

Reactor Ara Resin

Design, construction, and commissioning of resin production line

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Attachment: 3 sheets

In the Name of God

Dear Mr. Talebi,

Hereby, we would like to inform you that following the visit and meeting in the last week, the necessary equipment, the appropriate and suggested material type in order to production line of alkyd resins accompanied with the price, are presented as follows:

In addition, our specialists are ready to provide any advice on how to improve, collaborate on this process, commissioning, build a pilot and set up the required laboratory, as well as provide formulations, training on the production of various alkyd resins, saturated and non- saturated polyesters, vinyl Ester, epoxy ester, phenolic resin (roswell and novolac), phenol formaldehyde and so forth.

Also, it is worth noting that all the necessary items including design, type of equipment, and material type are available in the company's proposed system. However, if requested by the company, the following items can be changed.

1. A Reactor with a capacity of about 6 cubic meters (6000 liters)

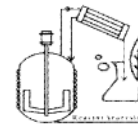
- Main wall is made from stainless steel 316L

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- Press and the edge of reactor's lenses with the depth proportional to the maximum speed in the resin reaction, made of steel 316L
- Thermal fluid (oil) wall in the form of stainless steel coil lens 430L, 410L
- Cooling coil made of high-pressure Manysman stainless steel pipe class 10, 340L
- Clamping Torques capable to be opened and closed, and solid shafts for the fastest response in stainless steel resin
- Flange pipes on the reactor in order to charge and circulation, light and observation are made from steel 316L and 304L
- N2 or Co2 or O2 Gas Injection Tube that is made from stainless steel 316L
- Locating Pressure Gauge, Vacuum, Safety and Temperature Valve
- Side glasses on reactor, made of stainless steel 304L and 316L, and security glass.
- Locating the outlet valve under the reactor and locating the sampling valve that is made from stainless steel 316L
- Manhole lid that is made from stainless steel 316L
- 4 pickets in order to reactor placement on an iron platform
- **Electromotor with European brand and gearbox suitable for resin, viscosity, volume and density**

2- Double-wall vertical column (vertical column)

- First wall with the required height for quick reaction a prevention system for preventing exit and throwing of glycols that is made from stainless steel 304L
- Second wall for cooling system that is made from stainless steel 304L
- Packing charge and discharge system with SideGlass of light and observation in order to better monitoring that is made from stainless steel 304L
- Flanges and fittings to the reactor and condenser with the capability of circulating and changing direction that are made from stainless steel 304L
- Locating the temperature sensor

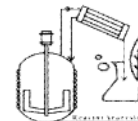
3- Condenser

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- The inner tubes of class 40 and Manysman in number and size proportional to the reactor that are made from steel 304L
- Condenser Cooling Wall that is made from stainless steel 304L
- Having multiple baffles for maximum heat exchange efficiency, that are made from stainless steel 304L
- The beginning and the end doors of condenser in the form of Lens-Flange with the capability of easy opening and closing that are made from steel 304L
- Having vent system for safety and gas outlet, made of stainless steel 304L
- Having Tee in the beginning in order to connection to steam transfer column that is made from stainless steel 304L
- Flanges in the beginning and at the end of the condenser are made from stainless steel 304L

4- Separator

- The main wall is made from stainless steel 304L
- Vertical lineglasses in order to visibility and better controlling of the effluent from the reaction made of steel 304L and security glass.
- Locating the pressure and vacuum gauge
- Sideglasses on top lens in order to exposure, made of steel 304L and security glass
- Total reflux system, and reflux into the reactor, and the effluent outlet are made from stainless steel 304L
- Locating vacuum system, made of stainless steel 304L
- Having vent system for safety and gas outlet that is made from stainless steel 304L
- Flange pipes and fittings to reactors and condensers are made from stainless steel 304L

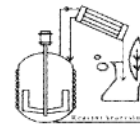
➤ **The price of the abovementioned equipment is \$ 33000.**

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5- Blender with an approximate capacity of 10m³ (10000 liters)

- Main wall is made from stainless steel 304L
- Press and the edge of blender's lenses with the appropriate depth in order to best mix, is made from stainless steel 304L
- Clip-paddle Torques with the capability of opening and closing and solid shaft for maximum speed in resin mix, made of steel 304L
- Side glasses on blender, made of stainless steel 304L, and security glass.
- Flanges on the blender in order to charge and circulation, light and observation are made of stainless steel 304L
- Flange for locating the below valve and sampling, made of stainless steel 304L
- Manhole lid that is made of stainless steel 304L
- 4 pickets proportional to blender capacity, made of iron
- Electromotor with European brand and gearbox suitable for resin, viscosity, volume and density

➤ **The price of the abovementioned Blender is \$ 20000.**

❖ In cases where the material is listed as 316L and 304L, it means:

All areas in the reactor that are in contact by material, are made from stainless steel 316L, and the external areas are made from stainless steel 304L.

❖ All the welds are argon weld.

❖ Filler 316 is used in 316L sheets, and filler 304 is used in 304L sheets.

6- Boiler (the container producing hot oil), suitable for heating the entire system

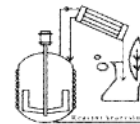
- The main wall is made from iron, and is suitable for heat.

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- Lens with proper depth, capability of opening and closing, having thick layer of cement and fireproof material
 - The main insulation wall is made of rock wool and colored galvanized cover
 - Inner coils are made from fire-eater pipes, thermal Manysman is preferably Russian
 - The source of storage and charging of thermal oil and expansion source
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- **The price of the abovementioned Boiler is \$ 8000.**

7. Cooling Tower

- Main wall is made from iron
 - Iron wall with three layers of anti-corrosion and anti-moisture epoxy ester
 - Pond section with capacity corresponding to the system
 - The watershed section has plenty of showers, along with two high speed cooling and waterproof fans
 - The capability of separation of two parts in order to easy transportation
- **The price of the abovementioned Cooling Tower is \$ 2500.**

If you approve and continue to collaborate, the time of construction and payment will be announced subsequently.

This price offer is valid for 3 business days.

Best Regards,

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