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July 22, 2008

To: LIGO VRB, for general distribution
From: M. Zucker
Re: SAFETY BULLETIN: **Kovar-sealed glass vacuum viewports**
Ref: LIGO-M080310-00-V

Investigation of the May 2008 vacuum accident at Virgo revealed important information about the safety of certain standard commercial viewports.

The viewports in question are those made of Corning 7056 or Kodial glass sealed directly to Kovar alloy, which is in turn welded into a stainless steel vacuum flange (usually a ConFlat type). These may be called “Kovar-sealed”, “zero-length,” “low-profile” or “zero-profile” viewports in catalog descriptions.

Fused silica, zinc selenide or O-ring sealed ports of any kind are *not* affected.

7056 glass/Kovar viewports are available in (at least) two different constructions:

Type A viewports (Figure 1) are manufactured by Larson Electronic Glass in California and marketed by MDC, Huntington, NorCal, Insulator Seal, and others. These ports use 3/8” [9 mm] thick glass¹ which is fused to the face of a flared Kovar tube.

Type B ports (Figure 2) are made by Instrument Technology Ltd. (ITL) in the UK, and possibly other factories, and typically marketed by Varian, Vermetal and other firms. These ports use 1/4” [6 mm] thick glass¹ which is fused into a recessed Kovar cup.

Type B viewports may be vulnerable to spontaneous breakage under normal atmospheric loads, and may also be more susceptible to induced damage. These should NOT be used on LIGO vacuum systems. While the risk is greatest for large diameters, this advisory also applies to smaller ports of similar construction.

Do not evacuate a vessel equipped with any **Type B** viewports. Report any **Type B** viewport (whether installed or inactive) to your site Safety Officer immediately.

If you are uncertain about what kind of viewports you have, consult with your local vacuum engineer or your supervisor. Brand name or model number alone are not adequate identifiers, since vendors frequently change sources.

Of course, special caution is always required around vacuum systems incorporating any glass components, irrespective of their type. Adhere to applicable safety protocols at all times.

¹ for 5” nominal clear aperture, the largest standard size; these may come mounted in 8” nominal or 10” nominal OD ConFlat type flanges.

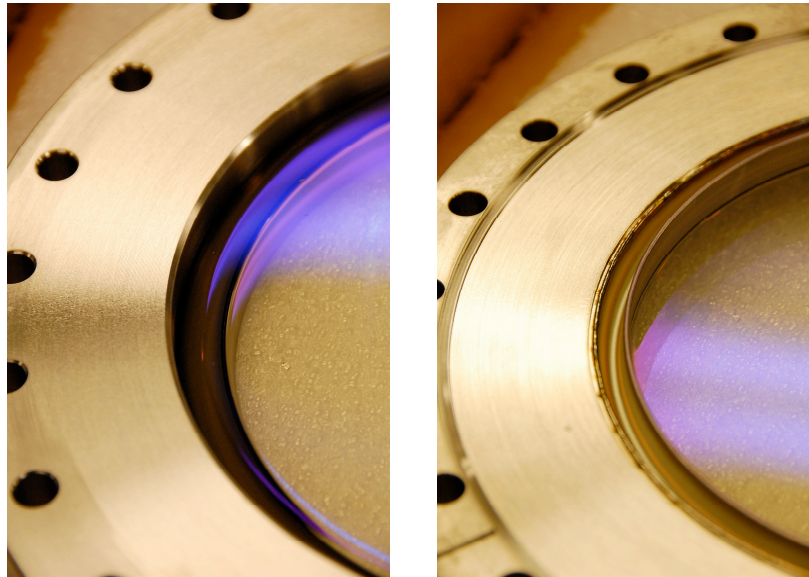


Figure 1: 5" aperture Type A Kovar-sealed vacuum viewport in a 10" OD flange, air side (l) and vacuum side (r). **OK.**

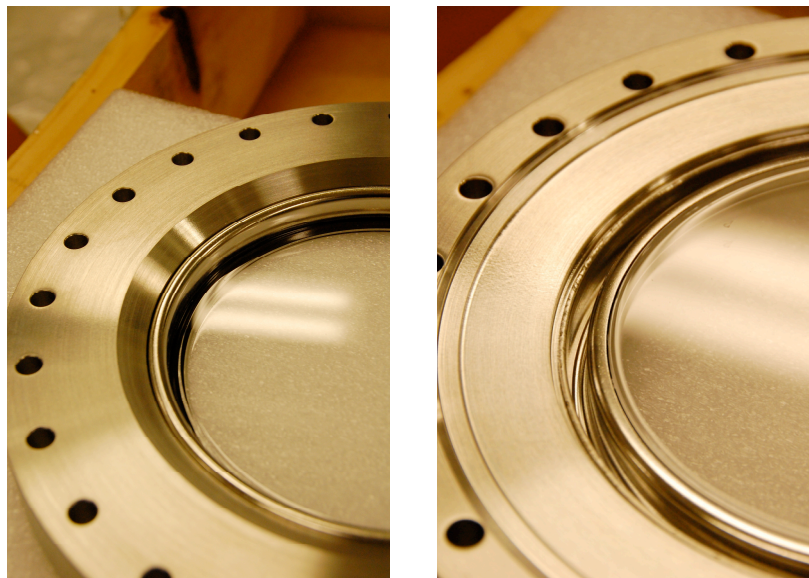


Figure 2: 5" aperture Type B Kovar-sealed vacuum viewport in a 10" OD flange, air side (l) and vacuum side (r). **NOT OK.**