LASER INTERFEROMETER GRAVITATIONAL WAVE OBSERVATORY

LIGO Laboratory

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BAFFLE FURNACE BAKE PROCEDURE

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Detector Group

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1 Introduction

This document describes setups in the preparation and manufacture of he Errant Beam Baffles used at LLO and LHO for protection of the suspension wire. A High Temp Furnace baking process reduces the reflectivity of he stainless steel baffle @1064nm to approx 12%.

2 Vendors

2.1 Material

The parts were made from super #8 mirror finished [one side] 304 stainless sheet 18ga.[.046"]" thick with PVC covering. Purchased from Coast Metals in Santa Fe Springs, CA. the only source found locally for the super #8 finish [super #8 finish means no visible brush marks on the polished side] Ref. $260 per 4' x 10' sheet.

2.2 Fabrication

The baffle shape was laser cut form the sheet, and bent to form the required shapes at ABC Sheet metal located in Orange, Ca.

2.3 Baking Process

The baking process was done at West Coast Porcelain 'WCP' 1250 enterprise Ct Corona Ca 92882.

Dean A. Reade is the contact person and the owner of WCP.

Ref. The charge for the furnace time is approx $1450 per hour.

2.4 Packaging

CP Stat 100 bags, The vender is Caltex Plastics Inc. 'CaltexPlastics.com'

3 Baking Process & Preparation

3.1 Process

The baffle parts material was baked in the continuous furnace at a temperature of 1560 F, and the parts were sent thru for a total of 4 passes each.Prior to running the parts check the furnace speed and temp, the speed is set at 18 Hz or 5 linear feet per min. this is the speed @1560F of the first baffle process done in 1999. Stabilize the oven at 1560F and for 15 min. min.[849C] prior to running the parts.

3.2 Preparation

3.2.1 Make sure there is the proper environment for our parts to be baked:

3.2.2 No porcelain spraying in the area

3.2.3 No sand blasting in the area

3.2.4 Get clean gloves for everyone handling the parts

3.2.5 'Cp stat 100' material to cover prep. tables

3.2.6 Line up two or more tables for staging the parts

4 Baffle Parts Prep and Handling

4.1 The baffle parts material was cleaned at CIT in **Acetone**, then in **Liquinox**, then **DI** water immediately to keep it from staining the surface, then dried in the clean room and wrapped in **CP Stat** 100 bags.

4.2 Special care to remove the melted plastic at the burn edge of the laser cut part were the cover PVC plastic was burned by the laser. This material comes off with standard solvent and lint free wipes.

4.3 At the site, in a room adjacent to the furnace room, on clean tables, clean stainless steel wire hooks were attached to the parts for hanging on the conveyor belt taking the parts thru the furnace.

4.4 Use 3o4 stainless wire to provide an attaching point for the metal furnace conveyer rail hook, to our parts of no good attaching point exists.

4.5 Ask for people to be ready to take the parts from the office to the furnace conveyor track, show them the procedure and proper parts handling.

4.6 Note: be sure the people know how to handle the material and not to touch the parts with their hands, everyone should wear clean rubber gloves.

4.7 Bring alcohol and lint free wipes for touch up cleaning prior to baking.

4.8 Use clean furnace hooks, if possible sand blast them and wipe them before using them.

4.9 The A Frames need to be hooked up with the long part of the hook on the backside away from the mirror side so it doesn't touch.

4.10 The handling should be only by the hook and not the part as they are transferred thru the furnace.

4.11 After the 4th pass the parts were placed in the CP Stat 100 bags for transportation back to CIT for vacuum clean and bake for shipment to the sites.

4.12 Some small spots were noticed on the parts, the spots look like they may have been from dust.

4.13 To try to reduce this affect and possibly reduce the dust on the part the inlet fan [air door] was turned off at the furnace however this didn't produce a visibly 'cleaner' part, and may not be necessary, although the visible dust was reduced.

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