Production scenario for SciFi detector module

At winding centre:

Cast fibre mat

Work load:

1. clean mould (cleaning, applying non-sticking layer, heating)
2. glue fishing lines
3. close casting form
4. mix glue
5. fill glue
6. remove mat from mould (after curing)

Estimated working time per fibre mat: 2 hours for two technicians

Curing time: 2 days

Tools:

1. 2 casting jig/winding centre (to cast two fibre mats at once)

   Price estimate: ??? Euro/jig
2. 1 water heating circuit (e.g. JULABO MC-4)

   Price estimate: 1646Euro

Costs per fibre mat:

???Euro for glue

Transversal cut

Polish fibre ends

Work load:

1. Align fibre mat on milling machine
2. cut fibre ends
3. same for second end

Estimated working time per fibre mat: 1 hour for one technician

Tools:

1. 1 Standard milling machine / winding centre
2. 1 Diamond milling head / winding centre

   cost estimate: ??? Euro

Glue mirror

Work load:

1. Align fibre mat in gluing jig
2. prepare glue
3. glue mirror

Estimated working time pre fibre mat: 0.5 hours for one technician

Curing time: 1 day

Tools:

1. 1 jig / winding centre

   cost estimate: 500Euro / jig

Total work load for 1 fibre mat: 6hours (winding excluded)

At Module Assembly Centre (MAC)

Longitudinal cut:

Work load:

1. Align fibre mat on milling machine
2. cut fibre mat

Estimated working time per fibre mat: 1 hour for one technician

Tools:

1. Milling machine with long table (~1.5m) / MAC
2. 1 Double blade 'Kreisfräse' / MAC

   cost estimate: ~500Euro

Glue end-pieces:

Work load:

1. prepare gluing jig (cleaning)
2. prepare end-pieces (grinding)
3. prepare glue
4. align and glue end-pieces in jig
5. apply pressure

Estimated working time pre fibre mat: 0.5 hours for two technicians

Curing time: 2 hours

Tools:

2 templates / MAC (assuming it can be used to glue 4 fibre mats at once)

cost estimate: 5000Euro / template

Glue end-plug & honeycomb on flat side of fibre mat

Work load:

1. prepare jig (cleaning)
2. prepare end-plug (cleaning & grinding)
3. align fibre mat in jig
4. prepare fibre mat (cleaning & grinding)
5. mix glue
6. apply glue and place end-plugs
7. apply glue and place honeycomb panel
8. place vacuum bag and apply vacuum

Estimated working time: 3 hours for two technicians

Curing time: 12 hours

Tools:

1 template / MAC

cost estimate: 20000Euro / template

(OT: 30.000Euro for two template + 33.000Euro for development)

Glue end-plug & honeycomb on pin side of fibre mat

Work load:

1. prepare end-plug (cleaning & grinding)
2. align fibre mat in jig
3. prepare fibre mat (cleaning & grinding)
4. mix glue
5. apply glue and place end-plugs
6. apply glue and place honeycomb panel
7. place vacuum bag and apply vacuum

Estimated working time: 3 hours for two technicians

Curing time: 12 hours

Tools:
1 template / MAC

cost estimate: 5000Euro / template

Wrap module

Work load: Wrap module with light and gas tight envelope

Estimated time: 1 hour for two technicians

Total work load for 1module: 16 hours per module

Module assembly site:

Remark: assuming Großraumlabor at Heidelberg university

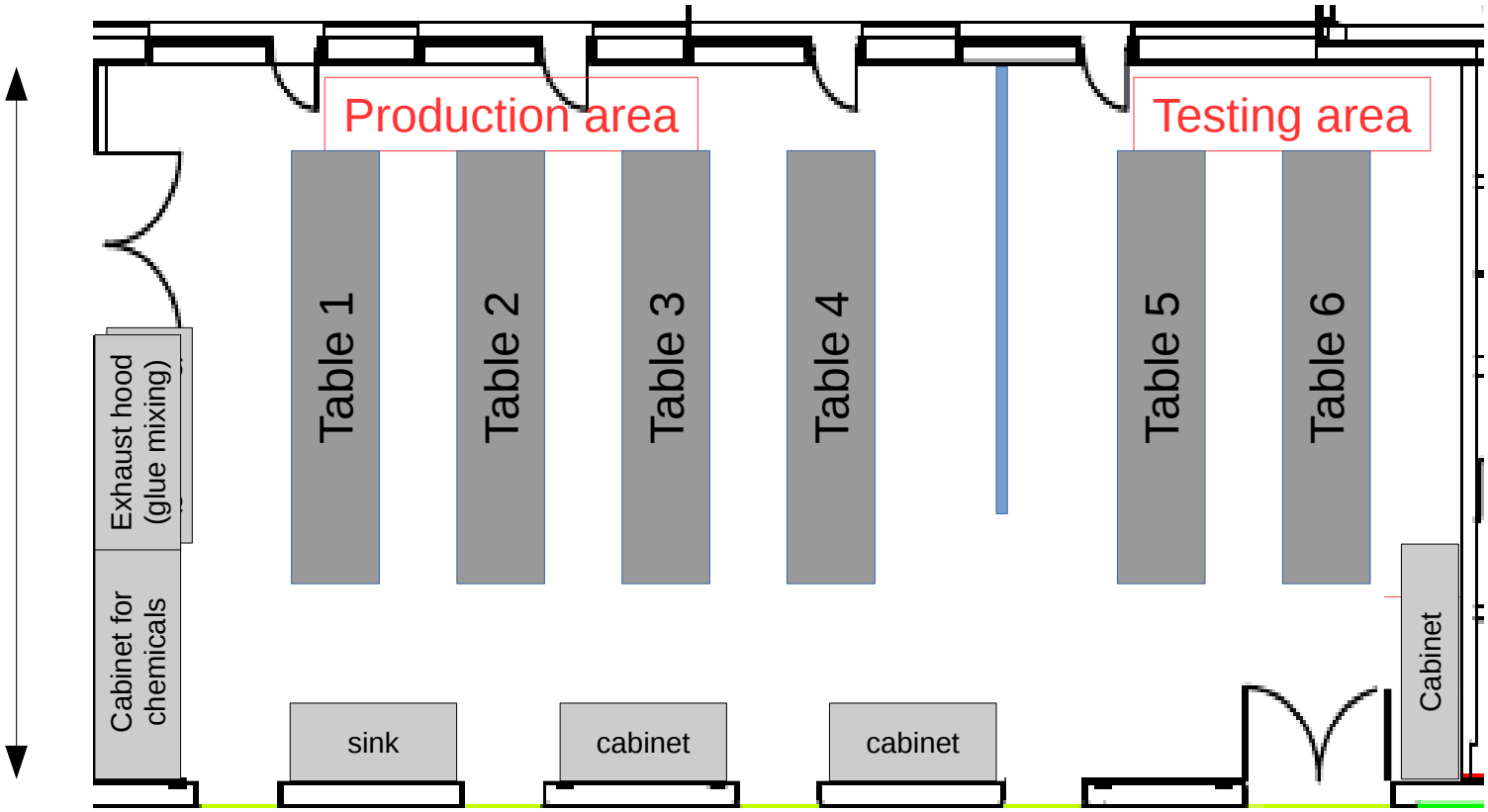

Table 1:	Gluing end-pieces
Table 2:	Gluing HC panel on flat fibre mat side
Table 3:	Gluing HC panel on fibre mat side with pins
Table 3:	Gluing sidewalls/wrapping module
Table 5&6:	Tests (dark room???)