The most versatile replicating system

For non-destructive testing and field applications
For engineering inspection and forensic investigation

Replicate in the field – examine in the laboratory

- High resolution: down to 0.1 micron
- Virtually no shrinkage: dimensionally accurate for measurement purposes
- Optimized for either optical microscopy or comparator macroscopy
- Other inspection techniques include SEM, laser metrology and interferometry
- Extensive operator experience is not necessary
- Replicas of any size and shape can be produced
- Flexible high strength replicas can be taken from inaccessible surfaces and can be removed from moderately re-entrant geometry
- Short curing time
- Can replicate surfaces over a wide range of temperature
RepliSet is a complete system for replicating materials. It is designed to transfer the structure of a solid surface to a flexible, highly accurate and stable replica. The result is an exact 3D copy of the surface, allowing microscopic examination and precise measurements. RepliSet is an accepted replicating system for ASTM standard E 1351 “Standard Practice for Production and Evaluation of Field Metallographic Replicas”.

RepliSet is a specially formulated, fast curing, two-part silicone rubber. The compounds are supplied in cartridges and are applied using dispensing guns. The cartridges contain both polymer and curing agent, which are automatically mixed in a disposable static-mixing nozzle during application to the surface. Various, reusable nozzle tips are available for spreading the compound on a flat surface or for conducting the compound into holes and cavities.

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 specially-designed backing paper, which bonds to the replica, is optional but it facilitates the handling, labelling and protection of the replica. The backing paper also allows thin replicas of curved surfaces to be taped flat on glass slides for microscopic examination.

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In routine inspection situations, replicas produced by a person present in the field can be evaluated at specialist laboratories. With the best possible success rate, RepliSet saves you time and consumables.

Any type and any shape
Most common solid materials such as metals, ceramics, plastics and glass can be replicated. It works even on rough re-entrant surfaces. There are no size or thickness limitations. The compound can be dispensed...
on any surface shape allowing inspection at remote locations where access is difficult, such as inside pipes or machinery. As the RepliSet replicas have a high tear strength and flexibility they can easily be removed from moderately re-entrant geometry without damage or distortion. Upon release, the material returns to its original shape.

A positive replica of a 3D surface can be produced by replicating the original replica with the compound itself or with an epoxy resin.

**Under all conditions**

The compound is available in versions with a range of viscosities and curing times tailored for application under different working conditions and on horizontal as well as vertical or overhead surfaces.

Generally, the weather is no problem. Being water-repellent, RepliSet can provide replicas under humid conditions. It will cure on surfaces in a temperature range from -10°C to +180°C allowing rapid inspection and minimizing possible machinery downtime.

**High resolution and form stability**

RepliSet offers a very high resolution down to 0.1 micron.

RepliSet has no shrinkage, and is therefore suitable for high accuracy metrology measurements.

Replicas can be transported without any problems and can be stored indefinitely for future reference.

**RepliSet is safe**

RepliSet compounds are solvent free and cleared for all normal modes of transportation, including air.

During work the operator is not exposed to any unhealthy fumes.

The compounds are approved for use on stainless steel in nuclear plants.
The materials are designed specifically to be compatible with stainless steels and other engineering alloys and not to compromise future corrosion behavior after replication.

**A variety of examination methods**
The black coloured RepliSet-F and -T types are optimized for optical microscopy using reflected light. The replicas will reflect light like a metal. This makes them very well-suited for microstructural examination at magnifications up to x500 using Bright Field, Dark Field or DIC. White light interferometry can be used for precise surface measurements including determination of surface finish. Replicas can often give better results than the original surface, because of the uniformity of their reflection.

The grey coloured RepliSet-GF and -GT types have been formulated for macroscopy. The replica will give a high image contrast, when the surface is examined in a stereomicroscope with oblique illumination. This is particularly advantageous for monitoring of surface degradation, fracture surfaces, damage or wear. The products also have great potential for many metrology applications and for forensic examination of tool marks by comparator macroscopy. The grey types are not suitable for optical microscopy using reflected light.

All replicas are suitable for 3D examination at high magnifications by SEM either directly, using low values of column voltage, or after metallic coating.

Engineering inspection applications
Typical applications are on-site non-destructive testing in connection with quality control, inspection, maintenance, reconditioning and failure analysis, typically within high tech engineering industries including power generation (fossil fuel or nuclear), aerospace, offshore industry, etc.

The use of high-resolution RepliSet replicas allows otherwise inaccessible surfaces and irregularities in critical machinery in service to be examined and measured under laboratory conditions.

**Typical tasks are:**
- detection and monitoring of pitting, corrosion, cracking, creep, deformation and wear
- assessment of change in microstructure
- inspection of internal surfaces such as bolt hole threads and root welds in small bore tubes
- quality control of edges, heights, angles, surface finish, thread profiles and other dimensions

**Forensic investigation**
In the course of forensic investigations comparator macroscopy / microscopy is used to identify whether fine scratch details found in tool-marks can be related to features on the original tool.

**RepliSet-G** is employed for replicating tool marks in the field. Comparison marks produced on lead using a suspect...
tool are similarly replicated and the replicas may be compared by comparator microscopy.

**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 by air 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.

*RepliSet is an accepted replicating system for ASTM standard E 1351 “Standard Practice for Production and Evaluation of Field Metallographic Replicas”.*
TECHNICAL DATA

ReplicSet ReplicFix

<table>
<thead>
<tr>
<th>Property</th>
<th>ReplicSet</th>
<th>ReplicFix</th>
</tr>
</thead>
<tbody>
<tr>
<td>Viscosity of uncured compound</td>
<td>Very low (F-types)</td>
<td>High</td>
</tr>
<tr>
<td>Low (T-types)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Detail reproduction</td>
<td>Down to 0.1 µm</td>
<td>Down to 5 µm</td>
</tr>
<tr>
<td>Shrinkage</td>
<td>Negligible</td>
<td>Negligible</td>
</tr>
<tr>
<td>Tear strength</td>
<td>15-20 kN/m²</td>
<td>Low</td>
</tr>
<tr>
<td>Hardness</td>
<td>30 Shore A</td>
<td>76 Shore A</td>
</tr>
<tr>
<td>Temperature range for the surface to be examined</td>
<td>-10°C to + 180°C (14°F to + 356°F)</td>
<td>0°C to + 150°C (32°F to + 302°F)</td>
</tr>
<tr>
<td>Life span of the finished replica</td>
<td>Practically indefinite</td>
<td>Practically indefinite</td>
</tr>
</tbody>
</table>

ReplicSet-F1

Particularly useful for replicating horizontal or sloping surfaces 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 (77°F).

1 cartridge of 50 ml 40900069
5 cartridges of 50 ml 40900046
2 cartridges of 265 ml 40900051

ReplicSet-F5

General-purpose material. Particularly useful for replicating horizontal or sloping surfaces in normal or high temperature conditions. Fluid quick curing compound with working life of 0.5 min. and curing time of 18 min. at 25°C (77°F).

1 cartridge of 50 ml 40900068
5 cartridges of 50 ml 40900047
2 cartridges of 265 ml 40900050

ReplicSet-T1

Particularly useful for replicating vertical or overhanging surfaces in normal or high temperature conditions. Thixotropic fast curing compound with working life of 0.5 - 1 min. and curing time of 4 min. at 25°C (77°F).

1 cartridge of 50 ml 40900071
5 cartridges of 50 ml 40900049
2 cartridges of 265 ml 40900053

ReplicSet-T3

General-purpose material. Particularly useful for replicating vertical or overhanging surfaces in normal or high temperature conditions. Thixotropic fast curing compound with working life of 0.5 min. and curing time of 10 min. at 25°C (77°F).

1 cartridge of 50 ml 40900070
5 cartridges of 50 ml 40900048
2 cartridges of 265 ml 40900052

ReplicSet-GFI

Replication system especially for comparator microscopy 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 (77°F).

1 cartridge of 50 ml 40900078
5 cartridges of 50 ml 40900076
2 cartridges of 50 ml 40900077

ReplicSet-GFI

Replication system especially for comparator microscopy and metrology. Particularly useful for replicating vertical or overhanging surfaces. Thixotropic rapid curing compound with working life of 0.5-1 min. and curing time of 4 min. at 25°C (77°F).

1 cartridge of 50 ml 40900079
5 cartridges of 50 ml 40900077

SPECIFICATIONS

ReplicSet ReplicFix

<table>
<thead>
<tr>
<th>Cat. No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low (T-types)</td>
<td>Combination for producing a rigid backing. It can be used directly for moulding of surface shape for profile measurement.</td>
</tr>
</tbody>
</table>

ReplicFix-2

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 (77°F).

50 pcs 40900086

ACCESSORIES

Dispensing Gun

Hand-operated dispensing gun.

For 50 ml cartridges 40900087
For 265 ml cartridges 40900085

Static-mixing Nozzles

For ReplicSet replication compound in 50 ml cartridges, 35 pcs. 40900088
265 ml cartridges, 10 pcs. 40900089

Nozzle Tips

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

30 pcs 40900090

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

10 pcs 40900091

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 geometry and for well-ordered labelling, transport and storage of ReplicSet replicas.

26 x 76 x 1 mm. 50 pcs. 40900084

Backing Paper

Bonds to the replica and facilitates labelling, handling and the levelling of replicas to assist microscopic examination.

60 x 70 mm. 100 pcs. 40900092
A4 (210 x 297 mm). 10 pcs. 40900093

Case for ReplicSet 50 ml System

Aluminium carrying case with room for all necessities for field applications. The content is ordered separately.

L x d x h = 445 x 155 x 330 mm 40900083

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