

Material Qualification Queue

as of 16 Nov-2010
in priority order

IN-TEST:

1. Masterbond low outgassing epoxy (EP30-2): repeat RGA and optical contamination cavity testing with epoxy bonded between 1" glass slides (~.001 thick)
As always, take extreme care in proper mixing ratios. Bond 10 pairs of glass disks of 1" diameter together to obtain 10 bonds each 1" diameter and ~.001" thick.

Measure the pair thicknesses before and after epoxying to gauge the bond thickness. You could get glass windows from Edmunds:

<http://www.edmundoptics.com/onlinecatalog/displayproduct.cfm?productID=1755&PageNum=2&StartRow=21>

The NT45-640 is an uncoated 25mm diam disc.

According to Master Bond reps, the best cure schedule (yielding the strongest bonds) is: overnight (say 12 hr) room temperature cure, followed by a heat cure of 3 hours at 150 deg. F. See the data sheet for the EP30-2 in the dcc:

<https://dcc.ligo.org/cgi-bin/private/DocDB/ShowDocument?docid=15100>

2. Perkin Elmer 3mm InGaAs Photodiode, Part Number - C30665GH
Intended Use - aLIGO DC readout detectors (ISC)
Quantity - 10
Purchase Order Number - CP748923
Max Storage Temperature (from data sheet) - 125 C
 1. Clean exterior of diodes
 2. Cut can lids off with clean cutting tool (Chub has tool)
 3. Bake at 120 C
 4. Perform RGA scan
 5. Perform Cavity Contamination Scan
3. Chamber 3 being re-commissioned after vacuum failure

QUEUE

4. a) RTD device (Omega #1PT100KN1510CL1/3)
for TCS temperature measurement

platinum wire wound
embedded in alumina?

b) Fiberglass insulated RTD extension cable (Omega # PN EXGG-4CU-26S)
for TCS temperature measurement

5. EG&G YAG-444A -- the proposed diodes for the arm cavity baffle
Bob to order ASAP
6. Nedox SF-2 coating (by General Magnaplate) Coating Material for TCS in-
vacuum relay mirror (will be applied to the I.D. and O.D. surfaces of a .50" tube)
There will be six specimens, each 16" long for testing
Mindy has ordered samples for testing
7. RG-316 (Allied)
Rich Abbott ordered a spool. Chub asked to give to Bob 10/1.
1. **Manufacturer** - Allied Wire and Cable
<http://www.awcwire.com/Part.aspx?code=213F27F27J34>

2. **Materials:**

Part Number RG316

Conductor Stranding 7/.0067

Nom. Dia. of Cond. 0.021

Dielectric (in) 0.06

Nom. O.D. (in) 0.102

Nom. Imp. 50 ohms

Approx LBS/MFT 11 (I think this should be kFt)

Nom. Cap. (pF/ft) 29.4

Shield Material: Silver-Coated Copper

Conductor Material: Silver-Coated Copper Clad Steel

Dielectric Material: Polytetrafluoroethylene (PTFE)

Jacket Material: Fluorinated Ethylene Propylene (FEP)

Shield: Overall Braid Shield

Min. Temp -55°C

Max. Temp 80°C

3. **Application:** In vacuum LSC and ASC detectors

4. **Quantities:**

The anticipated length for each coaxial bundle in vacuum is ~15ft.

Each LSC detector uses a bundle of 5 individual RG316, there are 2 LSC in-
vacuum detectors per IFO

Each ASC detector uses two bundles of 5 individual RG316, there are 4 ASC in-
vacuum detectors per IFO

Total lengths of cable(#detectors*connectors per detector*length*# of coaxial
cables)

$2*1*15*5 = 150$ feet for LSC per IFO

$4*2*15*5 = 600$ feet for ASC per IFO

Grand total of 150 + 600 = 750 feet of coaxial cable per IFO

5. This is an identified need, must have.
8. Ferrite Material
No currently defined need – would be nice to have qualified just in case
Rich Abbott needs to provide a significant number of samples (10 - 20 units) from a known source with a known material grade.
Ferrite materials are based on "Nickel-Zinc" and "Manganese-Zinc". Zinc has a high vapor pressure.
One possibility is BN-43-7051 is a Balun (binocular or multi-aperture) core sold by many companies, such as Amidon Corp.:
<https://www.amidoncorp.com/specs/2-34.pdf>
where "43" refers to the material.
Material 43 is a NiZn ferrite material:
http://www.cwsbytemark.com/CatalogSheets/Ferrite_datasheet_oct06/FR_MATL.pdf
<http://www.fair-rite.com/newfair/materials43.htm>
9. Copper & polyimide clad fiber optic, IVG Fiber CU1300.
Not yet a baseline element for aLIGO.
Brian Lantz wants to test this material for use with an optics table, optical lever system. Not yet a baseline element for aLIGO. Could be used for ALS etc. Likely "inherently" vacuum compatible, but worth checking since it has a polymer.
10. Tungsten carbide/carbon (WC/C) sample (for potential BSC-ISI tooling use (class b) but perhaps useful in vacuum as well) (had small sample -- likely inadequate in size probably inherently vacuum compatible)
No currently defined need – would be nice to have qualified just in case
11. Cesium sample (composite ceramic of SiC, Si and C) possibly inherently vacuum compatible application is not clear (high stiffness to weight structure) (sample size adequate?)
No currently defined need – would be nice to have qualified just in case