

On-site materialographic preparation and examination



Non-destructive preparation



Conventional materialographic preparation entails cutting a sample from a material. This method is not always appropriate as it destroys the component which is being examined.

Many applications require the ability to perform a materialographic preparation and examination without ensuing damage to the subject. The non-destructive method is used in these cases.

The usual preparation steps such as grinding, polishing and etching are performed on the part to be examined in a limited area where no damage can be done, whereupon the surface can be analysed.

On-site preparation is particularly suitable for quality checks in power stations, oil platforms, bridges, aircraft etc. The non-destructive preparation method enables the necessary inspection to be carried out on site.

Struers manufactures a complete range of portable equipment for non-destructive preparation, from basic grinding through mechanical and electrolytic polishing to electrolytic etching. The range also includes a portable microscope for on-site use and methods for producing replicas of the prepared surface.

Using replica methods makes it possible to perform the microscopic examination in the laboratory - under perfect working conditions.

The entire Struers non-destructive preparation range has been designed for field work. The equipment is thus as compact and as light as possible. It is easy to transport and can be used literally under any conditions.

Transpol-2



All the necessary accessories are contained in Transpol-2's carrying case.

Due to the special design of the polishing pencil, electrolytic polishing with Movipol-3 is quick and uncomplicated

Transpol-2 - Mechanical grinding and polishing under all working conditions

Transpol-2 is a portable grinding and polishing apparatus. It is extremely compact and is designed for field work under even the most difficult conditions. Transpol-2 fits into a practical shoulder bag with all the necessary accessories and weighs an approximate total of only 5 kg. Transpol-2 consists primarily of 2 parts: a control unit and a grinding and polishing unit. The control unit comprises the power supply and speed regulator unit (100-7000 rpm). The grinding and polishing unit is connected to the control unit by a soft, flexible cable. It consists of a direct current motor with a holder with an easily exchangeable rubber disc, upon which the grinding paper and polishing cloth are mounted.

Transpol-2 is available with two types of holder: one for straight mounting and one for right-angle mounting, thus making it possible to use Transpol-2 in even the most inaccessible places.

Grinding

Transpol-2 uses 32 mm diameter SiC grinding paper discs in grit sizes 60, 120, 240 and 500#. Transpol-2 also includes a special flapper wheel for grinding of extremely uneven surfaces.

Polishing

Transpol-2 uses DP-Dac, DP-Dur, DP-Mol, DP-Nap and OP-Felt polishing cloths, all 32 mm diameter, and DP-Paste, DP-Stick or DP-Spray. Transpol-2 is furthermore delivered with a special felt cone for polishing of uneven and curved surfaces.

Movipol-3



Movipol-3 - Electrolytic polishing and etching in the field

Movipol-3 is a portable electrolytic metal polishing and etching apparatus. It is extremely compact and robust and can be used anywhere. Electrolytic preparation is a particularly fast and efficient method of non-destructive metallographic preparation. It can be applied directly to critical surfaces and is widely used for metal safety inspection, especially for critical parts of larger units, e.g. for welds and other joints. The method effectively reveals changes in the microstructure of the metal and allows to prevent possible damage because of cracks and leaks.

Automatic polishing and etching

Movipol-3 consists of a compact unit comprising the power supply, control unit, pump motor, electrolyte container and polishing unit. When the polishing unit is pressed against the metal surface, an electrolytic reaction is started. After 5-10 seconds of use, the prepared area is as reflective as a mirror and etching can commence.



PSM-2 Transcopy



The entire process is automatic: after completion of the polishing, Movipol-3 proceeds to the etching process. When this is finished, the unit emits an audio signal. In less than one minute a surface is obtained which is ready for analysis, either on-site or by means of replica for laboratory examination.

Complete Freedom

Movipol-3 is equipped with rechargeable batteries and supply transformer. In other words, the apparatus is as suitable for stationary laboratory work as it is for field work, depending on the requirements.



PSM-2 and Transcopy constitute an indispensable tool for non-destructive materialography.

PSM-2 - Fast and easy microscopy outside the laboratory

PSM-2 is a small, portable microscope for use in the field. It is battery-powered and provides magnifications of 100 x, 200 x and 400 x. PSM-2 comes in a shoulder bag which also contains the batteries.

PSM-2 is particularly suitable for preliminary examination of the prepared surface. A replica is recommended if a more detailed analysis is required. PSM-2 is highly suitable for preliminary replica examinations when used together with Transpol-2 and Movipol-3.

Transcopy Replica Foil

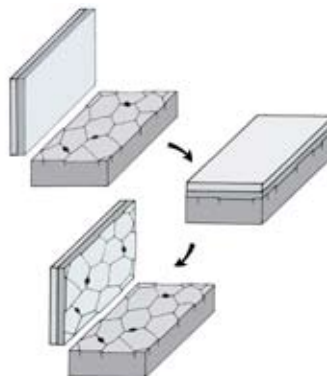
Transcopy Replica Foil is used to make a replica of any polished and etched surface. It is especially used if on-site analysis using a portable microscope is not sufficient or if micrographs of the prepared structure are required. Transcopy Replica Foil creates a permanent replication of microstructures, cracks and defects for future analysis and comparison in the laboratory.

Function

Transcopy Replica Foil consists of reflecting plastic film with a self-adhesive back. A replica is made by applying Transcopy fluid to the film and pressing it firmly onto the prepared and etched surface. A slightly over etched structure results in a higher contrast of the replica. After 4-5 minutes the foil is removed from the surface. By removing the cover paper, the replica can be adhered to a plain plate and then examined under an optical microscope.



Transcopy



With Transcopy, Replica foil, replicas can be taken on the spot for subsequent examination in the laboratory.

RepliSet

The **RepliSet** system is designed to produce an exact 3D copy of a surface. It is used for non-destructive testing and field applications allowing the structure or irregularities on critical components to be examined and measured under laboratory conditions.

RepliSet is a specially formulated fast curing two-part silicone rubber with a good releasing ability for flexible high-resolution 3D replicas, which behave like a metallic surface when examined in an optical microscope. RepliSet compounds are supplied in cartridges and are dispensed using a hand-operated dispensing gun. The cartridges contain both polymer and curing agent, which are automatically mixed in a disposable static-mixing nozzle during application to the surface. The application system offers superior and fast results, regardless of the conditions.

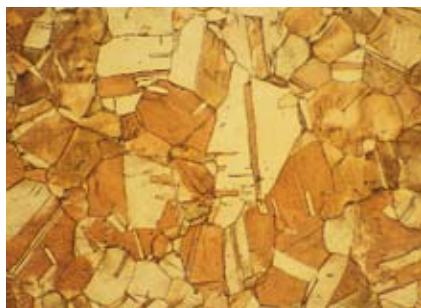
RepliFix is a less advanced parallel to RepliSet. RepliFix and RepliSet are designed to bond together. The two components are mixed and applied by hand. RepliFix is used as support for RepliSet or as a stand alone product for moulding of surface shape for low tech applications.

A backing slide bonds to the RepliSet or RepliFix replica. The backing slide serves to maintain the original profile and ensures a flat back to the replica.

A replica can be taken from all metallic materials and most other solid materials like ceramics, plastics and glass. There are no size, shape or thickness limitations on the replicas that can be made and it is even possible to take replicas from otherwise inaccessible surfaces. The RepliSet system can produce replicas, which at the same time are dimensionally correct, with ultra fine detail reproduction and with a flat back.

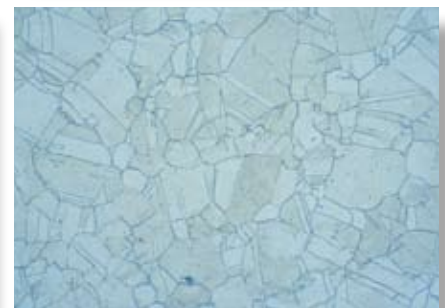


An operator dispenses RepliSet onto a sample, and then peels off the cured replica.



*Pure copper.
Sample etched with cupric
chloride and ammonia.
Magnification 100 x*

Sample



Replica

Further to examination by optical microscopes, 3D examination can be carried out using non-contact measuring instruments such as laser measuring equipment or measuring projectors with 2D or 3D facilities. A replica of a cavity, for instance inner holes, can be examined using measurement and profile projectors. The replicas are suitable for 3D examination by SEM.

Metallographic applications

Typical applications are on-site non-destructive testing in connection with quality control, inspection and maintenance of power plants, oil platforms, bridges, aircraft, etc.

Water or high temperatures do not affect RepliSet so the application range is very broad.

Typical tasks are:

- Quality control of edges, corners, heights, angles, surface finish and other dimensions.
- Inspection of internal surfaces such as bolt hole threads.
- Detection and monitoring of pitting, corrosion, cracking, creep and wear.
- Metrology.
- Forensic investigation.

RepliSet 50 ml system.



Case for RepliSet



The RepliSet Case is designed for transportation and use of the 50 ml RepliSet system. It is made of aluminium and is at the same time elegant and sturdy. It can be carried as hand luggage on flights and is compact and sturdy to such an extent, that it can be taken to locations with narrow or difficult access.

The contents is either fixed by straps in the lid or placed in compartments in the two detachable foam rubber inserts. Each item has its fixed position. The user has access to all that is needed to perform a regular replication by just opening the lid of the RepliSet Case. The lower insert carries a small stock of consumables.



Transpol-2

Technical Data

Voltages	230 V, 50/60 Hz; 120 V, 50/60 Hz;	
Speed	100-7000 rpm	
Dimensions (without shoulder bag)	Width	180 mm
	Height	75 mm
	Depth	150 mm
Total weight incl. accessories	5 kg	

Specifications

Transpol-2, complete with soft cable, DC motor 230 or 120 V, straight handle, right angle handle, flapper wheel, felt cone, 4 rubber discs

Rubber disc, 30 mm dia.

SiC grinding papers, adhesive, bundle of 100

Grit 60

Grit 120

Grit 240

Grit 500

DP cloths, adhesive, dia. 32 mm, bundle of 25

DP-Dur

DP-Dac

DP-Mol

DP-Nap

OP-Felt

Flapper wheel, 80 grit, 40 mm dia. x 10 mm

Cat. no.

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Movipol-3

Technical Data

Voltage supply to transformer	220 V 50/60 Hz, 115V 50/60 Hz	
Voltage supply from transformer	42 V AC	
Input fuse	5 A	
Battery fuse	10 A	
Thermal overload protection		
Polishing power	Max. 140 VA	
Polishing area	About 9 mm dia	
Dimensions	Width	410 mm
	Height	280 mm
	Depth	200 mm
	Net	8.80 kg
Weight with batteries, but without electrolyte		

Specifications

Movipol-3, complete with batteries and supply transformer, 220 V or 115 V

42 V charging/supply transformer for continuous use for Movipol 3, 230 V or 115 V

Set of extra batteries (9 pcs.)

Polishing Chambers for Movipol-3, Flexible type, 10 pcs.

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03926901

03926904

PSM-2

Technical Data

Batteries	4 x 1.5 V, type LR20	Length	210 mm (8.3")
Lamp (threaded base)	5 V, 6 W	Diameters	15-60 mm (0.6"-2.4")
		Weight	600 g

Specifications

Portable microscope PSM-2, complete with 10 x eyepiece, 10 x objective, lamp housing and carrying case, without batteries

Objective, magnification 20 x

Objective, magnification 40 x

Measuring set consisting of measuring eye piece and plate micrometer

04286101

04286901

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04286903

Transcopy

Transcopy Kit

Set consisting of 40 ml Transcopy Liquid, 50 replica foils 20 x 30 mm (0.8" x 1.2"), 1 pipette, spray nozzle and 50 microscope slides 25 x 75 mm (1" x 3")

Transcopy Replica Foils, 50 pcs.

Transcopy Liquid, 40 ml

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RepliSet

Technical Data

Resolution of cu red replica	Down to 0.1 micron
Shrinkage	Negligible
Tear Strength	15-20 kN/m ²
Temperature range for the surface to be examined	-10°C to +180°C
Life span of the finished replicas is practically indefinite provided they are stored according to the instructions.	
Content in static-mixing nozzle	1.1 ml in nozzle for 50 ml cartridge
	9.3 ml in nozzle for 265 ml cartridge

Specifications

Replication system for non-destructive testing of a microstructure or a 3D structure. Fast curing two-part silicon rubber compound for flexible high-resolution 3D replicas. For the 50 ml system, the hand-operated dispensing gun (40900066) and the static mixing nozzles (40900088) are used in combination with the 50 ml cartridges.

For the 265 ml system, the hand-operated dispensing gun (40900065) and the static-mixing nozzles (40900056) are used in combination with the 265 ml cartridges



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Specifications

Cat. no.

RepliSet-F1

Particularly useful for replicating horizontal or sloping surfaces in low temperature conditions or where rapid results are required. Fluid rapid curing compound with working life of 0.5-1 min. and curing time of 4 min. at 25°C
1 cartridge of 50 ml
5 cartridges of 50 ml
2 cartridges of 265 ml

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RepliSet-F5

General purpose material. Particularly useful for replicating horizontal or sloping surfaces in normal or high temperature conditions. Fluid fast curing compound with working life of 5 min. and curing time of 18 min. at 25°C
1 cartridge of 50 ml
5 cartridges of 50 ml
2 cartridges of 265 ml

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RepliSet-T1

Particularly useful for replicating vertical or overhead surfaces in low temperature conditions or where rapid results are required. Thixotropic rapid curing compound with working life of 0.5-1 min. and curing time of 4 min. at 25°C
1 cartridge of 50 ml
5 cartridges of 50 ml
2 cartridges of 265 ml

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RepliSet-T3

General purpose material. Particularly useful for replicating vertical or overhead surfaces in normal or high temperature conditions. Thixotropic fast curing compound with working life of 3 min. and curing time of 10 min. at 25°C
1 cartridge of 50 ml
5 cartridges of 50 ml
2 cartridges of 265 ml

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RepliSet-GF1

Replication system especially for comparatory macroscopy and metrology. Particularly useful for replicating horizontal or sloping surfaces and filling holes. Fluid rapid curing compound with working life of 0.5 - 1 min. and curing time of 4 min. at 25°C.
1 cartridge of 50 ml
5 cartridges of 50 ml

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RepliSet-GT1

Replication system especially for comparator macroscopy and metrology. Particularly useful for replicating vertical or overhead surfaces. Thixotropic rapid curing compound with working life of 0.5 - 1 min. and curing time of 4 min. at 25°C.
1 cartridge of 50 ml
5 cartridges of 50 ml

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40900077

RepliFix

Specially formulated hand mixed fast curing two-part silicone rubber. Bonds to RepliSet. Particularly useful in combination with RepliSet for producing a rigid backing. It can be used directly for moulding of surface shape for profile measurement

RepliFix-2

For low temperature conditions or where rapid results are required. Working life of 2-3 min. and curing time of 10 min. at 25°C. Net 500 g

40900084

RepliFix-20

For high temperature conditions or for taking replicas of complicated geometry or large areas. Working life of 20 min. and curing time of 60 min. at 25°C. Net 500 g

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Accessories

Hand-operated dispensing gun

For 50 ml cartridges of RepliSet
For 265 ml cartridges of RepliSet

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40900065

Static-mixing nozzles

For 50 ml cartridges. 35 pcs.
For 265 ml cartridges. 10 pcs.

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Nozzle Tips

For replicating flat surfaces. Fishtail spreaders, 10 mm width.
To be mounted on 50 ml static mixing nozzle (40900088). 30 pcs.

40900089

For replicating small holes. Luer needle, 1 mm dia., 30 mm long. To be mounted on 50 ml static-mixing nozzle (40900088). 10 pcs.

40900060

For replicating larger holes. Flexible hose, 6 mm dia., 100 mm long. To be mounted on 50 ml static-mixing nozzle (40900088) 10 pcs.

40900061

Backing Slides

A flexible plastic slide, which bonds to the replica and ensures a flat back to the replica. For levelling of replicas to assist microscopic examination, as dimensional support for metrology and for well-ordered labelling, transport and storage of RepliSet replicas 26 x 76 x 1 mm, 50 pcs.

40900087

Backing paper

For RepliSet replication system. Bonds to the replica and facilitates labelling, handling and the levelling of replicas to assist microscopic examination. 60 x 70 mm. 100 pcs.
A4 (210 x 297 mm), for cutting up to the required size. 10 pcs.

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Case for RepliSet 50 ml system

Aluminium case with room for all necessities for field applications.
The contents of the RepliSet Case is ordered separately

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*Struers' products are subject to constant product development.
Therefore, we reserve the right to introduce changes in our products without notice.*

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