

ENGINEERS INDIA LIMITED

A Total Technology & Engineering
Solutions Providing Organization



Always ahead of the competition



EIL IS COMMITTED TO CUSTOMERS

for delivering technical solutions with focused innovation



Engineers India Limited (EIL) is a Government of India organization primarily engaged in engineering, procurement, inspection, construction management and commissioning assistance for more than 45 years in hydrocarbon industry i.e. up-stream, mid-stream and down stream, non-ferrous metallurgy, power and infrastructure sector.

EIL R&D is an integral function of their business plan engaged in developing innovative solutions in hydrocarbon industry ever since 1970s. In the national market, EIL's designing capability can be judged from the fact that their designed refinery units refine more number of barrels of crude than any body else in the market.

Many efficiently running grass root refineries, petrochemical complexes and offshore installations are the testimony of EIL's capability to design, engineer and construct world class installations. Technologies developed through their R&D and licensed by EIL along with capability to engineer open art and licensed technology provide a clear edge to EIL over their competitors.

EIL operates from their head office in New Delhi and R&D centre in the satellite town of Gurgaon. EIL has a committed team of more than 3000 technically qualified engineers who are:

Trained to provide design, engineering, procurement, inspection, construction management and commissioning assistance services to customers across the industry.

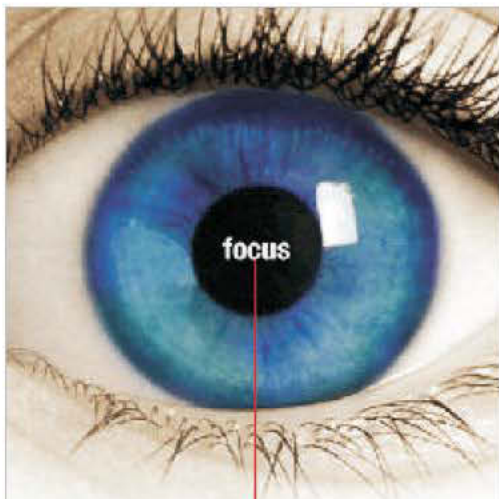
Engaged in R&D activities committed to develop innovative technologies keeping customers and environment in focus. Today, EIL through their R&D have been awarded 22 technology patents





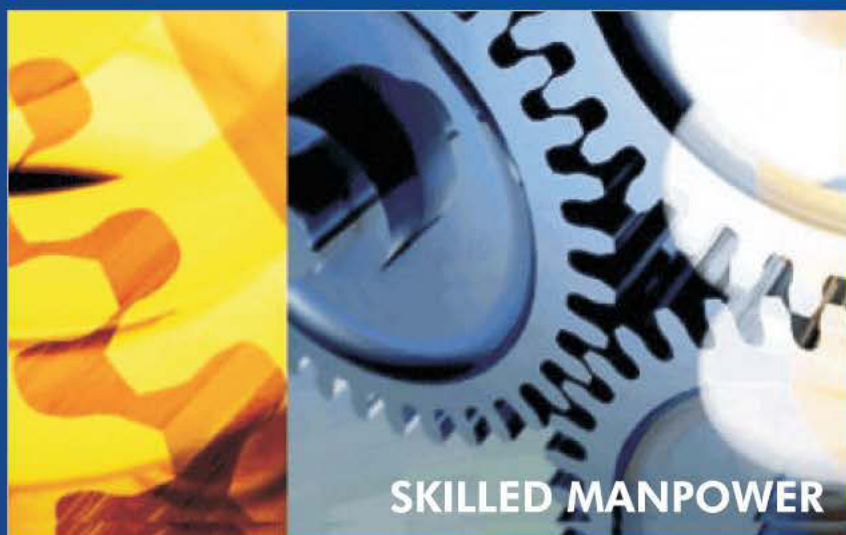
and more than 15 other patent applications are under evaluation. With a vision to become 'A world-class globally competitive EPC and total solutions consultancy organization', EIL is committed to provide best possible services and solutions to their clients world over. EIL through their R&D is also committed to serve the hydrocarbon industry with the most efficient and sustainable technologies.

EIL is Providing many Indigenous technologies by doing Active Research





EIL is still the Leader in Providing Engineering Solutions & Designs





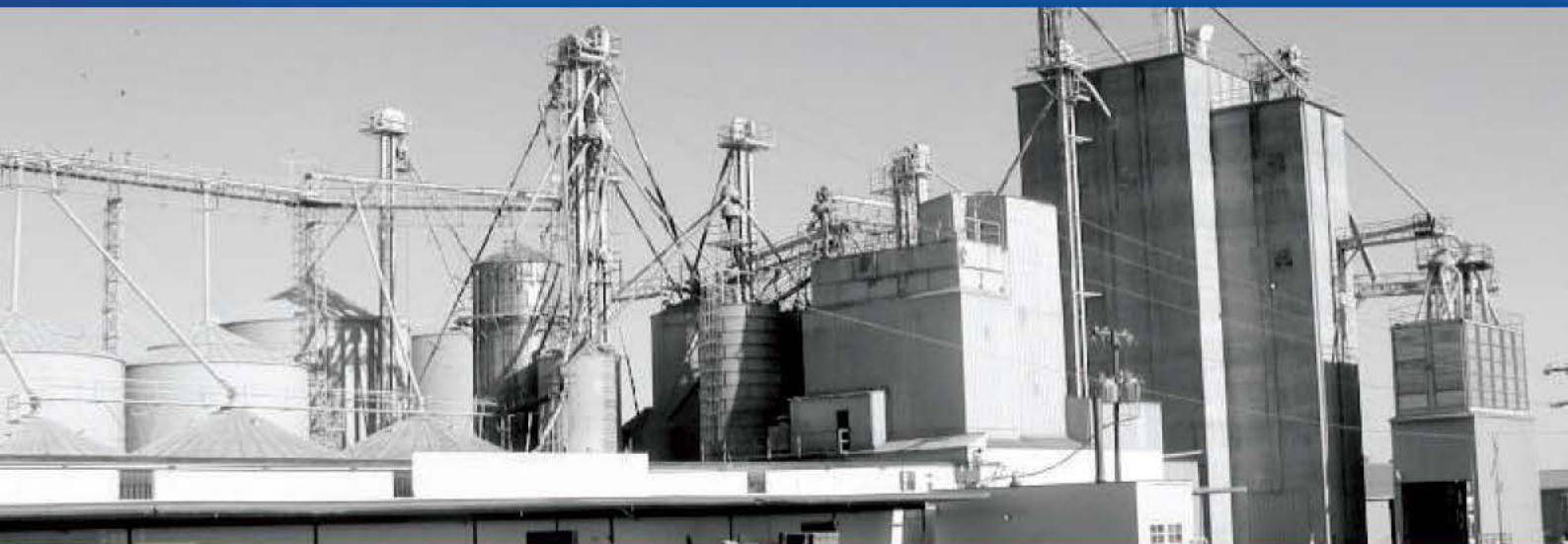
Technology that fits your needs CDU/ VDU Units from EIL

Crude and Vacuum Distillation Units (CDU/VDU) are the primary processing units of the refinery. Depending on the type of crude processed and processing objectives, different configurations like Stand-alone CDU, Stand-alone VDU or Integrated CDU & VDU options are available. The CDU/VDU units can be designed to process a range of crudes for higher operational flexibility. The different types of crudes like sweet/ sour, light/ heavy & Low TAN/ High TAN, can be processed either in blocked out mode or in admixture.

Latest detailed crude assay available for international crudes is used as base for prediction of distillate yield and properties. EIL also employs pinch technology and composite curve analysis for energy efficient design. The units designed compare well with the international benchmarks in terms of energy consumption per ton of crude processed.

EIL has an enormous experience both in terms of designing and revamping CDU/ VDU units. The capacities licensed include a unit of 11.0 MMTPA.





Meeting LPG Specifications is no more a problem, Use EIL Developed CFC Technology

Continuous Film Contactor (CFC) Technology developed jointly by EIL and IOCL R&D utilizes Caustic to remove primarily mercaptans and other extractable sulphur compounds complying stringent product specifications. The heart of the unit is a stainless steel fibre Module and a patented two stage distribution mechanism for efficient contacting between caustic and LPG.

EIL CFC Technology is a cost effective & energy efficient technology which has no dispersive energy requirements, no caustic carryover and reduced caustic/LPG ratio.

LPG product specifications met by CFC technology developed by EIL include Total Volatile Sulphur as <100 ppmw (excluding COS/CS₂ other non extractable Sulphur) H₂S as Nil, Mercaptan Sulphur as 5 ppmw max (for domestic purpose), Na+ as 1 ppmw (max), Copper strip corrosion is not worse than no. 1A at 38°C for 1 hour and Nil Free-water content. Unit capacity licensed includes 50 TPH unit.





For Propylene Recovery, need smart solution?

EIL offers Propylene Recovery unit

As a solution to the problem of losing valuable propylene feedstock during production, EIL offers PRU unit which also gives an opportunity to convert low-value C3/C4 by product to high value polymer grade propylene. Other benefits drawn are :

- Reduced incineration and flare requirements
- Significantly higher hydrocarbon recovery
- Minimized footprint and weight
- Does not create any secondary waste streams.

Propylene can be recovered in the following grades:

- Chemical Grade (95.5 wt% purity)
- Petrochemical Grade (99.5 wt% purity)

Based on requirement, conventional or vapor compression method can be employed for recovery.

EIL has designed several units with capacities ranging from 20,00 to 50,000 TPA of chemical grade propylene in India. EIL also offers modification of chemical grade PRU to a polymer grade PRU with minimum capital cost.



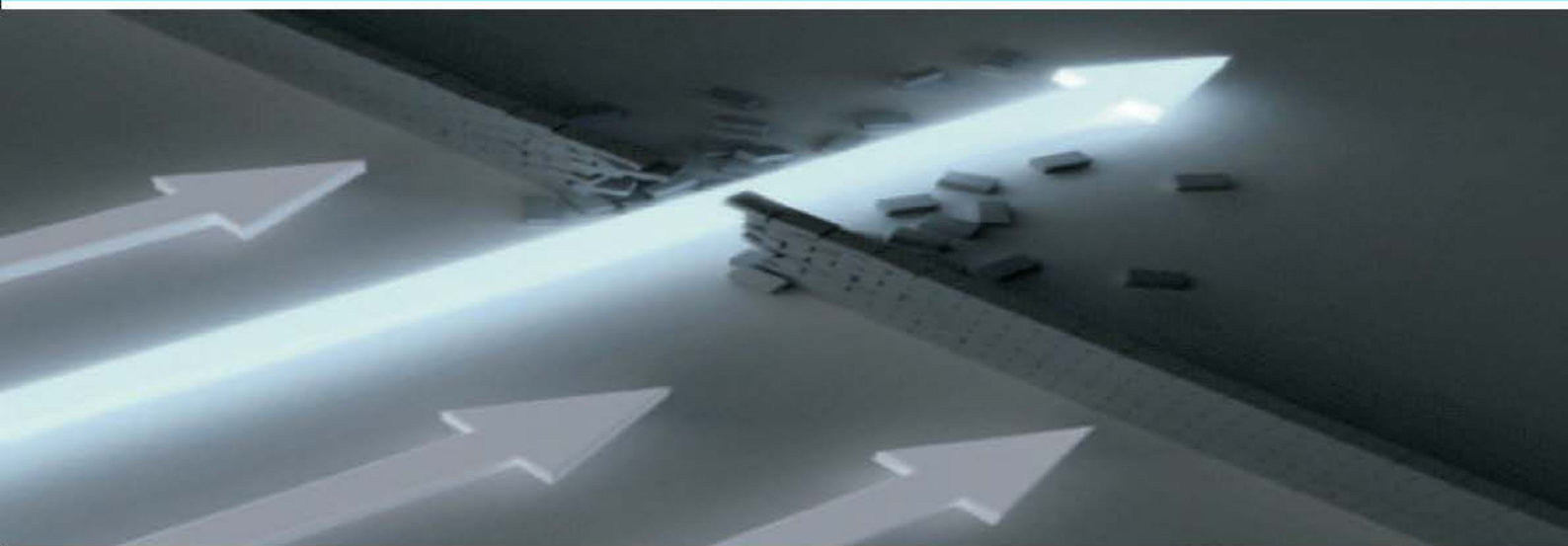


We are Proud of Our Aromatic Extraction Technology, Perfection is in our Genes

The Aromatics (Benzene, Toluene, Xylenes) extraction technology developed by EIL R&D and IIP, Dehradun is a highly efficient technology used for the extraction of high value petrochemicals from naphtha reformat stream. Sulfolane is used as solvent in this extraction process . This process can be essentially used to remove benzene from reformat in order to meet mandated specifications on gasoline composition. Features such as raffinate washing, better solvent recovery and recycling of solvent makes this technology unique in it's class.

This process commonly known as Sulfolane technology, when used for aromatic extraction of a feed with typical composition of 55+ wt% Aromatics for reformat and 70+ wt% Aromatics for Pyrolysis Gasoline, shall produce product Benzene meeting the nitration grade quality .

The technology has been licensed to BPCL's Mumbai and Kochi units each producing 100+KTPA of Benzene/Toluene products .



Stretching beyond the limits– Naphtha Isomerization Units by EIL

Worldwide lowering of sulfur levels in gasoline, limiting olefin and aromatic contents are the driving forces to introduce Naphtha Isomerization Units. With environmental concerns in mind, apart from alkylate, isomerate is the most attractive blend component.

Isomerization is the boosting of light gasoline streams by converting the n-paraffins to iso-paraffins of the same molecular weight in the presence of catalyst. The isomerate product is characterized by high octane number, ultra low sulfur, no olefins and no aromatics. This technology not only isomerizes C5/ C6 paraffins , but also saturates the benzenes in the feed in the same catalyst system.

EIL's technology has distinct advantages like maximization of liquid yield of isomerate product and octane gain across the unit, to meet gasoline pool requirement. The technology optimizes H_2/HC ratio to achieve desired activity, yields and catalyst life. The technology requires no expensive feed or hydrogen drying. The unit is suitable to handle varying feedstock quality and it significantly reduces the benzene content in the pool. Licensed capacity include a unit designed to produce 150000 TPA of isomerate to be used as blend component to the EURO III/ EURO IV Gasoline pool.





From CRUDE to FOOD

EIL offers Food Grade Hexane Technology

One of the footprint of crude extends to our food cycle also. Hexane is one of the Hydrocarbon solvents whose origin is petroleum. It has a very narrow boiling range of 63-70° C and is used in extraction of vegetable oils, oils from flower. FGH technology converts unsaturated compounds present in hexane stream obtained from Straight run Naphtha to saturated compounds in hydrogen environment in presence of catalysts.

EIL in technical collaboration with IOC-R&D offers FGH technology which has many benefits.

- Achieve very low benzene content (< 100 ppmw) in product
- Has longer catalyst life
- Spent catalyst from hydrogenation process can be disposed off from metal reclamation.

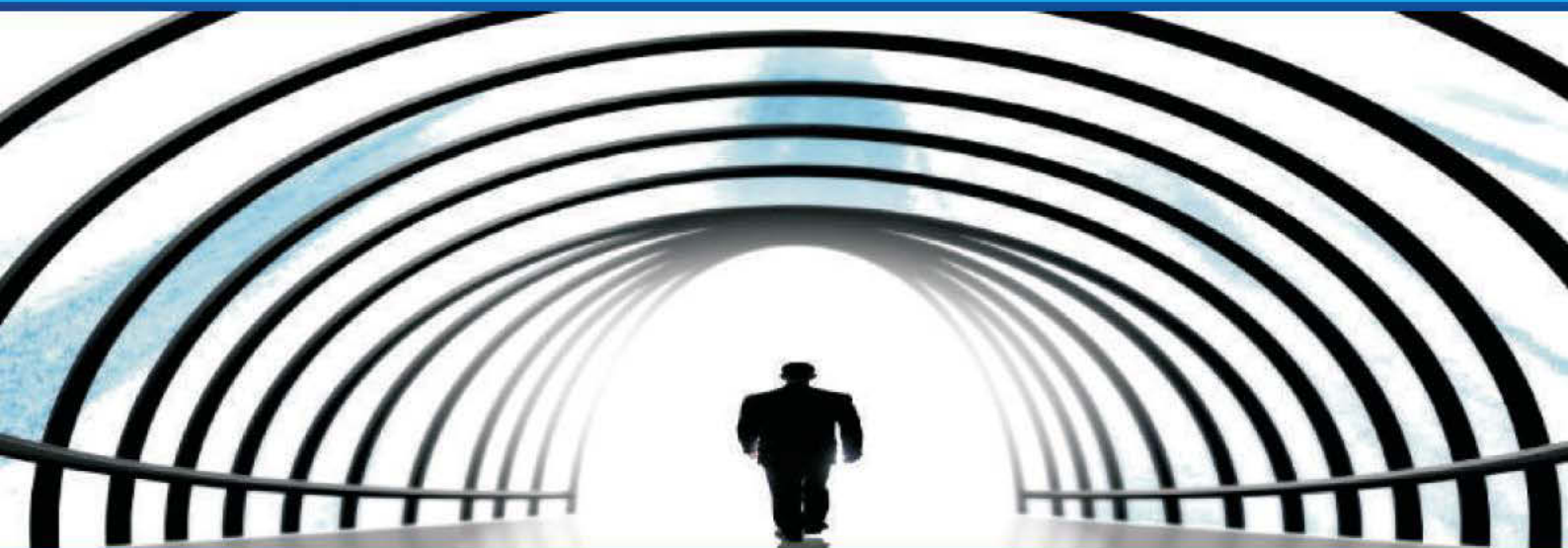


In pursuit of purity EIL's Diesel Hydrotreating Technology

One of the key areas of interest has been the reduction of sulfur in diesel fuel to very low levels. Hydrotreating of the diesel oil fractions is thus a common catalytic process in the layouts of petroleum refineries. The reactor is the main device determining the efficiency of this process and the depth of the raw stock conversion. The technical design should ensure the specified productivity and maintain the necessary heat exchange during the process and the level of catalyst activity.

EIL in technical collaboration with IOCL-R&D is offering an indigenously developed reactor design and proprietary internals. The technology is fit to achieve product sulfur specification of less than 35 ppmw. Successful commissioning of DHDT unit with a capacity of 1.5 MMTPA has been done at IOC-BGR.





Deep Desulfurization of Diesel and Gasoline by Reactive Adsorption Process (INDAdept)

Petroleum industry worldwide is facing the problem of reducing sulfur content in auto-fuels to meet stringent quality specifications from regulating authorities. Crude oil with higher sulfur content is being processed and the targets for sulfur in product gasoline and diesel have been receding continuously and have come down to the level of 10-50 ppm in many parts of the world.

IOCL & EIL R&D have jointly developed a process called INDAdeptG for removal of sulfur to produce ultra-low-sulfur gasoline at significantly lower pressure and lower hydrogen consumption in comparison to Hydrotreating processes and is based on low cost reactive adsorbents (having high porosity and surface area). The INDAdeptG process for gasoline desulfurization is capable of processing full range catalytic naphtha cuts (LCN/MCN/HCN) in a single step in contrast to other processes, which require multi-stage processing. The process conditions have been optimized so as to minimize olefin saturation and thereby limit RON loss to 2-3 units only, which is comparable to losses in other processes.

Lower hydrogen partial pressure requirement and negligible yield loss makes the technology attractive. A unit is being licensed to IOCL-Guwahati refinery.



In passionate pursuit of performance Choose Solvent Deasphalting technology from EIL

It is imperative to upgrade petroleum residues to recover valuable products and improve the overall economics of petroleum refining. Solvent Deasphalting technology has been jointly developed by EIL R&D and IIP, Dehradun. Large experimental database has been generated by carrying out bench-scale & pilot-plant runs on various feedstock. Today, EIL is in a position to offer both conventional as well as supercritical process technologies for solvent deasphalting. EIL's design considers various parameters like type of solvent, solvent to feed ratios, extractor internals & number of stages.

For making the design energy efficient, pinch technology is used in a conventional solvent recovery section. In a supercritical process besides having lower capital cost, it also offers the advantage of lower operating cost over conventional processes.

EIL has designed Solvent Deasphalting units of capacities varying from 60 to 72.5 tons/ day. One such unit has demonstrated the capability to run at super critical conditions and thus ensuring significant energy savings.





Want to stand out or be one in the crowd? Use Visbreaking Technology from EIL

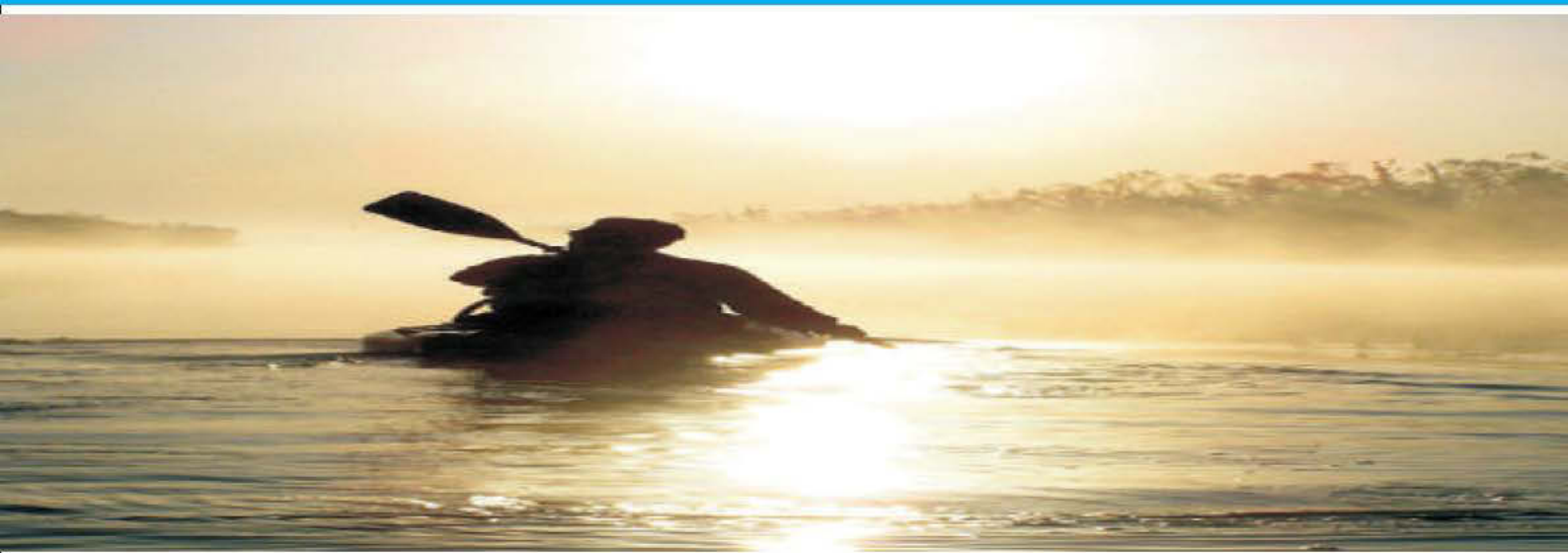
Atmospheric and vacuum residues are typically charged to Visbreaking unit to reduce fuel oil viscosity and increase distillate yield in the refinery.

The two basic parameters affecting the thermal cracking reactions are temperature and residence time. Two different configurations possible in the reaction section are :

- High temperature low residence time (Coil type)
- Low temperature high residence time (soaker type; with or without soaker internals)

EIL in collaboration with IIP, Dehradun offers design of both soaker and coil type VBU with unit capacities ranging from 0.4 to 1.6 MMTA.





Go with the flow - Adopt EIL's Lube Extraction Technology

Aromatic compounds have low viscosity index and hence are detrimental for production of lube oil base-stocks. Lube extraction, a solvent extraction process, is employed to remove aromatic components present in the feed. The feed to such unit is Vacuum gas oil obtained from VDU .

EIL offers lube extraction technology with both Furfural and NMP as the solvent. Elaborate experimental data base has been generated by carrying out experimental runs on various feedstock using different solvents. Optimization on various operating parameters like solvent to feed ratios, extractor internals and number of stages, and extractor operating conditions is done.

The highlights of the design is incorporation of pinch technology for achieving higher energy efficiency in solvent recovery section and ensuring minimum solvent loss. EIL has the capability to offer grass root units, revamp cases as well as conversion from Phenol extraction to better solvent, NMP.





It is time to change, select EIL's Delayed Coking Technology

The Delayed Coking Technology developed jointly by EIL R&D and IIP, Deharadun /IOCL-R&D utilizes Thermal Conversion process to upgrade heavy residue/bottom of barrel material into more valuable distillates/light liquid products. This technology with significant advanced features has made it possible to process heavier feedstock with increased throughput, improved safety, reduced environmental emission and enhanced overall reliability and flexibility of the delayed coking process. This technology has also emerged as a cost effective option to maximize distillate yield which can be easily integrated into an optimized refinery configuration .

The typical product yield from a Delayed Coker unit designed by EIL include LPG as 2-3wt%, Off gases as 5-6wt%, Gasoline as 10-16wt% LCGO as 25-35wt%, HCGO as 20-30wt% and Coke as 15-32wt% which depends upon unit recycle ratio and feed quality. Licensed capacity includes a 0.5 MMTPA unit.





Paving the way forward – Bitumen Blowing Units by EIL

Asphaltic bitumen, normally called "bitumen" is obtained by vacuum distillation or vacuum flashing of an atmospheric residue. This is "straight run" bitumen. The grade of the bitumen depends on the amount of volatile material that remains in the product: the smaller the amount of volatiles, the harder the residual bitumen.

EIL provides a technology which is based on air blowing in converters with air spargers. The plant design and its operating parameters are optimized based on the quality of feedstock to be processed in the unit and the quality/ grades of bitumen required to be produced. This is done on the basis of pilot plant studies using samples of actual feedstock to be processed. The main product from the unit is paving grade bitumen. It is possible to produce various grades of paving bitumen in the unit depending on market demand.

EIL has experience of designing, engineering, and execution of several grass root as well as revamp BBU. A feather in the hat is a unit designed for a Middle-East client after extensive pilot plant studies for economic and feasible route for an uncommon feedstock.





We are different from the competition Use EIL developed Solvent dewaxing/ deoiling technology

SOLVENT DEWAXING/ DEOILING technology has been developed by EIL R&D along with IIP, Dehradun utilizing the huge database collected through extensive experimental runs. This technology also provides the benefit of optimized operating cost due to adoption of incremental dilution/ delayed dilution scheme. This unit design is also optimized on several operating parameters like type of solvent, chilling rate, solvent to feed ratio, filtration stages and rate. The design also ensures uniform solvent composition throughout the operation.

EIL has designed & revamped Dewaxing/ Deoiling units with capacities varying from 50,00 TPA to 270,000 TPA. The units designed also incorporate energy efficiency practices like Pinch technology.



Stay **ONE STEP AHEAD** with **EIL's Sulfur Management solutions**

In the present scenario, when the crude oil prices are soaring, demand for oil with higher sulfur content is increasing. On the other hand, recent environmental concerns demand lower sulfur content in the motor fuels. These regulations in turn require operators to optimize and debottleneck their existing units.

EIL is ready with a total solution package, in terms of providing Modified Claus process technology, engineering design and revamp. EIL has a tie up with M/s Jacobs for sub-dew point technology for Modified Claus unit. Train capacity of 180 TPD has been implemented.





Is Environment pollution bothering you? Use EIL developed TGTU for Sulfur removal

Claus Tail Gas Treating (TGTU) process developed by EIL R&D to effectively remove Sulfur by recycling unreacted Sulfur components like H_2S , SO_2 , COS , Sulfur as H_2S to Claus section after Hydrogenation. This unit is useful to medium and high capacity sulfur units.

Claus process integrated with tail gas treating unit can result in 99.9% removal of Sulphur from acid & sour gases coming from amine regeneration & sour water stripper units in the refinery. With environmental quality standards getting stringent especially in terms of sulfur components, tail gas treating unit is need of the hour.



Looking for an efficient Sulfur recovery unit EIL provides Oxygen Enrichment Technology

Oxygen Enrichment Process increases the capacity of SRU by minimizing nitrogen content in process air and improves overall sulfur recovery. Source of Oxygen for the process could be Liquid Oxygen or Oxygen rich waste gases from nitrogen plant.

Oxygen Enrichment technology has been jointly developed by EIL-R&D and CPCL. Advantages of the technology include Increased capacity (by 22-30%), no major hardware modification, low cost option for enhancing SRU capacity, improvement in MCC temperature, stable flame even at Lean acid gas & low backpressure in the unit.





Prevent the world from global warming by capturing CO₂ from flue gas by IIP-EIL Process.

The world energy demand increases at a rate of 10-15% every 10 years. It results in rise of CO₂ emissions and it is expected to rise by 50% by 2030 in comparison to current CO₂ emission levels. Industries, due to stringent environmental norms, are under pressure and thus adopting various technologies to control emission. CO₂ capture from gaseous mixture is done by means of liquid absorbent. Removal of CO₂ by liquid absorbent is widely implemented in the field of gas processing, chemical production and coal gasification.

CO₂ Removal Process(COR Process) jointly developed by Indian Institute of Petroleum (IIP), Dehradun and EIL uses highly selective amine-based solvent to capture CO₂ from flue gases. Solvent is both thermally and chemically stable and produces minimum heat stable salt. High CO₂ loading makes the process economically attractive. The CO₂ removal efficiency of COR Process ranges from 75%-90%+. Highly pure CO₂ produced by this process can be used for production of urea in fertilizer industry.

EIL provides total design solution for grass root COR Plant along with ancillary equipments including water removal tower, Blower, Absorber & Regenerator .



Bask in the sunshine and enjoy cleaner atmosphere with SO₂ Removal Process

Petroleum refineries, thermal power-plants, sulfide smelters, and other SO₂ emitting industries world-wide are under increasing regulatory pressure to reduce sulfur emissions. Regenerative liquid phase absorption technologies are increasingly finding favor for SO₂ removal and recovery. Recent developments in such adsorption technologies have made SO₂ removal methods viable for applications involving flue gases generated from high sulfur fuels, and in general for flue gases with high SO₂ concentration.

SO₂ Removal Process (SOR) has been jointly developed by Indian Institute of Petroleum (IIP) & EIL for flue gas desulfurization. The process can handle SO₂ concentrations varying from 2000 ppmv to as high as 20 vol%, and produces a treated gas stream with less than 500 ppmv SO₂ concentration. Process is economical as it is regenerative in nature and is also highly energy efficient. Process uses a highly stable amine solvent which makes the operation smoother. The process can very well be integrated with a Claus unit where SO₂ can be used to enhance capacity of SRU. EIL provides total design solution for SOR Process.





Walk towards a cleaner future with Ammonia treating process technology from EIL

Stringent environmental norms are pushing refiners to minimize emissions of pollutants like SO_x and NO_x . Refinery sour water gases contains huge amount of ammonia (NH_3) which gets transferred with H_2S to SRU. High temperature in SRU MCC is required for ammonia destruction which in turn increases NO_x formation and also forms ammonium salts resulting in backpressure in the unit due to choking of condenser tubes.

Ammonia Treating Process (ATP) is developed by EIL to separate and process ammonia from sour water stripper (SWS) gas. The technology uses sulfuric acid to scrub ammonia from sour gases forming ammonium sulfate. The technology offers multifold advantages in form of enhanced capacity & less backpressure to SRU unit ensuring smooth and trouble free operation. Reduction in NO_x formation helps keeping the total emissions in check. In addition, a value added product in form of ammonium sulfate is recovered which can be used as fertilizer.

EIL has done rigorous experiments on bench scale level and has a comprehensive set of data available. EIL with its experience as SRU licensor has potential to offer ammonia treating process in refineries.



Breathe Easy

Breathe Cleaner air - Use EIL developed Vapor recovery and VOC capture technologies

Hydrocarbon vapor loss to atmosphere from the storage tanks not only pollutes the environment but is also a reason for major inventory loss in hydrocarbon installations. The tighter pollution norms have also forced the owners to adopt vapor absorption systems meeting statutory requirements.

EIL has developed an efficient technology to capture and recover hydrocarbon vapors using activated carbon. The vapor recovery units have been designed for all types of hydrocarbons including benzene. EIL's carbon absorption vapor recovery units safely prevent harmful volatile organic compounds (VOCs) from being released into the atmosphere during operations that involve the transfer of evaporative hydrocarbons. The recovery of hydrocarbons that would otherwise be wasted via a combustion process, delivers a significant return on investment while meeting any known worldwide emission standards.

The units have been designed considering absorption and recovery efficiency, safety and cost to the client. The designs are available in both skid and non-skid versions.





Make a positive change in the environment with Spent Caustic Treatment units from EIL

Spent Caustic Treatment unit is based on catalytic oxidation of spent caustic consisting of mainly sodium carbonate, sodium sulfide and sodium hydroxide. Chemical Oxygen Demand (COD) of such stream is very high and pH is in range of between 12 to 14. The characteristic of spent caustic varies greatly from one refinery to other. EIL design considers all the influencing factors such as source of crude oil, the refining process employed and the emission regulation which may affect the quality and quantity of spent caustic.

EIL designs these units with distinct features as ability of handling high sulfide concentration in the feed. In addition to this, almost 50% of sulfide reaction is achieved before feed enters the oxidation reactor. The overall conversion achieved at the outlet of oxidation reactor is as high as 99.8%.

The process used is found to be economical and environment friendly when compared with other technologies using chemical oxidation with H_2O_2 or wet air oxidation using patented process. The installed capacities include a unit of 5 m³/h .



Sour Water Stripper units from EIL

Sour water, generated in various refinery processes, primarily contains hydrogen sulfide and ammonia with traces of cyanides, phenols and hydrocarbons. Due to their poisonous and adverse effects to human life and environment, Sour water stripper units are provided. The Sour water stripper unit is used to strip off the H_2S and NH_3 components before routing to downstream user or wastewater treatment plant and hence meet the environmental regulations (MINAS standard).

EIL can offer two configurations for these units: single stage sour water stripper and a two stage sour water stripper. Single stage sour water stripper, generally used for sour waters containing comparatively a lower H_2S/NH_3 in the feed. In such systems sour water streams from various sources are mixed and has a single column for stripping. The overhead gases are routed to the SRU feed. The two-stage configuration is for feed typically from a Hydrotreating facility and two stage is often used to restrict the ammonia quantity in SRU feed.

Many units for single and two stage sour water stripper units have been designed by EIL and are in operation. The capacities range from 10 m_3/hr to more than 80 m_3/hr .





Increase your Green savings C_2/C_3 Recovery from LNG

With LNG trading/ cargo shipments substituting or supplementing the natural gas usage in economies like India, it has become attractive to recover the C_2+ components from LNG. C_2/C_3 being the feedstock for ethylene and propylene production are valuable products. The advantage LNG feed offers over Natural Gas is that the cold or low temperatures required for the C_1 - C_2 separation are already available in the feed.

EIL offers energy efficient designs for such plants and need for refrigeration compressor is avoided in comparison to conventional systems. The units designed by EIL boast of maximum cold recovery. In addition to minimum energy consumption, the other benefits are lesser capital cost as sweetening unit and gas drying unit are not required in this case.

Recovery of almost 99.9% of C_4 and 99.5% of C_3 components shows the process efficiency and design excellence. The overall C_2+ recovery is upward of 96.5%. In terms of purity, 95% can be achieved for all C_2 , C_3 & C_4 components.



Get more from us with Condensate fractionation units

Condensation Fractionation unit is a process which separates predominantly C_4 & heavier hydrocarbons from a high pressure vapor liquid mixture. The sour gas from well fluid coming through pipeline comes to CFU and associated condensate is separated.

A typical CFU comes with stripper column to separate the lighters (Methane, Ethane and a part of Propane along with H_2S and CO_2) from heavier components. A Gas Sweetening Unit (GSU) for removal of H_2S and CO_2 is also present and product from GSU is sent for C_2/C_3 recovery. The heavier components from stripper column bottom are then fractionated to recover LPG and Naphtha.

EIL has capabilities of delivering the most stringent of product specifications for LPG, Naphtha and Off-gas. The installed capacities include a 65 TPH CFU.



If you have problem in reconciling your plant data, EIL has the solution - use RAGE

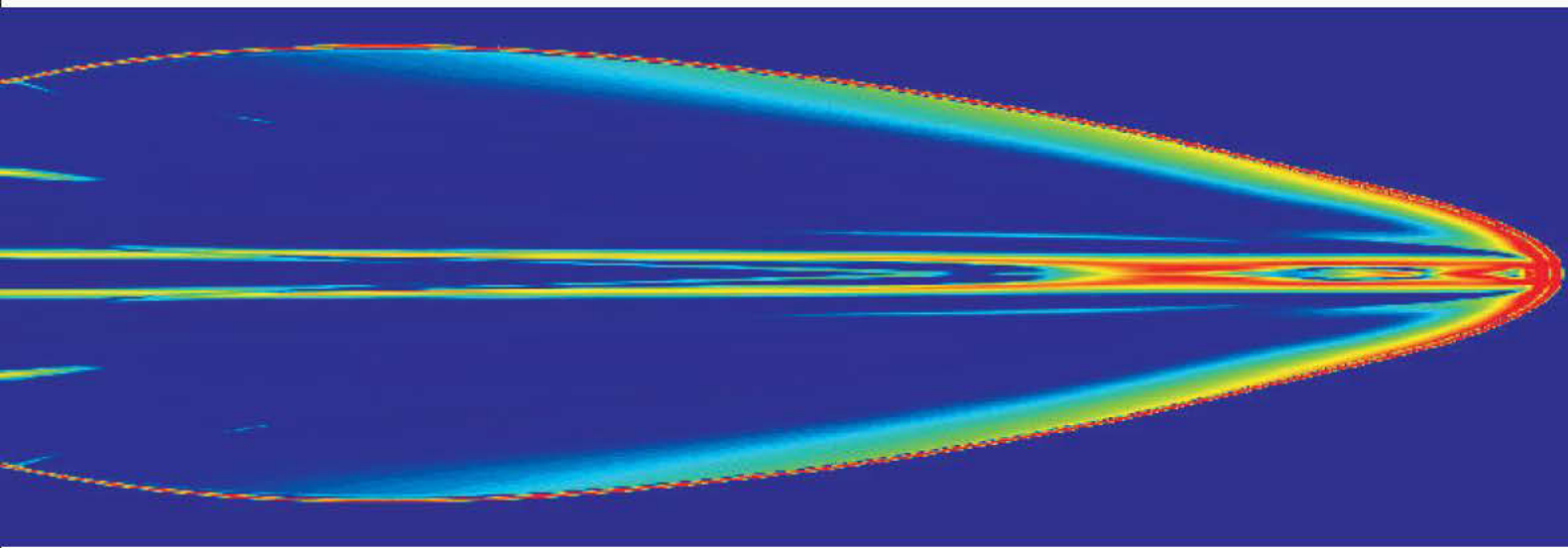
Reconciliation and Gross Error Elimination (RAGE) is the result of innovative approach of EIL to develop solutions to long standing problem of data reconciliation in the plant environment. This software has been developed to resolve the inconsistencies between real time process data and the known material and energy balance relations. It also identifies measurements which have biases or gross errors and corrects them.

RAGE software has been developed after rigorous field testing and has been validated for various refinery units, petrochemical units and metallurgical processes. Some of the examples include crude units in refinery, BTX and Cold Box in petrochemical plants and leaching in mineral processing units.

Features :

- State of the art mathematical techniques.
- Suitable for both online and offline applications.
- User friendly input format
- Module library with process models such as heat exchanger, mixer, heater etc available.
- RAGE software is supported on all PC configurations.



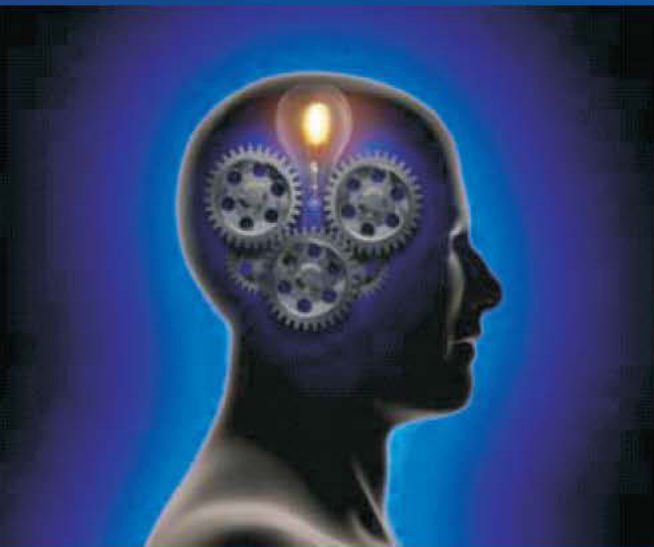


If you have serious design issues – utilise EIL's expertise in Computational Fluid Dynamics

Computational Fluid Dynamics (CFD) capabilities developed by EIL are being extensively used in the industry for :

- Validation of Combustion Air Manifold design for multi-burner fired heaters
- Analysis of hot gas passage over helidecks of offshore platforms
- Troubleshooting problems related to flow / heat transfer eg. For checking adequacy of Shut Down System in the calandria of a Pressurized Heavy Water Reactor (PHWR)
- CFD capability being extended to multiphase flows such as in Trickle Bed Reactor (TBR) and Slurry Bubble Column Reactor (SBCR) through collaborative development projects with IIT, Delhi and IOCL (R&D)





- INNOVATIVE
- PERFORMANCE
BASED
- SETTING INDUSTRY
STANDARDS





High Capacity packing - PARLPAK structured packing

In refinery and chemical industries, distillation has always been the most important process for bulk separation and would continue to remain so, even though it is a highly energy intensive process. In a typical refinery, distillation processes consume 30-40% of the process energy which is 6-8% of the crude throughput.

An increase in separation efficiency, achieved by installing PARLPAK in distillation column results in reduction of liquid and vapour flow rates through the column to meet same separation objective, which in turn reduces energy requirement in the reboiler. In addition to energy saving, other potential advantages are increased column capacity, higher product purity and reduced pressure drop in vacuum applications. Compared to other structured packing, PARLPAK offers 10% higher capacity and corresponding reduction in pressure drop. A typical analysis shows that if a crude vacuum column is revamped by replacing trays with PARLPAK, about 20% saving in reboiler energy is achieved which is around 2% higher compared to other structured packing. PARLPAK is competitive and even superior in certain cases to other commercially available structured packing.





Solutions for Hydroprocessing reactors- Reactor Internals

Diesel Hydrotreating is a major thrust area today with legislations enforcing low sulfur product diesel specifications for meeting environmental norms on fuel emissions. To meet the stringent transportation fuels spec, it is very much essential to improve the reactor performance further by enhancing the distribution of reactants uniformly over the ever increasing highly active catalyst surface in packed bed. EIL has developed a novel chimney type distributor having concentric gas & liquid riser pipe and associated with bottom attachment for efficient secondary distribution of the fluids. Along with the distributor trays design methodology for other reactor internal like inlet diffuser, the quench box (quench pipe, spillways, and mixing chamber), catalyst support grid, and outlet collector box also have been developed and evaluated at various sizes of cold flow reactors placed at EIL R&D center (upto 1.2 m dia col).

The novel design of internals has also resulted to achieve food grade hexane specification in Gujarat refinery (commissioned in 2002) and currently being implemented in FGH reactor for HMEL, Bhatinda.



If Energy is your concern, we have the solutions

GLASS AIR PRE-HEATER

Glass air preheaters are employed for low temperature heat recovery from flue gas and to achieve the targeted efficiency above 90%.

Composite Cast & Glass APH is frequently used to bring the flue gas temperature close to dew point of flue gas, thereby, avoiding problems of acid corrosion arising due to flue gas condensation.

Glass air preheater was developed by EIL in mid 90's along with APH supplier. A prototype glass APH was fabricated and heat transfer correlations were developed which were validated and tested for entire range of operation.

Till date, more than 40 glass air preheaters have been supplied to various installations both in India and overseas.





Fired Heater/ furnace enhancements developed and commercialized by EIL

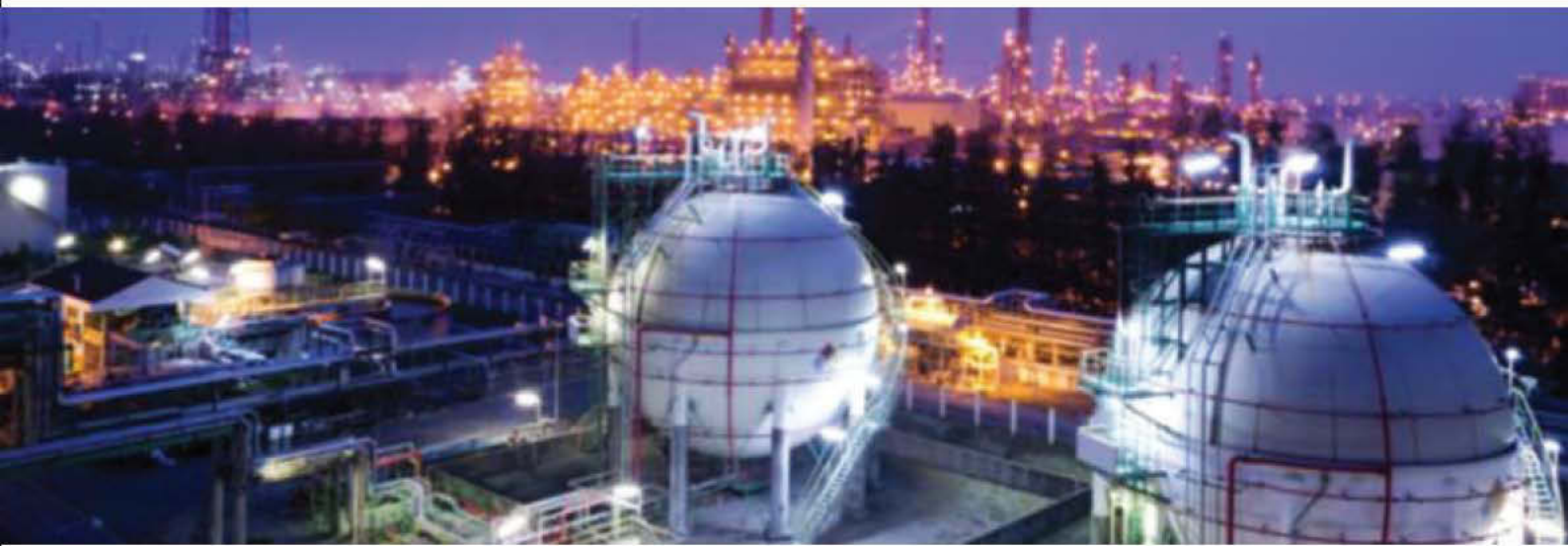
GLASS WINDOW PEEPHOLE OF FIRED HEATER

This device has been developed by EIL for safe view of the burner operation during startup and normal operation. This unit prevents ingress of cold air through conventional type peepholes.

These are being used in all fired heaters designed by EIL and has won the NPMP award for design excellence.

IGNITORS

EIL have patented a better performing low cost device for safe startup of furnace which is available in fixed as well as portable design. These have been supplied to various installations both in India and overseas.



Energy savings through hardware designs

ENERGY EFFICIENT STEAM TRAPS

Highly efficient steam trap design patented by EIL has none to match internationally. This steam trap design takes advantage of thermodynamic-cum-impulse type together to save dollars for the client.

STEAM-JET EJECTOR

Steam-jet ejector developed by EIL is an energy efficient ejector design which is capable of generating vacuum up to 5 mm of Hg.







Delivering Excellence Through People

Are you experiencing any Problem in
hydrocarbon handling or
processing



EIL HAS A SOLUTION

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