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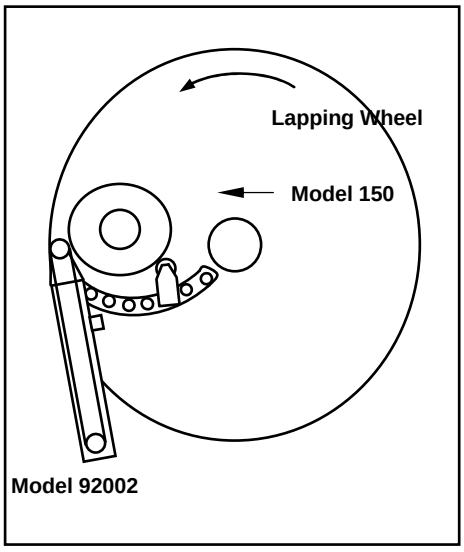
Basic Arrangement of Model 910 and 920 for Processing Cross Sections

Sample preparation of cross sections can be done using a variety of equipment and techniques. Depending on the level of automation and the application will warrant a different equipment setup. For preparing basic SEM cross sections of IC devices there are basically two methods available in common practice: Encapsulated cross sections and Un-encapsulated cross sections. Encapsulated cross section techniques involves mounting a cross sectional sample into an epoxy or acrylic mold compound, surrounding the device of interest and making the sample easier to handle. This mold is typically about 1" in diameter and is then ground and polished until the cross section is completed. Generally the process involves silicon carbide abrasive papers from 120 grit -1200 grit, ultimately ending with a final polish using 0.05 µm colloidal silica applied to a polishing cloth. Un-encapsulated cross sectioning is done directly on the IC device of interest. The sample is cleaved into a suitable size (generally about 3 x 5mm) and attached to some type of holder. The sample is then polished using diamond lapping films of 30 µm – 0.5 µm, ultimately ending with a final polish of 0.05 µm colloidal silica applied to a polishing cloth.

Using both techniques the equipment setup can also vary. Both techniques require some type of polishing machine to grind and polish the sample down to the suitable surface finished required for scanning electron microscope observation. In both cases the samples also need to be held using some type of jig or fixture to ensure a proper plane of polish and precision removal of material. A basic illustration of the arrangement used for holding samples onto a polishing machine for processing is shown below.



BASIC SETUP USED FOR POLISHING. THE MODEL 150 IS AUTOMATICALLY ROTATED WITH THE 92002 USED ON THE MODEL 920 LAPPING MACHINE

For encapsulated cross sectioning a typical arrangement used is the Model 920 Lapping and Polishing Machine combined with a Model 92002 Workstation. The samples are held and controlled using the Model 150 Lapping and Polishing Fixture which is held and rotated during processing. An image of this arrangement is shown in Figure 1.

For un-encapsulated cross sections, the Model 920 Lapping and Polishing Machine combined with the Model 595 BiPod Polisher™ are used. In some cases the Model 92002 Workstation can be used to hold the 595 on the polishing wheel, making it a semi-automatic arrangement. This arrangement is shown in Figure 2.

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Figure 1: Figure 1 shows the basic arrangement for holding the Model 150 Lapping and Polishing Fixture.

Figure 2: Figure 2 shows the basic arrangement for holding the Model 595 BiPod Polisher™ onto the Model 920.