



Passivation System

"The term passivation is commonly applied to several distinctly different operations or processes relating to stainless steels. In order to avoid ambiguity in the setting of requirements, it may be necessary for the purchaser to define precisely the intended meaning of passivation. Some of the various meanings associated with the term passivation that are in common usage include the following:

- Passivation is the process by which a stainless steel will spontaneously form a chemically inactive surface when exposed to air or other oxygen-containing environments. It was at one time considered that an oxidizing treatment was necessary to establish this passive film, but it is now accepted that this film will form spontaneously in an oxygen-containing environment providing that the surface has been thoroughly cleaned or descaled.
- Passivation is removal of exogenous iron or iron compounds from the surface of a stainless steel by means of a chemical dissolution, most typically by a treatment with an acid solution that will remove the surface contamination but will not significantly affect the stainless steel itself...Unless otherwise specified, it is this definition of passivation that is taken as the meaning of a specified requirement for passivation." (ASTM A380)



This application is a Passivation System for medical components. The standard MKT24WRR is constructed from type 316L stainless steel. The process uses heated nitric acid. The line runs left to right.



PROCESS:

Passivation - The first stage is designed to remove exogenous iron or iron compounds from the surface of the stainless steel using nitric acid at 25% concentration in a 135 degree F heated immersion. Due to the corrosive nature of the acid special consideration has been given to the construction of the system. In addition to the 316L tank and elevator construction the insulation panels, guards and legs have been upgraded to 304 stainless. The elevator connecting arm and guide rails have also been upgraded to 304 stainless on the passivation stage. The electrical wiring is Nema4X (corrosion resistant) using fiberglass enclosures and push button stations. A special alloy (Alloy 20Cb-3) heating element is used for compatibility with the heated nitric acid.

Rinsing - The dual heated cascading rinses use platform oscillation. The elevator moves the basket into the working zone and oscillates the parts in solution with either a short or long stroke. A selector switched is used to

select either long 5 to 9 inch or short 2 to 4 inch strokes. The long stroke is used to provide better flushing (hydraulically forcing solution through the working zone) for nested masses of parts and/or complex shapes with recessed passages whereas the short stroke is used to provide quicker oscillations and faster cleaning of simple parts and/or part configurations. Flexibility in stroke ranges and speeds produces more comprehensive cleaning (see [Dynamic Flow Combination](#)).

Ventilation - A lip vent exhaust system is included on the passivation stage. It is designed for 200 CFM per square foot of opening. A slotted vent and large plenum extends across the front of the processing chamber. The plenum extends along the side of the chamber and terminates at the rear with a corrosion proof exhaust blower. The positive mechanical ventilation is designed to limit the accumulation of chemical vapors thereby making the system safer when the cover is open. Furthermore, limiting the spreading of chemical vapors from the surface of the solution to the surrounding area will lessen any hazard to the immediate environment.

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