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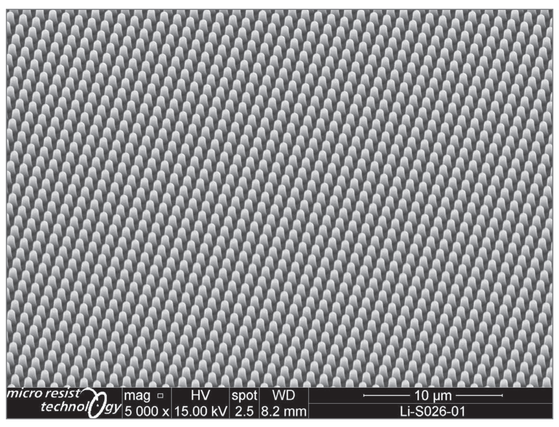
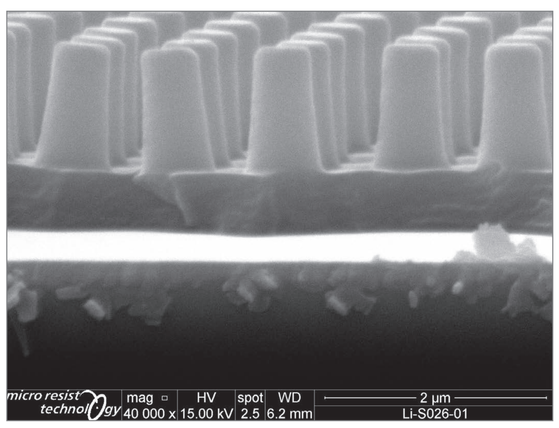
UV-curable liquid silicone rubber / UV-PDMS

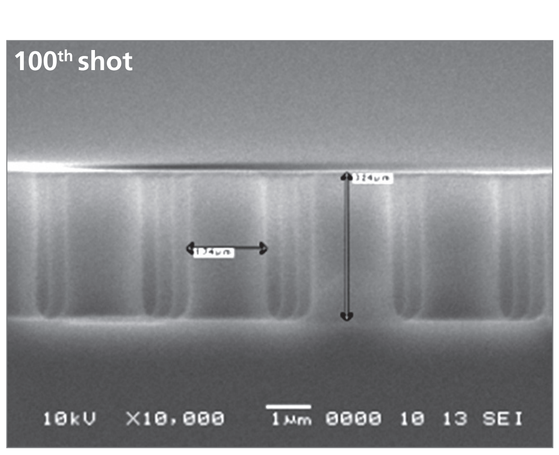
Distribution of KER-4690 and KER-4691 for european market



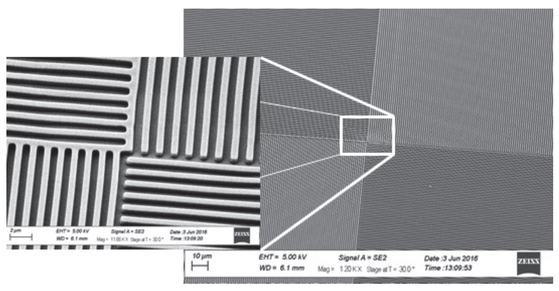
Replicated patterns into mr-NIL210
applying UV-PDMS KER-4690 working stamp



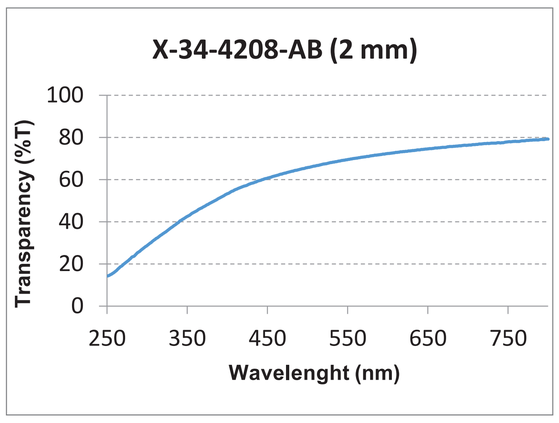
Replicated patterns into mr-NIL210
applying UV-PDMS KER-4690 working stamp



Imprint of PSS structures with minimized residual layer (<10nm). 100 subsequent imprints with one UV-PDMS KER-46901 working stamp.



SEM image of a UV-PDMS KER-4690 working stamp (courtesy of NILT ApS, Denmark)



Optical transparency of KER-4691 (X-34-4208) as 2 mm thick film

ls.17.01.26.03

micro resist technology GmbH is providing a new selection of UV-curable liquid silicone rubber / UV-PDMS (OEM:Shin-Etsu) for European markets. The UV-PDMS can be used in a wide range of applications, but in particular for the manufacture of soft-molds in replication technologies such as nanoimprint lithography.

Main advantages by using the new Shin-Etsu UV-PDMS over generic PDMS:

- Spin-coating for enhanced mold fabrication
- Faster curing time (e.g. 10 min after UV exposure)
- High resolution capabilities down 100 nm and smaller
- 0.02% shrinkage for superb pattern fidelity

There are two different types of UV-PDMS available. The following table provides the general material characteristics of the two different types of UV-PDMS:

General material characteristics of the new UV-PDMS (OEM:Shin-Etsu)

	KER-4690 (X-34-4184)	KER-4691 (X-34-4208)
Appearance (Color Tone)	Colorless	Milky-white
Appearance (Transparency)	Transparent	Semi-transparent
Viscosity [Pa*s]	2.7	110
Hardness: Durometer type-A	55	42
Elongation at Break [%]	110	400
Tensile Strength [MPa]	7.7	7.0
Tear Propagation Strength (crescent) [kN/m]	3.0	17.1
Linear Contraction [%]	< 0.1	< 0.1
Curing Rate* [Min]	20	45
Curing Condition [mJ/cm^2]	2000	2000

* TA Instruments ARES-G2, 25°C, 1Hz

Each system consists of two components. After thoroughly mixing the two-component material system (A/B) in equal volume, the liquid mixture compounds can be processed for up to 24 hours by casting, spin-coating or other deposition methods. Due to the photo-sensitivity, the cross-linking (or curing) is initiated by UV-exposure. In contrast to generic PDMS, this allows almost full curing already at room temperature and significantly increases the curing speed (by factor of 100 and more). Furthermore, without the need of an additional thermal curing one can achieve a minimized shrinkage of 0.02%.

The Shin-Etsu UV-PDMS are available in the following package sizes:

50 g / 50 g (UV-PDMS KER-4690-A/B)
500 g / 500 g (UV-PDMS KER-4690-A/B and KER-4691-A/B)