

## Quadrafunctional hydrophilic siloxanes

P 24

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Addition curing siloxanes and polyether materials are most commonly used as materials for high precision dental impressions. A-silicones show excellent properties in reproduction of detail, recovery from deformation and linear dimensional change after setting. Polyethers on the hand are known as excellent materials especially for impressions under moist conditions.

However mechanical strength, especially the tear strength and the rheological properties of the latter materials, still need to be improved.

In order to combine the benefits of both, A-silicones and polyethers, the so-called quadrafunctional hydrophilic siloxanes were developed. As proprietary components these materials comprise so-called quadrafunctional modified resins and a new surfactant together with vinyl terminated siloxanes and conventional fillers as cristobalit, diatomaceous earth and highly dispersed silicon dioxide in a two-component paste system.

It has been shown that the obtained impression materials have improved tear strength and extraordinary good hydrophilicity leading to an excellent reproduction of detail under moist conditions.

As a result of the improved mechanical strength, the consistency of the QHS-siloxanes can be varied in a wide range from a very low viscous so-called Light Body to a very high viscous putty material which enables the dentist to use these materials for all methods of taking dental impressions.

Especially the Light Body Aquasil™ ULV and the Monophase Material Aquasil™ Monophase FS show an optimized thixotropic behaviour. It can be shown that both materials are able to flow into the details of the preparation immediately after application, but as a result of the rebuilt of a rheological structure even the Light Body does not drop from the surface of the teeth.

In addition it can be shown that the used proprietary surfactant has no retarding influence on the setting reaction of gypsum, when a dental impression made of the QHS-materials is poured with gypsum.

The effect of the surfactant on the compressive strength was also tested by adding a concentration of 1.0 % surfactant to the water used for preparing the gypsum slurry. In comparison to pure water the proprietary QHS- surfactant shows only a very slight reduction of the compressive strength of the gypsum. The effect is much less pronounced compared to that of conventional surfactants.

*Notizen*

*Marburger Gipstagung 1999*

# Quadrafunctional Hydrophilic Silicone Impression Materials



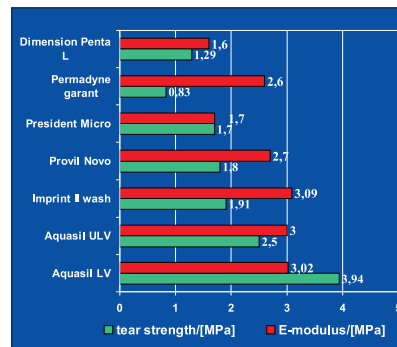
**Dr. J. Fiedler, DENTSPLY DeTrey (Konstanz, Germany)**

## Tear Strength

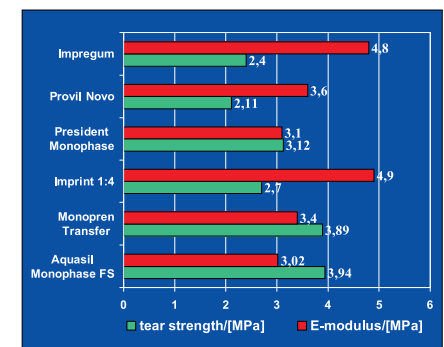
The use of quadrafunctional modified resins in combination with conventional vinyl silicones and SiH-crosslinkers leads to an extended network density in the resulting elastomeric Polymer. The resulting Aquasil™ products show improved mechanical properties characterised by an exceptionally high tear strength in combination with a moderate E-modulus.

In clinical use: Prevention of tear-off in the case of undercuts in combination with easy removal .

Light Body Materials

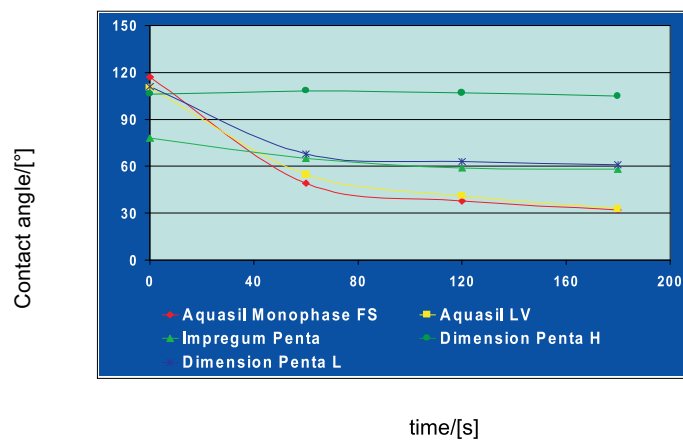


Monophase Materials

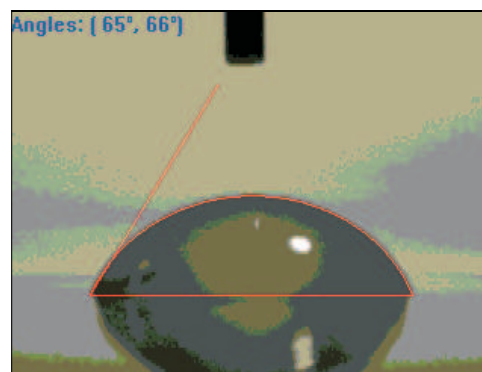


## Hydrophilicity

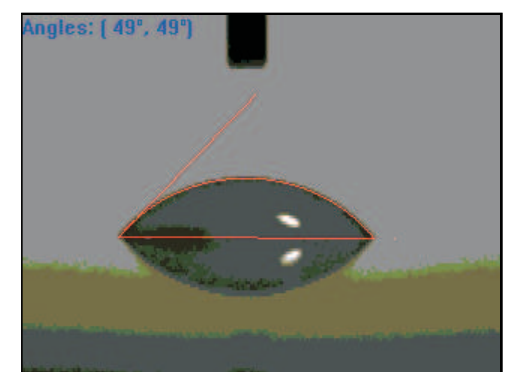
The use of a proprietary surfactant leads to an extraordinary good hydrophilicity, which guaranties wetting properties during the working time comparable to polyether materials.



Contact angle to water after 60 sec



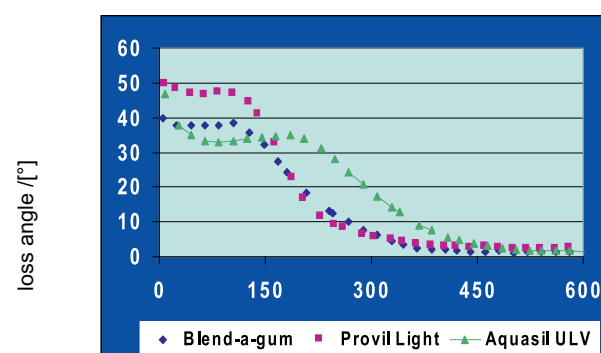
Impregum Penta



Aquasil™ Monophase FS

## Rheology during Setting

Especially the Light Body Aquasil™ ULV and the Monophase Material Aquasil™ Monophase FS show an optimized thixotropic behaviour. Both materials are able to flow into the details of the preparation immediately after application, but as a result of the rebuilt of a rheological structure even the Light Body does not drop from the surface of the teeth.



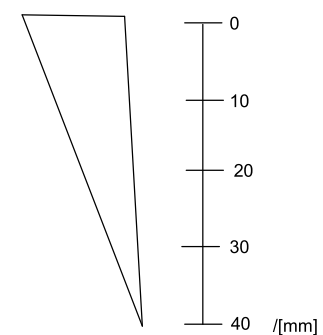
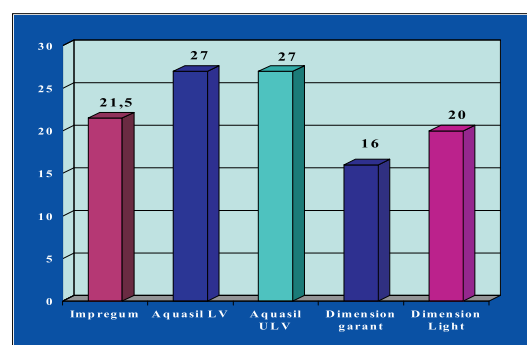
In cases where the loss angle is below 45°, the material behaves as a solid and consequently is not able to flow into the details with the influence of external stress.

In cases where the loss angle is higher than 45°, the material behaves as a liquid that flows into the details but also has a tendency to drop.

Aquasil™ ULV has an optimised flow behaviour with a high loss angle immediately after release and a very short relaxation time for the rebuilt of the rheological substructure.

## Flow Characteristics/Shark Fin Test

The so-called shark fin test shows that the Light Bodies of the Aquasil™ brand have excellent flow characteristics. Due to its low viscosity Aquasil™ LV/ULV flows deeper into the fin as the tested competitive products.

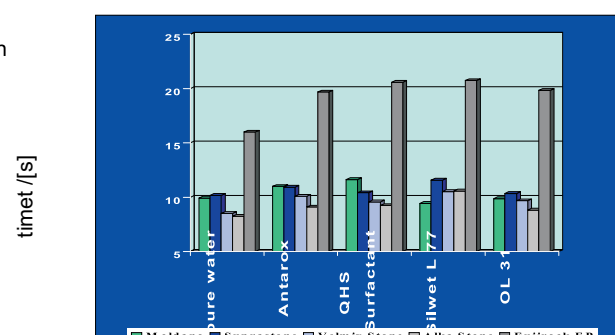


## Compatibility to Gypsum

The proprietary surfactant has no retarding influence on the setting reaction of gypsum when a dental impression made of QHS-materials is poured with gypsum.

In comparison to pure water the proprietary QHS-surfactant shows only a very slight reduction of the compressive strength of the gypsum.

Setting reaction of gypsum



Compressive strength of gypsum

