KINNEY®

CASE STUDY

VACUUM PUMP SOLUTIONS FOR STEAM STERILIZATION

PROJECT OVERVIEW

Due to the harsh nature and precise process involved in steam sterilization, the selection of a reliable and rugged vacuum pump solution is a key component to successful performance. Vacuum systems ensure effective sterilization with stable operation, high vacuum, and fast air suction for the removal of microbial life, including bacterial spores.

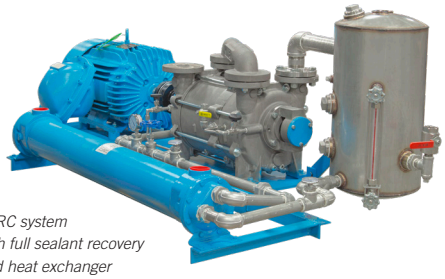
INDUSTRY SIC CODES

38429919 - Sterilizers, Hospital and Surgical
Key players in this market:

- Steris Corporation
- Getinge USA
- TSO3

34431105 - Sterilizing Chambers, Metal Plate
Key players in this market:

- San-I-Pak Pacific, Inc.
- Biobubble, Inc.
- Burnsco Technologies Inc.



KLRC system with full sealant recovery and heat exchanger

STEAM STERILIZATION

Steam sterilization uses high-temperature steam to eliminate all living organisms due to its ability to penetrate and transfer heat to the organism much more efficiently and quickly than dry air. To be effective, the steam must come into contact with the organism in order to be able to penetrate the internal surfaces where they may be present. The atmospheric air, which might act as a barrier or cause inefficient heat transfer, must be evacuated before starting the steaming process. The steam efficiently conveys the heat at high temperatures in order to rupture and destroy cell membranes. This process depends upon the steam temperature (ideally 121-132°C), residence time to ensure saturation of the material, humidity, pressure, and layout of the products (importance of loading) within the autoclave.

The steam sterilization process consists of loading products within the chamber or autoclave, evacuation of the atmospheric air down to a pressure of approximately 1.5-2" Hg A, and multiple steam cycles where the autoclave is backfilled with steam to elevated pressures and temperatures. Steam is then re-evacuated and backfilled to ensure contact and sterilization, run through a drying cycle to ensure all steam is removed, and proper bleed up to atmosphere and product removal. The effectiveness of the sterilization process relies upon the repeatability of the evacuation/pressure pulsation to remove air and ensure steam penetrates the product. The vacuum system must be able to perform effectively and reliably, pumping down the autoclave whether containing air or steam.

STEAM STERILIZATION VACUUM SYSTEM

The typical vacuum pump used in steam sterilization applications is a water-sealed liquid ring vacuum pump with or without an inlet condenser. Kinney has been designing and manufacturing such systems for 100 years and can provide specialized pumping packages that meet the rigorous pumpdown times for air and/or steam evacuation while also handling the process gases and vapor heat loads.

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