


	<b>OXYGEN CLEANING PROCEDURE</b>	Client/Project	
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## OXYGEN CLEANING PROCEDURE

<b>PO#</b>					
<b>Client</b>					
<b>Contractor</b>					
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## 1. Applicable Scope

This procedure will be applied to the valves are intended to be used for Oxygen Services. It covers the requirements for the cleaning & degreasing process of the valve parts and effective measures for preventing oil for valves' Parts.

## 2. Reference document

- 2.1 ANSI/MSS SP-138, Quality standard practice for oxygen cleaning of valves and fittings.
- 2.2 ASTM G93, Standard Practice for Cleaning and Cleanliness Levels for Material and Equipment used in Oxygen Enriched Environments.
- 2.3 ASTM G127, Standard Guide for the Selection of Cleaning Agents for Oxygen Systems1
- 2.4 CGA/GAS - CGA G-4.1, CLEANING OF EQUIPMENT FOR OXYGEN SERVICE

## 3. General requirement

- 3.1 Pre-cleaning, before cleaning, component materials incompatible with the cleaning agents shall be removed or isolated. Gross amounts of foreign materials such as scale, dirt, grit, solid objects, and hydrocarbons shall be removed. Removal can be accomplished by grinding, wire brushing, blast cleaning, sweeping, vacuuming, swabbing, etc.
- 3.2 All irregularities, such as weld spatter, rough, undercut and the scale will be removed from the valve parts completely and special attention should be paid to the body & bonnet and all Internal Part should be cleaned thoroughly and all the surfaces should be smooth enough.
- 3.3 Mechanical cleaning, solution cleaning, detergent cleaning will be applied by case.
- 3.4 Generally, no single cleaning process will remove all potential ignition sources, So Several cleaning methods should be employed depending on the type of contamination present to pass the post-clean inspection.
- 3.5 After each cleaning process and before applying the next cleaning method, thoroughly rinse, spray or immerse the part in freshwater (Hot water is preferred) to remove all the cleaning agents.
- 3.6 Tools for cleanliness inspection should be degreased completely employing different cleaning Methods.
- 3.7 For Cleaning the Stainless-Steel Parts' surfaces, Chloride-free cleaning agents will be used.
- 3.8 After all, the valve parts should be put into plastic bags temporarily and laid on the table or yoke. The plastic cover will be enclosed on the body ends, and the parts will be laid in regular to prevent machined surfaces from damage.

## 4. Cleaning & Degreasing

### 4.1 Steam Cleaning:

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- 4.1.1 Steam or hot water cleaning is accomplished by propelling steam or hot water combined with a detergent through a nozzle or spray head to remove contaminants such as dirt, oil, and loose scale.
- 4.1.2 The steam or hot water should be clean and oil-free. In most steam or hot water cleaning operations, a detergent solution is combined with the steam or hot water to provide an acceptable level of final cleanliness. The detergents selected shall be suitable for the contaminants involved and also shall be compatible with the surfaces being cleaned.
- 4.1.3 Either plant steam or steam from a portable steam generator can be used. If a steam lance is used, the detergent solution can enter the steam gun by venturi action and mix with the steam.
- 4.1.4 Steam removes oils, greases, and soaps by first thinning them at elevated temperatures. Dispersion and emulsification of the oils then occur, followed by dilution with the condensed steam. The system should provide control over the steam, water, and detergent flows so the full effects of the detergent's chemical action, heat of the steam, and abrasive action of the pressure jet are combined for maximum cleaning efficiency.
- 4.1.5 If the steam is clean and free of organic material, a secondary cleaning operation with a solvent or alkaline de-greaser might not be required in cases where the initial contamination is light or is readily removed with s

**4.2 Hot Water Cleaning:**

- 4.2.1 Typical cleaning with a hot detergent solution uses a spray system or a cleaning vat with suitable agitation of either the solution or the parts to be cleaned.
- 4.2.2 Hot detergent solution cleaning can be used where temperatures greater than 200 °F (93.3 °C) are not necessary to free and fluidize contaminants. Consideration shall be given to the size, shape, and number of parts to be cleaned to ensure adequate contact between the surfaces to be cleaned and the detergent solution. The solution temperature should be in accordance with the recommendation of the manufacturer of the cleaning agent. Mechanical energy shall be applied in the form of ultrasonic or agitation to achieve acceptable results. Soaking helps to soften foreign material but does not remove it without scrubbing or agitation. A dishwasher can be effective in some applications.
- 4.2.3 The valve parts will be put into the water pool to immerse, and maintain ultrasonic water frequency and temperature 60°C-70°C. The content of the cleaning agent in water will be controlled to meet PH=9~10. The immersing duration will be 60 minutes.
- 4.2.4 Then take out the valve parts and rinse them using a high-pressure water gun. The residue of the cleaning agent should be fully removed.

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After Completing the washing/Cleaning, the valve parts should be dried by compressed air. The compressed air will be oil-free.

If drying is not completed with the residual heat in the metal, it can be completed with dry, oil-free air or nitro-gen. If it is desirable that the equipment be maintained in a dry atmosphere before installation or use, the dew point of the contained atmosphere should not be above  $-30\text{ }^{\circ}\text{F}$  ( $-34.4\text{ }^{\circ}\text{C}$ )

The internal surface of valve body and bonnet, Specially the groove surfaces should be wiped or polished by acetone or pure alcohol.

## 5. Inspection

Valve Parts will be inspected individually before assembly. If the inspection reveals the presence of any contaminants, the part will be re-cleaned and re-inspected until it successfully passes the acceptance criteria of cleanless.

Generally single inspection method is not enough to verify that the part is adequately cleaned, and different method will be used,

The Following are some method for Inspection method are common for Oxygen service valves:

### 5.1 Direct visual Inspection (White light):

5.1.1 This is the most common test used to detect the presence of contamination such as oils, greases, preservatives, moisture, corrosion products, weld slag, scale, filings, chips, and other foreign matter. The item is observed (20/20 vision without magnification) for the absence of contaminants under strong white light and for the absence of accumulations of lint fibers. This method detects particulate matter in excess of  $50\text{ }\mu$  ( $0.002\text{ in}$ ) and moisture, oils, greases, etc. in relatively large amounts. The item being examined shall be re-cleaned if an un-acceptable amount of foreign material is detected by this inspection method.

5.1.2 No visible moisture, residual cleaning agent, or the above particulate matter is permitted and all them must be removed accurately.

### 5.2 UV inspection


5.2.1 The inspection shall be done in a dark room or enclosure that is free from any other light except UV.

5.2.2 Since Not all oil and grease are fluorescent, so this inspection method must be used with a combination of a visual inspection.

5.2.3 Any visible fluorescents shall be removed by wiping with a clean, lint-free cloth, blowing with oil-free air or nitrogen, or re-cleaned until fluorescent is no longer viewable.

### 5.3 Wipe inspection

5.3.1 Use this method for inspection of inaccessible surface or very large valve part.

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5.3.2 Wipe the surface with a clean white cloth. After wiping, examine the surface of white cloth,

5.3.3 No visible contamination is permissible other than a light oxide film (rust).

## 6. Post clean assembly

6.1 When all parts are degreased and passed the inspection requirements, all parts should be carried to the assembling zone carefully.

6.2 The assembling zone should also be cleaned and prevented from any grease to contacting the parts.

6.3 All Jig & Tools are required for assembling also should be degreased as per clause 3 & 4.

6.4 It is not permitted to contact the degreased parts with gauze & file and so on. If necessary, the degreasing process will be required to be performed again.

6.5 Assembling workers should wear a clean uniform, it is necessary to wear clean plastic gloves in order to contact the degreased parts.

6.6 When assembling, it is not permitted to put any grease on the sealing surface.

6.7 It is not permitted to coat MoS<sub>2</sub> or any other grease & oil on stem thread.

6.8 The valve shall be assembled in accordance with the assembly drawing and this procedure.

## 7. Post clean testing

7.1 Before the test, it is necessary to confirm that jigs and blind flanges and bolts also have been degreased.

7.2 For pressure test, clean, dry, oil-free compression air or nitrogen should be used, and confirm water for checking leakage will be clean water without any Oil.

7.3 When required, a high-pressure hydro-test should be performed using freshwater.

7.4 After test is OK, remove water in the valve cavity, dry inside & outside surface by pure compressed air, and clean again by acetone or pure alcohol with a clean cloth, then enclose valve ends by a plastic cap.

7.5 Cleanliness inspection will be performed as per clause 5.

## 8. Protection during blasting

8.1 Except for some special paint, if possible, blasting will be finished before cleaning and assembling.

8.2 Before blasting valve, a special protection measure shall be performed, such as body end, stem, clearance between gland & stuffing box.

8.3 All protection fixtures and parts shall be tightly fitted for keeping seal in order to avoid split away off or loosen, result in sand or ash to enter the valve inside.

8.4 When inspecting protection measure is OK, blasting work can be performed.

8.5 After blasting, remove protection, inspect whether sand and ash enter the valve inside. If found little, it shall be treated as per actual state. If found much, disassemble the valve, recleaning.

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## 9. Protection during painting

- 9.1 Usually, painting is not applied for oxygen valves unless it is required by the Customer due to his site condition.
- 9.2 Before painting, a particular protection measure shall be performed, such as body end, stem, in order to keep the seal.
- 9.3 During painting, pay attention to observe, avoid paint enter the valve inside.
- 9.4 After painting is finished, remove protection, inspect valve inside surface cleanliness as per clause 5. If found poor cleanliness, it shall be treated as per the actual state.

## 10. Packaging

- 10.1 Once a valve has been cleaned for oxygen service and the cleaning agent completely removed from the equipment and Pressure tested, it should be suitably protected as soon as practicable to prevent recontamination during storage and prior to being placed in service.
- 10.2 The body should be enclosed by plastic covers in order to avoid contamination. No tape or other adhesive shall be applied to clean surfaces, including flange faces.
- 10.3 The valves shall be packaged in a polyethylene bag with desiccant. packets. The desiccant packets shall be grouped and secured together. For added protection, double-bagging shall be used.
- 10.4 The oxygen valve shall be packed individually. Several small boxes shall be put in big plywood boxes in order to easy shipping.
- 10.5 The outside of the packing is to be marked with a tag stating:

Oxygen Service Valves, Specially Cleaned  
 Manufacturer's name  
 Item Commodity code  
 Valve Serial Number.  
 Date of Packing  
 Keep sealed until required for use,