



## **MSC Polymer System for making micro-sections**

### **Processing time estimation**

10.07.2017

#### **Product and Task:**

FR4 printed circuit board: thickness about 1.7 mm.

Drilled and plated through holes shall be precisely cross- sectioned and analyzed under the microscope.

MSC's specimen holder 4x2 mm used. 4 specimens milled and put into one holder. Then grinding and polishing of 4 specimens in one step. Thereafter ready for inspection under the microscope.

#### **Process flow:**

##### **1. S-OSR (high precision specimen milling machine)**

4 specimens are milled precisely.

Distance to target is 500 µm. Feed is 0.8 m/min.

Time expenditure per specimen: about 60 sec.

Time expenditure for 4 specimens: about 240 sec.

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##### **2. Embedding of 4 specimens**

Preparing embedding compound (2-component system used, called Demotec 20) and

Embedding the 4 specimens in the holder.

Time expenditure: about 90 sec.

Curing time: about 15-30 min.

Then ready for grinding and polishing.

##### **3. SPA (automated grinding and polishing machine)**

The specimen holder with the 4 specimens is grinded and polished automatically on the SPA.

It is also possible just to perform the precise grinding process on the SPA and move the time consuming polishing process to a separate polishing machine, if available. By that you optimize the effectiveness and maximize the capacity of the SPA.

Amount of grinding is 500 µm (400 µm rough grinding and 100 µm fine grinding).

Fresh grinding paper is used. Grinding paper with grain size 500 for rough and 1200 for fine.

The grinding speed depends on the grain size and the condition of the grinding paper.

Also if you reduce the distance to target from 500 µm e.g. to 400 µm you can shorten the time for grinding further.

**Time expenditure for 4 specimens (embedded in one specimen holder):**

Rough grinding: 120 sec

Fine grinding: 30 sec

Polishing: 180 sec (standard time I use, probably shorter polishing time possible, too)

Total: 330 sec.

Important: the SPA process is fully automated after pressing the start button. So the operator can work at the S-OSR for preparing further specimens while the SPA process is running.

**Summary:**

Total process time for S-OSR, SPA preparing 4 specimens (excluding embedding and curing):

570 sec (about 10 minutes) for 4 specimens. This is about 2.5 minutes per specimen.

As already mentioned actually the process time is less as the operator can work on further specimens (S-OSR, embedding ...) while the SPA process is running.

**Possible savings with our system:**

- 1) Embedding the maximum number of specimens per specimen holder (time saving).
- 2) Further time saving because of the precise and automated grinding and polishing process compared to a manual process. Such a manual process makes it necessary to stop and control under the microscope several times.
- 3) By using our patented specimen holders you save a lot of embedding compound.
- 4) As our machines are very easy to operate, even unexperienced people can run the machines and achieve very good results.

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Please contact me, if you have questions or would like to get additional information.

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