

Guide for a Foreign Company To Set Up a Medium / Small Chemical Industry in India

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Ergo Engineers Private Limited

DESIGN | ENGINEERING | SUPPLY | COMMISSIONING

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Identifying the product

Product type – Commodity or Niche

- Commodity products
 - Higher sales volumes, Lower margins
 - More market driven, less differentiation among competitors
 - Capital and operational investments higher
 - Market penetration easier
 - Buyers willing to entertain a new supplier
 - Barriers – capital costs, economies of scale, technology
- Niche or Specialty products
 - Command higher margins
 - Difficult sales conversion
 - Converted buyers usually stay long-time customers
 - Barriers - research and development, marketing for product penetration

Common commodity chemicals	Common specialty chemicals
Inorganic acids	Pesticides
Fertilizers	Pigments
Chlor-alkali products (caustic soda, HCl, chlorine, etc.)	Paints and coatings
Petrochemicals (ethylene oxide, propylene, ethylene, PET, glycols, formaldehyde, benzene, xylene, Phthalates, maleic anhydride, etc.)	Adhesives and sealants
Polymers (PVC, PE, PP, etc.)	Pharmaceuticals and APIs
Organic resins (epoxy, polyester, alkyd, CNSL, PF, MF, UF, etc.)	Dyes and intermediates
Gases (hydrogen, nitrogen, carbondioxide, oxygen, etc.)	Catalysts
Inorganics (sodium metabisulphite, sodium sulphate, ammonia, soda ash, carbon disulphide, etc.)	Flavours and fragrances
Acrylic, styrene, synthetic rubber based emulsions	
Surfactants and emulsifiers	
Industrial solvents (toluene, acetone, IPA, methanol, MDC, etc.)	
Bio products (ethanol, citric acid, organic acids, etc.)	

Identifying the Product - Target Customers

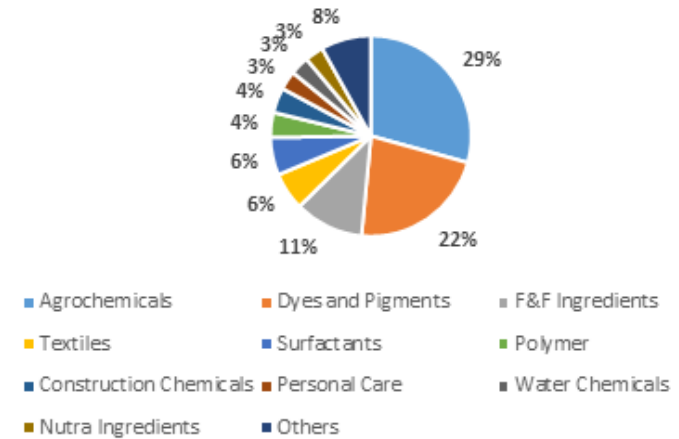
Potential Target Customers

- Other manufacturers
- Importers
- Distributors
- Retailers
- Consumers
- Institutions like government, etc.

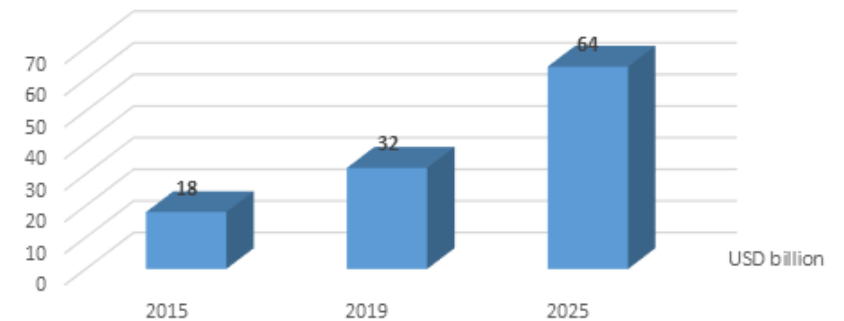
Each set of customers will give:

- Different margins; Different payment cycles
- Product and packaging requirements
- Sales volumes
- After-sales service requirements

Indian Specialty Chemicals - By Segment (%)



Indian Specialty Chemicals Industry Size



Source: <https://adityatrading.in/posts/specialty-chemicals-industry-research-report/>

Identifying the Product – Some key points

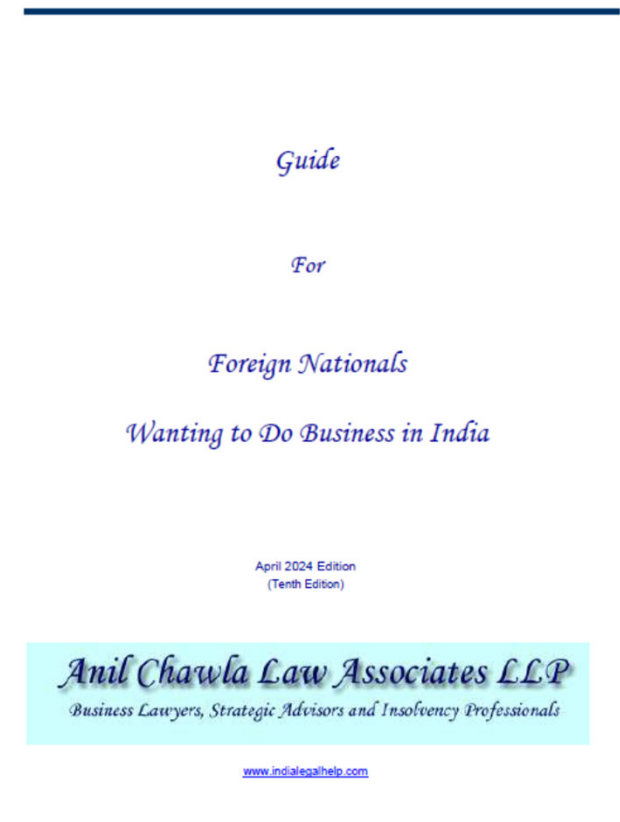
- Identify demand-supply gap
 - Example - India manufactures surplus sulfuric acid and exports huge quantities; viability of new plant will be tough although sulfur is available from refineries.
- Unique Selling Proposition (USP)
 - Necessary to have a USP either by means of better raw material availability, better distribution network, branding and marketing or improvement in product or new revolutionary product features.
- Identify the size of market
 - A fast-growing and large market could accommodate a new player more easily.
- Business model based on market research
 - Research should study target customers, payment cycles, financial requirements, growth projections, branding and estimated market penetration.

Chemical type	Size Indian market USD Billion	Annual Growth %
Inorganic acids	40.92	6%
Fertilizers	41.2	6.10%
Chlor-alkali products (caustic soda, HCl, chlorine, etc.)	4.34	3.56%
Petrochemicals (ethylene oxide, propylene, ethylene, PET, glycols, formaldehyde, benzene, xylene, Phthalates, maleic anhydride, etc.)	220	16%
Polymers (PVC, PE, PP, etc.)	19.6	6.10%
Organic resins (epoxy, polyester, alkyd, CNSL, PF, MF, UF, etc.)	1.5	7.10%
Gases (hydrogen, nitrogen, carbondioxide, oxygen, etc.)	3.6	7.12%
Inorganics (sodium metabisulphite, sodium sulphate, ammonia, soda ash, carbon disulphide, etc.)	44.6	5.80%
Acrylic, styrene, synthetic rubber based emulsions	10.11	8.65%
Surfactants and emulsifiers	2.48	9.30%
Industrial solvents (toluene, acetone, IPA, methanol, MDC, etc.)	1.54	4.35%
Bio products (ethanol, citric acid, organic acids, etc.)	1.5	15%
Pesticides	245.2	6.10%
Pigments	2.76	5%
Paints and coatings	13.41	9.38%
Adhesives and sealants	2.155	5.12%
Pharmaceuticals and APIs	65	12.40%
Dyes and intermediates	4.4	5.60%
Catalysts	0.6	6.10%
Flavours and fragrances	1.795	7.70%

Source: Collated from various websites

Legal Formalities - Initial

- Decide whether to go alone or with a local partner
 - India is a complex market. A local partner can help you understand the market and can be great help in dealing with local authorities.
- Decide and set up the form of legal entity
 - Private limited company, public limited company or Limited liability partnership firm are the three options.
- Decide the state where you wish to set up
 - Each state is very different. Please consider – availability of land, cost of land, availability of raw materials, availability of water, electricity supply situation, access to market, distance from port, state level industrial policy, ease of doing business, local labor situation.
- Get necessary registrations with tax authorities
 - Two most important registrations are – Permanent Account No. (PAN) and Goods and Service Tax (GST) Identification No.



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Please refer to the above Guide for Foreign Nationals Wanting to Do Business in India published by our sister concern
https://www.indialegalhelp.com/files/doing_business_india.pdf

Research and Development

R&D is conducted for either Product Development or Process Development. The three possible routes for R&D are as follows:

- Literature survey
 - Searching through published information can lead to valuable and useful information.
- Collaboration with University / Laboratory
 - Some reputed research institutes in chemical activities are : Council for Scientific & Industrial Research (CSIR); Indian Institute of Science, Indian Institutes of Technology, Institute of Chemical Technology, Mumbai.
- In-house Laboratory
 - This is expensive and most MSME units can afford only a very small facility.

Ergo Engineers Pvt. Ltd. can assist you with each of the above.

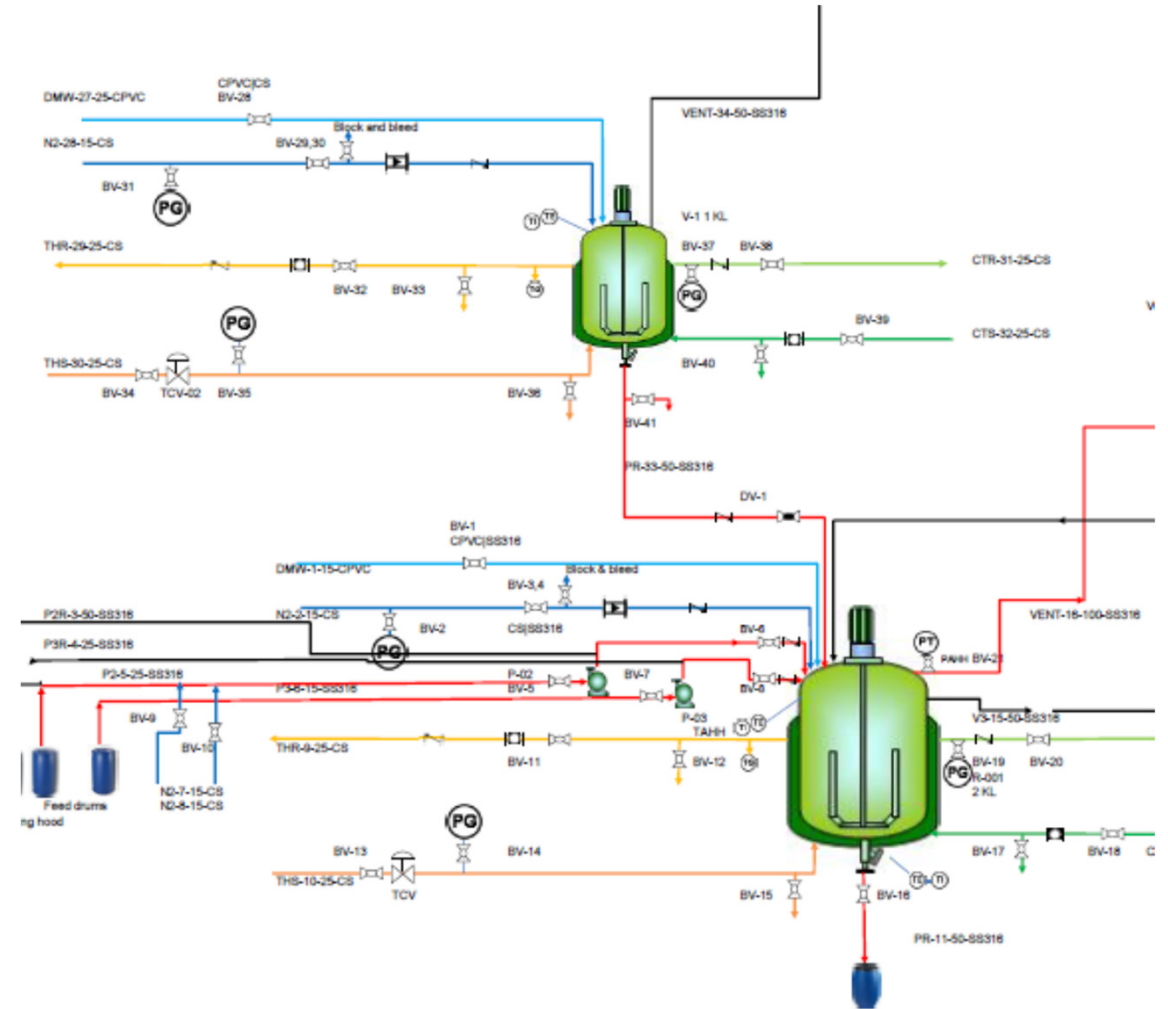


Basic Engineering

Based on the R&D output, Basic Engineering is carried out which involves the following:

- Process flow diagram (PFD)
- Equipment list including equipment sizing and basic specifications
- Utility list including sizing and basic specifications.
- Basic piping & instrumentation diagram (P&ID)
- Plant layout including estimation of land requirement
- Process Hazard Analysis and HAZOP (Discussed in next slide).
- After HAZOP HS-3, all the above are finalized
- Detailed bill of materials for civil, plant & machinery and electricals including cost estimates (likely to be $\pm 15\%$ of actual costs)

Ergo Engineers Pvt. Ltd. can assist you with each of the above.



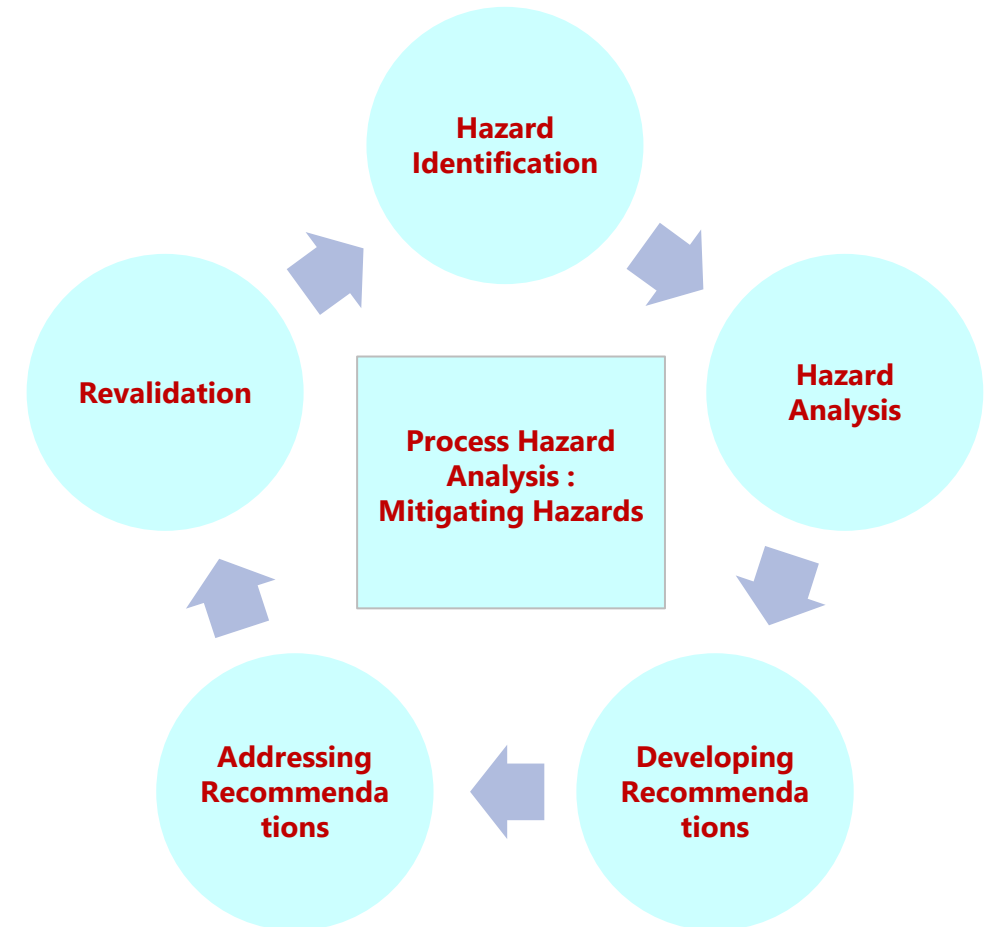
PHA and HAZOP

- **Process Hazard Analysis (PHA)**

- Process is reviewed to identify potential hazards and quantify the associated risks to avoid any catastrophic events like explosion, fire, toxic chemical release.

- **Hazard Operability Study (HAZOP)**

- It is one of the tools of PHA wherein process is extensively reviewed by means of deviations that may occur from normal operations in order to identify checks and balances to avoid those deviations or mitigate risks if occurred. The whole study is done in 6 stages.
- To conduct HAZOP, EEPL usually forms a hazard study team of experts of key areas like production, project management, R&D, process engineering, mechanical engineering, electrical and instrumentation engineering.



Ergo Engineers Pvt. Ltd. can assist you with each of the above.

HAZOP at Planning Stage

- **Hazard Study 0**

- Includes project definition, process description, control philosophy, incident review, inherent environment health and safety measures, material hazards identification, integrated pollution prevention and control, external approval requirements, review of design guidelines and codes, organization, transportation, emergency facilities and requirement of further studies.

- **HAZCON**

- Includes review of construction and demolition hazards

- **Hazard Study 1**

- Includes assessment of hazards due to interaction of chemicals among themselves and with different materials of construction, objective is safe handling and storage of chemicals and identifying right material of construction

Ergo Engineers Pvt. Ltd. can assist you with each of the above.



Image courtesy: TSM TheSafetyMaster Pvt Limited

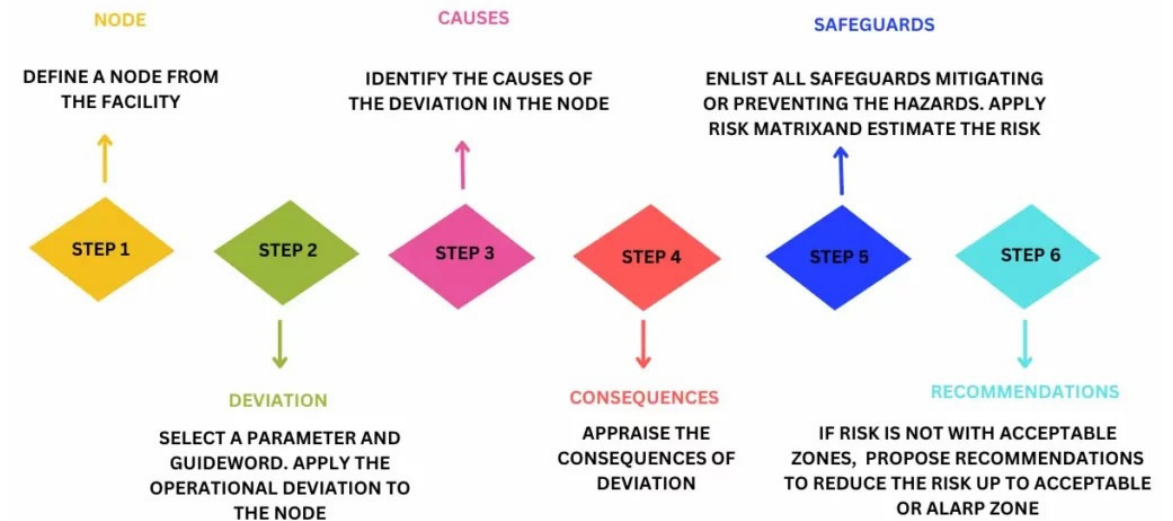
HAZOP at Planning Stage (Contd.)

- **Hazard Study 2**

- Identifies potential hazardous situation or event, how it was caused, its immediate and ultimate consequences, method for prevention or correction and emergency measures to be taken based on which final actions to be implemented are assigned to respective personnel of the study team.

- **Hazard Study 3**

- Each step of the process is identified as a node and during that step all the possible deviations that might occur are brainstormed by the study team to identify hazards associated with deviations in process parameters that might occur during operations, identify how they were caused, its effect or hazard, preventive and corrective action to be taken and the actions required being tagged to the concerned person who has to implement the actions.
- HS4 is conducted after erection and commissioning. HS5 is conducted before start of production and HS6 is conducted six to twelve months after start of production.



Ergo Engineers Pvt. Ltd. can assist you with each of the above.

Techno-economic Feasibility Report

After Basic Engineering preparation of detailed project report giving complete financials including

- Land cost
 - Civil construction cost
 - Plant and machinery cost
 - Means of finance
 - Materials cost and finished goods selling price
 - Interest and schedule of repayment
 - Variable expenses
 - Fixed expenses
 - Projected profitability statement
 - Projected balance sheets
 - Projected cash flow statements
- Gives complete picture about project viability
 - Necessary for funding either through debt or VC or angel investor

Ergo Engineers Pvt. Ltd. can prepare a Techno-economic Feasibility Report for you.

TECHNO ECONOMIC FEASIBILITY & PROJECT REPORT

FOR

**A Unit to Manufacture Xxxxxx Xxxxx
XXXXX Capacity - xxxxx**

Submitted to
MP Industrial Development Corporation Ltd.

XXX XXX Pvt. Ltd.

Registered Office: xxxxx,
xxxxxx xxxxx, xxxxxx - xxx 001
Factory: Plot No. xxx, Sector xxx,
Industrial Area, xxxxx, Dist. xxx (xxxx)

Ergo Engineers

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Land and Related Matters

Land for a small / medium chemical plant can be acquired from the following two sources:

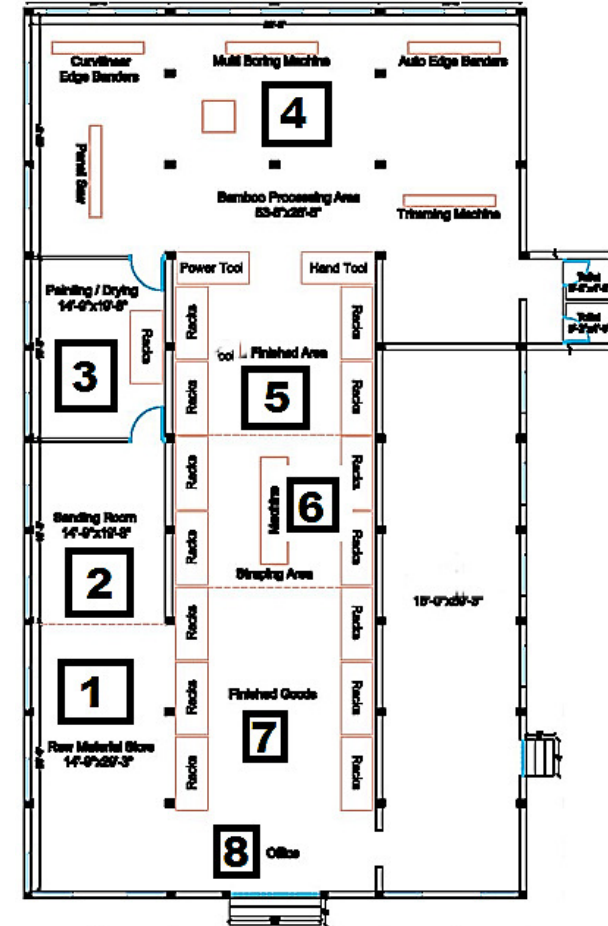
- Private land
- Leased land of industrial area
- Private land poses number of challenges including:
 - Land use change
 - NOC from local authority
 - Water and electricity connection availability
 - Environment clearance and pollution consents
- Every state has designated industrial areas. Advisable to look for one that suits the project. Advantages of industrial area:
 - Availability of infrastructure
 - Faster environment clearances and pollution consents
 - Better logistics support
 - Availability of central effluent treatment plant



Ergo Engineers Pvt. Ltd. can help you make the right decision regarding land.

Layout Preparation & Approval

- Layout & Building Plan Approval
 - Proposed layout needs to be prepared by a registered architect
 - Rules of the respective industrial area as well as guidelines from Petroleum & Explosives Safety Organization, Building bye-laws as applicable in the state, Factories Act have to be strictly adhered to.
 - The layout drawing should then be approved by the relevant authority.
- Pre-approval activities
 - Without waiting for the approval of layout and building plans, you may start building boundary wall, gates and guard cabins to secure the site.



Ergo Engineers Pvt. Ltd. can help you coordinate with an architect to prepare layout and building plans.

Environmental Clearance (EC)

List of chemical and related projects and activities requiring prior environmental clearance:

CATEGORY A PROJECTS:

- Mineral beneficiation >0.1 million tonne per annum
- Metallurgical industries (ferrous and non ferrous) all projects – sponge iron manufacturing >200TPD, all toxic and heavy metal producing units >20,000 TPA
- Petroleum refining all projects
- Chlor-alkali industry - >300TPD production capacity or unit placed outside notified industrial area
- Soda ash industry all projects
- Chemical fertilizers all projects
- Pesticides industry and pesticide specific intermediates (excluding formulations) all units
- Petro-chemical complexes (industries based on processing of petroleum fractions & natural gas and/or reforming to aromatics) all projects
- Manmade fibres manufacturing – rayon only
- Petrochemical based processing (processes other than cracking & reformation and not covered under the complexes) - Located out side the notified industrial area/ estate
- Synthetic organic chemicals industry (dyes & dye intermediates; bulk drugs and intermediates excluding drug formulations; synthetic rubbers; basic organic chemicals, other synthetic organic chemicals and chemical intermediates) - Located out side the notified industrial area/ estate
- Pulp & paper industry excluding manufacturing of paper from waste paper and manufacture of paper from ready pulp with out bleaching - Pulp manufacturing and Pulp& Paper manufacturing industry
- Industrial estates/ parks/ complexes/ areas, export processing Zones (EPZs), Special Economic Zones (SEZs), Biotech Parks, Leather Complexes. If at least one industry in the proposed industrial estate falls under the Category A, entire industrial area shall be treated as Category A, irrespective of the area. Industrial estates with area greater than 500 ha. and housing at least one Category B industry
- Common hazardous waste treatment, storage and disposal facilities (TSDFs) - All integrated facilities having incineration & landfill or incineration alone

Environmental Clearance (EC) (Contd.)

List of chemical and related projects and activities requiring prior environmental clearance:

CATEGORY B1 PROJECTS:

- Mineral beneficiation <0.1 million tonne per annum
- Metallurgical industries (ferrous and non ferrous) all projects – sponge iron manufacturing <200TPD, all toxic and heavy metal producing units <20,000 TPA. All other non –toxic secondary metallurgical processing industries >5000 tonnes/annum
- Chlor-alkali industry <300TPD production capacity and unit placed inside notified industrial area
- Manmade fibres manufacturing – other than rayon.
- Petrochemical based processing (processes other than cracking & reformation and not covered under the complexes) - Located inside the notified industrial area/ estate
- Synthetic organic chemicals industry (dyes & dye intermediates; bulk drugs and intermediates excluding drug formulations; synthetic rubbers; basic organic chemicals, other synthetic organic chemicals and chemical intermediates) - Located inside the notified industrial area/ estate
- Integrated paint industry all projects
- Pulp & paper industry excluding manufacturing of paper from waste paper and manufacture of paper from ready pulp with out bleaching - Paper manufacturing industry without pulp manufacturing
- Isolated storage & handling of hazardous chemicals (As per threshold planning quantity indicated in column 3 of schedule 2 & 3 of MSIHC Rules 1989 amended 2000) all projects
- Industrial estates/ parks/ complexes/ areas, export processing Zones (EPZs), Special Economic Zones (SEZs), Biotech Parks, Leather Complexes. Industrial estates housing at least one Category B industry and area 500 ha. and not housing any industry belonging to Category A or B.
- Common hazardous waste treatment, storage and disposal facilities (TSDFs) - All facilities having land fill only.
- Common Effluent Treatment Plants (CETPs) all projects.
- Source of all environmental clearance related information :
 - EIA notification 2006 and its subsequent amendments
 - <https://environmentclearance.nic.in/>
 - State specific SEIAA websites like <https://www.mpseiaa.nic.in/>

Environmental Clearance (EC) (Contd.)

- In case your project is NOT listed in the previous slides, EC is NOT required.
- In case EC is required, it is mandatory to get it before start of any work other than securing land.
- For projects under category A, prior EC is required from Government of India.
- For category B1, state-level committee has been authorized to give EC.
- Documents required for application for EC.
 - Pre-feasibility project report
 - Data from Basic Engineering
 - Copy of land ownership document
 - Approved layout and building plan
 - Copies of other statutory registrations like Incorporation, GST, Udyam etc.



- EC can take about 4 to 6 months depending on the project and various other factors.
- EC is generally valid for five years for chemical plants.

Ergo Engineers P. L. can help you coordinate with a registered EC consultant.

State Pollution Board Consent to Establish

- In addition to EC, one needs to apply to the state pollution control board to obtain Consent to Establish (CTE) the plant.
- Necessary to get CTE before starting any work on site.
- In addition to documents required for EC the following are needed:
 - Project report including production process
 - Data on emissions and its control
 - Waste disposal
 - Fuel, electricity and water consumption
 - Land use (green belt etc.)
- Each state has different pollution control board. One may refer to the website of the relevant board for more details.



Maharashtra Pollution
Control Board



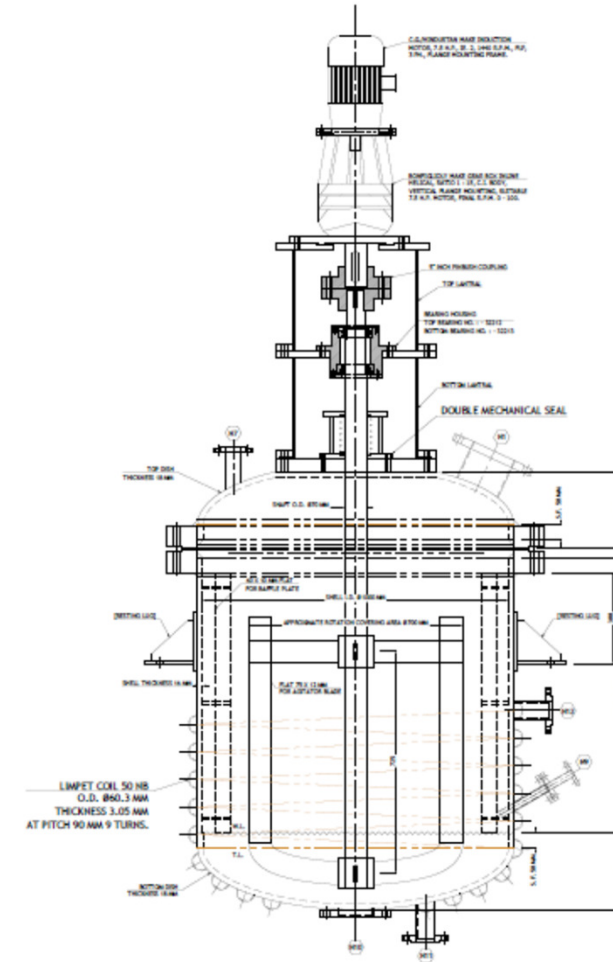
State Pollution Control Board, Odisha
ରାଜ୍ୟ ପ୍ରଦୂଷଣ ନିୟନ୍ତ୍ରଣ ବୋର୍ଡ଼, ଓଡ଼ିଶା

Ergo Engineers Pvt. Ltd. can help you apply for CTE.

Detailed Engineering

- Detailed structural drawings
- Detailed specification sheet of each equipment, valves, fittings, instrumentation, panels, etc.
- General assembly drawings and manufacturing drawings of all equipment, valves, fittings, instrumentation, panels, etc. are obtained from the respective original equipment manufacturers
 - The above are verified and approved by the project team before giving go-ahead for manufacturing.
- Batch record sheets, SOPs, Corrective and preventive maintenance schedules, Maintenance work permits and Onsite emergency plan.

Ergo Engineers Pvt. Ltd. can assist you with each of the above.



Procurement & Construction

- Construction will involve the following:
 - Preparing tender documents
 - Preparing shortlist of contractors
 - Inviting bids
 - Preparing comparison of received bids
 - Awarding contract and executing contract
 - Inspection at site during construction
 - Bill verification and clearance for payment
- Ensuring quality construction as per schedule is critical.



Ergo Engineers Pvt. Ltd. can assist you with each of the above.

Procurement & Construction (Contd.)

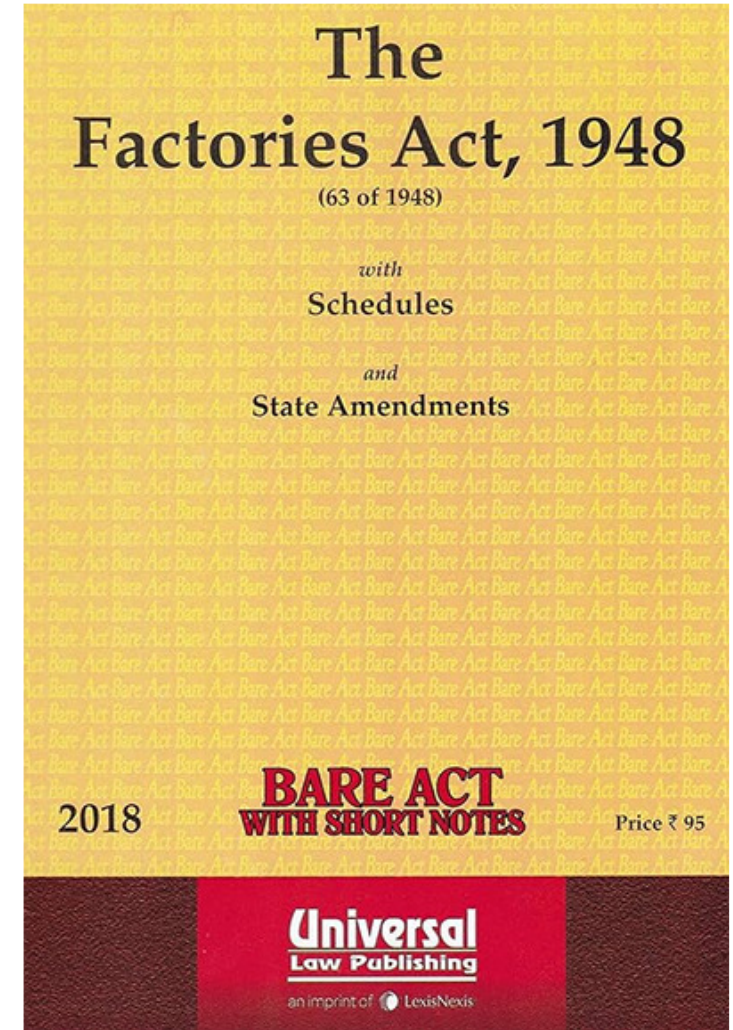
- Procurement will involve the following:
 - Shortlisting of vendors
 - Preparing comparison of received techno-commercial offers
 - Negotiations and award of purchase order
 - Approval of drawings and giving go ahead for manufacturing
 - Factory acceptance test after completion as per standards and terms of purchase order
 - Clearance for payment, logistics and insurance during transit
 - Site acceptance test
- Procurement and construction usually takes 12-16 weeks for small projects and is done parallelly.



Ergo Engineers Pvt. Ltd. can assist you with each of the above.

Legal Formalities – During & After Construction

- Along with construction and procurement, factory license under Factories Act should be obtained.
 - Registration under Factories Act is required if number of employees is ten or above. Some small units may avoid registration as long as number of employees is below the limit.
 - Required documents – KYC documents for firm/company as well as promoters, geo tagged image of factory.
- Validity of license is as per application which is maximum upto 10 years.
- Timeline for applying is within 15 days of start of construction.



Review of HAZOP After Construction & Commissioning

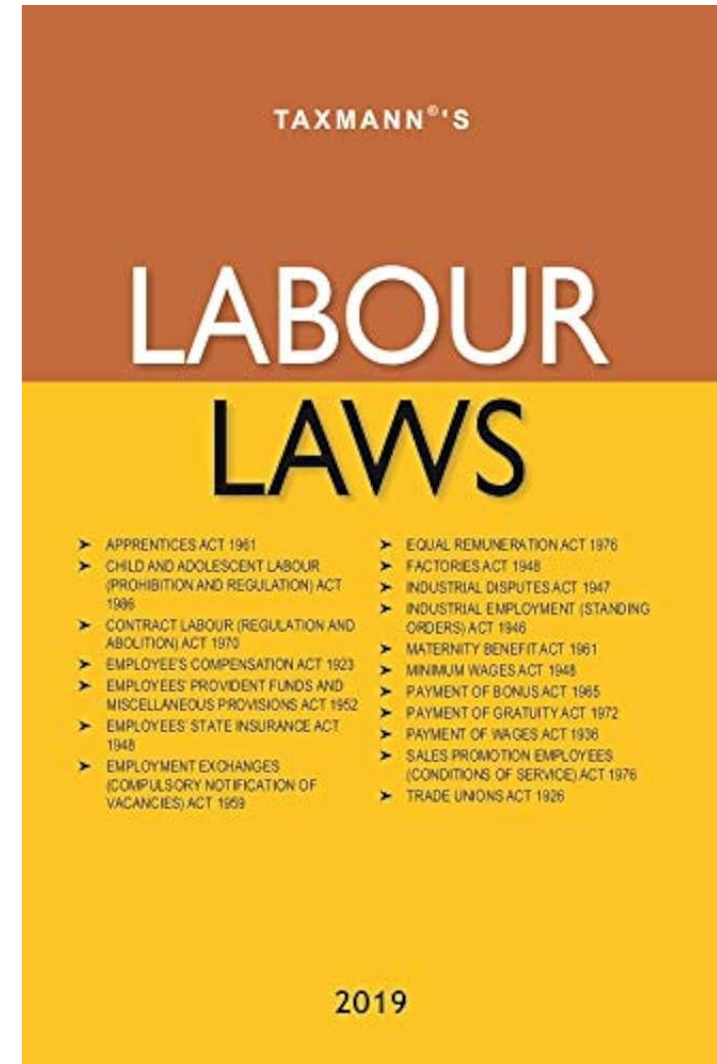
- On completion of installation of plant, optimal and efficient working of the whole plant should be checked by
 - Water trials
 - Hydraulic leak tests
 - Temperature testing
 - Calibration and testing of instrumentation.
- This is the time for Hazard Study 4 (HS-4). As part of HS-4, HAZOP is reviewed. Checks are carried out to ensure that all actions recommended in HAZOP have been incorporated in the plant as well as in batch record sheets, SOPs, corrective and preventive maintenance schedules, maintenance work permits and onsite emergency plan.

Ergo Engineers Pvt. Ltd. can assist you with each of the above.



Other Legal Formalities – Labour Related

- Strict compliance is needed with regard to laws related to labour. For factories employing ten or more workers registration under the following laws is mandatory:
 - Employees' State Insurance Act, 1948
 - The Employees' Provident Funds and Miscellaneous Provisions Act, 1952
- Other important labour laws with which compliance is necessary are as follows:
 - Payment of Wages Act, 1936
 - Minimum Wages Act, 1948
 - Payment of Gratuity Act, 1972
 - The Payment of Bonus Act, 1965
- Onsite emergency plan has to be uploaded to the website of state labour department.



State Pollution Board Consent to Operate

- After erection and commissioning of plant, factory owner has to apply to State Pollution Control Board for getting Consent to Operate and start production.
- Once the application is accepted, the applicant needs to pay combined fees for 5 years and obtain the consent.
- Necessary to file monthly/ periodic/ annual return of pollution data via online portal.
 - Hazardous waste annual return Form-4
 - Environment statement form -V
 - Periodical Compliance form
 - Hazardous waste manifest form-10
 - Last month return stating water, electricity and fuel consumption, effluent discharged per month, air/ water parameter values before and after treatment and production quantity

Ergo Engineers Pvt. Ltd. can assist you with each of the above.

MAHARASHTRA POLLUTION CONTROL BOARD

Phone : [REDACTED]
Fax : [REDACTED]
Email : [REDACTED]@mpcb.gov.in
Visit At : <http://mpcb.gov.in>

Green/S.S.I [REDACTED] Date: [REDACTED]

Consent No: SRO-[REDACTED]/CONSENT/[REDACTED]

Consent to Establish under Section 25 of the Water (Prevention & Control of Pollution) Act, 1974 & under Section 21 of the Air (Prevention & Control of Pollution) Act, 1981 and Authorization / Renewal of Authorization under Rule Hazardous Wastes (Management, Handling & Transboundary Movement) Rules 2016

[To be referred as Water Act, Air Act and HW (M&H) Rules respectively].

CONSENT is hereby granted to

M/s. [REDACTED]
Gat No. [REDACTED]
Near [REDACTED]
Village - [REDACTED] Tal. [REDACTED] Dist. [REDACTED]

Located in the area declared under the provisions of the Water Act, Air act and Authorization under the provisions of HW(M&H) Rules and amendments thereto subject to the provisions of the Act and the Rules and the Orders that may be made further and subject to the following terms and conditions:

1. The Consent to Operate is granted for a period up to: Commissioning of unit Or 5 years whichever is earlier.
2. The Consent is valid for the manufacture of -

Sr. No.	Product Name	Maximum Quantity	UOM
01	[REDACTED]	3100	No/M


3. CONDITIONS UNDER WATER ACT:

- (i) The daily quantity of trade effluent from the factory shall not exceed : Nil.
- (ii) The daily quantity of sewage effluent from the factory shall not exceed 0.01 M³.
- (iii) Trade Effluent : NA
- (iv) Trade Effluent Disposal: NA
- (v) Sewage Effluent Treatment: The applicant shall provide comprehensive treatment system as is warranted with reference to influent quality and operate and maintain the same continuously so as to achieve the quality of treated effluent to the following standards.

(1) Suspended Solids	Not to exceed	100	mg/l.
(2) BOD 3 days 27o C.	Not to exceed	100	mg/l.

MPCB-CONSENT-0000 [REDACTED]

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Thanks!

Ergo Engineers

We look forward to hearing from you.
We look forward to helping through your journey in India.

ERGO ENGINEERS PRIVATE LIMITED

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