



مكتب المستشار الوطني
NATIONAL CONSULTING BUREAU



NCB Courses In Petrochemicals Technology

- Petrochemicals Production Technology.
- Ethylene Production, Chemistry & Processes.
- Ethylene Plant Troubleshooting.
- Ethylene Furnace Training.
- Petrochemicals Shipping Accounts & Documentation.

نشرة الخبر الجيد



مكتب المستشار الوطني
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5-Day Intensive Course
In

Petrochemicals Production Technology

Course Outlines:

1- Primary Raw Materials for Petrochemicals:

- Natural Gas
Natural Gas Treatment Processes, Natural Gas Liquids, Properties of Natural Gas
- Crude Oils
Composition of Crude Oils, Properties of Crude Oils, Crude Oil Classification

2- Hydrocarbon Intermediates:

- Paraffinic Hydrocarbons
Methane, Ethane, Propane, Butanes
- Olefinic Hydrocarbons
Ethylene, Propylene, Butylenes
- Dienes
Butadiene, Isoprene
- Aromatic Hydrocarbons
Extraction of Aromatics
- Liquid Petroleum Fractions and Residues
Naphtha, Kerosene, Gas Oil, Residual Fuel Oil

3- Crude Oil Processing and Production of Hydrocarbon Intermediates:

- Physical Separation Process
Atmospheric Distillation, Vacuum Distillation, Absorption Process, Solvent Extraction
- Conversion Processes
Thermal Conversion Processes, Catalytic Conversion Processes
- Production of Olefins
Steam Cracking of Hydrocarbons, Production of Diolefins.

4- Non-hydrocarbon Intermediates:

- Hydrogen
- Sulfur
Uses of Sulfur, The Claus Process, Sulfuric Acid
- Carbon Black
The Channel Process, The Furnace Black Process, The Thermal Process, Properties and Uses of Carbon Black
- Synthesis Gas
Uses of Synthesis Gas
- Naphthenic Acids
Uses of Naphthenic Acid and Its Salts

5- Chemicals Based on Methane :

- Chemical Bases on Direct Reactions of Methane
Carbon Disulfide, Hydrogen Cyanide, Chloromethanes
- Chemicals Based on synthesis Gas
Ammonia, Methyl Alcohol, Oxo Aldehydes and Alcohol, Ethylene Glycol

6- Ethane and Higher Paraffin-Based Chemicals:

- Ethane Chemicals
- Propane Chemicals
Oxidation of Propane, Chlorination of Propane, Dehydrogenation of Propane, Nitration of Propane.
- n-Butane Chemicals
- Naphtha-Based Chemicals
- Chemicals from High Molecular Weight n-Paraffin
Oxidation of Paraffin, Chlorination of n-Paraffin, Sulfonation of n-Paraffins, Fermentation Using n-Paraffin

7- Chemicals Based on Ethylene:

- Oxidation of Ethylene
Derivatives of Ethylene Oxide, Acetaldehyde, Oxidative Carbonization of Ethylene



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- Chlorination of Ethylene
Vinyl Chloride, Perchloro-and Trichloroethylene
- Hydration of Ethylene
- Oligomerization of Ethylene
Alpha Olefins Production, Linear Alcohols, Butene-1
- Alkylolation Using Ethylene

8- Chemicals Based on Propylene:

- Oxidation of Propylene
Acrolein, Mechanism of Propane Oxidation, Acrylic Acid
Ammoxidation of Propylene, Propylene Oxide
- Oxyacylation of Propylene
- Chlorination of Propylene
Hydration of Propylene
Properties and Uses of Isopropanol
- Addition of Organic acids to Propane
Hydroformylation of Propylene: The Oxo Reaction
- Disproportionation of Propylene (Metathesis)
Alkylolation Using Propylene

9- Polymerization:

- Monomers, Polymers and Copolymers
- Polymerization Reactions
Addition Polymerization, Condensation Polymerization, Ring Opening Polymerization
- Polymerization Techniques
- Physical Properties of Polymers
Crystallinity, Melting Point, Viscosity, Molecular Weight, Classification of Polymers

10- Synthetic Petroleum-Based Polymers:

- Thermoplastics
Polyethylene, Polypropylene, Polyvinyl Chloride
Polystyrene, Nylon Resins, Thermoplastic Polyesters
Polycarbonates, Polyether Sulfones, Poly(phenylene) Oxide, Polyacetals
- Thermosetting Plastics

مركز البحوث والدراسات



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Polyurethanes, Epoxy Resins, Unsaturated Polyesters, Phenol-Formaldehyde Resins, Amino Resins

- Synthetic Rubber

Butadiene Polymers and Copolymers, Nitrile Rubber,

Polyisoprene, Polychloroprene, Butyl Rubber, Ethylene

Propylen Rubber, Thermoplastic Elastomers

- Synthetic Fibers

Polyester Fibers, Polyamides, Acrylic and Modacrylic

Fibers, Carbon Fibers, Polypropylene Fibers.

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5-Day Intensive Course
In

Ethylene Production, Chemistry & Processes

Course Outlines:

1. Physical Properties:

- Thermophysical properties of ethylene.

2. Uses & markets

3. Storage, shipping & handling

- Liquid storage under pressure.
- Liquid storage at atmospheric pressure.
- Safety in tank design, technigaz tank.
- Ethylene tank materials and costs.
- Tank testing and commissioning.
- Storage in salt domes.
 - Salt dome storage – creation and operation.
 - Storage in multilayered salt strata
- Transportation of ethylene.
 - Transport in cylinders.
 - Transport by tank truck.
 - Transport by railroad.
 - Transport by oceangoing tanker.
 - The future of marine transport.
 - Transport by pipeline:
 - Historical development & present status.
 - Ethylene pipeline design.
 - Commissioning of ethylene pipelines.
 - Cost of ethylene pipeline transport.
- Handling of ethylene.



4. Manufacture:

- Raw materials.
- By products
 - Hydrogen.
 - Acetylene.
 - Methlactylene & propadiene.
 - Propylene.
 - Butadiene and butenes.
 - Pyrogasline.
 - Pyrolysis fuel oil.
- Typical feedstock characteristics.
- Yields
- Product specifications and characteristics.
- Manufacturing processes.
 - Pyrolysis of hydrocarbons.
 - Ethanol dehydration.
 - Ethylene from coal.
 - Propylene disproportionation.

5. The modern ethylene plant

- Ethylene process technology.
- A typical ethylene manufacturing process.
 - Pyrolysis and primary waste heat recovery.
 - Secondary waste heat recovery and pyrolysis fuel separation.
 - Tertiary waste heat recovery and heavy gasoline separation.
 - Pyrolysis gas compression, acid gas removal, and drying.
 - Cryogenic treatment and demethanizer.
 - Deethanizer and acetylene hydrogenation.
 - Ethylene – ethane fractionation.
 - Purification of propylene and heavier products.
 - Refrigeration system.

6. Plant safety considerations in:

- Design.
- Operations.
- Maintenance.

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7. The pyrolysis of hydrocarbons:

- Free radical mechanism.
- Single component feedstocks.
 - Ethane.
 - Propane.
 - Butanes.
- Naphthas and gas oils.
- Kinetics.
 - Coke formation and deposition
 - Feedstock diluents.
- Furnace design concepts.
- Heaters and transferline exchangers.
 - Typical heater configuration.
 - Industrial pyrolysis furnaces.
 - Transferline exchangers.

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5-Day Intensive Course
in

Ethylene Plant Troubleshooting

Course outlines :

1- Feedgas treating (amine unit) troubleshooting

- Corrosion causes & prevention
- Symptom of foaming causes & solution
- Failure to meet specification
- Amine losses
- Fouling & degradation
- Residual carbonate (heat stable salts removing)

2- Ethylene crackingheaters troubleshooting

- Heaterradiant coil cok formations & decoking procedure
- Heat transfer line exchanger decoking
- Steam drum boiler feed water specification control
- Heater emergency procedure & actin after emergency
- Heater tube failure & factor affecting on coil life
- Coil creep strength & failure due to creep

3- Quench water system problems

- Oil-in water emulsion formation
- Corrosion & fouling of quench water exchangers & piping
- High delta pressure across the tower
- Foaming

4- Dispersed Oil Extraction (DOX unit) Troubleshooting

- -Hydraulic problem
- Chemistry problem
- Design range problem
- Emulation formation

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- 5- Caustic wash tower troubleshooting
 - Sulfur & CO₂ breakthrough & prevention
 - Flooding-foam-fouling mechanism & treatment
- 6- Charge gas compressor troubleshooting
 - Surge & Fouling Control
- 7- Hydrogen purification unit operation caution
- 8- Chilling train & expander troubleshooting
- 9- Demethanizer & deethanizer troubleshooting
- 10- Acetylene converter troubleshooting & run length
- 11- Ethylen fractionator troubleshooting
 - H₂, CH₄, C₂H₂, C₂H₆, N₂, O₂, CO & Total Sulfur, H₂O, C₃, CH₃OH high concentration & how to control

Practical Onsite Training

NCB can provide instructors to conduct practical Hands-on training at your plant and/or we can arrange practical training at relevant petrochemical plants in Alexandria – Egypt. The contents and duration of these courses will be agreed upon in advance.

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5-Day Intensive Course

in

Ethylene Furnace Training Course

Course Outlines :

1- Terminology :

- Equipment
- Feed stock

2- Kinetics/process variables:

- Kinetic theory
- Process variable:- (severity-selectivity)
- Feed stock & cocracking

3- Coil cocking/transfer line exchanger fouling/feed contaminates:

- Furnace coking-coke inhibition – TLE fouling-feed contaminants

4- Coils & transfer line exchangers (TLE) system:

- Coil metallurgy-tube length & spacing-TLEs

5- Firing and Convection section :

- Overall heat balance
- Convection section
- Burners & combustion

6- REVAMPS:

- Coils & secondary TLE & air preheat & steam integration

7- Decocking :

- End of run criteria-tube metal measurement-decocking philosophy-mechanical

8- Start Up & Shut down :

- Procedure-burner lighting

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- 9- Control & Instrumentation :
 - Regulatory & advanced control
- 10- Emergency operation
- 11- Environmental (NOX formation control).

نشرة الخبز الحبيب



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5-Day Intensive Course
In

Petrochemicals Shipping Accounts & Documentation

Course Objective:

This course is designed to provide working knowledge in petrochemicals shipping operations, accounts and documentation for shipping and export supervisors, technical and administration staff involved in export operations, sales administration, and marketing Staff.

Emphases will be on liquid, bulk and bagged solid petrochemical products such as chemical fertilizers, polyethylene polyvinyl chloride, anhydrous ammonia, etc...

Course Outlines:

1. Introduction:

- Notice of sales contracts
- Petrochemical markets
- Shipping baggage and bulk products
- Shipping Anhydrous Ammonia
- Ships loading capacity
- Belt conveyors and truck loading
- Difference between financial and shipping accounts.
- The relationship between export section and other depts.. (Sales – marketing – chartering – financial affairs dept. legal affairs – safety sect. – laboratory – production – inventory, third party inspector and shipment sampling)

2. Charter Party:

- Types of shipping services
- Agents and organizations involved in shipping
- Difference between FOB and C&F sales
- What is the charter party – C/P
- Types of the charter party
- Charter party details and condictions

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3. Shipping documents and their functions:

- Shipping notes
- Preparation of time sheets (expected & actual)
- Shipping arrival report
- Statement of facts
- Bill of lading – B/L
- Cargo storage plan
- Manifest
- Deliver orders
- Letter of protest
- How to deal with buyers claims

4. Freight payment, port authorities, shipping agents other cargo dues on the relevant shipment:

- Notice from chartering or marketing as per the organization structure to pay the provisional freight (90 – 95%) as per the C/P terms.
- Notice from chartering or marketing as per the organization structure to pay the brokerage commission (1.25%)
- Address commission (2.25%)
- Port charges invoices
- Contracts labor invoices
- Overtime form agents if any
- Notice from chartering or marketing to finalize the owner's accounts when receiving the discharging documents
- Preparing overtimes sheets
- How to make agreement with agent for working overtime

5. Cases study and exercise using time sheet

- When we take the decision for loading the ship during the weekend and the holiday at the part of load
- Correct use of shipping accounts
- Disbursement account



مكتب المستشار الوطني NATIONAL CONSULTING BUREAU

أعضاء في الاتحاد الدولي لمنظمات التدريب والتطوير (IFTDO) - جمعية الإدارة الأمريكية (AMA) - الجمعية العربية للإدارة .

MEMBER: AMERICAN MANAGEMENT ASSOCIATION (AMA). ARAB MANAGEMENT ASSOCIATION
INTERNATIONAL FEDERATION OF TRAINING & DEVELOPMENT ORGANIZATIONS (IFTDO)

List of Our Clients Include

- Saudi Basic Industries Company Sabic
- Bahrain National Oil Company BANACO
- Qatar Fertilizer Company QAFCO
- Abu Dhabi National Oil Company ADNOC
- Ministry of Electricity & Water-Oman
- Oman Petroleum Development Company
- Petromine-Mobil Yanbu Refinery
- Kuwait National Petroleum Company KNPC
- Kuwait Petroleum Corporation KPC
- Ministry of Public Works & Housing-UAE
- Arabian American Oil Company ARAMCO
- Qatar General Petroleum Corporation
- Kuwait Oil Company KOC
- Shuiba Industrial Area Authority
- Zakum Development Company-UAE
- Ministry of Work, Power & Water-Bahrain
- Abu Dhabi National Oil Co.- UAE
- Kuwait Oil Tankers Company KOTC
- National Industries Gasses Co. -Saudi Arabia
- Ministry of Oil – Kuwait
- Petrochemical Industries Company PIC
- Ministry of Public Works-Kuwait
- Kuwait Municipality
- Civil Service Commission Kuwait
- Ministry of Information – Kuwait
- Public Authority for Minors Affairs-Kuwait
- National Bank of Kuwait
- Ministry of Defense – Kuwait
- Arabian Oil Company – Saudi Arabia
- Saudi Texaco Oil Co. – Saudi Arabia
- Oman Liquefied Gas Company (OLNG)
- Ministry of Defense & Aviation – Saudi Arabia
- Kuwait Fund for Arab Economic Development
- Bahrain Petroleum Company BAPCO
- National Chemical Fertilizer Co.-IBN Albitar
- Oman Refinery Company
- Saudi Methanol Company
- National Oil Distribution Company-Qatar
- Qatar Petrochemical Company
- Al-Jubail Petrochemical Company
- Kuwait Airways Corporation
- General Ports Authority
- Al Jubail Fertilizer Company
- Ministry of information – BAHRAIN
- National Insurance Company – Kuwait
- Kuwait Foundry Company
- Arab Petroleum Investment Co. APICORP
- Kuwait Insurance Company
- Ministry of Public Health – Kuwait
- Kuwait British Ready-mix Company
- The Public Warehousing Company
- Ministry of Municipality & Agriculture - Qatar
- Kuwait Finance House
- Kuwait Institute for Scientific Research KISR
- National Oil Distribution Company-Qatar
- Abu-Dhabi Gas Liquefaction Co.(ADGAS)
- Ministry of Justice – Kuwait
- Ministry of Commerce & Industry – Kuwait
- Gulf Bank – Kuwait
- Kuwait Investment Authority
- Public Authority for Compensation – Kuwait
- Gulf Cooperation Council- Saudi Arabia
- Ministry of Finance & National Economy-Qatar
- Qatar Monetary Fund
- Qatar Telecommunication (QTEL)
- Touristic Enterprises Company –Kuwait