LTU Stud and Grouting Installation Specification

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Brief Summary:
Installation instructions for LTU (Linac to Undulator) stands installed in the BTH (Beam Transport Hall)

Change History Log

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<td>001</td>
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<td>Activated floor drilling instructions (BTH West)</td>
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<td>003</td>
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<td>Anchor drill diameter changed from 13/16&quot; to 7/8&quot;, added rotohammer/core drilling instruction.</td>
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<td>004</td>
<td>February 14, 2008</td>
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<td>Revised drill depth and added nut &amp; washer for stud alignment</td>
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Summary

This document is intended as a guideline for the installation and grouting of the stands in the Linac to Undulator (LTU) and beam dump regions of the LCLS project. These stands start in the Beam Transport Hall (BTH) and end at the Undulator hall (including the Vestibule between them). The beam dump region begins at the downbeam end of the undulator hall and end at the beam dump. This document applies to all of the Floor Anchor Install and Grouting and Stand Install drawings in the ID-380-036-XXX series. All dimensions follow the LCLS coordinate system.

Anchor Installation

Floor Marking

The floor will be marked using the templates specified in the FLOOR ANCHOR INSTL drawings (ID-380-036-XXX series). Align the templates using the dimensions given in these drawings and mark the floor through the four (4) corner holes with spray paint, marking the drill locations for the anchors.

Drilling and Installation

Anchors (PF-380-736-25) will be installed with Hilti HIT-RE-500-SD adhesive into the concrete floor. For complete anchor installation specifications consult ICC report ESR-2322 (available through the Hilti website):


The ICC specification supersedes this document, but generally:

- 7/8” diameter holes 7.25” depth are to be drilled using a rotohammer with a carbide tipped drill bit complying with ANSI B212.15-1994. In instances when rebar impedes drilling, a core drill will be used to finish drilling the impeded hole. A matched tolerance diamond core bit using a diamond core machine as specified by Hilti will be used in this instance.
- New construction (Headhouse and BTH) holes must be cleaned of dust and debris by blowing with oil free compressed air, brushing three times with a wire brush, and blowing again with compressed air to achieve a relatively dust free wall surface. Holes in the former FFTB beamline tunnel (now BTH-west) must be cleaned for dust and debris using a HEPA vacuum cleaner to control activated material with SLAC Health Physics staff monitoring this process.
- Perform special inspection of prepped holes as required by ESR-2322 section titled “Instructions For Use”, recording all relevant data for SLAC UTR.
- Holes may be dry or damp but must not contain any water at the time of anchor installation.
- Vendor will use HILTI HIT Profri accessory set Part Number 385231 and Piston Part Number 274024 for HIT-RE-500-SD adhesive.
- Check expiration date on HIT-RE-500-SD adhesive pack, attach injection nozzle with internal mixing element, and put into dispenser.
- First two (2) trigger pulls from each new injection nozzle must be discarded to ensure proper mixing.
- Holes must be filled approximately 2/3 full, filling from the bottom to the top.
• Anchor (PF-380-736-25) is to be twisted in a clockwise direction as it is inserted into the hole (to minimize air pockets). 6.75” of the anchor is to be embedded (anchor is marked). A steel flat washer and ¾-10 hex nut will suspend the anchor at the 6.75” insertion depth. The washer will remain in place after cure, but the ¾-10 hex nuts will be removed after cure.
• Anchor position may only be adjusted during the gel time, which is approximately 30 minutes at 68°F. The anchor reaches full cure in 6 hours (at 68°F). Do not disturb between gel time and cure time. For other temperatures see ESR-2322.

Stand and Alignment Plate Installation
After full anchor cure time, the Alignment Plates and Stands (those not requiring an alignment plate) may be installed. Align using the tooling ball sockets and the dimensions given in the GROUTING & STAND INSTALL drawings (also in the ID-380-036-XXX series). The dimensions given are from the nearest device center to the top center of each tooling ball socket. See Figures 1 & 2 below for details on hardware.

Installing Quadrupole and Device Stands
After full anchor cure time, install the Alignment plate. After the Alignment plate is installed and aligned, torque the ¾-10 hex nuts to 130 ft-lbs.

DO NOT USE AN IMPACT WRENCH.

The SLAC UTR will approve grouting after stand installation and alignment.

The gap between the plate or stand base and floor will then be filled with BASF Masterflow 928 1 non-shrink grout see (Figure 1). An equivalent non-shrink grout product is acceptable and will be approved by the SLAC UTR in writing prior to use. The grout will have no visible external gaps. There will be minimal air inclusions in the interior (non-visible) grout volume (less than 2% by volume).

When grout has cured the Device and Quad stands will be installed. Remove the socket head cap screws (which were used as plugs) from the Alignment plate. Set the stand on the alignment dowels in the alignment plate. Install the threaded stud, washer, and nut as shown in Figure 1. The nuts will be torqued to 130 ft.-lbs. The SLAC UTR will approve the installation of each stand after final fastener torque.
Installing Component and Drift Stands

After full anchor cure time, install a washer and ¾-10 nut on each anchor. Set each component or drift stand on the anchor quartet. Align the stand. Install a washer nut set on each anchor and torque to 130 ft-lbs after alignment.

DO NOT USE AN IMPACT WRENCH.

The SLAC UTR will approve grouting after stand installation and alignment.

After the Stand is installed, fill the gap between the floor and the stand base with BASF Masterflow 928 or equivalent non-shrink grout as shown in Figure 2. Equivalent grout products will be approved by the SLAC UTR in writing prior to use. The grout will have no visible external gaps. There will be minimal air inclusions in the interior (non-visible) grout volume (less than 2% by volume).
Appendix

1. BASF Masterflow 928 is available from:
   Chas. E. Phipps Co.
   Cleveland Main Office and Warehouse
   4560 Willow Parkway, Cleveland, Ohio 44125
   tel: (216) 641-2150
   toll free: (800) 362-9267
   fax: (216) 641-1756

Figure 2: Grout and Hardware without Alignment Plate
Component and Drift Stands