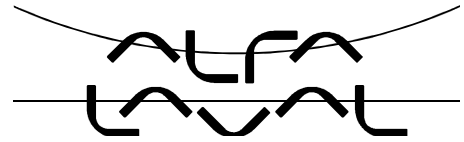


General Utility Supply Requirements

Document #: 11543



| Issued by | Department | Revision No | Last Revision Date |
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| Imre Kovács | Alfa Laval CE | Rev1 | 24.01.2012 |

Our Equipment is designed to suite general recommendations for service media.
Following service media is considered in quality at specified termination points:

- Steam
- Tower water
- Cooling water
- Water (town water and/or well water)
- Ice water
- Compressed air, (sanitary quality)
- Electricity

Deviation from below recommendations may result compromise in the lifetime and performance of the equipment.

Steam supply

- Design pressure: as per equipment specification
- Dry, saturated, free from chemicals and particles
- pH: 8.5-9.2
- Chloride: Max. 7.8 PPM

Condensate

- Maximum backpressure < 20 kPa

Note:

- Pressure shocks in the steam supply and condensate return during start up and operation are not permitted.
- Rapid temperature changes shall be avoided during start up and shut down. The equipment shall be warmed up on a gentle way.

Tower or other cooling/ice water

- Design pressure: as per equipment specification
- Temperature: as per equipment specification
- Soft and clean with max.
- hardness: 4-7 °DH
- The water shall be free from sand, leaves, algae or other biological activity
- Size of solid particulate: Max. 0.5 mm
- Max amount of solid particles: 0,05% vol/vol

Note:

Rapid temperature changes shall be avoided during start up and shut down. The equipment shall be warmed up or cooled down on a gentle way. Heat exchangers shall be filled up completely and vented prior to use.

Glycol

- Design pressure: as per equipment specification
- Temperature: as per equipment specification
- Concentration: as per equipment specification
- Free iron as Fe and from Chloride
- Size of solid particulate: Max. 0.5 mm
- Max amount of solid particles: 0,05% vol/vol

Note:

Rapid temperature changes shall be avoided during start up and shut down. The equipment shall be cooled down or warmed up on a gentle way. Heat exchangers shall be filled up completely and vented prior to use.

Water

- Design pressure: as per equipment specification
- Temperature: as per equipment specification

The water quality recommendations to be obtained by the customer are according to WHO guide lines and the following figures:

- Taste None
- Smell None
- Turbidity Max. 5 FTU
- Colour Max. 20 mg/l Pt
- Oxygen demand Max. 20 mg/l KMnO4
- Total dissolved solids Max. 500 mg/l
- pH 7-8.5
- Total hardness 4-7 °DH
- Ammonium Traces
- Ammonia Max. 0.5 mg/l NH4
- Iron Max. 0.1 mg/l Fe
- Manganese Max. 0.05 mg/l Mn
- Nitrate Max. 30 mg/l NO3
- Nitrite Max. 0.02 mg/l NO2
- Sulphate Max. 100 mg/l SO4
- Chloride Max. 75 mg/l Cl
- Chlorine Max. 0.2 mg/l Cl2
- Aggressive carbon acid Max. 0 mg/l CO2
- Total amount of bacteria Max. 100/ml
- Total amount of 35 °C Max. 1/100 ml
- coliform bacteria
- Total amount of 44 °C Max. 0/100 ml
- coliform bacteria
- Copper Max. 0.05 mg/l Cu
- Zinc Max. 1.0 mg/l Zn

Compressed air:

- Design pressure: as per equipment specification
- Max. dew point: -20 °C
- Free from oil and particles

Electricity:

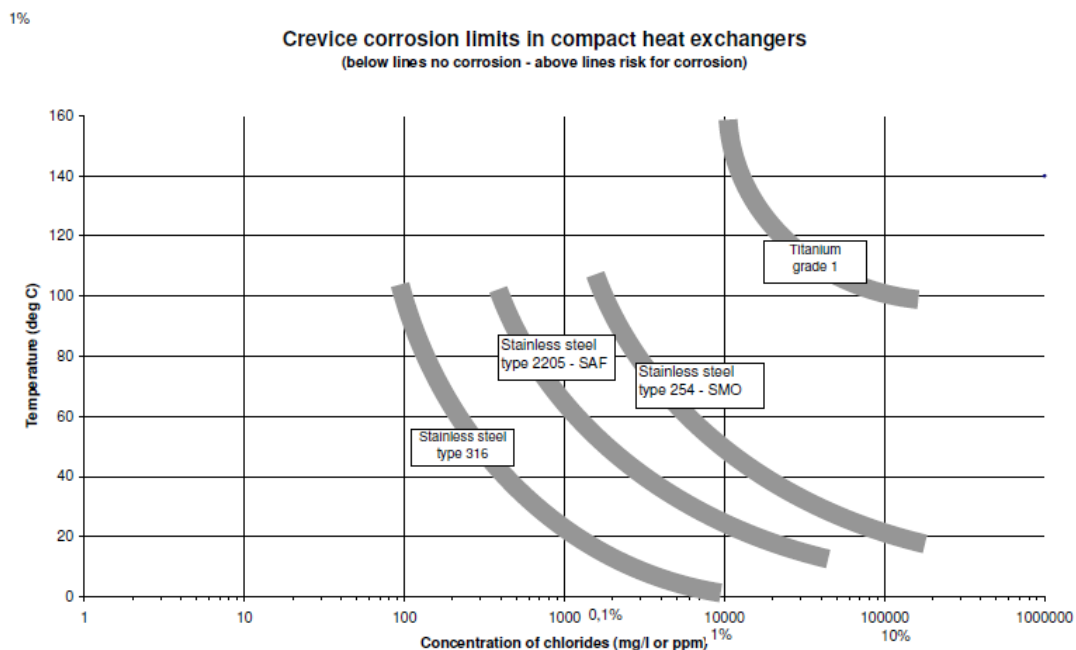
- Supply voltage: 3/400/240 V, +-5 %
- Control voltage, AC: 1/240 V
- Frequency: 50 Hz, +- 1 Hz

Corrosion resistance:

Our equipment is generally made from high grade stainless steel alloys or upon special request from other enhanced corrosion resistant "exotic" material. Presence of Chloride in the treated media shall be avoided as it leads within short to serious crevice corrosion.

Speed of the corrosion accelerates at higher temperatures and lower pH.

Resistance of the applied materials to crevice corrosion is as per below table.



Positioning and installation of the equipment

Positioning and installation of the equipment shall comply with safety legislation and industrial standards, and further the requirements and instructions specified in user/ installation/ maintenance manuals; such as but not limited to (e.g. permissible load on process connections, free space around equipment for service purposes, lifting tool installation above decanters, platform vibration resistance for rotating machines etc.) .