



Technical Guideline

Number

6.3e

CSVS

Cleaning of Bellows Used in Beam Vacuum

Status

2014-04-03

This Technical Guideline is valid for bellows used in beam vacuum. This Technical Guideline and the cleaning procedure described herein is not valid for bellows used in tubings for cryogenic media or for cryostat vacuum vessels.

Great care has to be taken when cleaning thin-walled metal bellows, particularly those of edge-welded, nested construction. If any solvent residues are trapped between the convolutions, either interior or exterior, these can induce corrosion which can rapidly cause leaks to develop. Similarly, if any particles are deposited between the convolutions, mechanical puncturing can occur.

The bellows must be fixed (if necessary with a suitable fixture) to their extended condition.

Bellows may be cleaned in an analogous manner like stainless steel according to F-TG-V-6.1e, but the duration for rinsing and drying has to be prolonged.

- 1.) Removal of all coarse contaminations and filings with high pressure air and/or by wiping; coarse feed machining, steel brushing, grinding, filing and other abrasive techniques are not allowed.
- 2.) High pressure cleaning (water temperature ca. 80°C) with mild alkaline cleaning agents; rinsing of cleaning agents and immersion in water until all traces of cleaning agents are gone.
- 3.) Ultrasonic cleaning for at least 15 min in hot (60°C) alkaline cleaning agent (SurTec™ 138/092, pH 13).
- 4.) Rinsing in deionized water.
- 5.) Ultrasonic cleaning for 15 min in hot (60°C) alkaline cleaning fluid (P3 Almeco™ 18, pH 11).
- 6.) Rinsing in deionized water in two different baths for 24 h, the second bath with continuous water flow.
- 7.) Drying in a hot air furnace at 180°C for 24 h; drying stains have to be avoided.
- 8.) Cool-down of components in dry, clean, dust-free air.
- 9.) Bake-out of components in an UHV compatible vacuum furnace or with an adequate bake-out jacket at 250°C for 24 h at UHV conditions; pump-down of vacuum components only with completely dry (oil-free) pumps.
- 10.) Packaging of vacuum components with aluminium foil and sealing with polyethylene foil (see F-TG-V-9.1e).

Ultrasonic cleaning bath sizes at GSI:

900 mm x 500 mm x 500 mm (length x width x height)
 5000 mm x 1000 mm x 1000 mm (length x width x height)

Possible replacement for cleaning agent in 5.): SurTec™ 132/092

Alternative cleaning procedures may be suggested by the contractor if it can be proven that the required outgassing rate and ultimate pressure of the vacuum component can be reached. Any alternative cleaning procedures have to be approved in written form by the contracting entity.

P3 Almeco™ 18 is a registered trademark of Henkel AG & Co. KGaA, Düsseldorf, Germany

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