

Metal Specimen Preparation

1. Cutting

When cutting a specimen from a larger piece of material, care must be taken to ensure that it is representative of the features found in the larger sample, or that it contains all the information required to investigate a feature of interest.

One problem is that preparation of the specimen may change the microstructure of the material, for example through heating, chemical attack, or mechanical damage. The amount of damage depends on the method by which the specimen is cut and the material itself.

Cutting with abrasives may cause a high amount of damage, while the use of a low-speed diamond saw can lessen the problems. There are many different cutting methods, although some are used only for specific specimen types. MTI provides the SYJ-150 low speed diamond saw for cutting OM (optical microscope), SEM (scanning electron microscope), and even TEM (transmission electron microscope) specimen.

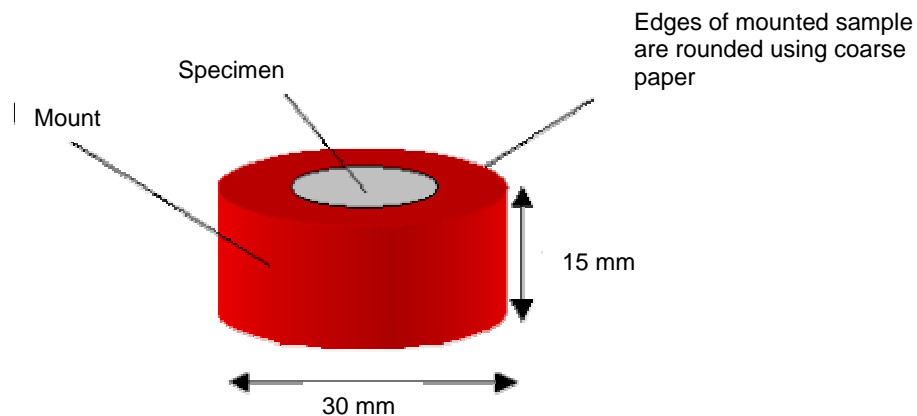
2. Mounting

Mounting of specimens is usually necessary to allow them to be handled easily. It also minimizes the amount of damage likely to be caused to the specimen itself.

The mounting material used should not influence the specimen as a result of chemical reaction or mechanical stresses. It should adhere well to the specimen, and if the specimen is to be electropolished later in the preparation then the mounting material should also be electrically conducting.

Specimens can be hot mounted (about 150 °C) using a mounting press either in a thermosetting plastic, e.g. phenolic resin, or a thermosoftening plastic e.g. acrylic resin. If hot mounting will alter the structure of the specimen a cold-setting resin can be used, e.g. epoxy, acrylic or polyester resin. Porous materials must be impregnated by resin before mounting or polishing, to prevent grit, polishing media or etchant being trapped in the pores, and to preserve the open structure of the material.

A mounted specimen usually has a thickness of about half its diameter, to prevent rocking during grinding and polishing. The edges of the mounted specimen should also be rounded to minimize the damage to grinding and polishing discs.



A mounted specimen (shows typical dimensions)

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