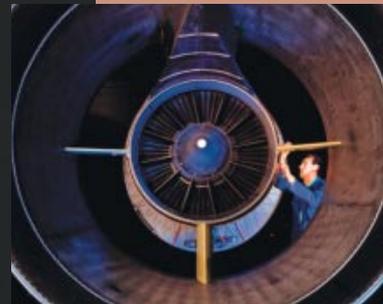


# RepliSet



**RepliSet advances the process of transferring microstructures to replicas and produces exact 3D copies of engineering surfaces**



## **The most versatile replicating system**

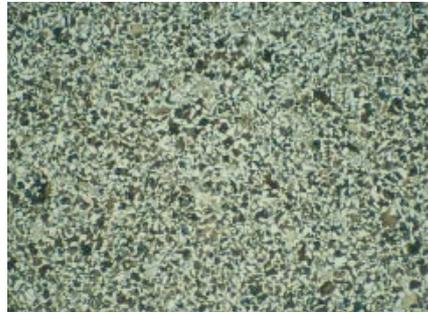
**For non-destructive testing and engineering inspection**

- Extensive operator experience is not necessary
- Replicas of any size and shape can be made
- Short curing times and high reproducibility for fast, reliable operation
- Wide surface temperature range reduces machinery downtime
- High resolution: down to 0.1 micron
- Virtually no shrinkage enables an accurate measurement of 3D shapes
- Non-hazardous and safe for all modes of transportation



Medium C-steel.  
Sample etched  
with Nital 3%.  
Magnification x100

Sample



Replica



**RepliSet** is a new system for replicating materials. It is designed to transfer the microstructure of a surface to a highly accurate and stable replica. The result is an exact 3D copy of the surface.

It is used for non-destructive testing and field applications, including evaluation of the microstructure or engineering inspection of a surface. RepliSet is a specially formulated fast curing two-part silicon rubber for flexible high-resolution 3D replicas, which behave like a metallic surface when examined by an optical microscope. The application system offers superior and fast results, regardless of the conditions.

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

Pure  
copper.  
Sample  
etched  
with cupric  
chloride  
and  
ammonia.  
Magnifi-  
cation  
x100



Sample



Replica

static-mixing nozzle during application to the surface. When finished, the static-mixing nozzle is left on the cartridge as a seal. A new static-mixing nozzle is mounted at the beginning of the next operation.

Various, reusable nozzle tips are available for spreading the compound on a flat surface or for conducting the compound into holes or cavities.

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.

### Replicating has never been so easy

With the easy to operate dispensing gun, everybody can produce perfect replicas. Extensive operator experience is not necessary and you can be sure to return to the lab with good replicas every time. With the best possible success rate, RepliSet saves you time and consumables.



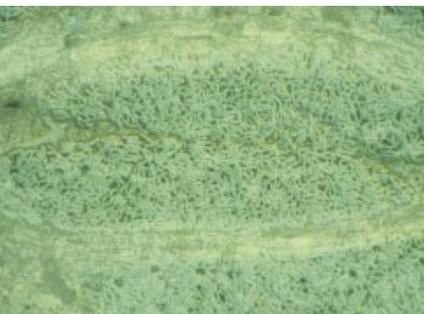
An operator dispenses RepliSet onto a sample



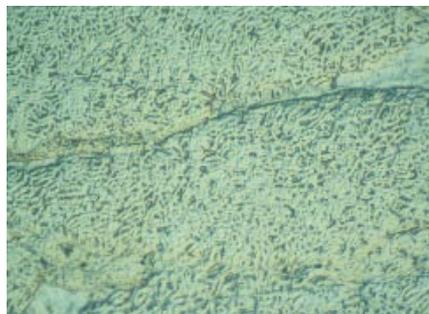
An operator peels off the cured replica



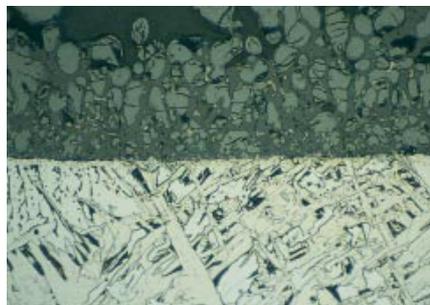
Sample



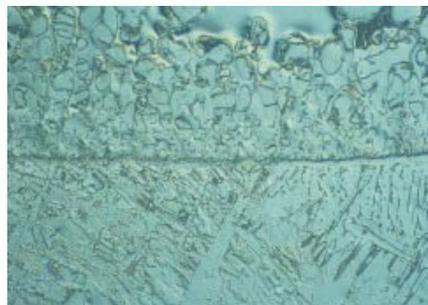
Replica



Kevlar fibre. RepliSet shows better image than original due to fibres' translucent behaviour. Magnification x 200



Sample using Bright Field



Replica using DIC

Overheated steel with corrosion layer. Etched with Nital 3%. Magnification x100



### Any size and any shape

A replica can be taken from all metallic materials and most other solid materials like ceramics, plastics, glass and concrete. There are no size, shape or thickness limitations on the replicas that can be made. Compound can be dispensed on any surface shape allowing inspection at locations where access is difficult, such as inside pipes.

The replica can be removed without damage or distortion. A special backing paper allows curved surfaces to be examined in planar form.

The compound is available in versions with various viscosities and working life / curing time tailored for application under different temperature conditions

and on horizontal as well as vertical and overhead surfaces.

### RepliSet is time saving

When replication tasks require machinery downtime, a fast and efficient procedure is necessary. RepliSet compounds are available with curing times as short as 5 min. The temperature range for the surface to be examined can be from -10°C to +180°C.

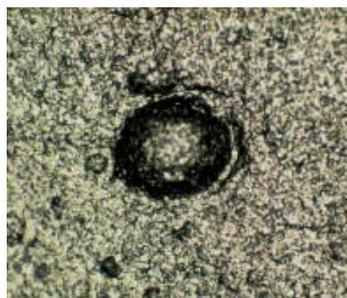
### High resolution and form stability

RepliSet offers a very high resolution down to 0.1micron allowing replicas of microstructures to be examined.

The cured replica will typically have a thickness of a few mm. It is easily peeled off, without leaving any residues on the sur-

### Laser measurement of pitting

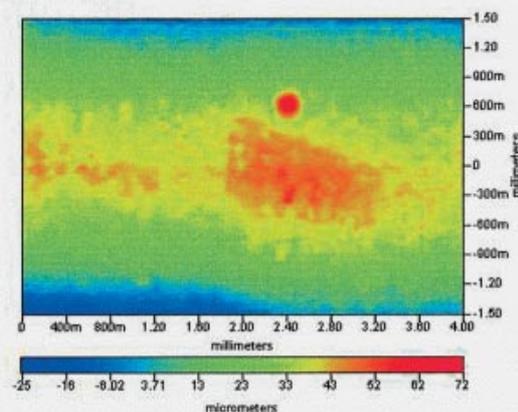
Replica of pitting



Depth of pitting

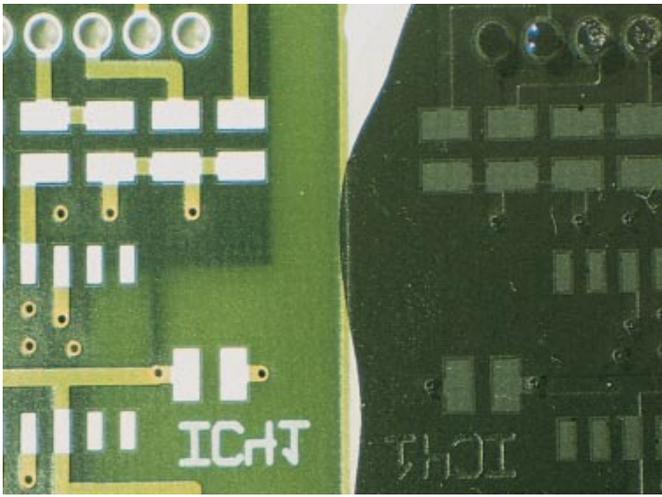


Width of pitting

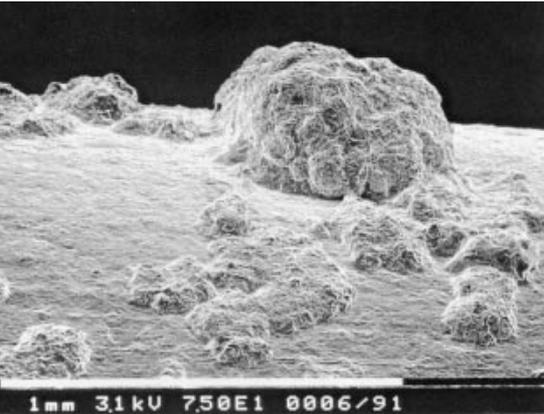


Sample

Replica



Printed circuit board



Replica of pitting. Examined by SEM

face. The cured replica is also tough, flexible, dimensionally accurate and stable at the same time. Upon release, the material returns to its original shape.

Replicas can be transported without any trouble or can be stored for future reference.

### RepliSet is safe

Unlike traditional replicating materials, RepliSet compounds present no significant health

risk. They are non-flammable, solvent-free, and cleared for all normal modes of transportation, including air.

None of the ingredients are classified as dangerous and the cured product can be disposed as non-hazardous waste. During work the operator is not exposed to any unhealthy fumes.

### Examination techniques

In optical microscopes, replicas will reflect light like a metal. This makes them very well suited for micro-structural examination with conventional optical microscopes at magnifications up to x500 using Bright Field or Dark Field. The use of DIC at high magnifications provides enhanced contrast and resolution.

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 by use of measurement and profile projectors. The replicas are suitable for 3D examination by SEM using low kV (about 2 kV) and particularly with field-ion microscopes either uncoated or coated.

### 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. RepliSet can copy all microstructures suitable for examination on a microscope. Moderate to deep etching is recommended.

### Engineering inspection applications

The use of high-resolution RepliSet replicas allows otherwise inaccessible surfaces, and irregularities on critical compo-



Examination of cracking in a crankshaft



nents to be examined and measured under laboratory conditions.

The replica will pick up possible loose particles on the surface which could be utilised for subsequent examination such as EDXA microanalysis.

A positive replica of a 3D surface can be produced, making a copy of the original.

The testing could be made in connection with quality, maintenance, inspection and reconditioning, R&D or failure analysis.

**Typical tasks are:**

- quality control of edges, corners, heights, angles, surface finish, thread profiles and other dimensions.
- inspection of internal surfaces such as bolt hole threads and small bore tubing root welds.
- detection and monitoring of pitting, corrosion, cracking, creep and wear.

*The 50 ml system*



*The 265 ml system*



## Technical Data

Resolution of cured replica:	Down to 0.1 micron
Shrinkage :	Negligible
Tear strength:	15-20 kN/m <sup>2</sup>
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:	0.9 ml in nozzle for 50 ml cartridge 9.3 ml in nozzle for 265 ml cartridge

## Specifications

## Code

### RepliSet

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 (SEFUN) and the static-mixing nozzles (REPNO) are used in combination with the 50 ml cartridges (REPF5), (REPF1), (REPT3) or (REPT1). For the 265 ml system, the hand-operated dispensing gun (RELUN) and the static-mixing nozzles (RELNO) are used in combination with the 265 ml cartridges (RELF5), (RELF1), (RELT3) or (RELT1).

### 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

50 ml cartridge size. Package of 5 cartridges  
265 ml cartridge size. Package of 2 cartridges

REPF5  
RELF5

### 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

50 ml cartridge size. Package of 5 cartridges  
265 ml cartridge size. Package of 2 cartridges

REPF1  
RELF1

### 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

50 ml cartridge size. Package of 5 cartridges  
265 ml cartridge size. Package of 2 cartridges

REPT3  
RELT3

### 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

50 ml cartridge size. Package of 5 cartridges  
265 ml cartridge size. Package of 2 cartridges

REPT1  
RELT1

## Accessories

Hand-operated dispensing gun

For 50 ml cartridges of RepliSet or SampleSeal

For 265 ml cartridges of RepliSet replication compound

SEFUN  
RELUN

### Static-mixing nozzles

For 50 ml cartridges. 35 pcs.

For 265 ml cartridges. 10 pcs.

REPNO  
RELNO

### Nozzle tips for replicating flat surfaces

To be mounted on static-mixing nozzle (REPNO).

10 mm with fish tail spreaders. 10 pcs.

REP10

### Nozzle tips for replicating holes

To be mounted on static-mixing nozzle (REPNO).

For small holes. 1 mm diameter. 30 mm long. 10 pcs.

For large holes. 6 mm diameter. 50 mm long. 10 pcs.

REPON  
REPIX

### 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.

REBAS  
REBAL

*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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