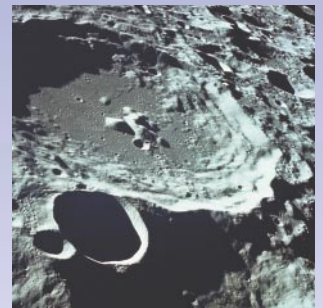


# Mineralogical Specimen Preparation



**A Complete Range  
of Equipment and  
Consumables**



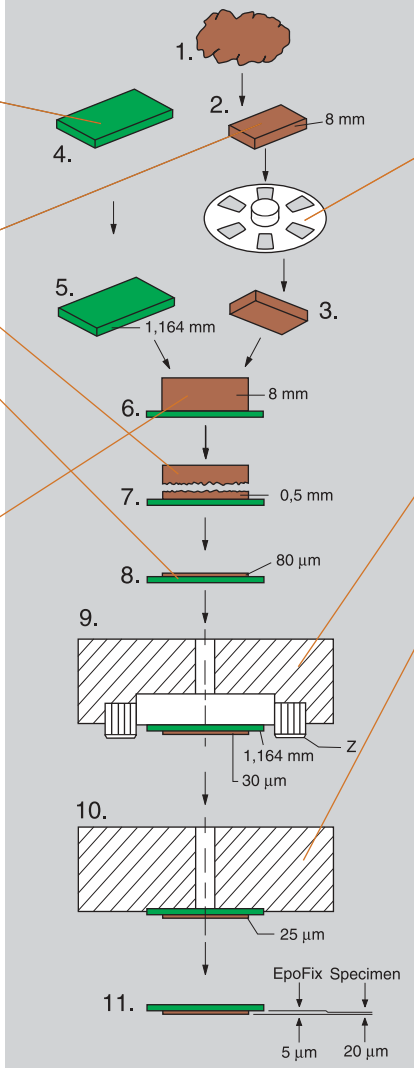
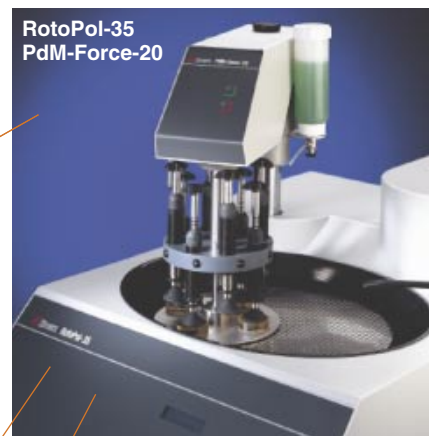
**Struers' range of equipment** and consumables for the preparation of mineralogical, geological and ceramic specimens covers the entire preparation process - from initial cutting to the finished thin section or polished section, ready for microscopic examination

## **Struers' approach to mineralogy is based on four key points:**

- A thoroughly tested method for the production of thin sections without the need of special skills
- Equipment that is easy to handle
- Cost-efficiency
- Environmental protection

## **The preparation of mineralogical, geological and ceramic specimens may be divided into two main groups:**

- Preparation of thin sections or polished thin sections for microscopic examination in transmitted or reflected light
- Preparation of specimens for microscopic examination in reflected light



### The TS-Method™ for Preparation of Thin Sections

1. Sampling.
2. Cutting of a specimen on Discoplan-TS.
3. Automatic lapping of the specimen on RotoPol-35/PdM-Force-20 lapping/polishing machine.
4. Glass slide 27 x 46 mm, 28 x 48 mm or 30 x 45 mm.
5. Grinding of glass slide in Discoplan-TS to a given thickness, e.g. 1.164 mm.
6. Epovac vacuum impregnation unit: cementing of specimen to glass slide using Epofix resin.
7. Discoplan-TS: cutting off surplus specimen material to a thickness of 0.5-2 mm.
8. Discoplan-TS: grinding of thin sections to a thickness of 80 µm (section + EpoFix resin), up to three specimens at a time.
9. Automatic lapping of thin section in BORTY thin section holder on RotoPol-35/PdM-Force-20. Final thickness of section + resin e.g. 30 µm. Experience shows that the abrasion does not stop until z (specimen without resin) equals approximately twice the diameter of the grinding grains.
10. Automatic polishing of thin sections in TYNDS thin section holder on RotoPol-35/PdM-Force-20. Reduction for a typical polishing: approximately 10 µm.
11. The specimen is now finished. Thickness: 20 µm.

### Thin Sections

The production of thin sections requires highly specialized equipment. When you are dealing with a specimen thickness of e.g. 20 µm, there is no point in taking chances. For the preparation of thin sections, Struers has developed the TS-Method™, a technique which provides outstanding quality and very high reproducibility. Nevertheless, it is very easy to use. The cornerstone of the TS-Method™ is Discoplan-TS, a combined cutting and grinding machine specifically designed for the preparation of thin sections.

### Polished Sections

The preparation of mineralogical specimens for microscopic examination in reflected light is basically similar to the preparation of other materials. However, some special equipment is required. After cutting, the specimens are normally mounted in the vacuum impregnation apparatus Epovac using Epofix resin. Lapping is carried out on RotoPol-35/PdM-Force-20 by means of a cast iron lapping disc and the special plane polishing disc Petrodisc. The abrasives used are SiC powder and diamonds. Grinding, lapping and polishing can also take place on other semi-automatic or automatic preparation equipment.

### Discoplan-TS - Sophistication and Reliability

Discoplan-TS is a very versatile machine for fast and economical production of mineralogical thin sections. Discoplan-TS combines the cutting and grinding processes in one ma-

chine, thus reducing investments and allowing for very fast preparation procedures.

### Cutting on one hand...

The left hand side of Discoplan-TS takes care of the cutting. A choice of two types of diamond cut-off wheels ensures perfect cutting of all materials, with a minimum of deformations. The cutting module of Discoplan-TS also carries out re-sectioning of the specimen (cutting off surplus material): the thin section is easily fixed in a vacuum holder controlled by a guide rail on the table of the machine.

### ...Grinding on the Other

The right-hand side of Discoplan-TS is designed for precision grinding. For automatic preparation of thin sections all glass slides must have exactly the same thickness with a tolerance of a few µm. A built-in micrometer ensures extreme precision.

Time is saved in the final processing if the specimens can be precision ground to almost final thickness. Both these functions are carried out on the grinding module of Discoplan-TS.

### Outstanding Precision

The glass slides are placed on ceramic vacuum holders and are then moved across a cup wheel with diamonds. The slides or specimens may be ground with an accuracy of ±2 µm in a couple of minutes. The ceramic vacuum holder allows for dressing of the cup wheel. This feature is important to ensure absolute precision. The vacuum holder is designed for up to three standard specimens or standard slides at a time, or one specimen of up to as much as 75 x 75 mm.

### Accutom-50

For the occasional preparation of thin sections the precision cut-off- and grinding machine Accutom-50 can also be used. On Accutom-50 both cut-off wheels for sectioning and cup-wheels for grinding can be used. The



microprocessor controlled movement of the specimen allows for a positioning accuracy of 5µm.

### **PdM-Force-20 - Automation Means Reproducibility**

PdM-Force-20 is a semi-automatic specimen mover for the production of thin sections, polished thin sections and polished specimens of mineralogical materials. The force is applied through springs which can be individually adjusted up to maximum load of 20N. PdM-Force-20 is designed for mounting on a RotoPol-35 grinding/polishing machine. RotoPol-35 has a variable speed from 40 to 600 rpm, making it possible to carry out grinding, lapping and polishing processes, including final polishing with oxide polishing suspensions.

### **Automatic Lapping and Polishing of Thin Sections**

Sections cut to a standard size on Discoplan-TS, are lapped automatically on RotoPol-35/PdM-Force-20 - up to eight sections at a time. Subsequently, they are glued to a glass slide, then cut and ground on Discoplan-TS.

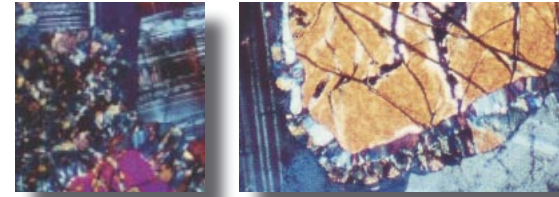
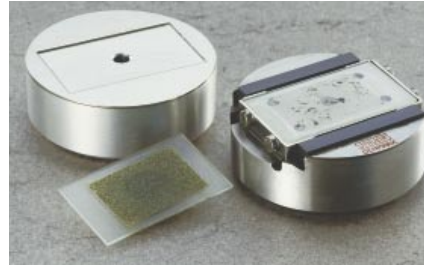
To achieve the final thickness (e.g. 20 µm), the sections are now lapped and polished on RotoPol-35/PdM-Force-20: the specimens are placed either in a BORTY thin section holder with boron carbide support for lapping or in a TYNDS thin section holder for polishing - up to four holders at a time. During the preparation, each of the thin sections may be taken out of PdM-Force-20 separately for inspection without interfering with the preparation of the others. Due to the automated preparation process, RotoPol-35 with PdM-Force-20 produces specimens with very high reproducibility.

### **Epovac**

Many mineralogical materials have cracks, cavities and pores. Such materials must be embedded under vacuum to ensure that the entire specimen is impregnated with resin. For this purpose, Epovac has been developed. Epovac is a vacuum impregnation apparatus, especially designed



*Grinding with cup-wheel on Accutom-50*



*Thin section holders for lapping and polishing*

for mounting and impregnating of porous materials. Furthermore, Epovac is very well suited for gluing specimens to glass slides for the production of thin sections. With Epovac both mounting and impregnation are carried out quickly and efficiently. Epovac is easy to operate and extremely easy to clean.

### **Thin Section Holders**

Thin section holders are indispensable tools in rational precision lapping and polishing of thin sections. Struers' thin section holders ensure plane specimens of perfect surface quality and well defined and uniform thickness. They are suited for both manual and automatic preparation.

### **BORTY - Precision Lapping Holders with Boron Carbide Support**

The BORTY thin section holders are provided with very hard sticks of boron carbide (B<sub>4</sub>C) which stop any further material removal when they make contact with the lapping disc. This method is fast and allows for the automatic preparation of multiple specimens on RotoPol-35/PdM-Force-20. Standard holders are available for glass slides in three sizes.

### **TYNDS - Thin Section Holders for Polishing**

As diamond is used for polishing the thin sections, BORTY can not be used as diamond also removes material from the boron carbide sticks. Therefore a holder which does not touch the polishing cloth must be used. The TYNDS thin section holders are designed to solve this problem. They have the same outer dimensions as the BORTY holders. Consequently, they can be used on the same equipment with the same specimen mover disc that has al-

ready been used for precision lapping. The holders ensure excellent polishing.

## **Preparation Discs and Lapping Powders**

### **Petrodisc**

Petrodisc was developed in co-operation with mineralogists and geologists. The aim was to achieve perfect plane polishing of materials whose phases differ largely in hardness. Petrodisc is used in connection with diamond spray: the diamond grains cut evenly and uniformly through both hard and soft phases of the specimen. As a result the specimen surface is relief-free and the soft phases suffer no damage.

### **Cast Iron Lapping Discs**

Two cast iron discs (200 mm and 300 mm) for lapping are available. The discs are made of a special cast iron alloy which will resist long-term influence from SiC grains, regardless of grain size.

### **MD-Piano**

For the fast removal of material, grinding can be carried out using MD-Piano, a diamond grinding disc. MD-Piano is available in 3 grades, corresponding to a grit # size of 80, 120 and 220. MD-Piano is part of the Struers MD-System

### **MD-Largo**

MD-Largo is a composite disc for fine-grinding. Diamond suspension or spray is applied in regular intervals during preparation. The special formulation of the composite material together with the use of diamonds as abrasive guarantees a uniform removal of material from different phases without smearing, deformation or chipping. The specimens will maintain a perfect planeness.

### **Lapping Powders**

Lapping on cast iron discs is carried out with SiC powder. Depending on the hardness of the material the specimen is lapped in a number of steps - from one to four. A wide range of grain sizes is available.



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## Discoplan-TS

### Technical Data

1- or 3-phase  
 Rotational speed:  
 1400 rpm at 50 Hz  
 1700 rpm at 60 Hz  
 Diamond cut-off wheel:  
 150 - 230 mm dia. 0.5-1.5 mm thickness  
 Diamond cup wheel: max 180 mm dia.  
 Precision scale including vernier: 1 µm  
 Vacuum chucks: 3 pieces, 30 x 50 mm  
 Dimensions: L x D x H: 700 x 370 x 320 mm  
 Weight: 65 kg  
 Recirculation cooling unit:  
 Dimensions: L x D x H: 500 x 400 x 410 mm  
 Weight: 7 kg

### Specifications

#### Discoplan-TS

Precision thin section machine. With 3 vacuum chucks for grinding of 3 glass slides of 27 x 46 mm, 28 x 48 mm or 30 x 45 mm, or 2 glass slides of 1 x 3" and specimens. Including holder for cutting of rocks (75 x 75 mm), holder for cutting of standard specimens (8 x 20 x 30 mm), dial gauge and recirculation cooling unit (TREC). Diamond cut-off wheels, diamond cup-wheels and vacuum pump are ordered separately

### Code

TISCO

### Discoplan-TS

As TISCO, but 1-phase

TISEN

### Table unit

For Discoplan-TS. With a rolling pallet for recirculating cooling unit

LABDI

### Diamond Cup Wheel, 70 µm

Metal bonded, for grinding of hard, brittle materials on Discoplan-TS.

01TYN

### Diamond Cup Wheel, 35 µm

Resin bonded, for grinding of hard, ductile materials on Discoplan-TS.

06TYN

### Diamond Cut-off Wheel

For cutting of minerals and ceramics (HV 800). Metal bond. 200 mm dia. x 1.0 mm x 22 mm dia.

20TRE

### Diamond Cut-off wheel

For cutting of sintered carbides and ceramics (HV 800). Bakelite bond. 200 mm dia. x 1.1 mm x 22 mm dia.

23TRE

### Vacuum Pump

used with vacuum chucks on Discoplan-TS and Accutom-50, -5 and -2. With vacuum: 780 mbar and output: 5.8 l/min.

TISPU

## RotoPol-35

### Technical Data

1-phase/3-phase  
 Rotational speeds: 40-600 rpm  
 Dimensions: W x D x H: 515 x 720 x 315 mm  
 Weight: 49 kg

### Specifications

#### RotoPol-35

Grinding/polishing machine with variable speed (40-600 rpm in steps of 10 rpm). For disc 300 mm dia. With water in- and outlet and water tap. Integrated system for cooling the preparation disc up to 300 rpm. 750 W motor. Lid (ROTLI) and discs are ordered separately. RotoPol-35 is a RotoSystem modul

### Code

ROT35

## PdM-Force-20

### Technical Data

1-phase  
 Dimensions: W x D x H: 140 x 355 x 315 mm  
 Weight: 12 kg

### Specifications

#### PdM-Force-20

Automatic specimen mover for the preparation of mineralogical specimens. For mounting on, and power supply from RotoPol-35. Lubricator (PEDRI) included. Specimen mover plates have to be ordered separately

#### Specimen Mover Plates for PdM-Force-20

For 8 specimens, 25 mm dia.  
 For 8 specimens, 30 mm dia.  
 For 4 specimens, 40 mm dia.  
 For 4 specimens, 60 mm dia.  
 For 8 specimens 20x30 mm.

### Code

FOTWE

FOTIN  
 FOTNE  
 FOTYF  
 FOTIX  
 FOTON

#### Thin Section Holder with Boron

##### Carbide Sticks

For lapping of thin sections. 60 mm dia. Including 4 foils of 25 µm and 3 foils of 8 µm.

BORTY

#### Set of Copper Foils

Extra set of 4 pcs. 25 µm and 6 pcs. 8 µm.

BORCU

#### Thin Section Holder

For polishing and lapping of thin sections, size 60 mm dia.

TYNDS

## Accessories

### Standard Slides

Standard Slides for thin sections, with ground edges. 100 pcs.  
 or

OBJEK  
 OC145

### Microcover Glass

To be used for covering thin sections. 24 x 32 mm. Abt. 100 pcs.

COVER

### Eukitt

Synthetic thermoplastic resin for mounting of cover glasses on thin sections. 250 ml.

EUKIT

### Petrodisc for Plane Polishing

Polishing disc for plane polishing of mineralogical and ceramic specimens, 290 mm dia.

PETRO

### Cast Iron Lapping Disc

Concentrically grooved disc, for lapping of mineralogical specimens, 300 mm dia.

GRICO

### Silicon Carbide Powder

For lapping of mineralogical specimens. To be used on cast iron lapping disc. Grit: 120, 220, 320, 400, 600, 800, 1000, 1200

POWDE

### MD-Disc

Disc for magnetic fixation, 300 mm dia.

DEMAL

### MD-Piano

Diamond grinding disc for grinding of materials HV 150 - 2000  
 MD-Piano 80, 300 mm dia.  
 MD-Piano 120, 300 mm dia.  
 MD-Piano 220, 300 mm dia.

MANPA  
 MANAX  
 MANXA

### MD-Largo

Maintenance-free disc for one-step fine grinding, using diamonds 300 mm dia.

MALAX

### DP-Spray - P

9 µm  
 6 µm  
 3 µm  
 1 µm

SPRAC  
 SPRIX  
 SPRET  
 SPRON

*For further information on Epovac, Epofix, the MD-System and diamond products please see separate brochures.*