

Preproduction status update



November shipment missing additional follow up (all complete!):

- **(8/8) CuW** Full to TITF + **(6/6) CuW** Full to IHEP
- (0→16/16) Ti-Full [Full-glue]

December shipment status:

- **3/3 CuW-Full** [Full glue]
- **3/3 Ti-Full** [Full glue]
- **9/76 CuW-Full** [Hybrid gluing]
- **1/44 Ti-Full** [Full glue]

Massive boost with full-glue method

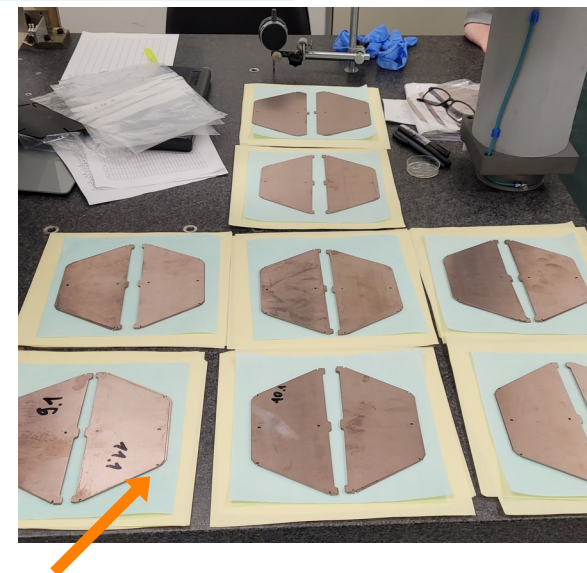
Single plate op.

- **QC Measurements [8-12 min/plate]**

- **No alignment step! (1hr → 0min)**
- Glue preparation (10min/batch)
- **Glue application (roll) + Kapton gluing (10min → 3min/plate)**
- Leave for initial cure (~1 hr/ 0 duty cycle task)

*Batch op.
(~8-10 per batch)*

Current rate now
~8 plates every 1.5hr!
(Down from 5 plates/ half-day)
 (Also a lot less stressful for operators)



Now limited by space required for glue curing (currently 1 batch/day)
 (This is not a problem for reproduction rates)

Single plate op.

- Glue overflow cleaning and inspection (~3 min/plate)
- Full cure (12-20 hr/ 0 duty cycle task)
- Top glue tape (3 min/plate)

More details about alignment method



Procedures of glue application (**roller method**):

- Prepare araldite (~5-8 grams a batch)
- Weigh the plate to get bare weight
- Add ~1.0+ grams to plates with spatula
- Spread glue evenly across plates with roller
- Reweight the plate to determine the amount of glue applied
- Place plate and kapton in vacuum jig
- Engage kapton bendplate jig
- Press kapton jig onto plate jig, while slowly disengage kapton bendplate
- Check alignment of kapton-plate under microscope, (and then??)

Current concerns

- *How to quantitatively determine “evenly”?*
- *What is the acceptable limit of glue? (30-50um → 0.7 -1.2g)*
- *Better method for air bubble elimination? What is acceptable?*
- *Additional quality checks?*

Some notes about “quality”



While the full glue method is a lot more forgiving, **we still need to work on success rate** and eliminate operation error:

- Nov 15 (Friday) 3 laminated, 3 passed final inspection.
- Nov 18 (Monday) 4 laminated, **1 passed final inspection.**
- Nov 19 (Tuesday) 2 laminated, **1 had a large air bubbles**
- Nov 20 (Wednesday) 8 laminated, 8 pass final inspection, **4 orange grade flatness (from green)**
- Nov 21 (Thursday) 7 laminated, ? Pass final inspection

Massive shifts was found during inspection after fully cured.

- Should try to caught earlier@cleaning step
- Handling method needs to be nailed down

What is driving flatness degradation?

- Uneven glue?
- Additional bubbles?
- Uneven pressure during curing?
- Just this batch?

Are there better ways to understand what causes bubble to form?

- Is the current bendplate insufficient?
- One-time operator error?

CuW full glue?



Full glue means:

- *Much faster lamination time*
- Failed attempts can usually be cleaned and reused
- **Allow us to more freely use larger-than-nominals plate**
(> 60% of previously un-usable can be used with full glue (+60 plates!!))

Current Concerns

- **Cannot accurately determine amount of glue on CuW plates due to scale precision**
How accurately do we need, given that we have a 30% margin? Are roundabout method goods enough (measure glue reduction in glue platter)?
- Aforementioned **quality** concerns (not unique to CuW)

Personally in favor of cautiously proceeding with CuW (since we need to more experience with full glue to determine quality concerns)

Extra information on flatness degredation



20.Nov batch:

Index	Bare flatness [mm]	Laminated flatness [mm]	Glue amout [g]
42	0.196	0.287	1.2
44	0.102	0.164	1.08
46	0.025	0.356	0.99
47	0.029	0.302	1.1
49	0.069	0.115	1.2
51	0.043	0.237	0.85
55	0.108	0.134	0.98
63	0.237	0.149	1.04

Currently no obvious culprit in measurements.... Need additional observations

Space requirements for (nonpre) production



1 batch per day is good enough for preproduction, but looking beyond that we definitely need shelves:

- Shelves can be shallow (a single plate doesn't need large vertical space)
- Shelf surface must have no texture (avoid glue forming patterns)
- **Shelf surface needs to be level** (avoid shifting during curing)
- Crude temperature control? Accelerates curing time if needed.