Uni-Mech is a leading organization involved in designing, manufacturing and undertaking turnkey projects in Pharma & Chemical Plants & Equipment. To keep ahead with technological developments in Machinery, Uni-Mech has developed our manufacturing activity since 1986.

Uni-Mech offers complete range of Engineering Services, as ours is an integral Engineers entity. We provide consulting services in process Engineering, Design, Simulation, Process Development, Mixing Technology and Trouble shooting.

The superior characteristics of our equipment are fully exploited through excellence in overall equipment designs, fabrication and quality work. We believe in dynamic testing and actual service conditions. Each equipment has been designed and manufactured by us to be more efficient and offer better economy than other products available in the market.

Uni-Mech is backed up with a competent technical team covering:
- Designing
- Planning
- Manufacturing
- Inspection
- Expediting

Vision
Our Vision is to Transform thoughts into reality

Mission
To Achieve 1000 Satisfied Clients by 2025 by Providing Quality Products in Pharmaceutical and Chemical Industries

Values
Do What We Speak
Quality Consciousness
Uni-Mech has invested more than two decades in R & D to develop special various Processes, Reaction & Mixing designs in Pharma & Chemical Industries like Dyes, Intermediates, Pesticide, Pigments, Fine and Aromatic Chemicals, Bulk Drugs, API.

Uni-Mech follows ASME / IS / API, BS, cGMP Code or other codes available in International Market to suits the customer requirements for applications.

Uni-Mech can offer following equipments in Process Reaction & Technology:

- Chemical Autoclaves
- Hydrogenation
- Chemical Reactors
- Various type of Crystallizer
- Agitators (As per Process Requirements)
- Pharma Sterilizer
- Open Reaction Vessel
- Homogenizer
- Emulsifier
- Kettle

**Reactor / Autoclave**

Uni-Mech offers a wide range of superior designed and engineered products that are also in accordance with ASME / IS / API / cGMP and other international standards. Ideal for optimum Agitation solutions these products include:

- Gas - Liquid Mixing
- Liquid - Liquid Mixing
- Solid - Liquid Mixing
- Homogenization
- Blending
- Wet - Grinding

Application of Uni-Mech's specially designed impellers:

- Hydrogenation
- Oxidation
- Homogenization
- Chlorination
- Esterification
- Bromination
- Slurry Preparation

**Design Capability & Range:**

- Capacity Range: 5 lits to 60,000 lits
- Shell Diameter: 300 MM to 6000 MM
- Pressure Range: Full vacuum to 100 kg/cm² g
- Thickness: 5 MM to 40 MM
- Temperature Range: Cryogenic to 350 (degrees) C

**Materials of Construction:**

- Stainless steel
- Titanium
- Carbon Steel
- Duplex steel
- Hastelloy
- Aluminum
- Nickel
- Lined with special non-corrosive material like PTFE, FRP, Rubber lining, Tile lining etc.

**Special Features of Uni-Mech Reactor:**

- High Heat & Mass transfer area
- Cutting down Batch Cycle Time
- Low power consumption
- Capacity Expansion
- High mixing efficiency
- Cost Reduction in Process Operation
Filtration & Separation Equipments


Filtration and Separation equipments are used by Petrochemical, Refining, Gas Processing, Pharmaceuticals, Chemicals, Biotechnology, Food, Dairy and Beverage Industries, as well as Environmental Applications.

Uni-Mech offers following equipment in Filtration & Separation Technology

- Centrifuge (Three Point / Four Point)
- Agitated Nutsche Filter
- Vacuum Nutsche Filter
- RO Plant
- Side Stream Filter
- Carbon / Sand Filter
- Candle Filter
- Bag Filter
- Cartridge Filter
- Liquid-Liquid Separator

Agitated Nutsche Filter

Agitated Nutsche Filter is a closed cylindrical flanged end type Agitated Vessel with a jacketed perforated bottom. Agitated Nutsche Filter is used for closed filtration under pressure / vacuum / atmospheric pressure along effective washing.

Uni-Mech Agitated Nutsche Filters are made from suitable materials like Mild Steel, different grades of Stainless Steel, Hastelloy, Mild Steel with Lining or Coating like FRP, Lead or Rubber-Lined, PTFE, Halar in accordance to the Chemical properties.

These machines are used in the manufacturing process of various chemicals, pesticides, insecticides, dyes, food products and pharmaceuticals.

Advantages of Uni-Mech Agitated Filter:

- Reduction in manpower due to no manual handling.
- Toxic and hazardous material can be processed.
- Easy cake discharge.
- Low power consumption compared to other filtration systems.
- Easy to handle solvent wash along with recovery of solvent.
- Combining filtration, washing, re-slurring and drying in a fully enclosed automated unit thus reduction of capital and operating costs.
- Heat transfer surface can be provided on the vessel wall by providing jacket or limpet coil.

Vacuum Nutsche Filter

Vacuum Nutsche Filter is a closed / Open Filtration under Vacuum / atmospheric pressure along effective washing. Nutsche Filter consists of Cylindrical Shell / Rectangular Shell, Top Open / Dish-end with / without Davit Arm attachment.

All filters are manufactured from Mild Steel, Different grades of Stainless Steel (SS316/SS304), Hastelloy, Mild Steel with Lining or Coating like FRP, Lead or Rubber, PTFE, Halar in accordance to the Chemical properties.

These Equipments are used in Dyes & Intermediates, Pesticides, Insecticides, Pharmaceuticals & Food Industries, where Solid-Liquid Separation by Filtration with Safe Solvent recovery, Preventing Atmosphere from Hazardous Chemicals.

Other Filters manufactured by Uni-Mech

- RO PLANTS
- BAG FILTERS
- MEMBRANE FILTERS
- CARTRIDGE / CANDLE FILTERS
- FILTER PRESS
Centrifuge

The robust body of Uni-Mech’s Centrifuges (with basket) is suspended by THREE POINTS or FOUR POINTS. Basket is driven at high speeds resulting in generation of enough centrifugal force to pullout liquids from basket into casing through the basket’s perforated sieves and filter cloths. These machines are available with top discharge, bottom discharge or bag lifting type.

UNI-MECH Centrifuges are made from suitable materials like Mild Steel, different grades of Stainless Steel, Hastelloy, Mild Steel with Lining and Coating like FRP, Lead or Rubber-Lined, PTFE, Haller in accordance to the Chemical properties.

Centrifuges are used in Chemicals, Textiles, Dyes and Intermediates, Pharmaceuticals, Food Product Industries.

Evaporation and Drying Equipments

Uni-Mech specializes in Innovation, Technology-Driven Solution in Drying Technology with specific requirements for food, chemical, pharmaceutical, specialty chemicals, agrochemicals, fine, basic and bio chemicals and waste water treatment Industries. We are offering the design and engineering of Drying equipment and systems to meet the customer’s requirements and drying systems to dry wet materials, ranging from granules, cakes and powders from sludge, slurries and solutions. We work together with our clients to develop and fulfill specific product requirements all under strict confidentiality. To maintain our leading position, we continue to focus on product quality, system reliability, energy savings and emission control.

Uni-Mech offers following equipment in Evaporation and Drying Equipments

- Drum Dryer / Flakers
- Continuous Fluid Bed Dryer
- Rotary Vacuum Dryer
- Roto Cone Vacuum Dryer
- Rotary Dryer
- Vacuum Tray Dryer
- Tray Dryer
- Refrigeration Dryer / Lyophilizer

Drum Dryer / Flaker

UNI-MECH Drum Dryer/Flakers are used to convert solid flakes from slurry by either applying heating media or chilling media, depending on materials and their properties. This is achieved by forming a thin Layer of Molten Slurry. Molten Slurry is fed into a single or double Drum dryer and the materials are dried in single rotation and scrapped out by adjustable scraper Blades. Drum Dryer is made from MS, SS304/SS316, Alloy material and MS with Hard Chrome materials. Enclosure is provided for Vapor extraction by vacuum / blower. It is dust tight so prevent atmosphere and nitrogen purging is possible.

It is widely used in Some Minerals, MCA, fatty acids, caustic soda, Naphthalene, resins, Nickel catalyst, waxes, guar gum, sulfur dyes, Milk products, baby foods, breakfast cereals, fruit and vegetable pulps, starches, spent yeast, and various kinds of glues, pigments and waste products etc.

Special Features:

- Low Cost of operation
- Designed for trouble free operation
- Continuous Process
- High thermal efficiency
- User friendly
- Accomplishment of flaking in a single step with uniform product
Continuous Fluid Bed Dryer

Uni-Mech Fluid Bed Dryer is designed for rapid and uniform drying granular, crystalline, coarse or similar materials in pharmaceuticals, fine chemicals, dyes, food & allied industries.

Fresh air passes through a filter and is heated in a Heating Chamber creating fluidization in product container using diffuser plates and sieve. Fluid Bed Dryer contains explosion flap and pressure relief valve for the safety, in case of excess pressure generation.

MOC: Mild Steel, different grades of Stainless Steel and even cGMP / Non-GMP model is available.

Operated by: Steam, Electrical heater, Thermic oil or hot air

Performance:
- Suitable for Water / Solvent removable at low temperature
- Continuous process

Temperature: up to 135°C

Application: Chemical, Pharmaceuticals, Food products

Salient Features:
- Rapid Heat exchange by granules
- Differential pressure gauges for measuring differential pressure across inlet filters & filter bags
- Pneumatically operated exhaust air control damper (for control of fluidization)
- Inspection window on product container and processing chamber
- Filter bags & sealing arrangement by means of inflatable tube
- CIP system for washing down during product changes
- Fully sealed air control damper with positioners for accurate air monitoring
- Air filtration supplied with HEPA filters
- Online sampling facility

Rotary Vacuum Dryer

Uni-Mech Rotary Vacuum Dryer (RVD) is useful for wet cake/powder/slurry drying at high/low temperature steam/thermic oil in a closed condition with a batch process. This is very effective drying operation with agitator under vacuum and hence process becomes faster and sometimes decomposition / cheering of product can be prevented at higher temperature. Heat sensible product can be dried in this equipment. Any solvent based product is very safe when used in this equipment with effective solvent recovery by condensing the vapor.

RVD is constructed from Mild Steel, different grades of Stainless Steel and even cGMP / Non-GMP model is available.

Benefits:
- Suitable for organic solvent based product
- Drying time reduce due to drying is carrying out under vacuum & Agitator
- Safe for handling of flammable solvent
- Prevent atmosphere from hazardous chemicals
- Suitable for heat sensible product and prevent decomposition / cheering
- Solvent recovery is possible by condensing the vapor

Application:
- Pharmaceutical & Chemical
- Dyes & Intermediates
- Pesticides & Insecticides
- Food Products

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Vacuum Tray Dryer

Uni-Mech Vacuum Tray Dryer is offered in cGMP / Non-GMP models for drying at low temperature (normally below 80 °C) to avoid decomposition / cheering of the product. It is composed of vacuum tight insulated drying chamber with shelves, utility circulation arrangement, special designed door, vacuum system, solvent recovery system, heating system. It is used for processing batch using vacuum for pharmaceutical & Food Industries, Sterilization should be conducted prior to the drying process.

MOC: Mild Steel, different grades of Stainless Steel, Alloy material and even cGMP / Non-GMP model is available.

Operated by : Normally by Hot Water
Performance:
• Suitable for drying at low temperature with solvent recovery
• Suitable for Batch process
Temperature : Normally below 80 °C.
Application : Chemical, Pharmaceuticals, Food products.

Features: The Hot Fluid is Circulate in Hallow Shelves. Vacuum tray dryer is designed in such a way to resolve the client problem with a suitable MOC. Special designed door locking arrangement

Tray Dryer

Uni-Mech Tray Dryer is an enclosed insulated chamber in which trays are placed in trolleys. Fresh air and re-circulated air is heated by Heating Elements and is re-circulated in chamber resulting in heat transfers in materials. Uniform air circulation, controlled temperature, sturdy construction and large working space are the valuable features of the oven. TRAY DRYER is especially designed for Pharmaceutical, Food & Bakery, Chemical and Dyes & Intermediates.

Uni-Mech Tray Dyers are manufactured from materials like Mild Steel, Different grades of Stainless Steel. (cGMP Model is available)

Tray Dryers are operated by Steam, electrical heater, thermic oil or hot air.
Heat Transfer Equipments

Uni-Mech develops, design and produce heat transfer equipment and can offer Evaporation, Crystallization, Distillation, Phase Separation, Liquid-Liquid Extraction and Membrane Separation technology and systems. Uni-Mech Process Engineering designs, fabricates, and tests systems for the petrochemical, refining, gas processing, Pharmaceuticals, chemicals, biotechnology, food, dairy and beverage industries, as well as environmental applications.

Uni-Mech expertise includes Falling Film, Flash and Forced Circulation Evaporators and Crystallizers with Specialty Chemicals and Solutions

Uni-Mech offers following equipments in Evaporation & Heat Transfer Technology

- Various Types of Crystallizers
- Distillation Plant (Continuous / Batch Type)
- Multi Effective Evaporator
- Distillation Column
- Shell & Tube Heat Exchanger
- Shell & Tube Condenser
- Calenderia
- Inter Cooler / After Cooler
- Air Heater
- Chiller
- Finned Tube
- U- Tube
- Fixed Tube Sheet
- Removable tube Bundle
- Coil in Tank
- Heat Exchangers without phase transition
- Coolers and pre heaters for liquids and gases

Heat Exchangers / Condensers

Uni-Mech designs (Thermal and Mechanical) and manufactures a complete range of Shell and Tube Heat Exchangers for cooling, condensing and heating application in fixed tube sheets type, floating head or removable “U” tube bundle type to suit different process conditions and to specific requirement of customer. Uni-Mech designs are as per design Code IS-2825, AMSE SEC. VIII, TEMA, API-660 etc.

Heat Exchangers for processes involving phase transition:
- Condensers
- Falling Film Evaporators
- Re-boilers
- Finned Tube
- U- Tube
- Fixed Tube Sheet
- Removable tube Bundle
- Coil in Tank
- Heat Exchangers without phase transition
- Coolers and pre heaters for liquids and gases

Heat Exchanger Design Range:
- Capacity Range: 0.1 m² to 1000 m²
- Pressure Range: Full vacuum to 100 Kg/cm² g
- Temperature Range: Cryogenic to 500 °C

Materials of Construction:
- Carbon Steel
- Various grades of stainless steel
- Copper
- Duplex Steel
- Hastelloy
- Titanium
- Alloy 20
- Brass

Distillation Plant

A) Batch Type Distillation

UNI-MECH has hand on experience to manufacture Vessels & Columns from almost all material of constructions, used in process Plant industries.

The columns are mass transfer units generally used for the following applications:
- Distillation
- Solvent Extraction
- Gas Absorption
- Packed Column etc.

Columns of various sizes and capacities are manufactured by Uni-Mech with complex internals like single pass perforated trays / double pass perforated trays with TSR (Tray Support Rings) and bolting bars.

Uni-Mech are manufactured even for critical fluids like Ammonia, Nitrogen, Hydrogen, High Pressure Air, etc.

Uni-Mech Columns are made from suitable materials like mild steel, different grades of stainless steel, hastelloy, duplex steel, titanium, etc.
- Shell: Diameter 300 mm to 5000 mm
- Height: Up to 50 Meters
- Thickness: 5 mm to 40 mm
- Design Code: ASME Sec-VIII, Div-1, IS-2825, BS-550
B) Continuous Type Distillation

Uni-Mech designs and supplies fractional distillation System for various aromatic chemicals, fine chemicals, and solvent recovery. The company’s unique design offers high purity and maximum recovery of the product. Uni-Mech also designs systems for heat sensitive chemicals.

Continuous Distillation System
High Vacuum Distillation system is designed for separation of heat-sensitive, high molecular weight or viscous material using structured packing and Falling film or forced circulation evaporator.

Continuous Azeotropic Distillation System is used for separation of Azeotropic compound using third component as an entertainer.

Continuous liquid-liquid Extraction System is extensively used in the chemical industries where separation by distillation is difficult or not possible because of close boiling point of two component. Continuous extraction needs less solvent and less man power compare to batch system.

- Proven and time tested technology for the separation involving very low specific gravity difference
- Highest recovery of the product from mother liquor
- Durable and Demands less maintenance

Applications:
- Fine Chemicals
- Bulk Drugs
- Petro chemicals
- Pesticides

Static Crystallizer

Crystallization is an important unit of operation for manufacturing wide range of chemicals, which are ideal for use in pharmaceutical and chemical industries.

The nature of a crystallization process is governed by both thermodynamic and kinetic factors, which can make it highly variable and difficult to control. Factors such as impurity level, mixing regime, vessel design, and cooling profile can have a major impact on the size, number, and shape of crystals produced. Crystal growth is a layer-by-layer process with less retention time. Crystallization equipment has been classified according to the means of suspending the growing product.

Cooling Crystallizers
- Static Crystallizers
- Draft Tube Baffle Crystallizers
- Evaporative crystallizers
- Forced Circulation Crystallizers
- Freeze crystallizers
- Melt crystallizers
- Oslo Crystal Crystallizers
- Vacuum Crystallizers and many more

Multi Effective Evaporator

Uni-Mech Multi Effect Evaporators are the equipment in which steam from an outside source is condensed in the heating element of first effect. The boiling temperature at which the first effect operates is high enough so that the evaporated water can serve as the heating medium for second effect. The vapors so formed are then sent to a condenser if it is a double effect evaporator. The feed for the multi-effect type evaporator is generally transferred from one effect to another. This leads to the ultimate product concentration to reach the desired effect through the evaporator.

Uni-Mech offers many Evaporators like:
- Falling Film Evaporator
- Thin Film Evaporator
- Forced Circulation Evaporator
- Rising Film Evaporator
Size Reduction & Mass Mixing Equipments

With continuous R & D & experience of over two decades in designing various process applications at Dyes & Intermediates, Pesticides, Pigments, Fine & Aromatic Chemicals, Pharma Bulk Drugs, out of all these process applications Uni-Mech has developed Size Reduction & Mass Mixing Equipments.

Uni-Mech offers following equipment for Size Reduction & mass mixing applications.

- Ribbon Blender
- Ball Mill (Batch / Continuous)
- Lump Crusher
- Impact / Micro Pulverizer
- Sigma Mixture
- Coating Pan
- Roto Cone Blender

Ribbon Blender

Ribbon blender is used for uniform, homogeneous and quick mixing of powders and semi-wet materials of different densities by specially designed helical ribbon agitator. It can be used for Pharmaceutical, Food, Chemical, Dyestuffs & Pigment etc.

For Pharmaceutical Industries, Ribbon Blender is called as Mass Mixture. Uni-Mech manufactures Continuous type and Batch type Ribbon Blenders. Uni-Mech also designs Ribbon Blenders for Chemical Reactions with Heating & Cooling applications.

Ribbon Blender Design Range:

- Capacity range: 5 liters to 15000 liters
- Material of Construction: Various grades of Stainless Steel, Mild Steel, Hastelloy (cGMP model is also available).

Special Features

- Homogeneous Mixing
- Dust Free Operation
- Easy Handling & Operations
- Top Charging & Bottom Discharge through Butterfly Valve / Sliding Gate

Ball Mill

BALL MILL is an equipment that is used for size reduction and homogeneous mixing of wet and dry materials effectively. Uni-Mech manufactures specially designed Batch type and Continuous type Ball Mills ranging from 2 Kg to 10000 Kg capacity.

Uni-Mech has also designed Ball Mills with/without Jacket/Limpet Coil based on chemical properties and process requirements. Uni-Mech also provides hood to unload material with dust prevention arrangement on client request. Pitch Gear arrangement is also provided on client request for safety provision.

Special Features:

- Ball mill can be provided in MS / Various grades of stainless steel / Alloy material
- Jacketed arrangement for heating or cooling applications
- Custom - designed to suit your requirements
- Noise free operation
- Stable performance and easy installation
- Easy maintenance and operation
- Dynamically balance equipment
Impact Pulverizer

Impact Pulverizer is most commonly used for size reduction equipment by a crushing action. Impact Pulverizer is impact action at high speed, air swept, swing hammer type, multipurpose grinding mills capable of grinding soft to medium hard minerals & chemicals.

Impact Pulverizer impacts the heavy load on molecules of dry material and resulting outcome may divide / shear many molecules. This equipment has a dynamically balanced rotor, which rotates at high speeds. Uni-Mech manufactures multi-purpose Pulverizers / Crushers. These include Impact Pulverizer, Micro Pulverizer, Lump Crusher etc.

Lump Crusher

Lump Crusher is one of the simplest equipment for crushing and reducing the size of lumps, coals and rocks by an action of impact shear and compression.

Lump Crusher is made from SS316 / SS304 / MS plate with a sturdy hopper. Body is mounted on a channel frame. Pins, Bitter or Cutter are welded on Static balanced rotor. Breaker plate is a stationery part of the crusher and crushing action will happens between the rotor and breaker plate.

Performance: Soft materials such as chemical lumps, Ice, limestone, phosphate rocks, cement rocks, etc. is suitable in crusher for the size reduction.

Specifications: Crusher Size is available in ø6”x24”, ø12”x24” and ø15”x30” (GMP Model is also Available)

Applications: It is used in Chemicals, Dyes and Intermediates, Cement, Coals, etc. Industries

Impact Pulverizer Design Range :

- **MOC:** Cast Iron, Mild Steel and different grades of Stainless Steel (cGMP Model is also available)
- **Capacity:** Impact pulverizers are available in 6”, 12”, and 18” rotor diameter size with a cyclone separator.
- **Applications:** It is used in Chemical, Dyes and Intermediates, Pharmaceuticals, Food products, & Minerals industries.

Outstanding Features of Impact Pulverizer:

- Cold, silent and Dust free operation
- Robust construction
- Low power consumption
- Guaranteed grinding efficiency. Particle sizes are finer and more uniform than those obtained from machines using screen
- Dynamically balanced rotor

Process System

UNI-MECH understands the Industrial problems and develops some important utility systems with their unique features.

UNI-MECH has designed indigenous system like:

- Cooling / Heating System (HWS)
- Filter Cleaning System (FCS)
- Chilling System / Chilling Plant
- Pressure Reducing Station
- Air Handling Unit
- Material Conveying System

Cooling / Heating System (HWS):

Hot / Cold Water System is the most commonly used in versatile and compact fully automatic skid mounted unit. It is designed with higher energy efficient solution on heat Transfer requirements. It is operated by way of Steam / Electrical / Solar / Brine Water etc.
Storage Tanks

Uni-Mech manufactures Storage Tanks / Vessels ranging from 1 KL to 350 KL in capacity.

Storage Tank is designed for Mechanical / Process Chemical as per IS-2825 / ASME Section-VIII, Div. – 1 / API 650 / IS 803.

The main application of the tank is in Pharmaceuticals, Fine Chemicals, Petro-Chemicals, Dyes and Intermediates, Fertilizers, Refineries, Dairies and Food Product Industries.

Many times, inside the storage tank lining, bonding is done with Rubber / FRP / Lead / Tile / Brick / Glass / PTFE / Haller / SS Cladding etc.

Filter Cleaning System (FCS): Manual/Automatic Filter Cleaning System is used for Filter Cleaning in AHU areas. UNI-MECH manufactures the system complete with washing, scrubbing and drying of single / double Filters (600x600x300 mm approximately.)

Chilling System / Chilling Plant:

Applications:
- Pharmaceutical / Chemical Plants
- Food
- HVAC
- Hospitals
- Hotel
- Breweries

Features:
- Compact & Indigenous Design
- Customized solutions to meet all process requirements
- Easy Installation
- PID controllers with PLC systems

Design Range:
- MOC: Carbon Steel / A515 GR. 60/70 / IS 2002 / IS 2062 / Stainless Steel SA-240 GR 304, 304L, 316, 316L, 321 / Clad Material / Non-Ferrous / Alloy materials
- Capacity Process: 0.1 KL to 350 KL
- Parameters: Measured/Performed by Manhole/Nozzles
- Lining: Rubber / FRP / Lead / PTFE / HDPE

Raw Material Storage Tank:
- Silo Tanks
- Pressure Tanks- Ethylene Oxide & Petroleum Tank, Air Receiver
- Horizontal Tanks
- Vertical Storage Tank

PROCESS STORAGE TANK:
- Batch/Measuring Tanks
- Receivers

FINISHED PRODUCT STORAGE TANK:
- Solid Material Storage- SS Bin, SS Containers

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