



LIGO Laboratory / LIGO Scientific Collaboration

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Cleaning Procedures for Viton and PFA O-rings

Margot Phelps

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LIGO Scientific Collaboration

This is an internal working note
of the LIGO Laboratory.

California Institute of Technology
LIGO Project – MS 18-34
1200 E. California Blvd.
Pasadena, CA 91125
Phone (626) 395-2129
Fax (626) 304-9834
E-mail: info@ligo.caltech.edu

Massachusetts Institute of Technology
LIGO Project – NW22-295
185 Albany St
Cambridge, MA 02139
Phone (617) 253-4824
Fax (617) 253-7014
E-mail: info@ligo.mit.edu

LIGO Hanford Observatory
P.O. Box 159
Richland WA 99352
Phone 509-372-8106
Fax 509-372-8137

LIGO Livingston Observatory
P.O. Box 940
Livingston, LA 70754
Phone 225-686-3100
Fax 225-686-7189

<http://www.ligo.caltech.edu/>

1 Introduction

The purpose of this document is to outline the suggested cleaning procedure for two kinds of o-rings used in LIGO hardware, viton o-rings and PFA encapsulated viton o-rings. The PFA encapsulated o-rings are used in the core optics shipping containers and in the sucker plates that are attached to the ergo-arm. This is not a cleaning procedure for o-rings that will be kept in vacuum. For a complete explanation and list of vacuum compatible materials see Dennis Coyne's LIGO doc# E960022.

2 Cleaning

PFA encapsulated viton o-rings:

1. DI water ultrasonic bath, 10 minutes.
2. Wipe with lint free cloth, allow to dry.
3. Wipe with isopropanol & lint free cloth just prior to inserting into clean o-ring groove.

Viton o-rings:

1. DI water ultrasonic bath, 10 minutes.
2. Wipe dry with lint free cloth
3. Optional: Wipe with isopropanol

3 Notes on cleaning o-rings with chemicals

Methanol has been approved to clean PFA encapsulated o-rings (see the Chemical Resistance Guide below and additional links) The manufacturer of these o-rings, Row Inc., recommends a quick wipe with methanol only if the o-ring is very dirty. In most cases isopropanol is sufficient.

Some people have seen a residue left on the optic after cleaning the o-rings with methanol. It has not been determined whether or not the methanol is to blame, but this is something to watch for. No residue has been seen following the cleaning procedure above (see LIGO document T1000108 for a list of tests)

Isopropanol, but not methanol or acetone, can be used to wipe Viton o-rings clean.

3.1 Supplier Information

Row Inc., <http://www.row-inc.com/> is a good supplier of viton and PFA encapsulated viton o-rings. To order, send your request to Mike Broderick, mbroderick@row-inc.com. Be sure to ask that they ship the o-rings flat in a "pizza box", not taped. You can also ask that they clean them in isopropyl before shipping them.

3.2 Additional Links and Chemical Resistance guide

Dupont Chemical Resistance Guide on Viton & PFA

Chemical Fluid	Viton-A	Viton-B	Perfluoroelastomer
isopropanol (isopropyl alcohol)	1	1	1
methanol (methyl alcohol)	4	1	1
acetone	4	4	1

1 = little to minor effect, 0 to 5% volume swell

2 = minor to moderate effect, 5 to 10 % volume swell

3 = moderate to severe effect, 10 to 20% volume swell]

4 = not recommended

Links:

LIGO document E960022

<https://dcc.ligo.org/cgi-bin/DocDB/ShowDocument?docid=3652>

PFA chemical resistances link.

<http://www.zeusinc.com/technicalservices/technicalbulletins/chemicalresistanceofpolymers/chemicalresistancechartpfa.aspx>

PFA, PEEK, and other polymers information link

<http://entegrisfluidhandling.com/Default.asp?G=1024>