

## Application notes

### Preparation of specimens for microscopic examination

#### Practical execution

Specimen preparation starts with embedding of the workpiece if applicable. Depending on the state of the specimen, it is rough ground with silicon-carbide grinding paper or with WINTER diamond grinding wheels or WINTER diamond foils. The specimen is then polished with WINTER Diaplast® compound or WINTER Diaplast suspension. See also our recommendations on the next page.

#### Embedding

The standard embedding media in practice are plastic-based hot or cold embedding media. It is important that the embedding media should fit the specimen snugly without any gaps between embedding and specimen, otherwise there is a danger that abrasive or polishing agent may be deposited between specimen and embedding.

The hardness of the embedding media must be selected with great care and should be suited to the hardness of the specimen in order to avoid edge rounding.

#### Grinding

The surface state of the specimen before polishing is critical for the economics of polishing with WINTER Diaplast® and for the quality of the final polish. Proper rough grinding with abrasive paper or with a WINTER diamond grinding wheel or WINTER foil can greatly reduce polishing time, enabling economical application of WINTER Diaplast® and giving good surface quality. It is important to ensure that any unevenness caused by sawing is removed by the grinding operation.

#### Polishing

(See also recommendations on next page.) Polishing with WINTER Diaplast® compound or WINTER Diaplast suspension can be effected on polishing machines with or without polishing automation. A separate polishing disc with polishing cloth must be used for every diamond grit size. WINTER polishing cloths can be used on commercially standard machines. Before starting polishing, slightly moisten the polishing cloth and distribute the polishing agent evenly on the polishing cloth. There are some cases where WINTER diamond suspensions are easier to handle than diamond compounds; diamond distribution on the polishing cloth is more even. Diamond suspensions are preferable for automated polishing operations, as feeding during the work is possible.

WINTER Diaplast® diamond compound is soon saturated with the swarf of the material being machined, so that a little WINTER Diaplastol must be sprayed on at intervals in order to maintain the cutting action of the diamond grit.

What is important is that there is a thin, cooling lubrication film with good adhesion, to support the material removal work of the diamond grit. This is achieved in combination with the thinner WINTER Diaplastol.

The **polishing pressure** to be applied is dependent on the specimen material and the diamond grit size. As a rule, **high polishing pressure** can be used with **hard materials**, and **lower pressure** should be used for **finer** diamond grits. This is particularly important for deformation-sensitive materials.

The polishing times for the individual polishing stages are about **3-5 minutes**. Longer polishing times should be avoided, especially for the fine grit sizes, since they cause relief formation.

The selection of the **grit sizes** to be used depends mainly on the hardness of the specimens and their individual structural constituents. As a rule, the greater the hardness of the material to be polished, the coarser the grit to be used at the beginning. But with very hard materials the finest grit sizes (D1 to D0.25) can be omitted. Remember that the polishing process not only removes the scratch marks of the last grinding operation, but also reduces the invisible surface deformations, since these may cause falsification of structure. This means it is often necessary to start with a larger diamond grit size than would be necessary for removal of the scratch marks from the last grinding operation.

#### Remark

When polishing with WINTER Diaplast® it is important to ensure **maximum** cleanliness, in order to avoid any transfer of a coarser grit to the next finer polishing operation. It is essential not only to keep the polishing device **clean**, but also to clean the individual specimens **between the individual polishing stages**. This may be done under running water or with the aid of a brush (for coarser grit sizes) or a cotton pad (for finer grit sizes). It is then recommended to use an ultrasonic cleaning bath.