High Gradient R&D Coordinating Committee
December 5, 2000

Agenda

1. High Gradient R&D Schedule - (Attached)
   a. Review and Discussion (Burke)

2. Review of Structure Production Plan (Wang)

Upcoming: Dec 12 Review of Structure High-Temperature Processing Plan (Pearson)

Dec 19 Review of Cleaning R&D Plans (Cornuelle)
1. Ongoing Program
   - T20VG5N  Assembly finished.
   - Tuning and characterization finished.
   - Preparation work for vacuum firing before Holidays.
   - Surface processing starts after Holidays.
   - and will be finished by end of January, 2001.
   - T105VG5N  First brazing finished.
   - Straightening finished (reducing 0.3mm bow to 0.1).
   - Full assembly will be finished by Dec. 15th.
   - Microwave measurement will be finished by Holidays.
   - Mechanical QC and microwave QC by end of 2000.
   - Preparation work for vacuum firing before Holidays.
   - Surface processing starts after Holidays.
   - and will be finished by end of January, 2001.
   - No design change for T53VG3F, T53VG5F
   - KEK will deliver bonded T53VG3F, T53VG5F
   - (One by end of January, second in February 2001).
   - The pair of sections will be ready by end of March 2001.
   - T53VG3R, T53VG5R Cups will be delivered from Robertson
   - in the beginning of December
   - We will proceed the assemblies.
   - The pair of sections will be ready by end of February 2001.
   - DS2 disk damage studies

2. T20VG5NA
   - Some decisions made in video conference with KEK.
   - Coupler design will be decided ASAP.
     - Tapering input waveguide
     - Corrugated input waveguide
     - TM02 coupler cavity
     - Optimized 1st disc iris or coupler cavity shape
     - Two-cavity coupler
     - TM01 Mode converter for coupling
     - Race track coupler cavity

3. High Phase Advance Structure: HxxVGy
   - We are still discussing its design.
   - 150° phase advance, Starting Vg 3%.
4. SW Structure: S20PI
   • Mechanical design is being finished.
   • Regular disk machining will be completed in Robertson by Holidays.
   • Disk fabrication at LLNL will be discussed on 12/8/00.
   • Coupler will be machined at SLAC in January 2001.
   • Sections will be completed by end of March 2001.

Brief Summary of 11/30 Video Conference with KEK

   • Review of above status summary.

   • Some discussion results on T20VG5NA:
     i) KEK will be responsible for disk fabrication.
     ii) Only two disks (1\textsuperscript{st} and 2\textsuperscript{nd}) will have possible design change, SLAC will provide the new design drawings after the input coupler design is fixed.
     iii) There will be two sets of disks ordered for rough machining.
     iv) The disk fabrication will probably be completed in early March.
     v) SLAC will be responsible for design and fabrication of input and output couplers.
Process and Installation Plans for T20VG5N and T20105VG5N

Color legend:
Yellow: Things to pay attention to
Red: Potential damage steps
Blue: Suggested precautions

1. Wet fire in H₂ at ~750°C
2. Exposed to Air
3. Dry fire in H₂ at ~900°C
4. Exposed to Air
5. Placed in 304L stainless steel can with cupronickle eyelets and a Ø1-1/8" copper pinch off, vacuum bake at 650°C for ~2 weeks.
6. Leak check can and pinch off. Can’t leak check pinch-off and no pumping on can, could draw in air if under vacuum with leak. May be storing can up to two weeks.
   - Post vacuum atmosphere options:
     a. Leave under vacuum
     b. 3% H₂O₂ (hydrogen peroxide)
7. Move can to the clean room adjacent to plating shop. Clean room Class unknown.
8. Vent can to nitrogen. Nitrogen is from boil-off and transported through building manifold to clean room and is submicron filtered.
9. Eyelets are cut with shears and lifted out into clean room air. Structure weight >70 lbs.
   - Lifting options
     a. Lift by hand
     b. Use clean chain fall
     c. Extend clean room and use adjacent pit.
     d. Use clean cherry picker
10. Assemble structure on strong back in clean room air.
    Assembly Options: What gets put on at this stage?
    There are 6 possible open ports, 2 beam line, 2 input and 2 output
    All assembly components will have conventional clean handling and a 150°C bake but will have been vented to nitrogen and will most likely have a high particulate content.
    Option 1: Standard procedure (6 “open” ports at installation)
      a. Attach beam phase monitor with window, cross assembly with ion and convectron gauge and beamline spool and bakeable valve to one end of accelerator. Attach blank flange to other end of accelerator.
      b. Attach four blank WR90 flanges to the input and output waveguide flanges.
    Option 2: Superports at installation
      a. Same as a. above.
      b. Attach input waveguide bends, magic tee and one blank WR90 flange to input end. Not normally transported with these items, will require addition of sufficient support system.
      c. Attach output waveguide bends, directional coupler, ion pump ports, ion pumps and loads to output end. Not normally transported with these items, will require addition of sufficient support system.
    Option 3: (0 “open” ports at installation)
      a. Same as a. above, except attach an inline or gate valve at both ends of beamline assembly. Valves need to be acquired and system modified to provide space for them in beamline.
b. Same as b. above, except replace blank flange with x-band high power window assembly. **Window(s) need to be acquired and system modified to provide space for them.**

c. Same as c. above.

After assembly above is complete, system will be leak checked (**possibility of drawing in clean room air**) and either left under vacuum or vented to nitrogen and valved off ready for alignment.

11. Align:

   a. Accelerator needs to be aligned to +/-0.04"? This tolerance to be confirmed by Chris A. Chris P. will have tooling ball welded on flanges prior to assembly. Should this be done on CMM or by alignment group?

   b. Other components need to be aligned on strongback prior to installation in NLCTA.

12. Install:

   a. For option 1 or 2 from step 10, system will be vented to filtered nitrogen from a dewar. **Portable cleanroom (shower curtain) will be installed over installation area. This may require modifications.**

   b. Flanges will be removed one or two at a time as required by assembly. Structure will be connected to beamline and new waveguide run, but not SLED system until after successful leak check.

   c. Structure will be pumped down and leak checked. **Possibility of drawing in tunnel air and helium if leak exists.**

   d. Structure will be vented again to filtered nitrogen and interconnection to SLED will be made. Final pump down and leak check. Again there is a **possibility of drawing in tunnel air and helium if leak exists.**

13. In situ Bake:

   What gets baked?

   a. Nothing

   b. Structure only

   c. **Structure and all vacuum components**

   What temperature?

   a. Everything at 150°C (or structure only at 150°C)

   b. Everything at 200°C (or structure only at 200°C)

   c. **Structure and all vacuum components at 200°C**

   What method?

   a. **[Image of method]** Need power for two 30 amp, 208 volts in tunnel.

   b. Hot air

   d. Other?