NO. RRF15-001-E1

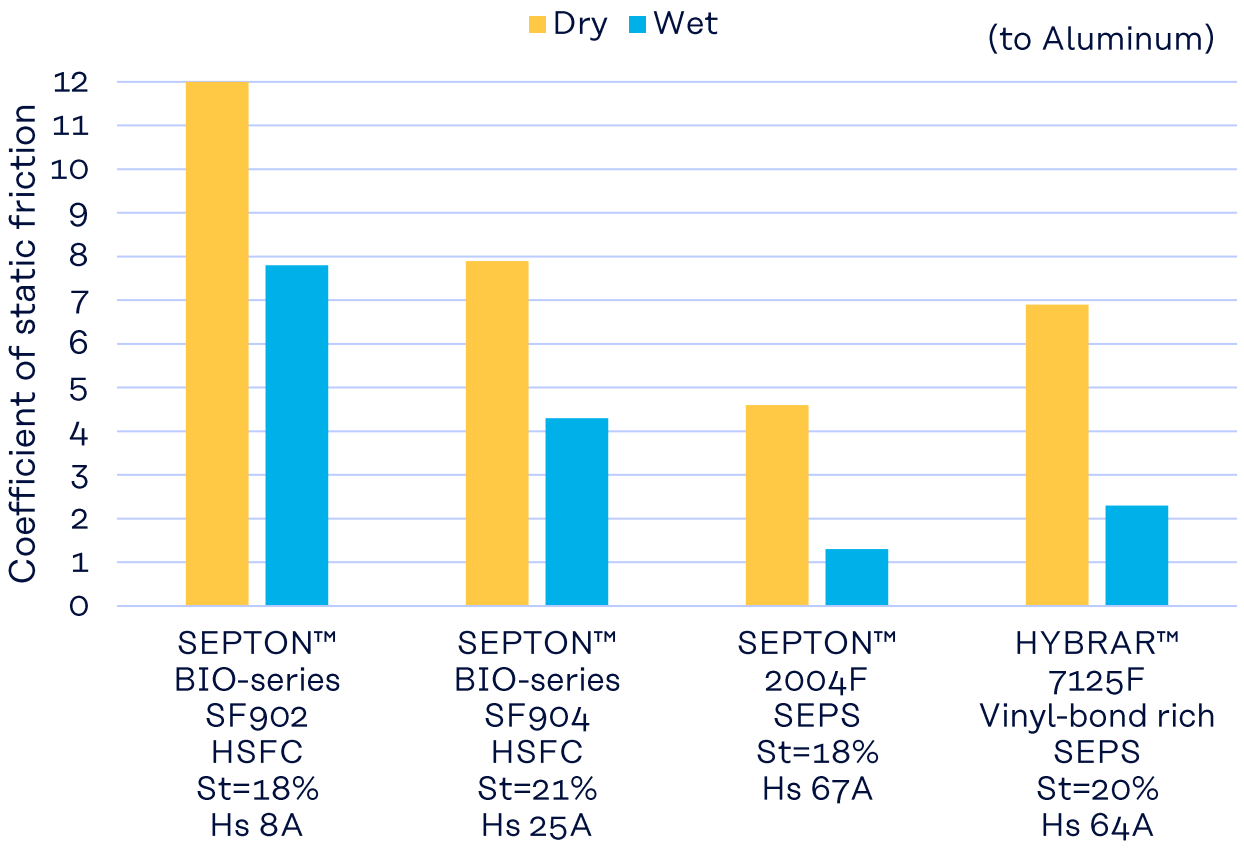
High grip mechanism of SEPTON™ BIO-series

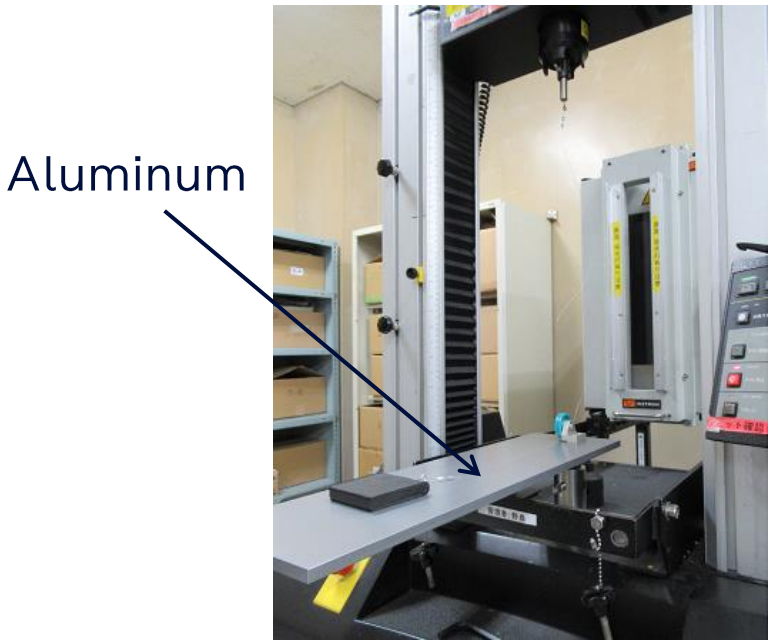
Elastomer R&D department
Elastomer division

kuraray Septon™ BIO-series

Grip performance

- SEPTON™ BIO-series show high grip performance compared with general HSBCs.
- SEPTON™ BIO-series show high grip performance in wet conditions.





Specimen: Compression molded sheet (0.5 mmt)

Grip mechanism of SEPTON™ BIO-series

Key factor

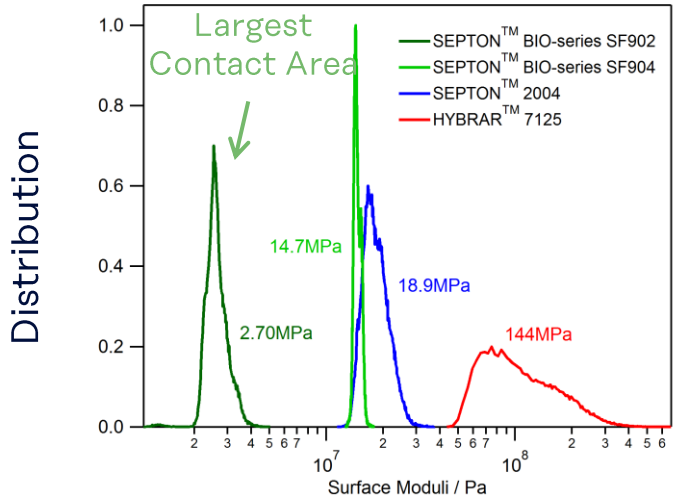
- Large true contact area or adhesive energy at the interface
- Squeezing out the water at the interface

Surface Moduli & Adhesive Energy

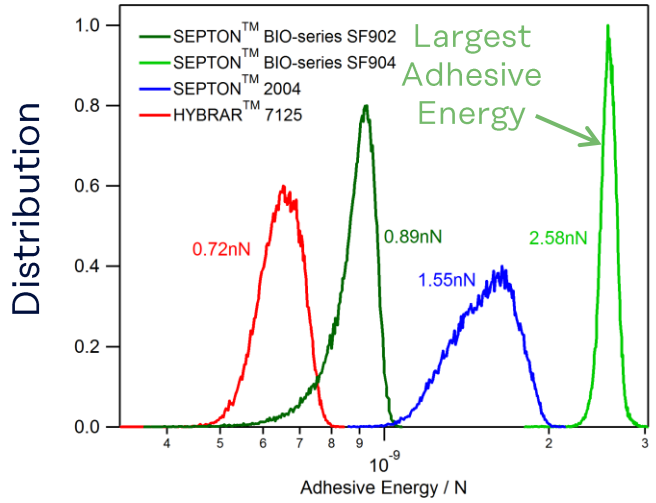
SEPTON™ BIO-series show low surface moduli (= large contact area) or high adhesive energy.
=> It seems to be a reason for high dry grip of SEPTON™ BIO-series.

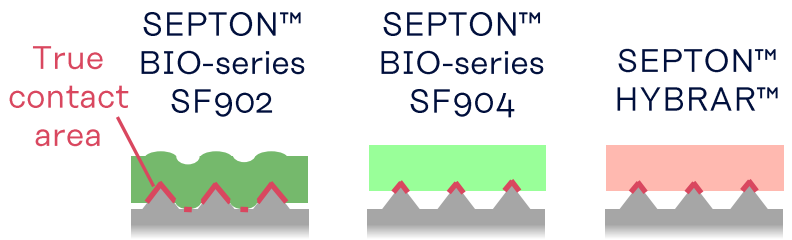
Observed by FV-AFM
(Force Volume-AFM)

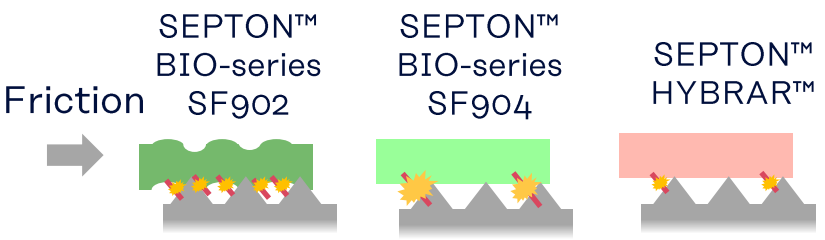
Surface Moduli Distribution



Adhesive Energy Distribution





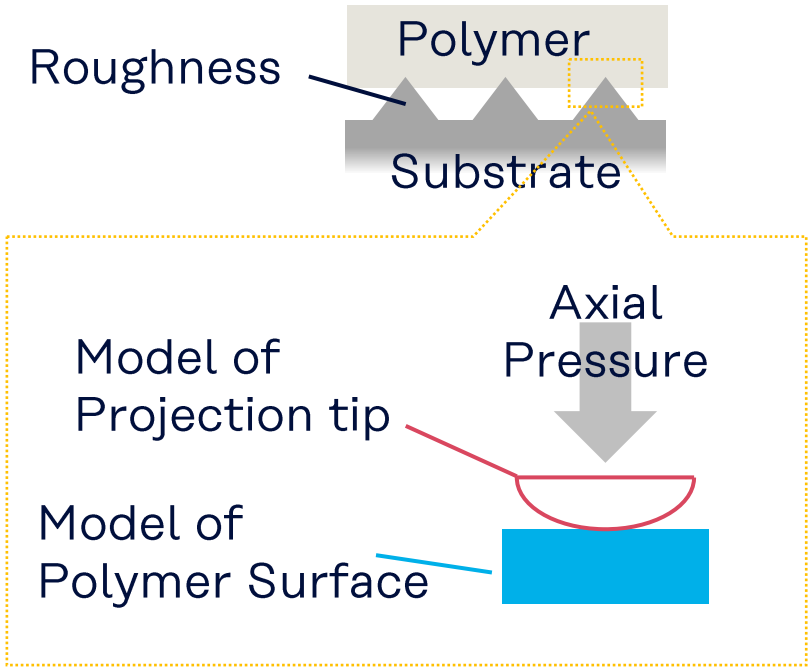


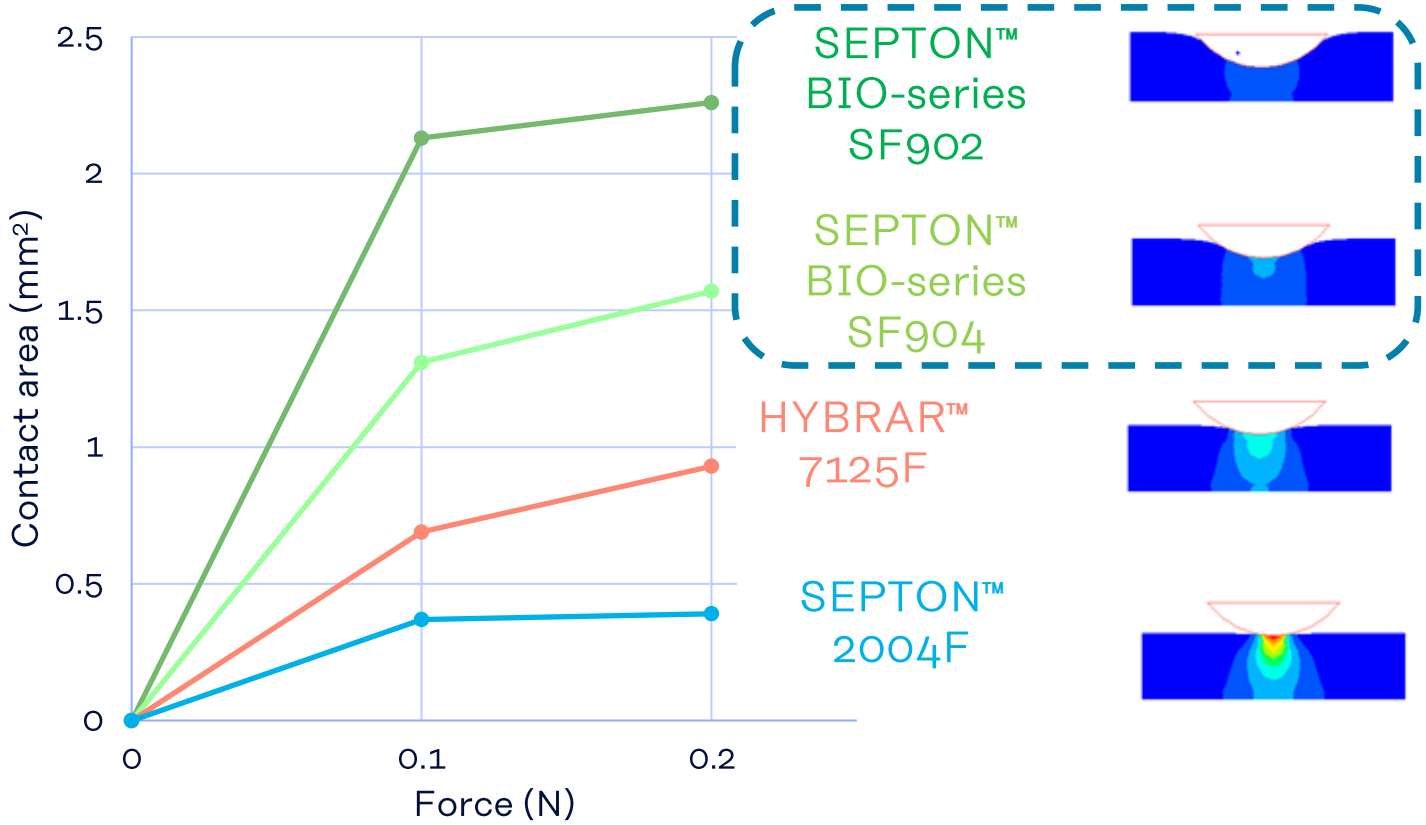
Contact Simulation to Model Roughness

Soft surface of SEPTON™ BIO-series lead to large contact area.

CAE Calculation with ***MSC software***

Axial force : 0.2N





(The absolute values that was calculated by this simulation may not be coincide to real value.)

Squeezing out the water

Significant difference in squeezing out the water

Special observation system on tensile tester (self-made)

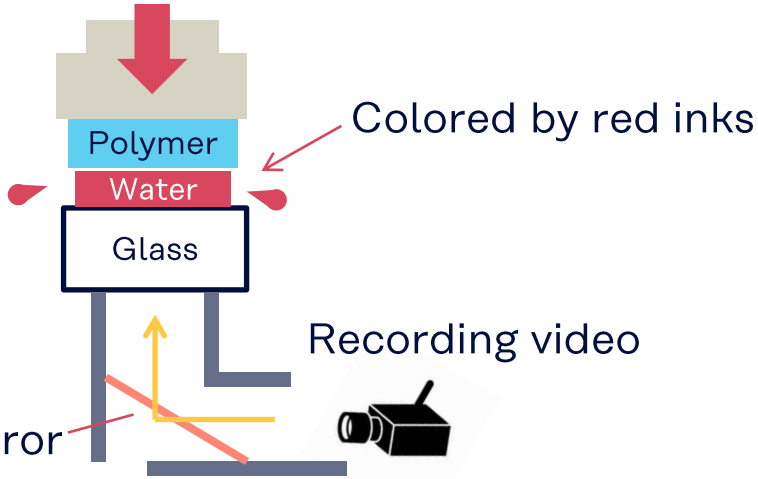
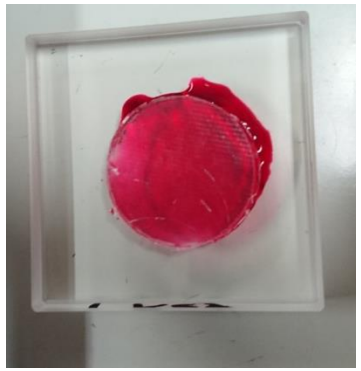
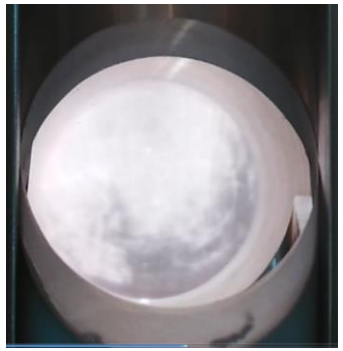


Photo from upside

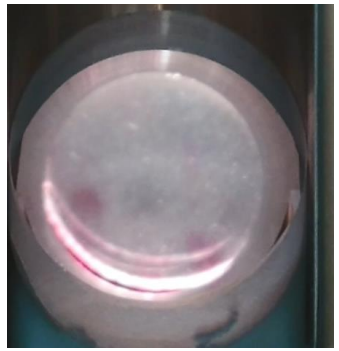


SEPTON™ BIO-series SF902



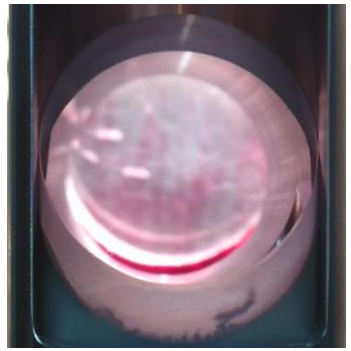
Red Area Ratio ≃ 0

SEPTON™ BIO-series SF904



Red Area Ratio ≃ 0.1

SEPTON™ 2004F



Red Area Ratio ≃ 0.5

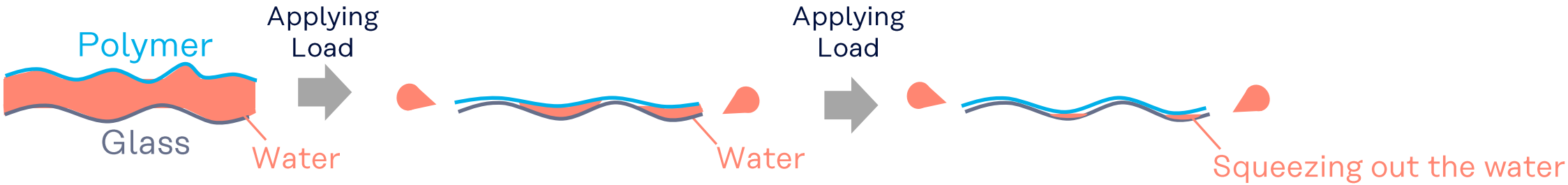
HYBRAR™ 7125F

Red Area Ratio ≃ 0.3

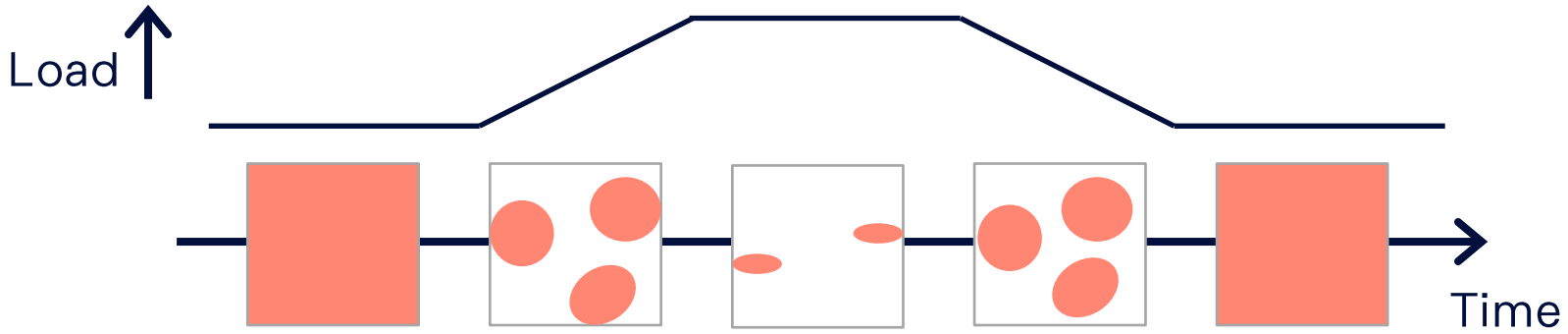
Wet Grip Mechanism

SEPTON™ BIO-series can squeeze out the water at the interface well.
We think that the phenomenon is based on the low surface moduli.

We could observe squeezing out the water at the interface by deformation of polymer film.



We revealed that the residual water at the interface leads to around water during unloading step.



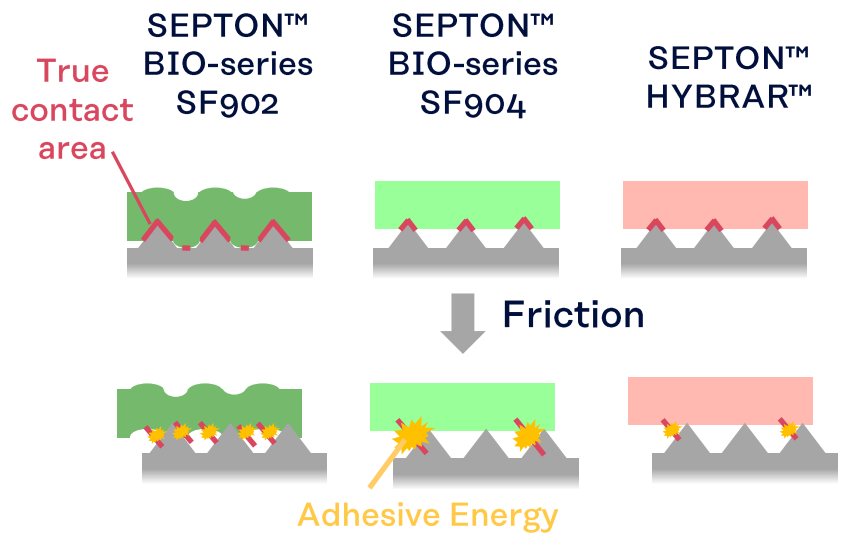
High Grip mechanism of SEPTON™ BIO-series

SEPTON™ BIO-series have flexible or adhesive surfaces that can follow the substrate roughness

Dry Grip Mechanism

SEPTON™ BIO-series have large true contact area or large adhesive energy and that leads to large adhesion force.

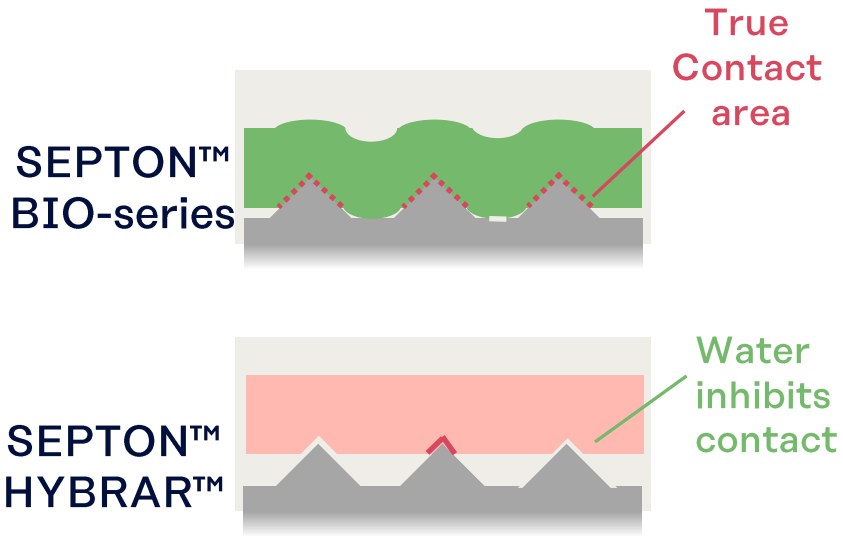
⇒ **High Grip Performance**



Wet Grip Mechanism

SEPTON™ BIO-series can squeeze out water from interface by their deformation.

⇒ **High Grip Performance**



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