



## Hammond Valve Engineering Standard

Title: Oxygen Cleaning Procedure

HVES 60-02, Revision 1, Page 1 of 4

Rev. Date: December 3, 2001

Initiation Date: February 6, 2001

### Hammond Valve Company Engineering Department

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#### 1.0 Scope:

- 1.1 This procedure defines the specific examinations, cleaning, testing, and packaging required to assure control of cleaning and assembly procedures for valves and valve components specified for Oxygen service.

#### 2.0 Responsibility:

- 2.1 It is the prime responsibility of the valve assembler assigned to control the quality of work being performed per the procedures outlined in this specification. This responsibility is also carried to supervision and inspection.

#### 3.0 Definitions:

- 3.1 Clean Area – Designated area for the cleaning, assembly, and packaging of components requiring special cleaning, i.e. oxygen, chlorine, cryogenics, and/or other specials. Area cleanliness shall be maintained at all times and provided with dedicated clean tools. During operations, this area shall be free from contamination due to outside factors, such as manufacturing and machining. The area itself shall be arranged to prevent the accidental mixing of clean and unclean parts or the use of non-approved material for assembly.
- 3.2 Oxygen clean – The state of being ready for use in typical commercial oxygen systems, i.e. degreased, free of hydrocarbon residue and entrained moisture.
- 3.3 Contaminant – A foreign or unwanted substance that can have deleterious effects on system operation, life, or reliability.
- 3.4 Contamination – The amount of material in a system that is not intended to be there.
- 3.5 Wipe – A clean white lint-free paper or lint free cloth.
- 3.6 Black Light – Commercially available dyed bulb, emitting UV in the wave length range of 1800 to 3800 angstroms



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3.7 Wetted Area – Any surface that is exposed to media through normal use.

#### 4.0 Assembly Preparation:

- 4.1 Only valves designated for cleaning by assembly order are allowed in clean area.
- 4.2 Prior to assembly clean area must be cleaned and assembly bench area covered with polyethylene sheeting.
- 4.3 Following degreasing, and through final bagging, personnel handling wetted areas of components and assembled valves shall use latex gloves to prevent contamination.
- 4.4 All tools necessary to perform assembly functions must be cleaned and degreased.

#### 5.0 Component Cleaning Prior to Assembly:

- 5.1 In the process of preparation for cleaning, the assembler will watch for defects in material and workmanship of the component parts, setting apparent defective parts aside for disposition.
- 5.2 Components are thoroughly cleaned and degreased, using a variety of available methods. When detergent and other water-based methods are used that require rinsing, final rinsing shall be with demineralized water, to remove all surface contaminants.
- 5.3 Once degreased all components are to be thoroughly dried. Forced air-drying, if used, shall be with nitrogen or filtered non-lubricated air. Components are to be then rinsed with isopropyl alcohol. Components may be aired dried, or oven dried for expediency and/or to ensure all trapped moisture is removed.



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5.4 Components shall be visually inspected under bright white light, and a wipe test performed to reveal surface contaminants. Any residue evident on the wipe test shall require complete re-cleaning.

5.5 Components having passed 5.4 shall be subjected to a final inspection under black light to ensure no hydrocarbon residue remain. Any phosphorescence seen shall require re-cleaning of component until no phosphorescence can be seen. Black light inspection shall be performed in an area where ambient light is sufficiently dimmed to allow easy viewing of hydrocarbon phosphorescence.

5.6 Cleaned Components are then immediately moved to clean area.

### 6.0 Assembly:

6.1 Valves are assembled in clean area, using tools that have been degreased.

6.2 Standard assembly procedures related to specific product line shall be followed.

6.3 When needed oxygen compatible lubricants (e.g. Krytox™) are to be used sparingly applied to seat surfaces in rubbing contact, and on other sliding/rubbing friction pairs.

### 7.0 Testing:

7.1 After assembly, all valves are shell and seat tested using clean, dry nitrogen following standard test procedures.

7.2 Safety precautions must be followed at all times especially those that require full (1.5X) shell test.

7.3 Test fittings shall be clean and degreased. PTFE tape may be used for thread sealant if needed; all tape remnants shall be removed from valve(s) prior to packaging.



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### 8.0 Packaging:

- 8.1 All components after assembly and testing will be bagged and heat-sealed in 5 mil. Polyethylene bags with desiccant packs for entrapment of any stray moisture.
- 8.2 Each package includes a written statement on the cleaning, and suggestions for handling for customer reference.
- 8.3 Bagged components then boxed or crated according to weight and other considerations for final shipment.

### 9.0 Amendments (MVES 60-01)

Issue	Date	Document History
1	12/3/01	5.2 Demineralized water, removed "having a TDS count of 100 ppm or lower"; 5.3 Isopropyl alcohol rinse was isopropyl alcohol wipe; 5.5 "require re-cleaning of component until no phosphorescence can be seen" was "require complete recleaning"; 6.3 Added "when needed"; 7.2 & 7.3 Removed "burst box verbiage".