

ISG8-WG4: Structures Summary

Working Group 4: Structures Fabrication and Structure Preparation

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Fabrication and Structure Preparation Goals:

- **Review Progress and Experiences in Fabrication**
- **Document How to Manufacture and Process NLC/JLC Accelerator Structures**

Fabrication and Structure Preparation Summary Table

ITEM	FNAL	KEK	SLAC
Disk Fabrication	Precision machined	Diamond turned	Precision machined
Coupler Fabrication	Precision machined, with diamond turned iris area	Precision machined, with diamond turned iris area	Precision machined
Cleaning and Etching	SLAC C 01 procedure using 1 minute etch time on machined surfaces & 5 sec. etch on D.T. parts	SLAC C 01 procedure. No etch on diamond turned cups. Still investigating best method.	C 01 procedure
Disk Stack Assembly	Brazed in vacuum furnace w/150 milli Torr argon gas	Diffusion pre-bond, then diffusion bonding in H2 or vacuum furnace	Diffusion bonded in H2 furnace
Coupler Assembly	Brazed in vacuum furnace w/150 milli Torr argon gas	Brazed in H2 furnace	Brazed in H2 furnace
Structure Final Assembly	Brazed in vacuum furnace w/150 milli Torr argon gas	Brazed in H2 furnace	Brazed in H2 furnace
Structure Processing	220 deg. C in situ bake for 7 days upon installation in NLCTA	Series of Dry and Wet H2 firings, then vacuum firing to remove H2. Finally, 220 deg. C in situ bake for 7 days upon installation in NLCTA	

Fabrication and Structure Preparation: Comparisons

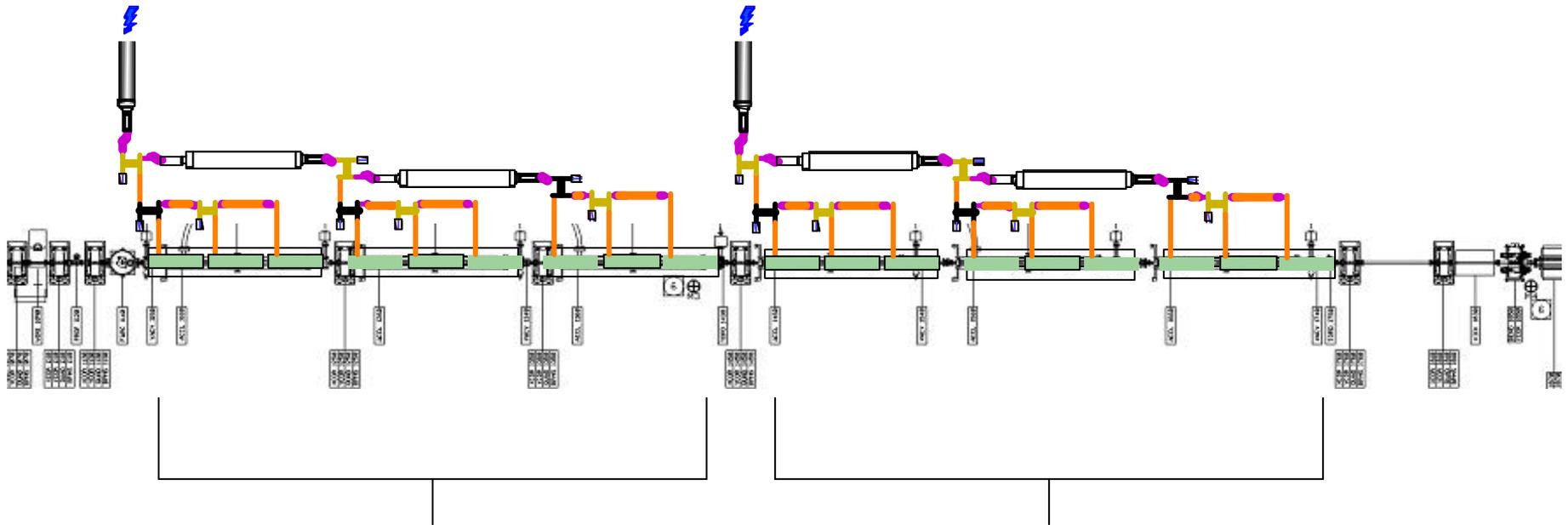
- The table shown on the previous slide lists the basic similarities and differences in processes and preparation methods for structure production
- SLAC and KEK have very similar processes, FNAL differs mainly due to the use of vacuum (or partial pressure argon) brazing which may have the advantage of requiring much less processing time for completed structures
- FNAL uses brazing for assembly of the disk stack, while KEK and SLAC utilize diffusion bonding. As the braze joint design increases in complexity with the addition of the HOM damping manifolds, FNAL may also begin diffusion bonding the disk stack.

Fabrication and Structure Preparation Table: Documentation

The “Cookbook”:

- It is universally agreed that a document that addresses all aspects of structure production, beginning with raw materials specifications and ending with the processing procedure for a completed structure, needs to be assembled.
- Such a document would contain:
 - Structure mechanical and electrical performance specifications
 - Chemical cleaning and etching procedures for component parts
 - An assembly procedure for structures
 - Electrical and mechanical test procedures for structures
 - Quality assurance procedures for structures
 - Processing procedures for structures

The 8-Pack Test in NLCTA



High Gradient Structures (FXBs)
On NLCTA-type Strongbacks
(Girder A)

NLC Prototype Structures (FXCs)
On NLCTA-type Strongbacks
(Girder B)

ISG8-WG4 Structures Summary: Conclusion

- **Most importantly, “We have a plan!”**
 - **We have identified the coupler design (C. Nantista #1) to be used for high gradient and prototype accelerating structure production.**
 - **We have developed a timeline leading to HDDS-1 testing in the first quarter of Calendar Year 2003.**
- **The Fermilab attendees of ISG8 were very pleased to be able to participate and encouraged by the progress made in the working groups. We found the workshop to be a very useful, particularly in setting the course of action for structure production in support of the 8-Pack Project. We look forward to participating in ISG9.**