

**SPECIFICATION**

**SERTO AG Cleaning Specifications CSO-OX**

Cleaning regulations for SERTO components and SERTO products used in oxygen-enriched environments.

**1. Scope**

This document describes SERTO's guidelines and regulations regarding the implementation of and adherence to the ASTM Standard G93 Level B.

The specifications refer to the surfaces of components which come into contact with media.

It is the responsibility of the draftsman and user to ascertain that the quality achieved according to this cleaning guideline is adequate for his purposes. Furthermore, all additional documents of SERTO AG such as catalogues, supply terms, etc. must also have been considered.

**2. General requirements and features**

The products are cleaned, lubricated, assembled, tested, packaged and labelled according to the process described herein.

ASTM G93, Level B specifies that all unwanted non-volatile contamination be removed from the media-contact surfaces up to a cleanliness grade of  $\leq 33 \text{ mg/m}^2$ .

Assembled products are lubricated with a special lubricant, AC 850 OX, if indicated. This lubricant is approved by the German Federal Institute for Materials Research and Testing (BAM). Cleaned components are packaged individually in weld-sealed plastic bags and delivered. The bags are specially labelled. To prevent damage and contamination during transport or storage, the individual bags are packed in cardboard boxes.

**3. Monitoring the cleaning process**

The cleaning process is monitored and tested for residual contamination as per ASTM G 144 -01. The periodic testing warrants that the cleanliness level B defined in ASTM G93-96 is adhered to.

**4. Cleaning, drying and testing**

The components are cleaned thoroughly in a specially developed sequential multi-level process, rinsed, washed and dried as described and recommended in ASTM G131. The procedure includes :

- Visual inspection to remove the heaviest contamination, such as shavings
- Special single-unit cleaning receptacles to ensure that cleaning and rinsing media do not accumulate
- Alkaline, high-temperature ultrasonic cleaning
- Ultrasonic solvent cleaning to remove residual impurities
- Multiple rinsing with warm ultra pure water to remove all residue left by the cleaning agents
- Residue-free, high-temperature drying with special air filtration through class 100 laminar flow boxes in order to completely remove the rinsing water as well
- Visual inspection of the surfaces at specially equipped, illuminated workstations. If necessary with UV lamps.
- Each cleaning job is documented and traceable.

**5. Assembly and testing**

The cleaned components are handled with care to prevent any damage or contamination.

The cleaned components are assembled in a very clean specially equipped environment, separated from the rest of production. The processes as well as all the assembly equipment and facilities are designed so that the surface cleanliness of the components is maintained and protected. Individual elements, such as threads, O-rings, seals, friction surfaces, are treated with an approved non-carbonated lubricant (AC 850 OX )in order to achieve an optimal seal and to prevent cold welding or extreme friction.

Function tests are done in such a way as to avoid subsequent contamination.

Employees wear special work clothes and gloves and work according to SERTO's special XDB-PB438-001 regulations in this area.

**6. Packaging and labelling**

The cleaned and assembled components are specially packaged to protect them from contamination and damage. All the components are packaged individually in weld-sealed PE plastic bags.

Each bag has a special label which calls attention to the standard and the special care.

The content of each bag is labelled as recommended in ASTM G93 with the material number, type and packaging date so that the products can be clearly identified from the outside.

The individual bags are packed into boxes for the protection of the components during transport and storage.

Repackaging is also clearly indicated on the label so that the contents can be clearly identified.

**7. Applicable documents/standards**

SERTO AG XDB-PB438-001 "Options OX + SI - coupling"  
ASTM G93-96, Practice for Cleaning Methods and Cleanliness Levels for Material and Equipment Used in Oxygen-Enriched Environments

ASTM G131-2001, Standard Practice for Cleaning of Materials and Components by Ultrasonic Techniques

ASTM G144-96, Standard Test Method for Determination of Residual Contamination of Materials and Components by Total Carbon Analysing Using a High-Temperature Combustion Analyser.