

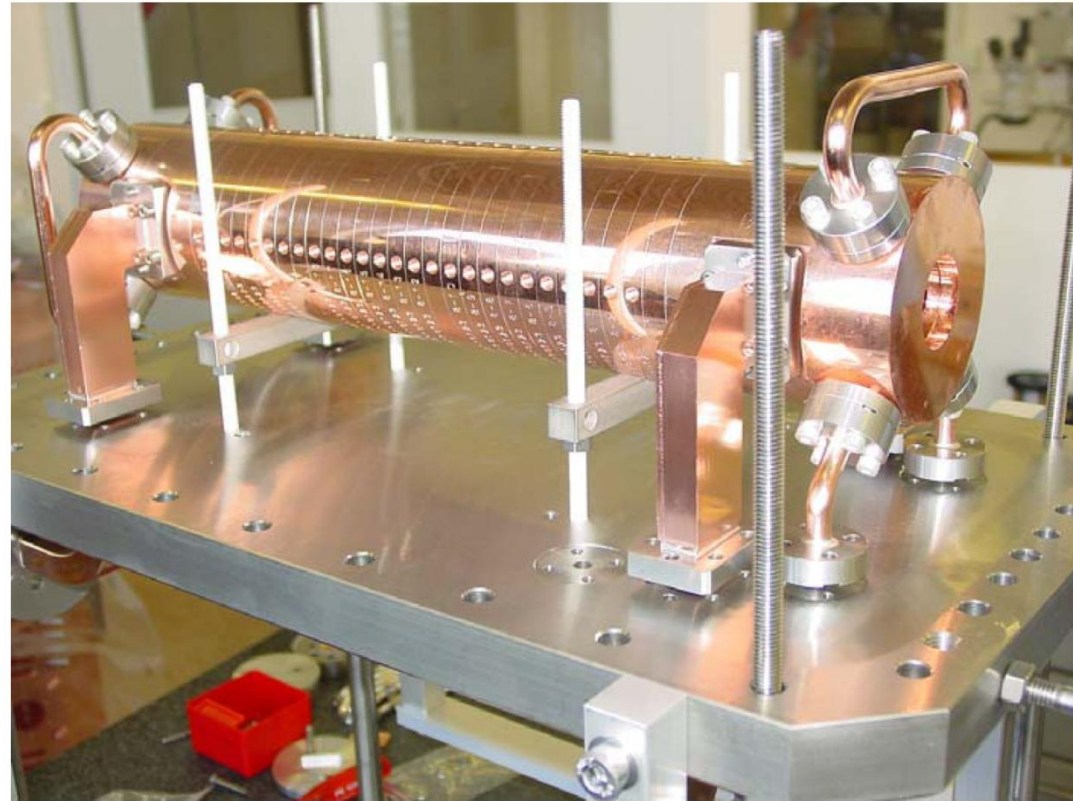
T24 structure fabrication

Production meeting, 20091126

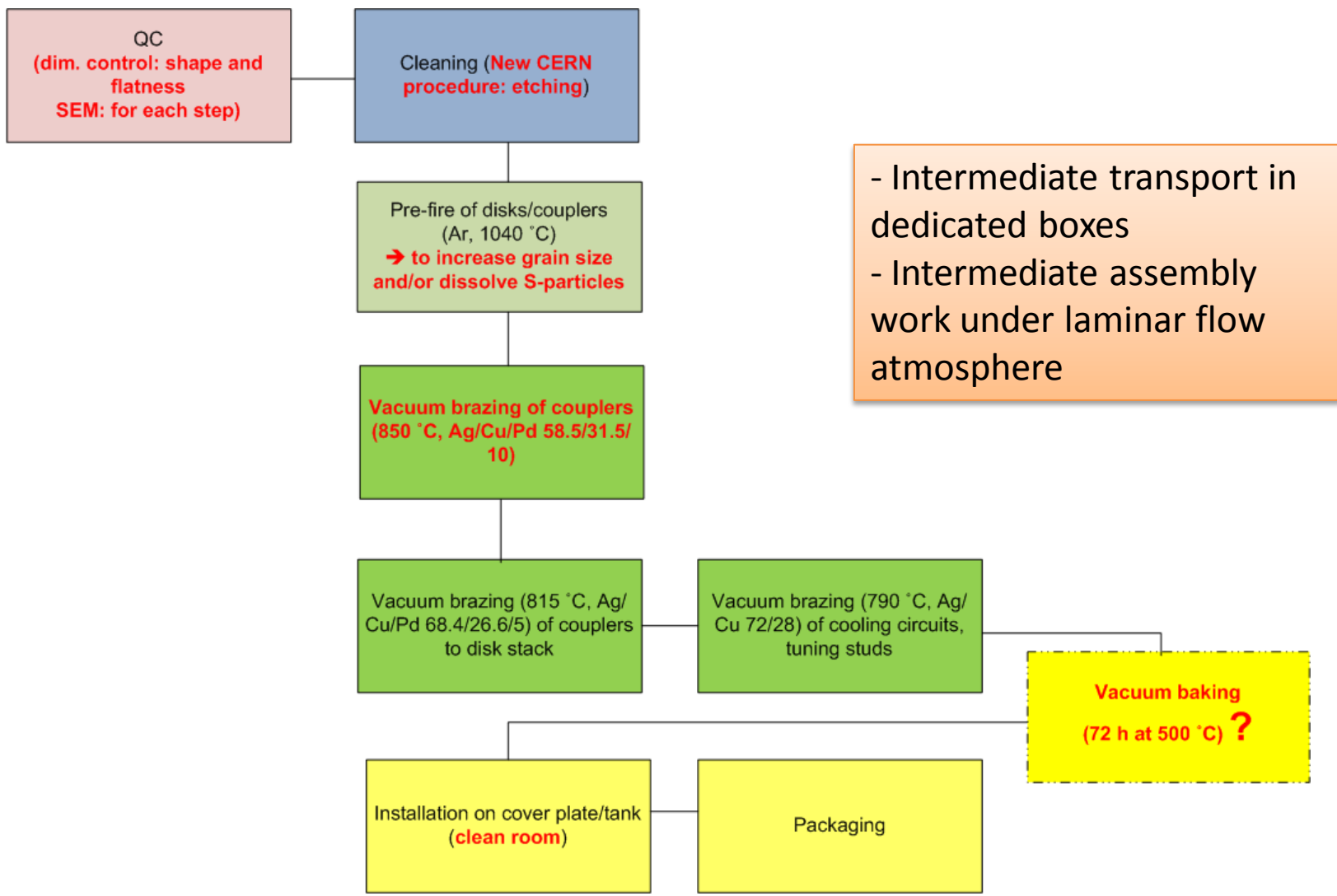
G. Riddone, BE/RF

T24#1 fabrication

- T24#1:
tank version
- Manufactured
at VDL, Q4 '08
- Assembly at
CERN with “new”
procedure
(following T18
task force) Apr-
Jun 09



CERN new assembly cycle



QC

- Dimensional control of the disks at factory: EDMS# 981136
- Inlet inspection at CERN: EDMS# 979854
- Flatness/dimensional control measurements: EDMS# 988492 [witness discs, within specification]
- SEM:
 - EDMS#988003 – as machined [morphology, burrs, iris,....]
 - EDMS#1000840 [witness disc, after cleaning, after pre-fire, after brazing] no traces of Sulfur precipitates in the grain boundaries

Cleaning

- New [based on 30 GHz discs, EDMS#983346] cleaning procedure EDMS#1016987

The surface gets reactive and oxidizes fast ("black" surface within hours). To avoid this the former procedure included Freon step, which is skipped due to present regulations on chemical products

GAMME OPÉRATOIRE POUR LE NETTOYAGE DES DISQUES EN CUIVRE DIAMANTE POUR LE CLIC

SÉQUENCE DE TRAVAIL :

- **Dégraissage avec lessive NGL 17.40 spec. ALU III avec ultrasons + injection de la lessive dans les trous borgnes avec seringue :**
 - concentration : 10 g/l.
 - température : 50 °C.
 - temps : 15 - 30 minutes.
- **Rinçage à l'eau.**
- **Dégraissage électrolytique Cleanor GL 301 cathodique :**
 - concentration : 80 g/l.
 - température : 30 – 35 °C.
 - tension : 5 - 6 V.
 - temps : 15 secondes.
- **Rinçage à l'eau.**
- **Décapage/désoxydation :**
 - acide chlorhydrique : 50 %.
 - température : ambiante.
 - temps : 15 secondes.
- **Rinçage à l'eau.**
- **Dégraissage électrolytique Cleanor GL 301 cathodique :**
 - concentration : 80 g/l.
 - température : 30 – 35 °C.
 - tension : 5 - 6 V.
 - temps : 15 secondes.
- **Rinçage à l'eau.**
- **Rinçage à l'eau déminéralisée + injection de l'eau dans les trous borgnes avec seringue.**
- **Rinçage avec alcool éthylique avec ultrasons.**
- **Séchage à l'azote.**
- **Emballage dans le papier soie + sachets.**

Pre-fire and brazing

COUPLERS

- Pre-fire of couplers at 1040 °C
- Brazing of couplers 850 °C, SCP2
- Machining of couplers

STRUCTURE

- Pre-fire of disks at 1040 °C
- Brazing of all structure 815 °C, SCP1
- Brazing of cooling circuit 790 °C, eutectic AgCu – **spots of braze filler material**



Zone brasé - présence de cordon de brasage

EDMS#10000659

EDS analysis of brazing filler metal dropped out - The drops of filler metal in structure 11WNSDvg1.8 have a composition close to the Ag-Cu eutectic with **no evidence of Pd.**

RF check and installation in the tank

- RF check and tuning in building 112 clean room
[<https://edms.cern.ch/document/1003028/1>]
- **Problem occurred in the clean room:** oxidation of the structure (all the parts made of annealed copper which were lying in the lab had blue or purple spots and those which were not annealed preserved their Cu color)
- Baking 650 °C for ½ day
 - Witness piece analyzed (EDMS#1009001) –
 - Before baking: traces of Cl and S
 - After baking: traces of S (traces of Cl disappeared)
- Installation in the tank to verify part compatibility (EDMS#1003726)
- Shipment to SLAC (all parts under N₂) – cover design incompatible with transport loads

Main remarks

- Traces of braze filler material (couplers + outside surface)
 - Compatibility of brazing design (Ag/Cu/Pd ~ 800 C) with pre-fire at 1040 C in Ar (sharp facets observed)
- Oxidation of the structure in clean room

Tests

- At SLAC →

<https://edms.cern.ch/document/1051282/1>

Post-mortem analysis

- RF check (Riccardo) → no changes
- Straightness measurement (Serge) → no changes
- Cutting (Said, Serge)
- SEM inspection (Anders, Gonzalo)