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Dextro Propoxy Phene Hydrochloride

DESCRIPTION

- A multi process giving high yields of d-isomers, high recovery of d-camphor sulphonic acid and excellent product quality
- Does not require any special environmental protection mechanism. Normal effluent treatment measures are sufficient

Advantages

- Cost Effective - Estimated investment for a battery limit plant of 1 TPD is around USD 0.06 million

Target Countries

- African countries
- China
- South American countries

Applications

- Non anti-pyretic analgesic conforming to IP and BP grades

- **Current stage of development**
Process standardized at bench level 1kg/batch. One licensee
- **Collaboration options**
Technology Transfer

SPECIFICATIONS

Raw materials

Propiophenone
Dimethylamine hydrochloride
Paraformaldehyde
Benzyl chloride
D-Camphor sulphonic acid

Equipment

Jacketed glass-lined reactor
Agitator reflux condenser
Solvent recovery unit
Basket centrifuge
Filter
Ion exchange unit
Boiler

Organisation

Central Drug Research Institute (CDRI)

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Maximisation of LPG Yield in FCC Unit

DESCRIPTION

- Expertise available for enhancing the LPG yield by process optimisation, catalyst selection and revamp of FCC units
- Studies conducted by Indian Oil R&D Centre at Indian FCC units indicated increase in yield from 10-20% to 25-35% wt of feed and Propylene from 4.5% wt to 12% wt of feed

R & D Strength

- Strong R&D Centre with state of the art facilities for characterisation and performance evaluation of FCC catalysts and additives. The important facilities include:
 - Automated MAT Units
 - FCC Pilot Plants
 - Steaming Units
 - Characterisation equipments include ABD, PSD, TPD, Octane Analyzer etc
 - Kinetics based FCC process simulation model FCCMOD

Organisation

Indian Oil Technologies Ltd

Cross Reference

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Benefits

- Maximisation of LPG yield without any major revamp in the RFCC unit
- Maximisation of LPG with wet gas compressor capacity augmentation
- Necessary technology available for major revamp of FCC units with additional throughput increase along with the maximisation of LPG or to fulfill the objective of a normal

Implementation Approach

- Performing Microreactor studies with FCC feed streams and catalyst plus ZSM-5 additive at different concentration levels
- Conducting scoping study of the project including the optimisation of process parameters and catalyst selection
- Performing optimisation studies for generating additional cushion in wet gas compressor and air blow
- Preparing a revamp proposal including cost estimate for establishing techno-economic feasibility
- Preparing design package and project execution

Engine and Tribotesting Training and Testing Services

Material Engineering Services

Services

- The specialised facilities at the R&D centre can be broadly classified into three areas:
 - Engine Testing
 - Tribological Evaluations
 - Metal working fluid testing
- Imparts training programs

Engine Testing

- Lube and fuel evaluation:
 - Various tests like Peter AV 1, MWM, CRC L 38, JASO etc can be carried out
 - Performance level of oil upto ILSAC GF 3 can be tested
 - Diesel and gasoline engines upto 160 KW capacity can be tested for exhaust emissions
- Development of in-house test methods and engine optimisation:
 - Customised homologation and endurance tests can be carried out for engine component optimisation and durability

Organisation

Indian Oil Technologies Ltd

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Tribological evaluations

- Tribotesting on simulated rig test benches are used for evaluation of lubricants over wide range of test conditions such as load, speed, temperature and type of material
- Design, development and fabrication of special purpose custom made tribological test rigs at competitive cost can be taken up

Metal Working Fluid Testing

- Metal working Fluid testing offers its expertise in the evaluation of the following:
 - Metal cutting oils
 - Metal forming oils
 - Quenching oils
 - Automotive coolant and gear oil

Services

- Following specialised material engineering services are provided:
 - Material failure analysis
 - Remaining life assessment
 - Fitness for purpose analysis
 - Onsite conditioning monitoring
- Tailor made training programs

Material Failure Analysis

- High temperature failure
- Metallurgical degradation failure
- Corrosion/environmental assisted cracking failure
- Fatigue failure

Remaining Life Assessment

- Component specific for both statutory and non statutory complied equipment
- Component specific methodology development

fitness for Purpose Analysis

- Fracture mechanics application
- Engineering critical assessment

Onsite Condition Monitoring

- Field hardness testing and replication
- Metallurgical degradation studies
- Positive material identification
- Conventional non-destructive testing
- Field inspection of statutory equipment

(Contd...)

Material Engineering Services (Contd.)

Tailor Made Training Programs

- Material failure analysis
- Remaining life assessment
- Metallurgy for non-metallurgists
- Software on remaining life assessment
- Material selection

R & D Strength

- R&D Laboratory is fully equipped with advanced mechanical and metallurgical corrosion testing equipments. Special facilities includes:
 - Scanning electron microscope with EDAX attachment
 - Optical microscope with image analysis system
 - Servo-hydraulic universal test machines
 - Direct reading spark emission spectrometer
 - Corrosion Inhibitor testing facilities
- Portable kits which include: Metallography kit, hardness tester, alloy analyzer, high temperature, thickness measurement

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Software / Data Support

- Softwares developed for predicting remaining life and assessing mechanical integrity which is offered on service basis:
 - RLA/FFP: Software for pressure vessel life prediction
 - RELIF: Boiler component life prediction
 - CLIP: Creep failure prediction Optical microscope with image analysis system
 - RLAHT: Heater tube life prediction
- Available several databases required for life assessment and condition monitoring

Clients

- Kuwait National Petroleum Corporation
- Chennai Petroleum Corporation Ltd.
- Bharat Petroleum Corporation Ltd.
- Mangalore Refinery and Petrochemicals Ltd.
- Engineers India Ltd.
- Numaligarh Refinery Ltd.
- National Thermal Power Corporation

Instrumented Pig (IPIG) Online Inspection of Buried Pipeline

DESCRIPTION

- A device for inline inspection of buried pipelines to monitor their health and assess the risk associated with their operation
- Very few companies provide these inspection services to pipeline operators world wide
- IPIG has been developed jointly by IOC and BARC (Bhabha Atomic Research Centre)

Working Principle

- The 12" size instrumented Pig is based on Magnetic Flux Leakage (MFL) Principle which detects the mechanical defects by sensing the change in flux near the pipe wall under the influence of applied magnetic field
- IPIG travels with the propelling force of the fluid being pumped through the pipeline. While traveling inside the onboard data recoring system records the defect data sensed by the sensors touching the internal surface of the pipe
- Data is analyzed and defects are reported with respect to sizing and location for a long distance pipeline

Organisation

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Field Trials

- It has been extensively evaluated in WET Test Loop specially designed and developed for testing such tools under actual pipeline simulated conditions, at Indian Oil R&D Centre
- Several field trials have been carried out, in 162 Km long Mughalsarai- Allahbad section of BKPL
- IPIG is commercially available to inspect 12" size aging pipelines

Hydroprocessing Technology Services

Technical Services for Chemical Process Plants

SERVICES

SERVICES

Services

- Optimisation of hydroprocessing units through pilot plant experimentation and application of mathematical models
- Troubleshooting of hydroprocessing units
- Assistance in selection of new catalyst system and/or process technology through pilot plant evaluation, physio-chemical characterisation, modeling, simulation etc
- Catalyst remaining life assessment and unit performance monitoring services
- Detailed characterisation of feed and product streams
- Quality check-up of procured catalysts
- Catalyst loading/ unloading, reactor start up and shut down procedures
- Process feasibility
- Pilot plant design and assistance in installation and operation

Process Models

- Developed various proprietary process models for Hydrocracking, DHDS, Catalytic Reforming etc.
- Used for interpretation of pilot plant data and scale up applications

Services Rendered

- Troubleshooting of hydrocracker unit for obtaining design throughput
- Optimisation of hydrocracker unit for maximisation of middle distillates
- Studies for maximisation of LPG through application of novel catalyst system
- Troubleshooting of DHDS unit
- Selection of Hydrocracker catalyst system for existing as well as grassroots refinery
- Selection of DHDS catalyst system
- Catalyst health assessment & performance monitoring for several hydrocracker plants

Tools

Catalyst Characterisation Facilities

- Adsorption and Chemisorption units
- Atomic Emission Spectrometer
- X-Ray Diffractometer,
- Scanning Electron Microscope
- Thermal Analysis Unit (TGA, DSC, DTA)
- Electron Spectroscopy for Chemical Analysis
- CHNS and CS Analyzer
- Diffuse Reflectance UV VIS
- Microcalorimeter

Feed/ Product Characterization Facilities

- Sulphur & Nitrogen Analyzer
- SIMDIS and HTSIMDIS Units
- Refinery Gas Analyzer
- GC- Sulphur Chemiluminescence Detector
- GC-MS
- NMR Spectrometer

Organisation

Indian Oil Technologies Ltd

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Services

- Following specialised material engineering services are provided:
 - Commissioning support
 - Engineering services

Engineering Services

- Century Rayon has in-house facilities of engineering services and provides advisory/ professional services in the field of:
 - Energy Conservation
 - Cost Reduction
 - Productivity Improvement
 - Total Quality Management

Organisation

Century Rayon

Cross Reference

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Commissioning Support

- Provide support in planning, procurement, assembling, Erection and Commissioning on turnkey basis to Chemical Process Plants producing the following products:
 - Rayon Viscose Filament Yarn - Pot Spun and continuous Spun
 - Viscose Tyre Yarn/ Industrial Yarn
 - Sulphuric Acid
 - Carbon Disulphide
 - Caustic Soda
 - Liquid Chlorine
 - Hydrochloric Acid
 - Compressed Hydrogen Gas

Operations and Maintenance Services in Fertiliser & Chemical Plants

Services

- RCF has technical competence in:
 - Construction, pre-commissioning/ commissioning
 - Operations, maintenance and complete project management of Greenfield fertiliser and Chemical projects
- Expert Technical help in monitoring and overhauling of centrifugal & reciprocating equipment/machinery such as compressors, pumps, turbine etc of Ammonia, Urea, Salt and Acid Plants.
- Technical and Energy Audit of process plants which include Fact finding, Analysing operating data, recommendation of adjustment of operating conditions, recommendation for modification and for replacements
- Turnaround supervision assistance in shutdown maintenance jobs, repair, modification work and safety supervision
- Project construction including Pre-commissioning, start-up and commissioning services

Organisation

Rashtriya Chemicals and Fertilisers Ltd.

Cross Reference

Organisation Page 168

International Clients

- Mitsubishi Heavy Industries for JFCL project in Bangladesh
 - Assisted Mitsubishi Heavy Industries, under Technical Assistance Contract in providing pre-commissioning, start-up, commissioning and on-line operations services for fertiliser project of Jamuna Fertiliser Company at Tarakandi, Bangladesh
- GPIC, Baharain
 - Deputed its Engineers for pre commissioning, start-up and commissioning of Urea, Utilities and off-sites plants of GPIC, Baharain
- Asmidal (Sonatrach)- Nitric Acid/ Ammonium Nitrate Plant in Algeria
 - Completed two projects for operation and maintenance of Asmidal's (formerly Sonatrach) Nitric Acid and Ammonium Nitrate plants at Annaba in Algeria
- Fertiliser plant, Togliatti and Novomoskovsk, Russia
 - Assisted M/S Snamprogetti, Italy in commissioning the fertiliser plant
- Zibo Organic Amines and Siangshan Chemicals, China
 - Commissioned Methylamines and Di Methyl Formamide Plants
- Turnaround Maintenance Services in Saudi Arabia
 - Under a collaboration Agreement with Saudi Designers Engg Consultants, RCF rendered turnaround services to numerous petrochemical factories in Al-Jubail Industrial City, Saudi Arabia

Condition Monitoring & Testing in Chemical & Fertiliser Plants

Non Destructive Testing

- Complete inspection of static equipment using the techniques like:
 - Ultrasonic testing, magnetic particle testing, liquid penetrate testing, eddy current testing, radiography, thickness measurement, micro densitometry based corrosion severity checks, thermography, acoustics emission techniques and vacuum testing etc

Domestic Clients

- IOCL, Guwahati Refinery, Assam (2002)
 - Successfully commissioned and are operating the IOCL plant
- Hindustan Fertiliser Corporation Limited, Namrup, Assam (2002)
 - Commissioned, stabilized and revamped Ammonia Plant
 - Provided expert advice and technical assistance including manpower to solve major mechanical problems in HFCL
- Oswal Chemicals and Fertilisers Limited, Shahjahanpur (1995)
 - Commissioned Ammonia and Urea Plants

Organisation

Rashtriya Chemicals and Fertilisers Ltd.

Cross Reference

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Inspection & Condition Monitoring

- Rotating machines such as compressors, drive turbine pumps, fans and blowers using vibration analysis
- Complete inspection, condition monitoring and overhauling of electrical equipments such as power transformers, high voltage induction motors, high voltage circuit breakers, motor control centres, switch gears, motorized valves, UPS units, cables etc
- Complete inspection, checking, repair and calibration of electronic/pneumatic instruments

Technical services for Paper Industry

Technical Audit

- Conduct audits for paper making process and machinery for all types of paper, board etc

Clients

- BTIL, Bangladesh
 - Technical audit for paper machine
- Andhra Pradesh Paper Mills, India
 - Project management
- Sirpur Paper Mills, India
 - Consultancy services for upgradation/ expansion of paper production
- West Coast Paper Mills, India
 - Consultancy service for upgradation/ expansion of paper production

Organisation

Elof Hansson (India) Pvt. Ltd.

Cross Reference

Organisation Page 151

Project Management

- Upgradation/ Expansion of paper making facilities
- In-house project management experts and process specialists
- Auto Cad facility is available

Engineering

- Undertake contracts for basic/detailed engineering for paper making process

Industrial and Material Modeling Services

Industrial Flow Modeling

- Reactor Engineering
- Product/Process Engineering
- Development of modeling tools

Polymer & Materials Modeling

- Single chain conformational analysis and statistical properties
- Modeling of amorphous bulk state
- Optical properties of polymer
- Polymer surfaces and thin films
- Molecular thermodynamics
- Thermal and mechanical properties
- Rheo-optics and melts
- Nano-materials and composites
- Ab-initio/DFT modeling of organic molecules
- Exploratory materials science and technology

Organisation

National Chemical Laboratory

Cross Reference

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Digital Information Resource Centre

- Chemoinformatics
- Biodiversity Informatics
- Knowledge management for capturing organisational knowledge

Theory & Computational Science

- Frontier theoretical development on molecular properties
- Theoretical investigation of hard-soft acid-base relation
- Study of interaction potential in electron-molecule scattering
- Application of modeling and theoretical tools

Bio-Chemical Research Services

Combi Chem-Bio Resource Centre

- Synthesis and evaluations of libraries for anti-inflammatory activity
- Natural product derived new lead molecules for anti-depressant activity

Bio organic & Biomimetic

- Antisense agents block gene expression by complexing with corresponding m-RNA
- Chimeric & hybrid peptides
- Myo-Inositol
- DNA nanotechnology
- Drug polymorphism

Organisation

National Chemical Laboratory

Cross Reference

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National Collection of Industrial Microorganisms

- Strain improvement for production of lactic acid
- Prostaglandin intermediate preparation of 4 (R)-hydroxycyclopent-2-en1(S)-acetate
- Thermostable galactosidase & phytase from fungus

Biochemical Sciences

- Control of Helicoverpa infestation by recombinant protease inhibitors
- Regiospecific conversions of drug intermediates using microbial oxidases
- Cellulases and Xylanases
- Endophytic fungi produce nanoparticles
- Model system to screen antifungal agents: Benjaminiella poitrasi
- Chemistry and structure of bio-molecules
- Sex determination in papaya

Catalyst Research Services

Heterogeneous Catalysis

- Hydroxylation of Phenol over a solid catalyst
- Isomerization of 0-dichlorobenzene
- Selective chlorination of Toluene
- Ammoxidation of ketones with NH₃
- Selective Alkylation of Catechol to Guaiacol
- Selective alkylation of Anisole
- Dehydrogenation of Alkenes
- Oligomerization of Alkenes
- CO free H₂ generation from LPG for fuel cell application
- Synthesis of Zeolites and microporous materials for commercial applications

Organisation

National Chemical Laboratory

Cross Reference

Organisation Page 164

Homogenous Catalysts

- Carbonylation of olefins/ alcohols/ halides
- Oxidative Carbonylation reactions
- Animation of Aryl halides
- Hydroformylation of functionalized olefins
- Liquid Phase oxidation of hydrocarbons
- Hydrogenation of functionalized organic compounds
- Hetrogenization of homogeneous catalysts
- Homogeneous catalytic reaction engineering

Polymer and Organic Chemical Research Services

Operation and Maintenance of Process Plants

Central NMR Facility

- Structural elucidation by multi-nuclear, multi-dimensional NMR
- Hydration of macromolecules
- Characterisation of materials in solid state by multinuclear and two dimensional NMR
- Polymer surfactant interactions
- Molecular self assemblies

Complex Fluids & Polymer Engg

- Nanocomposites
- Stick-slip
- Finger printing
- Product development
- Advanced training programs
- In-house development of new equipment

Organisation

National Chemical Laboratory

Cross Reference

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Polymer Chemistry & Materials

- Functional polymers via controlled polymer synthesis
- Synthesis of polymer nanoparticles via dispersion polymerisation
- Study of environmentally degradable and durable polymers
- Study of structure and morphology of semicrystalline polymers
- Synthesis of novel polymers
- Functionalized conducting polymers and their application
- Tailored polymer architectures for enhanced protein ligand interactions

Organic Chemistry

- Development of process chemistry for Zidovudine, Lamivudine, Nevirapine etc
- To synthesize and evaluate small molecules as potential clinical candidates for infectious, cancer, fungal, inflammatory/COX-II, obesity and tuberculosis
- To isolate naturally occurring compounds from plants as potential drug candidates
- Development of chemistry for chiral drugs such as (S)- Amlodipine, Levo-Citrazine, R-Salbutamol, (S)- Citalopram
- Development of chemistry for chiral fine chemicals
- Development of plant growth regulators, pesticides and chemical hybridizing agents such as Ethephon, Maleic hydrazide, Paclobutrazole, Glyphosate
- Leather Biotechnology

Expert Assistance

Expert Assistance available in operations and maintenance of:

- Membrane Cell process for Caustic Soda/Caustic Potash
- Re-membraning of cells
- Caustic soda evaporation, concentration, flaking & prilling
- Caustic potash evaporation, concentration & flaking
- Potassium carbonate process
- Sodium cyanide process
- Thermal/photo chlorination for chloromethane
- HCL synthesis
- Phosphoric acid through HCL route
- Auto-oxidation process for Hydrogen peroxide

Organisation

Gujarat Alkalies and Chemicals Limited

Cross Reference

Organisation Page 153

Expert Advice

Expert advice on safe handling of:

- Chlorine
- Chloromethane
- Hydrogen peroxide
- Sodium cyanide

Miscellaneous

- Assistance in trouble shooting, start-up and commissioning of process plants
- Undertake contract research in new processes, value addition and import substitution
- Advice on energy conservation and safety audit

Inspection, Fabrication, Repair & Construction Services

Contract Manufacturing for Pharmaceuticals

NDT Techniques for Inspection

- Ultrasonic thickness measurement
- Radiography examination of welded joints
- Magnetic particle testing
- Ultrasonic flaw detector
- Dye penetration testing
- Vibration analysis
- Reformer tube inspection by hydro couplant method
- Acoustic emission test (Recognised by CEE)

Civil Engineering

- Site survey
- Preparation of site drawing including solid investigation etc
- Preparation of estimates based design drawings
- Execution/ Supervision of civil works
- Services for preparing painting systems, specification and inspection
- Advisory service for AR Brick Lining, its supervision
- Services for enhancing the life of structure by inspection, suggestion for replacement, repair etc

Organisation

Gujarat State Fertilisers and Chemicals Limited

Cross Reference

Organisation Page 154

Fabrication & Repair

- Critical equipment with exotic MOC like SS, Incolloys, Titanium, Aluminium, HK-40M and Alloy Steels
- Pressure vessels, heat exchangers, tank etc under third party inspection
- Heavy maintenance jobs in fertiliser, petrochem and pharma industries
- Crane services for 100 & 75 MT Crawler Cranes
- Technical services in field of repair, welding, rebuilding, refurbishing etc at clients place
- Impart on job training and technical education in field of expertise

Works executed

- Offsite for 1350 MTPD Ammonia plant, Melamine expansion plant, SA-IV and Coastal DAP plant
- Rehabilitation of Nylon-6 plant
- Anone debottlenecking for Caprolactum plant
- Heat exchanges for Melamine II plant fabricated at GSFC workshop
- Revamping of acid scrubbing system of Urea plant
- Specialised inspection services for IPCL, GNFC, GIPCL, KRIBHCO-Hazira, SPIC, Zuari Agro, NFL-Bhatinda, HWP Bharat Corp Ltd
- Execution of high rise structures like RCC chimney (100 & 70 Mtr height) with continuous concreting

Offerings

- Specialised globe-girdling plant network
- Comprehensive range of manufacturing capability
- Exceptional quality systems and standards
- Economies of scale
- Manufacture the entire range of products and forms - from soft gelatin capsules to hard gelatin capsules, tablets to injectables and can handle conversion between modes with minimal disruption

Organisation

Strides Arcolab Ltd.

Cross Reference

Organisation Page 175

Partnerships in Complex Industries

- Ciba Speciality Chemicals Ltd, Mumbai
- Unibios, Italy
- Brantford Chemicals, Canada
- Chemi, Spa., Italy
- Glaxo Welcome, U.K
- Greenwood Products Inc, USA
- Ciba Speciality Chemicals Inc, colours division and additive division, Switzerland

Services

- Literature survey and preliminary investigation
- Miligram level synthesis
- R&D and pilot plant scale ups
- Commercial scale ups from R&D scales
- Process development
- Process validation and standardisation followed by technology transfer.

Technical services for Fine & Speciality Chemicals

Custom Synthesis

- Preparation of 0.5 kg. to 4 MT quantities of organic fine chemicals (existing or new molecules) for further transformations, formulations etc

Organisation

Sudarshan Chemicals Limited

Cross Reference

Organisation Page 176

Custom Research

- Intermediates as per client's requirements
- Lab scale to pilot scale using known or to be developed procedures. Evaluation of competitive processes, synthesis of new molecules or advanced
- Research sponsored by clients for development of new organic molecules in the field of agrochemicals, aroma chemicals, intermediates, and speciality chemicals

Analytical Services

- Instrumental and wet method analysis of organic fine chemicals and Intermediates

ORGANISATIONAL

PROFILES

SERVICES

Alchemy Leather Pigments & Auxiliaries Pvt. Ltd.

DESCRIPTION

- Engaged in the production of "Finishing Chemicals" for Leather
- Products are available under the brand name of "Alchem"
- Wide sales and distribution network
- Setting leather centers in places like Kolkata, Kanpur and Ranipet

Focus Areas

- Casein based Leather Pigment finishes
- Casein-free Leather Pigment finishes
- Casein/ Protein Binders
- Anionic & Cationic Dye- Solutions
- Resin Binders
- Syntans, Lacquer & Lacquer Emulsions

R&D Capability / Infrastructure

- Technical team is headed by the Managing Director Mr. S. Ravindran who has 26 years of experience in leather pigment and finishes
- Facilities exist to provide the finishing chemicals as per client's specifications like colour matching
- Team of technicians is available to work jointly with clients technical team to satisfy their requirements
- Tied up with tanners nearby to test the products apart from testing in their own laboratories

Financial Details

- Turnover of US \$ 0.3 Mn in FY02

Key Achievements

- Products are Eco friendly as they are AZO- Dye free, PCP free and Chrome VI free
- Products are of international standards

Technologies Cross Reference

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Ashok Organic Industries Limited

DESCRIPTION

- The flagship company of Kadakia Group, currently engaged in the manufacture of organic chemicals such as Monochloro Acetic acid (MCA), Acetic acid, Alcohol, Acetaldehyde, Acetic anhydride, Ethyl acetate, and Carboxy methyl cellulose
- It also manufactures ethyl Alcohol, Chloro alkalies and exports all kind of chemicals, solvents and acids

Focus Areas

- Chloro-Alkali Products
- Castor Oil derivatives and Fatty Acids
- Poly Aluminium Chloride
- Stable Bleaching Powder
- Paint Pigments-Intermediates
- Amines and Plasticizers

R&D Capability / Infrastructure

- Acetic Acid Plant (grass-root) set up in 1982 with technology from Chematur A.G. Sweden
- Methane - gas plant of Distilleries at Pungam and Walchandnagar set up with technology from Aqua Technos Co. Ltd., Thailand
- Caustic Soda plant set up with latest environment-friendly and energy-efficient Membrane Cell Technology from the Chlorine Engineers Corporation Ltd., Japan (a Mitsui Group company)
- Company's locations have distinct advantage of having continuous and cost-efficient fuel in the form of natural gas or methane-gas, a non-conventional source of energy generated from Effluent Treatment Plant

Financial Details

- Turnover of US \$ 0.3 Mn in FY02

Technologies Cross Reference

- Technology Page 38

Key Achievements

- Recipient of Gujarat Safety Council Award
- Johnson's Award for the Best Quality Suppliers
- Coveted Enviro Tech'93 Award instituted by Chemtech Foundation
- Export Award from CHEMEXCIL for the year 1992-93, 1993-94 & 1994-95

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