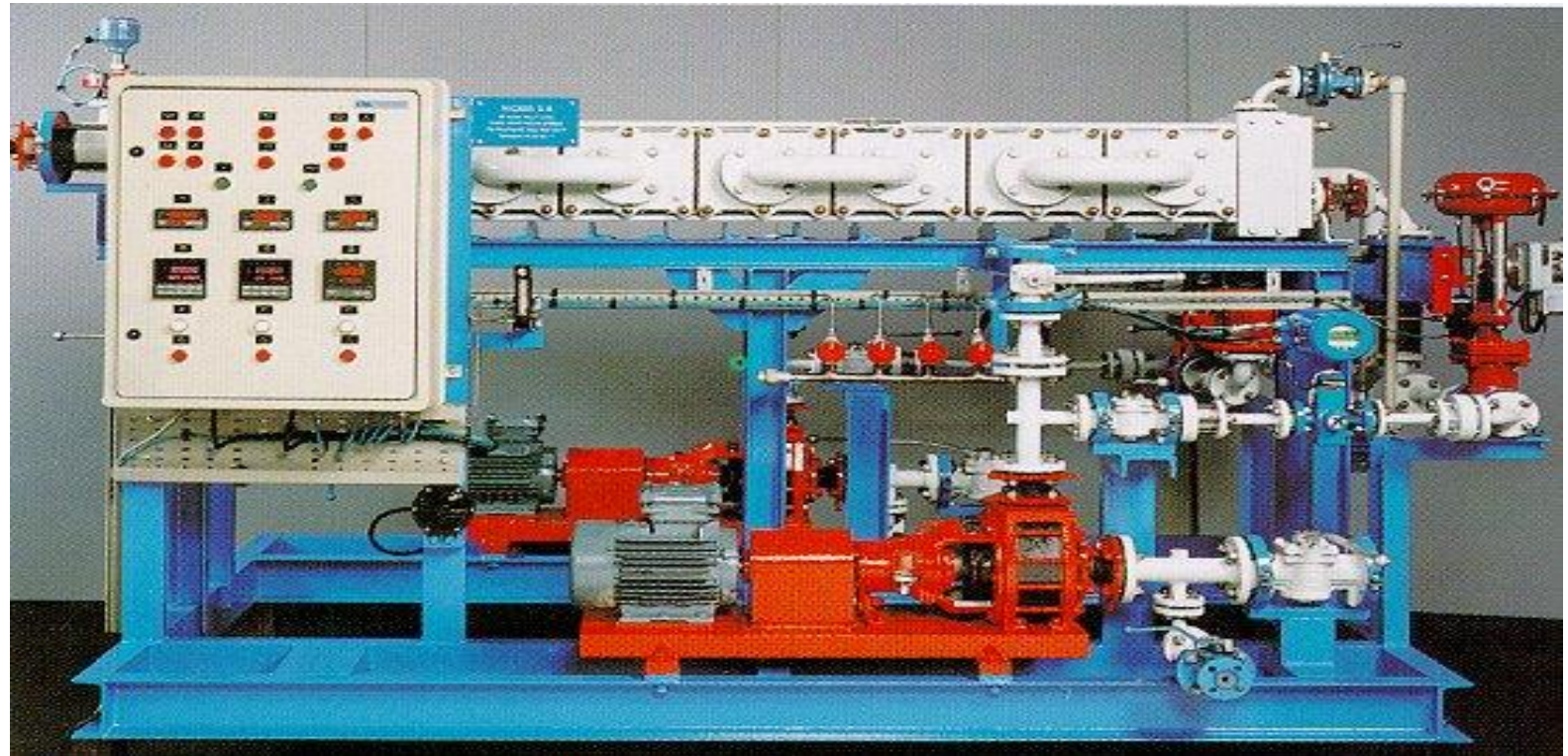


Examples of H₂SO₄ dilution units.

- Example of one skid mounted dilution unit, ready for start-up. It is made of one NEC type cooler, two graphite pumps and of one mixing device in PTFE.



Sulfuric acid : H_2SO_4

- **Typical Applications**

- Pigment producers (Titanium white, Barium white)
- Fertilizer Plants / phosphate rock attack
- Iron & Steel / pickling baths
- Automotive industry / car batteries
- Batteries in General
- Chemicals retailer
- Sulfuric Acid production plants
- Leather industry

Dilution process: fluids, features and items

- **Concentrated sulfuric acid**

- Colorless or slightly yellow liquid when pure, Very hygroscopic (used as a drying agent) and very viscous
- Usually between 98 and 99 %, produced by sulfur burning
- Not corrosive with high concentration with piping in C-steel or SS

- **Dilution water**

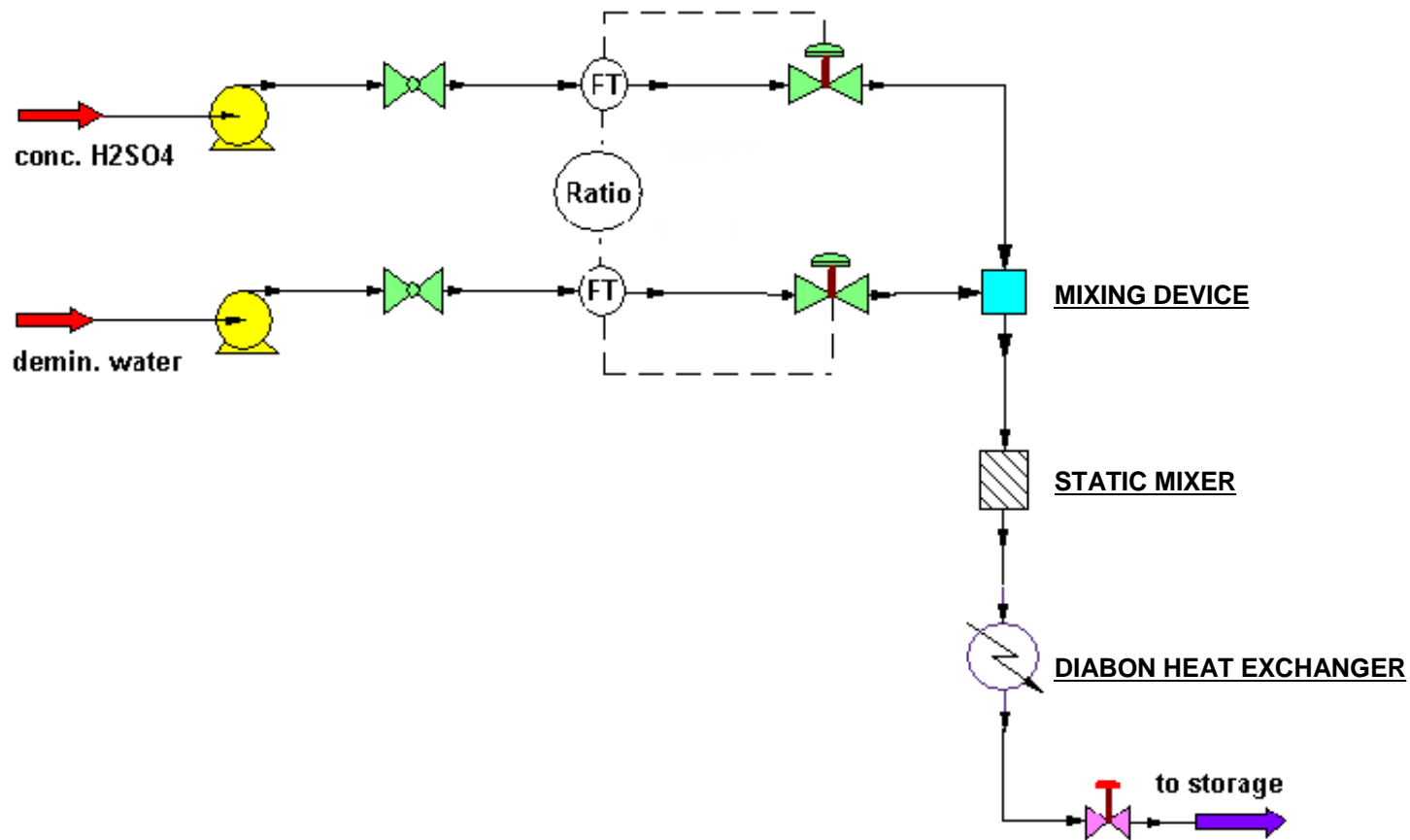
- Should / shall be de-mineralized to avoid sulfate deposit
- Water / Acid flow rate ratio has to be controlled to ensure the appropriate concentration

- **Sulfuric dilution process is very exothermic**

- Dilution enthalpy is very high and after dilution, the temperature can rise up to 180 C
- Dilution is carried out in a mixing device in PTFE lined C-steel and/or graphite PTFE
- Static mixer or multi-pass heat exchanger are recommended to avoid corrosion in heat exchanger,. (S&T, plate or monoblock heat exchanger)
- Pressure must be controlled and maintained to avoid boiling of diluted acid before cooling.

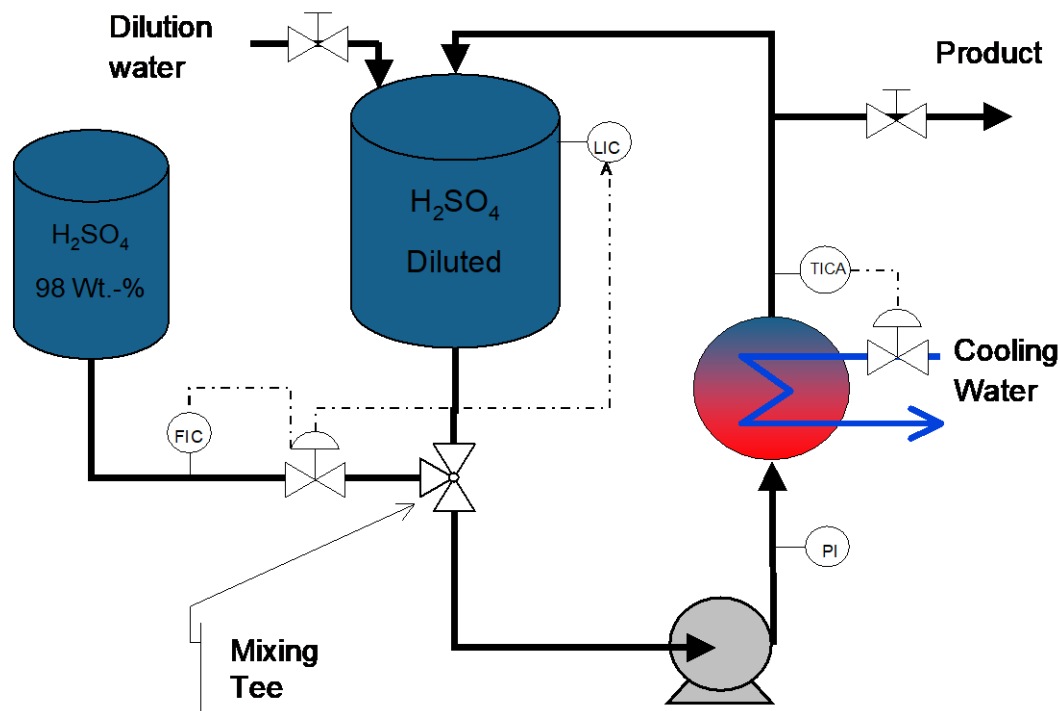
Dilution process: type of flow schemes

Continuous operations



Dilution process: type of flow schemes

Batch operations



1. The diluted acid tank is filled up with the calculated water quantity.
2. Cooling water ON
3. Pump ON
4. Control Valve ON
5. The flow meter on the concentrated acid line controls the flow rate.
6. **Level Indicator Controller Alarm (LICA)** shuts the control valve OFF
7. Manual opening of the ON/OFF valve on the product line to empty the tank.
8. Either another batch can be produced, either the pump is stopped.

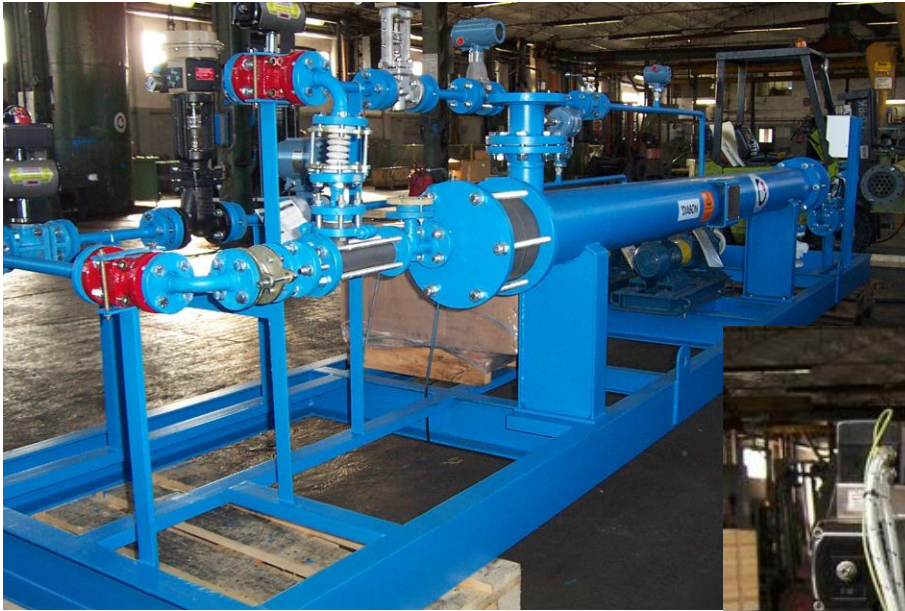
DIABON Dilution Systems: turn key units

- **SGL PT produces turn key units which include**
 - Anti-corrosive pumps,
 - Non return valves
 - Mixing device
 - Heat exchanger
 - All valves and control valves
 - PTFE lined piping, C-steel piping
 - Instrumentation, control and regulation including:
 - Plastic storage tanks (in option)
 - Steel structure (skid mounted units, in option)
 - Cooling tower (in option)
- **Commissioning and start-up can be carried out by SGL GROUP engineers**

Control & instrumentation

- **To control the concentrations**
 - FIC on both lines with a ratio control
 - High temperature safety level on the diluted acid at the outlet of the cooler
 - Concentration analyzer with low and high alarm on the diluted acid outlet
 - pH-meter on service side to detect acid leakages
 - Control panel including
 - PLC or other controlling device
 - Start up / shut down sequences, fully automated
 - safety interlock
 - Easy-to-use and safe mode
 - Option for manual mode in case of control system failure
 - Many concentration values may be achieved and managed by control panel, with precise and accurate regulation.

Examples of H₂SO₄ dilution units.



- Skid mounted dilution units with one shell and tube cooler.



Examples of H₂SO₄ dilution units.

- Very compact skid mounted dilution unit with a mono-block graphite heat exchanger. (KU type)

