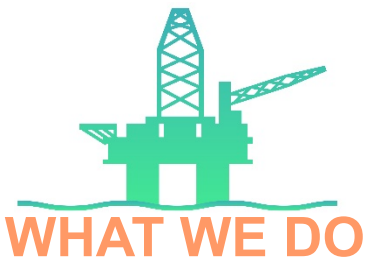


FDAN

EQUIPMENT & ENGINEERING SUPPLY GMBH





FDAN Equipment & Engineering Supply was established with the aim of providing technical engineering services in Oil, gas and petrochemical industry. We continued later by providing engineering and equipment procurement consulting services in the field. In this regards we are focused on equipment and raw materials such as Piping Material (pipes, fittings, Flanges, Valves), Instruments (Control valves), Rotary Machines (Pumps and Compressors) and Process equipment. As a result of the planning and efforts of our team, this company has left a reasonable record in the fields of design, engineering and supervision of the implementation of various projects, and its continuous and successful activities always has a deep commitment and attention to meet the needs of Clients and made it as main activities a priority to fulfill its obligations to customers and projects owners by creating value in quality, time and cost of projects.

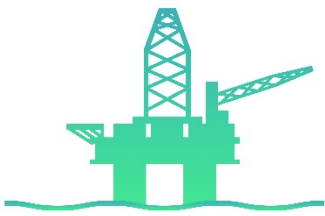


FDAN Equipment & Engineering Supply Company relies on good relation to its clients and the experiences that we made with its teams in providing equipment and engineering supply with, consulting and supervision in Oil and Gas, Petrochemical and Energy industries.

This Consulting Engineering with specialized and experienced team and its scientific and experimental support, by using the latest technology and engineering methods and international standards and emphasizing the principle of customer satisfaction, meet the needs of engineering and industrial consulting and in a sustainable interaction With clients and partner companies, it has provided new solutions to solve the problems of various industries and has been able to gain a significant share in international markets and has succeeded in providing a wider and higher quality services to customers.

Diversity and quality of engineering consulting services along with the experienced staff of this Consulting Engineering and cooperation with leading international and regional companies has made it possible to provide consulting services at any level and has created suitable opportunities to provide capabilities.

FDAN Equipment & Engineering Supply, with the aim of developing technical knowledge and transferring new technologies, has formed cross-sectional or long-term cooperation with reputable international companies and intends to establish a number of companies with the participation of local partner companies. In this regard, in order to focus on the target markets of the Far East, the company FDAN Global Limited was registered in Hong Kong, which subsequently gained significant experience and success in the East Asian market. In order to expand our business in China main land also we have started our operation by helping our chines new sister company “FDAN SHENZHEN Trading Co. Ltd”. We return back to this operation later in May 2021.



Services and Products

FDAN Equipment & Engineering Supply is able to provide a wide range of technical and engineering services by relying on the ability of professional team with years of experience in designing and providing engineering services for oil, gas, petrochemical projects. Also, the specialists of this department, with their continuous efforts in acquiring the latest knowledge and technology in this industry, are in charge of controlling and closely monitoring the technical specifications of the equipment being provided by the commercial department of this company.

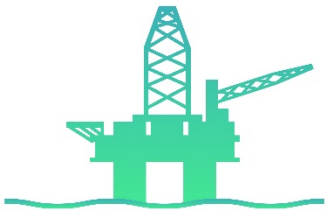
Equipment and Material Supply

Process Fixed Equipment,
Design, Engineering and Manufacturing

Process Packages

Engineering Services





Equipment and Material Supply

FDAN Equipment & Engineering Supply was established to supply equipment and raw materials required for Oil, Gas and Petrochemical industries and projects. Relying on the capability of skilled Engineers and technical and commercial specialists, long term relation and experiences with well—known manufacturers, made able this company to achieve a suitable position in the field of equipment and material supply. In this regard, in order to optimize the process of activities, the company implemented and obtained the required standards in order to satisfy customers by providing timely and quality of standard goods.

The company's specialized divisions are focused on the supply of pipes and fittings, valves and control valves, pumps and compressors and fixed equipment. Our main target is to understand our Customers' needs and allocate and assign the reliable sources to them. For this purpose, the company has signed some Partnership/dealership agreement with reputable equipment manufacturers.

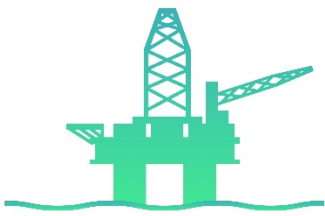
Piping Material

- Pipes, Fittings, Flanges
- Manual (on/off) Valves
- Control Valve

Rotary Equipment:

- Process Pumps
- Compressors





Piping Materials

Pipes, Flanges and Fittings

WHAT IS A STRATEGIC PLAN for Piping Material Procurement?

Oil, Gas and Petrochemical Plants must do all they can to ensure a steady supply of product to distributors and consumers. An infrastructure of pipes that carry oil and gas across the plants or in bigger scale a country and around the world is, therefore, essential. Parts such as piping materials, fittings, Flanges, Reducers, ...must be durable and resilient, so maintenance and repairs do not interrupt the supply of product.

There are Elements like corrosion (due to chemical composition of the flow), Temperature, and pressure on both side of a piping system which determine the type of material, thickness and other physical character of the piping materials. Thus, choosing the right materials for pipes and connections have considerable effect on a project and future of the Investment. Here are just a few of the most common different types of materials used in the oil and gas industry.

In a project like a petrochemical plant or refinery, there will be many different types of pipe, with different material, demotions and characteristics. Sometimes this is a list of over thousand items. There is no manufacturer or stockiest in the world who has this range of product range. It is an engineering and commercial process to source out from different resources, this wide variety of products.

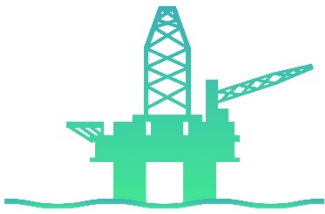
FDAN supply you and your projects with complete package of piping Materials, pipes, fittings and flanges. We always consider a combination of referring to available Stock and production from Mills.



- **CARBON STEEL PIPES**
A106 Gr.B – C / A333 Gr.6 / A53 / API5L
Gr.B-X42-X52-X60-X65 / EN 10216-10210-10219
- **ALLOY STEEL PIPES**
A335-P1/P5/P9/P11/P12/P22/P91
- **STAINLESS STEEL PIPES**
A312-TP304(L)/316(L)/321(H)
- **FITTINGS AND FLANGES**
to correspond with all A/M qualities

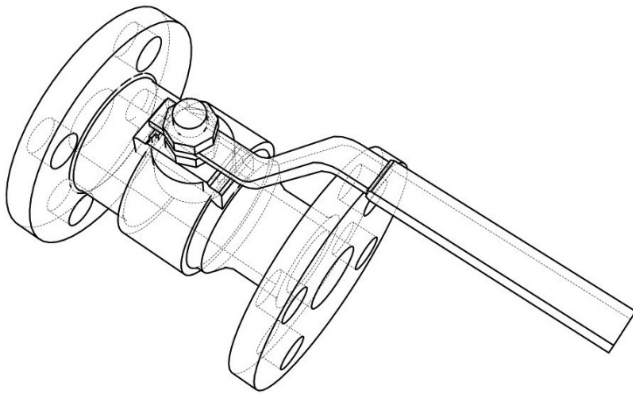
Our Main Suppliers:





Manual Valves

Valves are a vital part of any piping system, which means that they play a key role control the flow in the oil, gas and petrochemical plant. We have been in contact with many valve manufacturers during the years of activities for many different types of applications, considering type of the valve, related manufacturing technology, materials and other specification. FDAN can supply you and your project valve a complete list of your inquiry with almost no technical deviation from manufacturer or available stock.

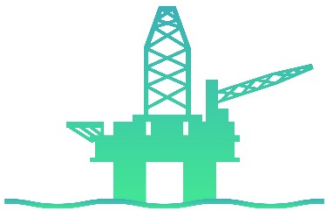


We are focused on valve industry in both direction of production and stockiest. We have the experience to provide a quotation by mixing of available stock and refer to production, considering your:

- Budgets
- Delivery time
- Technical requirements
- AVL (approved vendor list)

Manual Valves Types that we are supplying:

- Ball valve
- Gate valve
- Globe valve
- Butterfly valve
- Plug valve
- Needle valve
- Diaphragm or Membrane valve
- Knife valve
- Pinch valve
- Piston valve
- Solenoid valve
- Spool Valve



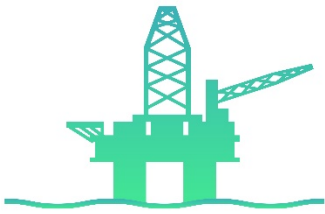
Control Valves

Considering that in general Control valves can be classified into two main types, based on the stem movement: Sliding and Rotary, and Apart from our experiences with manual valve, through dealing with control valves we have made established contacts with well-known actuators manufacturers. The majority of control valve manufacturers normally manufacturer the pneumatic actuators themselves and outsource the electrical actuator. We can supply your projects and inquires of different type of control valves by referring to the right manufacturers in order to meet your technical / commercial demands.



Control Valves Types that we are supplying:

- **Sliding Stem**
 - Globe valve
 - Angle body valve
 - Angle seat piston valve
- **Rotary**
 - Butterfly valve
 - Ball valve
- **Other**
 - Pinch valve
 - Diaphragm valve

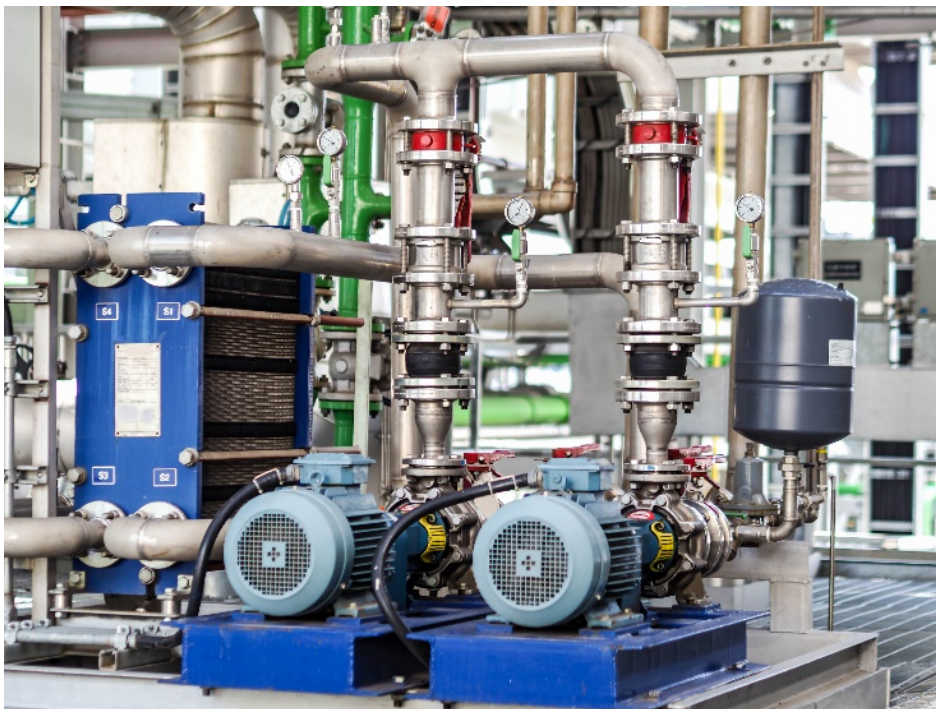
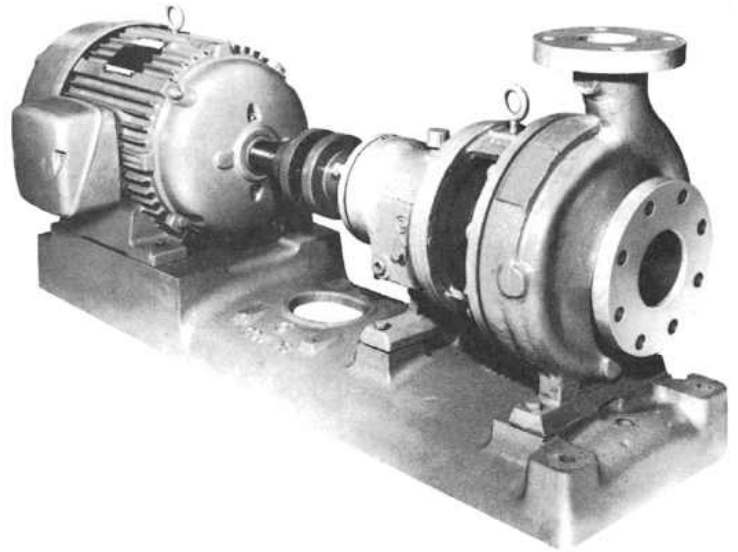


Rotary Equipment

Process Pumps

We are offering a broad range of process pumps by cooperating with limited well-known Pump manufacturers to meet and provide the Technical requirements or duties in different type of applications within the Oil & Gas, Petrochemical industry sector. Pumps are a source of energy consumers in production plant and we are focused on low consumption of energy and optimum operation in order to minimize the operation costs.

Positive-displacement, centrifugal and axial-flow pumps are covering the most demanding application in Oil & Gas, Petrochemical industry considering standards such as: ISO, API, Hydraulic Institute and ANSI/ASME. Additionally we offer fire protection pumps and systems designed and manufactured to meet the latest NFPA standards.



FDAN offers following different Types of Process Pumps:

- Centrifugal pumps.
- Reciprocating plunger pumps.
- Progressive Cavity pumps.
- Gear Pumps.
- Diaphragm pumps.
- Metering pumps



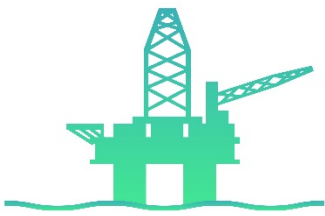
Compressors in Oil and Gas Industry

We are supplying Compressors which are used for providing gas pressure required to transport gas with in pipelines and to provide required pressure in process or production. During years we have approached to some well-known compressor manufactures and provide their products in different projects. No need to remind that Compressors are one of the main investment in any plant. A non-functioning Compressor cause plant shut down or fall in production. We understand this importance and provide our clients the best durable solutions.



Compressor Types that we offer:

- Rotary Screw Compressor
- Reciprocating Air Compressor
- Axial Compressor
- Centrifugal Compressor
- Free Oil screw Compressor

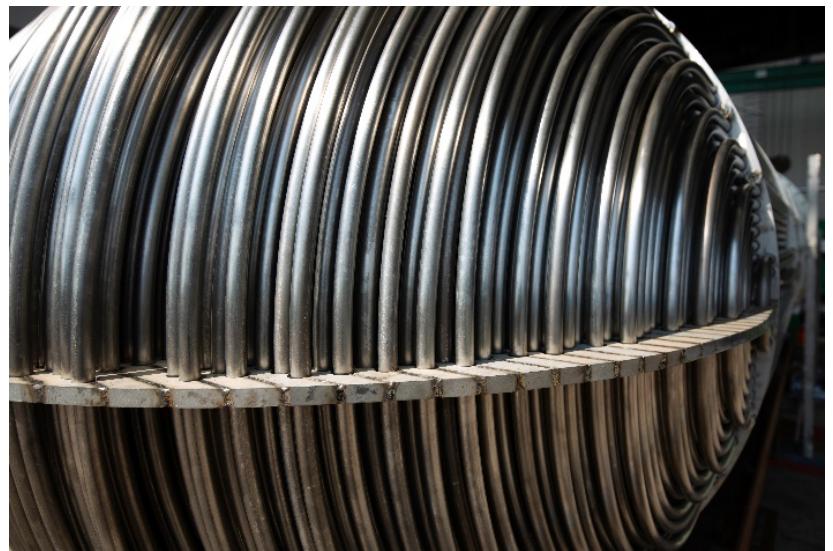


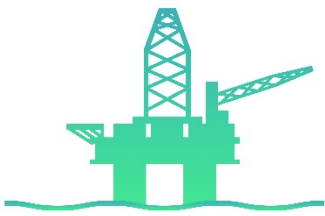
Process Fixed Equipment

FDAN Equipment & Engineering Supply, backed by its Expert Engineering Team is able to perform basic design and detailed design, final design and engineering, generating process and mechanical documents, and manufacture and commission the equipment. We understand your requirements and demands of the process and we are ready to offer our solutions to minimize energy consumption and maximize efficiency. Our target is to meet your technical requirements along with investment restrictions by offering the latest engineering practices.

Process Equipment

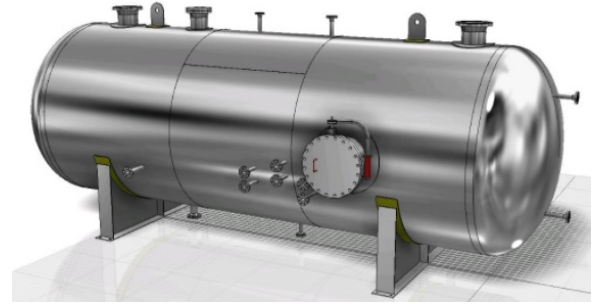
- Pressure Vessels (Drum)
- Heat Exchangers
- Storage Tanks
- Filtration Equipment
- Dry Gas Filters
- Filter Separators
- Gas Scrubber
- Multi Cyclone (Scrubbers)
- Filter Coalescers
- Process Columns
- 2/3 Phase Separator
- knockout drum
- Reactors
- Flare Stacks
- De-Oiler





Pressure Vessels

We design, engineer and manufacture pressure vessels according to EN 13445, ASME Boiler & Pressure Vessel Code (BPVC) Section VIII, BS 5500, AD Merkblätter in different applications. Quote, design and fabricate faster and smarter with the leading ASME pressure vessel software. COMPRESS saves Engineering hours, prevents mistakes, and helps shorten equipment delivery times. It combines comprehensive ASME® calculations with cost estimating, solid modeling, and automatic drawing



We Quote, design and fabricate more efficient with the leading ASME pressure vessel software's like PV-Elite or COMPRESS, which save Engineering time, prevents mistakes, and helps more organize MTO' ordering, shorten equipment delivery times. It combines comprehensive ASME® calculations with cost estimating, solid modeling, and automatic drawing generation.



Heat Exchangers

FDAN offers design, engineering and manufacturing wide range of heat exchanger as follow:

- Shell and tube heat exchangers.
- Double pipe heat exchangers.
- Plate heat exchangers.

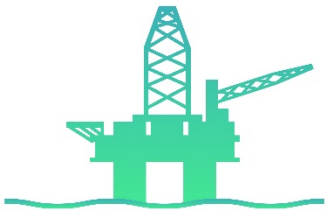
According to ASME TEMA.

Storage Tanks

We design, engineer and commission Oil storage tanks, some with capacities of more than 390,000 barrels (more than 16 million gallons), to store crude oil, intermediate stocks (partially refined), finished products, and chemicals.

- Fixed-roof tanks.
- External floating roof tanks.
- Internal floating roof tanks.
- Domed external floating roof tanks.
- Horizontal tanks.
- Pressure tanks.
- Variable vapor space tanks.
- LNG (Liquefied Natural Gas) tanks.





Filtration Equipment

FDAN provides design, engineering and manufactures Filters which are used in just about every process equipment package within the oil, gas and petrochemical industry. Their function is to remove impurities in different process systems such as fuel gas, glycol dehydration units or glycol dehydrators, oil lubrication, and even the main inlet gas feed to a gas plant or compressor station.



Dry Gas Filters

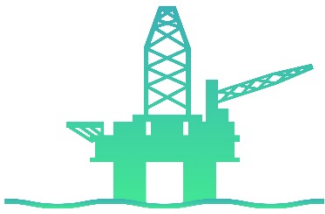
We design, engineer and manufacture dry gas Filters which are mainly used to remove the remaining solid particles in gas pipelines (solid particles) especially in reducing pressure stations or compressor stations. The internals called “dry filter element” can be designed in different dimensions and aspects, considering the defined life cycle, and service interval, and can be replaced accordingly.

Filter Separators

FDAN designs and produces filter separators to separate solids and liquids from flow of (natural) gas. Specifically, to remove impurities such as pipe scale, water, iron sulfide, liquid hydrocarbons, compressor lube oil and sulfur products from the natural gas flow in pipeline.

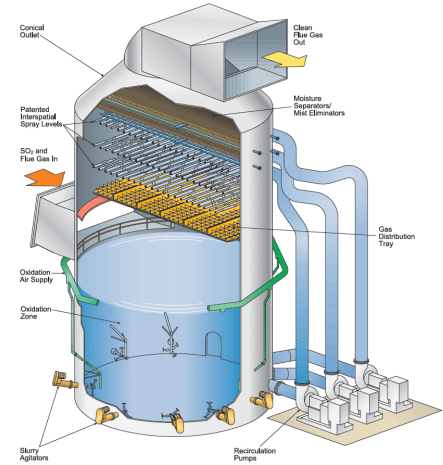
- Flexible designs
- Custom sized vessels and internals
- Built to ASME code





Gas Scrubber

We design, engineer and manufacture Gas Scrubbers which work by spraying a liquid to flow of Gas in order to absorb the solid particles or unwanted chemical gaseous parts like NO_x, SO_x. In the next stage we can remove the sprayed liquid from the flow of Gas. There are some variations in design of scrubbers. For example, some scrubbers may use other chemicals such as lime or magnesium oxide to react with the SO₂ in the flow of gas.



Multi Stage Gas Filter (Multi Cyclone)

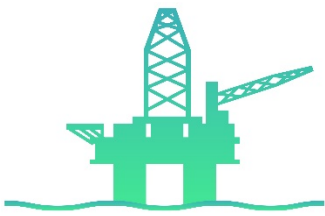
We provide a Multi Stage Gas Scrubber. We define normally 2 stage. In first stage we utilize a Multi-cyclone which based of centrifugal force removes solid particles and liquid droplets from a flow of gas. This equipment is stationary and this is the flow of gas that rotate during passing through the Cyclone tube. Higher efficiencies and lower pressure drop make Multi Cyclones a good candidates for removal of bigger particles and droplets. In the next stage, we remove the remaining solid particles and liquid droplets, which are smaller with dry gas filter or coalesce filter cartridges.

Filter Coalescer

We are offering Coalescing filter cartridges as a device used to produce larger droplets of liquid in flow of gas by agglomerating smaller ones. Then at the outer layer of these filters, we have the possibility to separate these larger droplets from the flow of Gas. This filters also has a possibility to trap the solid particles.

Interval of replacement, and numbers of filters are important operating cost functions.





Process Columns

FDAN provides design and manufacture range of distillation column which is basically a tall vertical vessel in which crude oil or in general heavier products are heated and separated into its components. The first process in the refining of crude oil is fractional distillation which is carried out in a tall steel tower known as a distillation column.



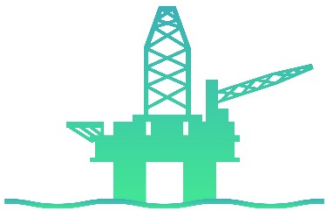
2/3 Phase Separator

FDAN designs and manufactures in advanced application of physical separation 2-3 phase separator. A vessel that separates a multi-phase flow like the well fluids into liquid phase (oil and Water also get separated as well), gas and solids. A three-phase separator can be horizontal, vertical. This can be called free-water because it can separate gas, oil and free water and solid particles. We offer design, engineering and manufacturing different type of 2, 3 and even 4 phase separator.

knockout Drum

FDAN supply different knockout drums which are used to remove any oil or water from the relieved gases. Gas Flow travels upward at a designed velocity which minimizes the entrainment of any liquid droplets as it exits the top of the vessel.





Petrochemical Reactors

We offer petrochemical reactors which are enclosed volume in which a petrochemical reaction takes place. In petrochemical engineering, it is generally understood to be a process vessel used to carry out a chemical reaction, which is one of the classic unit operations in petrochemical process analysis.

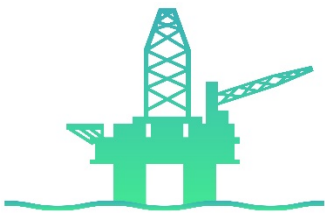


Flare Stacks

In oil and gas production units or petrochemical plants we offer different type of flare stacks which are primarily used for burning off flammable gas released by safety valves during unplanned over-pressuring of plant equipment. During plant or partial plant startups and shutdowns, they are also often used for the planned combustion of gases over relatively short periods.

De-Oiler

We are offering design, Engineering and Manufacturing different types of De-oiler in Oil, gas and petrochemical application.

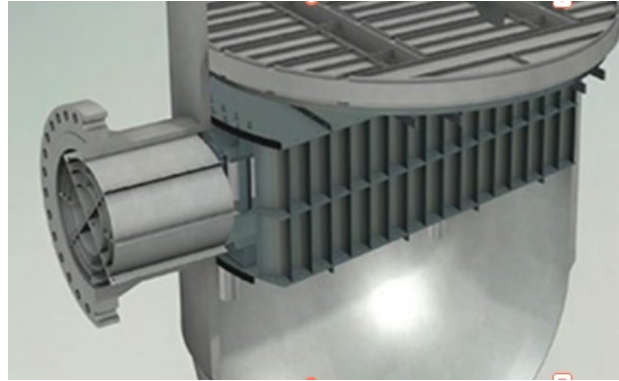


Internal for Separation

Normally in oil, gas and petrochemical process we do physical separation of liquid (oil)/gas/solid in a pressure vessel. That means when we are dealing with a mass flow of 2-3 phase, we pass the flow through a pressure vessel. There are several mechanisms that we can do the separation like: Gravity, inertia, Centrifugal force. Based on these mechanisms we design some parts called "Internal" which will be installed in the pressure vessel in order to perform the requested physical separation function.

Flow Inlet Distributor

FDAN designs, engineers and manufactures different type of flow Distributor in order to control the flow entering the pressure vessel and make the preparation function for next separation stage. In this product, the target is to remove as much as possible separate the liquid flow from gas flow.



Demister Pad / Wire mesh

We consider Demister Pad or Wire mesh in order to deal with smaller droplets of liquids and pass the flow which contains these droplets through Demister Pad or Wire mesh to build up bigger droplets to ease the separation function.



Internal for Separation

Vane

We design, engineer and manufacture different type of vane type separators, in order to overcome pressure drop and keep the momentum of the flow, by changing the direction of the flow in vane pack separator, we have the chance to trap the liquid droplets, which have heavier molecular weight compare to gas, and clean the gas flow from them.



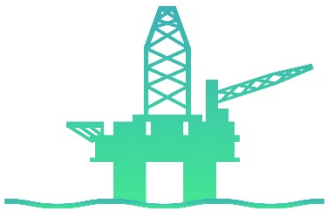
Cyclone/Vortex Tube

FDAN provides Cyclone separators or simply cyclones which are type of separation devices (used normally in dry scrubbers) based on principle of inertia utilize to remove mainly solid particles from the flow of gases. It is important to note that this is the flow which rotates in the Cyclone/vortex tube, and there is no rotary devise in this internal. Therefore due to Centrifugal force heavier particles, move the extern layer and we have the chance to remove them.

Filter cartridges / Filter Coalescence (Coalescer)

FDAN supply wide variety of Filter cartridges in order to provide the cleanest flow of gas. With dry gas filter, we filter very fine solid particles from flow of Gas and by Coalescence filter we can remove the very tiny droplet of liquid from the flow of Gas. It is important to note that Coalescer elements, do not separate anything, they just help us to produce bigger droplet of liquid from smaller ones during passing the flow through them.





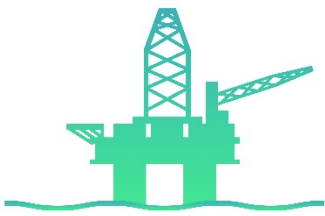
Process Packages

During the past years' experiences, we have supervised design, engineering and erection of many process packages. We have been approach some process licensor and designers and we have executed some projects. Here are the list of packages that we have focused in the last years:

List of Process Packages

- NITROGEN Generation Package
PSA, Cryogenic
- Hydrogen Generation Package
- MOT (Mobile Oil Treatment)
- SRU (Sulfur Recovery Unit)
- HOMOGENIZATION SILOS
- EXTRUDER & PELLETIZING UNITS
- Chemical Injection Packages





State of the art Design and Engineering

FDAN Equipment & Engineering Supply, with support of its technical staff and strong engineering background, has the ability to perform consulting activities, basic design and detailed design, preparation of technical specifications for equipment. In general, the scope of activity of this company is related to the manufacture of equipment in the oil, gas, petrochemical and energy industries.

Engineering Services

- **PV-Elite**

Design of Pressure Vessel and Heat exchanger Equipment using PV-Elite

- **Nozzle PRO**

Design and Analysis for Piping and Pressure Vessel Components using Nozzle pro

- **CFD (Computational Fluid Dynamics)**

Fluid Flow Simulation with CFD software such as ANSYS Fluent, CFX, COMSOL and OpenFOAM

- **SolidWorks, AutoCAD**

Design and Modelling the Geometries with CAD, CAE and CAM software such as AutoCAD, SolidWorks, CATIA, 3D Max, PDMS and Rhino

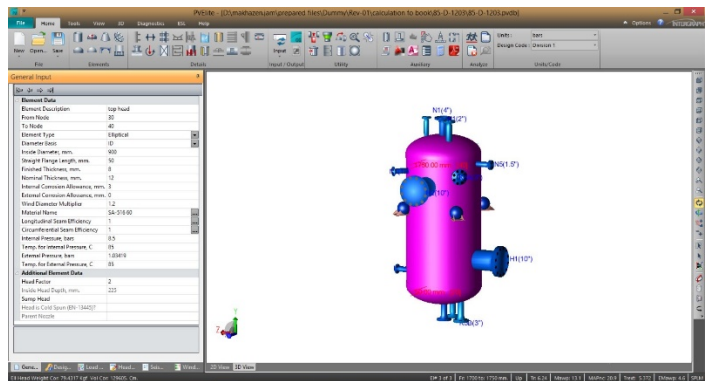
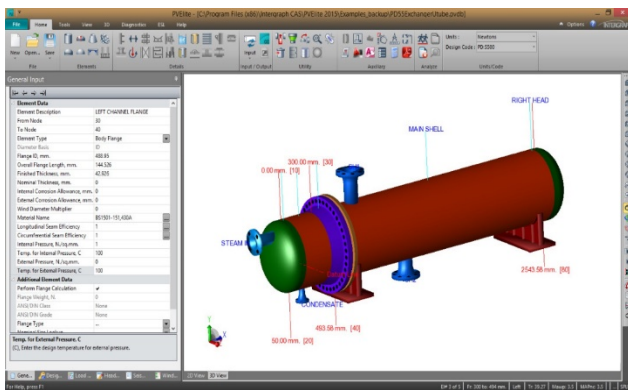
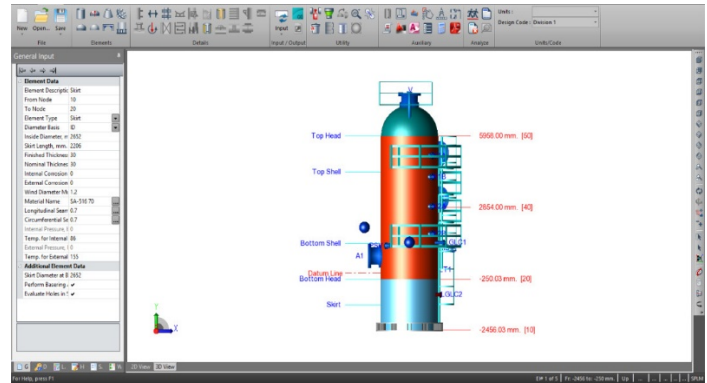
- Engineering Calculation for Defining the Dimensions using Matlab or Python code and Excel Sheet
- Discretization of Fluid and Solid Domain with Mesh Generation software such as Gambit, ICEM and Pointwise
- Mechanical and Stress Analysis with FEA software such as ANSYS, Nastran and Abaqus
- Thermal and Chemical Process Design and Simulation using HTRI and Aspen Hysys





Pressure Vessel Code Calculation PV-Elite

Design and Analysis of Pressure Vessel and Heat exchanger using PV-Elite
We do design, engineering and code calculation of Pressure Vessel & Heat Exchanger by PV Elite and Tank which are the most complete solutions for designing and calculation of pressure vessel and heat exchanger.



NOZZEL PRO

Design and Analysis for Piping and Pressure Vessel Components using Nozzle pro.
Nozzle/Pro is designed specifically for the instances where excessive conservatism or dangerous designs might result from dated and often inadequate simplified techniques. Nozzle/Pro is 'sharpening the pencil', and eliminating uncertainty in a calculation.

"Nozzle/PRO 6.0" - File: C:\PRGSOFT\example

File Units Input Screens RUN ANALYSIS Results APPRO Help

Base Shell Type
 Hemispherical Head Elliptical Head Conical Head Flat Head
 Cylinder Dish Head Flare Head

Cylinder Geometry
 Outside Diameter (mm): 520
 Wall Thickness (mm): 25
 Total Length (mm):
 Hillside Offset (mm):
 Nozzle Location (mm):

Pad Reinforced Nozzle Geometry
 Outside Diameter (mm): 60
 Wall Thickness (mm): 25
 Nozzle Length (mm): 50
 Pad Width (mm): 4
 Pad Thickness (mm): 25
 TR Angle (deg.):

Nozzle / Attachment Type
 Straight Pad Barrel Structure Saddle Pipe Shoe Gusseted Nozzle

Units
 English SI Shell Mat'l same as Nozzle Yes No

Blue - Optional

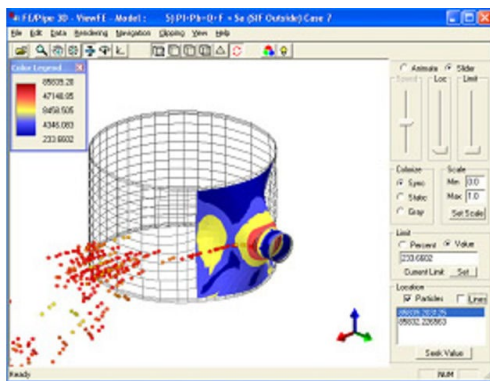
Loads Orientation Title Help Run FE EXIT
 Options Material ALLPRO Get MeFin Print Files Plot Only

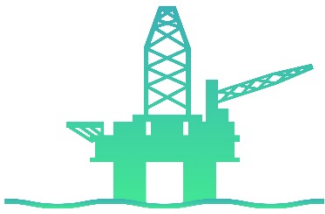
FEA made easy...

CODE COMPLIANCE
 ASME Sec VIII Div 2
 ASME Fatigue Analysis

SIFs Steady State & Transient Heat Transfer
 Flexibilities Seismic & Offshore Analysis
 Allowable Loads Axisymmetric & Brick Skirt Supports

Diagram labels: Outside Diameter, Tilt Angle, Pad Width, Nozzle Length, Nozzle Wall Thickness, Pad Thickness.



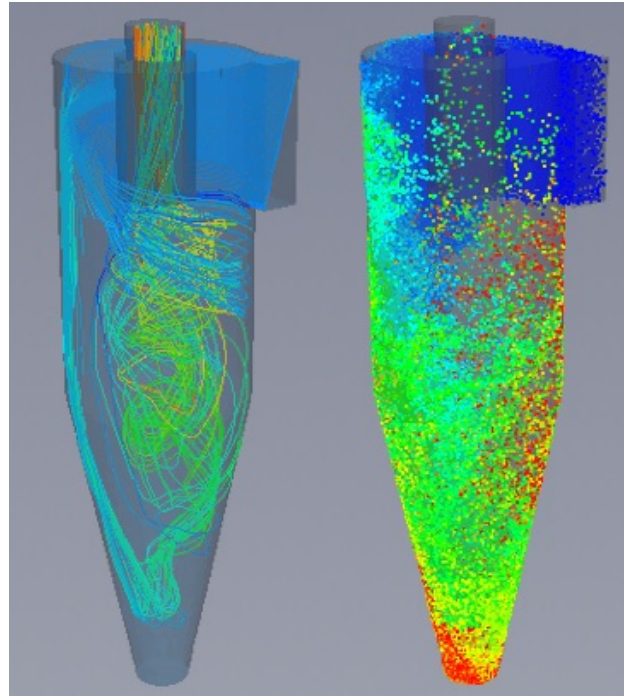


CFD

(Computational Fluid Dynamics)

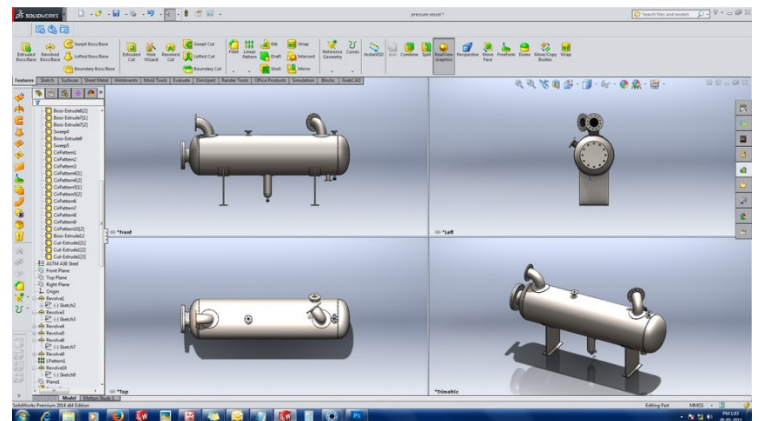
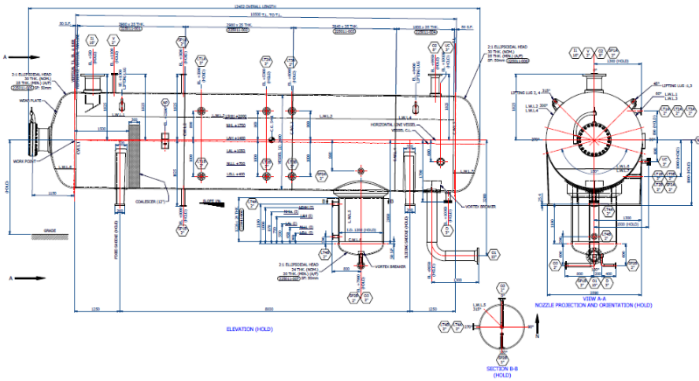
Fluid Flow Simulation with CFD software such as ANSYS Fluent, CFX, COMSOL and OpenFOAM

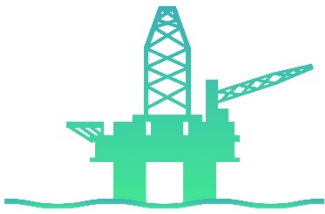
With the benefit of Computational Fluid Dynamics (CFD), we are able to measure and define any fluid variables such as density, pressure, velocity and temperature in any location of flow field for different physics and geometries such as flow inside separators, heat exchangers, pumps, compressors etc. We are using different commercial software and some homemade CFD codes to make sure our results are valid and we are able to simulate and numerical analysis of different thermo-fluid problems.



SolidWorks, AutoCAD

Design and Modelling the Geometries with CAD, CAE and CAM software such as AutoCAD, SolidWorks, CATIA, 3D Max, PDMS and Rhino.





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