAL FEED	PURPOSE
Light crude refinery	Light, low-sulphur crude	Naphtha, kerosene, diesel and fuel oil for local markets
Condensate refinery	Natural gas condensate	Stabilised naphtha, solvents and middle distillates
Mixed hydrocarbon refinery	Off-spec fuels, contaminated or blended hydrocarbons	Recover on-spec fuels and solvents from mixed streams
Solvent recovery	Spent solvents, white spirit, aromatics, kerosene	Distil back to reusable solvent grades
Glycol recovery	Used or wet glycols	Dehydrate and separate MEG, DEG and TEG for reuse

MODULAR

Skid-built sections

Shop-assembled modules shorten site work and simplify later expansion.

FLEXIBLE

Feed changes handled

Operating windows are designed to cope with varying feed quality.

CAPACITY

To client requirement

Throughput and product slate are engineered to your feed and market.

HOW A COLUMN WORKS

VAPOUR UP, LIQUID DOWN, SEPARATION IN BETWEEN

When a liquid mixture boils, the vapour carries more of the lighter components than the liquid it came from. A distillation column repeats this effect many times over. Rising vapour and falling liquid meet on trays or across packing, exchange components at each contact, and the column gradually separates the feed into a light top product and a heavy bottom product.

Two choices decide most of a column's cost and performance: the number of separation stages and the reflux ratio. More stages mean a taller column; more reflux means more energy. Good design finds the economic balance for your product purity.

BATCH

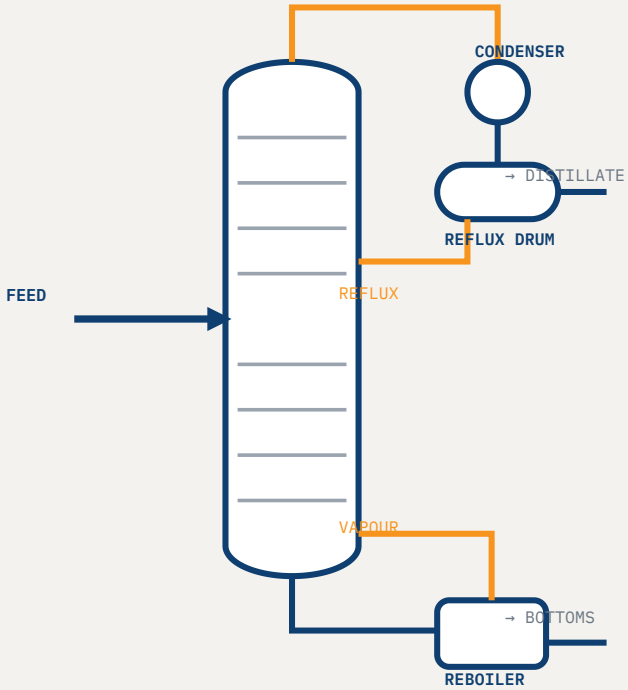
Batch columns

One charge is processed at a time; ideal for varied feeds and small volumes.

CONTINUOUS

Continuous columns

Steady feed and draw-offs; best for larger, consistent throughputs.



Schematic of a continuous column with condenser, reflux drum and reboiler.

THE MAIN ELEMENTS

FEED
Introduced at the stage that best matches its composition

REBOILER
Boils part of the bottom liquid to drive vapour up

CONTACT
Trays or packing bring vapour and liquid together

CONDENSER
Turns the overhead vapour back into liquid

REFLUX
Returned liquid sharpens the top product

PRODUCTS
Distillate, side draws and bottoms

> Typical applications range from fuel and solvent fractionation to alcohol, aromatics and glycol separation, in both new columns and revamps of existing ones.

COLUMN INTERNALS

WHAT IS INSIDE DECIDES WHAT COMES OUT

A column shell is only a pressure container. Capacity, efficiency and pressure drop are set by the internals. We select and supply complete internals for new columns and for revamps that need more capacity or purity from an existing shell.



FIG. 2.1 RANDOM PACKING ELEMENTS IN METAL AND CERAMIC

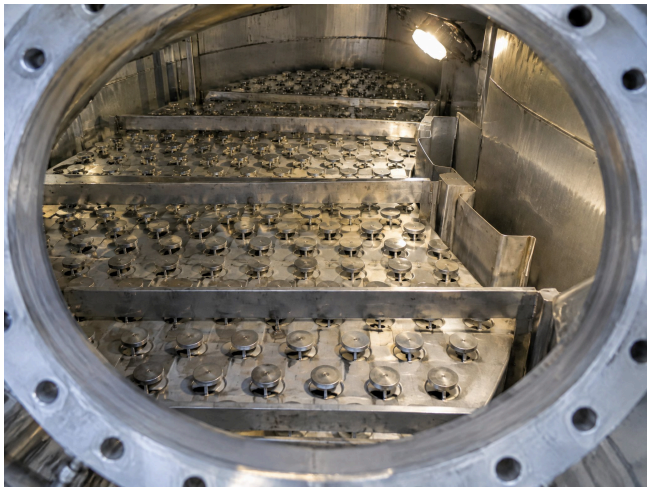


FIG. 2.2 VALVE TRAY DECKS SEEN THROUGH A COLUMN MANWAY

PACKINGS

- **Random packings** in metal, plastic or ceramic: low cost, simple installation, good for corrosive and smaller columns.
- **Structured packings** in corrugated sheet or wire gauze: high efficiency and very low pressure drop, the first choice for vacuum service.
- **Grid packings**: rugged and open, for fouling, coking or solids-laden duties.

TRAYS

- **Sieve trays**: simple perforated decks, economical for steady loads.
- **Valve trays**: movable valves widen the operating range for varying loads.
- **Bubble-cap trays**: hold liquid at low rates; used where turndown is extreme.

TABLE 2.2 CHOOSING BETWEEN PACKINGS AND TRAYS (GENERAL GUIDANCE)

CONSIDERATION	PACKINGS TEND TO SUIT	TRAYS TEND TO SUIT
Operating pressure	Vacuum and low-pressure service	Moderate to high pressure
Column diameter	Small to medium diameters	Medium to large diameters
Fouling or solids	Grid packing only	Generally more tolerant
Heat-sensitive products	Preferred, thanks to low pressure drop	Less suited

DISTRIBUTION

Liquid distributors and redistributors keep packed beds evenly wetted.

SUPPORT

Support plates, hold-down grids and bed limiters keep packing in place.

SEPARATION

Mesh-pad demisters, collectors and chimney trays for draws and entrainment control.

PROCESS DESIGN & ENGINEERING

DESIGNED AS A SYSTEM, BUILT AS ONE



FIG. 2.3 FEED AND PRODUCT STORAGE IS ENGINEERED TOGETHER WITH THE PROCESS UNITS

Our process engineers take a refinery or column project from first idea to construction drawings, and support revamps of existing units.

01 **Feed assay review & feasibility**

02 **Process simulation, heat & mass balance**

03 **PFDs, P&IDs and equipment sizing**

04 **Column hydraulics & internals selection**

05 **Detailed mechanical design**

VESSEL FABRICATION

BUILT IN GROUP WORKSHOPS

Columns, pressure vessels, reactors, heat exchangers and storage tanks are fabricated by our group company Shree Shakti Engg Works at its two manufacturing units in Gujarat, including U-stamp pressure vessels.

MATERIALS

- Carbon steel
- Stainless steels
- Alloy steels on request

INSPECTION

- Design to recognised codes
- Stage-wise QC
- Third-party inspection on request

LET'S TALK ABOUT YOUR PLANT

FROM A FEED SAMPLE TO A RUNNING PLANT.

Share your feedstock, the products you want and the capacity you have in mind. Our process team will come back with a technical route, a block flow diagram and the next steps.

01 · Send

Feed details

Feedstock type, source, analysis if available, and the volume you expect per day.

02 · Define

Target products

The grades or cuts you need, the quality they must meet, and site constraints.

03 · Receive

Technical proposal

Process route, equipment scope and an execution plan for your review.

DIVISION WEBSITE

hitorq.in

GROUP WEBSITE

www.specxtech.com

EMAIL

connect@specxtech.com

PHONE

+91 7600 12 1222

HiTorQ LUBRICANTS

HITORQ LUBRICANTS IS A DIVISION OF

SPECX TECHNOLOGIES

Xtending Engineering Possibilities

SPECX TECHNOLOGIES PVT. LTD. · PETROLEUM, CRUDE OIL & MIXED HYDROCARBON REFINERIES