



SPECIFICATION

SPECIFICATION FOR O-RING AND FLANGE INSTALLATION

APPROVALS	DATE	REV	DCN NO.	BY	CHECK	DCC	DATE
AUTHOR:							
CHECKED:							
APPROVED:							
DCC RELEASE							

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1.0 Purpose

This procedure controls the final installation of Viton O-rings and Flanges on LIGO Vacuum Components. The Seller shall incorporate these requirements in their procedures.

2.0 General

Installation of the O-rings should be done in an ISO 14644 Class 5 clean room areas. Handling and assembly should be done wearing the appropriate clean room protective clothing and clean gloves. The flange receiving the O-rings should be clean and dry.

The O-ring grooves and mating flat face flange should be inspected for local contamination including dirt, water, metal chips, detergent or washing process residue etc.

Spot Cleaning

Spot cleaning of small local dirty areas (such as the bottom of the O-ring groove) may be done using lint free wipers and isopropyl alcohol or a Liquid CO₂ cleaning gun.

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Each size flange has two O-ring grooves. Each groove has a specific O-ring (Buyer part number) designed for an exact fit. These part numbers are referenced in O-ring Spec. E960085-v1 (Att. 19). All O-Rings will be supplied by the Buyer

The special O-rings that are to be used for final flange assembly and are vacuum baked (by the Buyer) to remove volatile compounds prior to installation. Before installing the O-ring, the Seller must verify that the O-ring is clean and has been vacuum baked. The O-ring package will state that the O-ring is baked. O-rings will be given a different part number after baking.

3.0 Responsibilities

The Seller is responsible for installation of O-rings and Flanges.

The Seller's Q.A. dept. is responsible for monitoring that procedures are being followed.



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4.0 Procedure

4.1 O-ring Installation

Due to the large flange diameters, three people are required to hold the O-ring in position during installation. The O-rings are easily inserted into the groove by starting at the top and working down. They fit snugly on their ID and are held in place by the groove dovetail. Care should be taken not to roll or twist the O-ring during installation.

4.2 Mating Flange Installation

Note: When positioning the flanges for mate-up, the machined surfaces should be protected with cleaned aluminum sheet or virgin powder-free heavy plastic. The protective material is removed when the flanges are close to their final aligned position.

After the O-rings are installed, the mating flange is carefully positioned parallel to the O-ring flange. Two centering pins are used in bolt holes to align the flange for bolting. This technique will assure flange alignment and prevent O-ring damage. The bolts are inserted with a washer under the head and under the nut. All bolts should be installed hand-tight. The mating flange should be in contact with the O-rings but not compressing the O-rings. After contact with the O-rings is made, it is important not to move the mating flange to preclude rolling or twisting the O-ring.

4.3 Torquing the Flange

Bolt tightening for 7/8 in. bolts is to be done in a cross-flange “star” pattern. The recommended final torque value is 220 ft-lbs. The bolts should be torqued in ~25% increments:

Torque %	25%	50%	75%	100%
	55 ft-lbs	110 ft-lbs	165 ft-lbs	220 ft-lbs

The last step in the bolt tightening procedure is a final torque check done in a sequential fashion going around the flange. The cross-flange “star” pattern is not required for the final torque check.

4.4 Tagging

After the final torque check has been done, the assembled flanged joint should be tagged with a label indicating the date of assembly, final torque value, and assembler’s signature.