xFLEX402

Basic Properties

Measurement	Unit	Test Method	2x30min in XiP Cure, 1x60min in xCure, 2x5min 100% in xCure Desktop
Elastomer Properties			
Young's Modulus	MPa	ASTM D638	54.6
Ultimate Tensile Strength	MPa	ASTM D638	5.3
Elongation at Break	%	ASTM D638	236
Stress at 50% strain	MPa	ASTM D412	3.1
Stress at 100% strain	MPa	ASTM D412	3.6
Stress at 150% strain	MPa	ASTM D412	4.4
Stress at Break	MPa	ASTM D412	5.8
Strain at Break	%	ASTM D412	230
Tear Strength	kN/m	ASTM D624	21.2
Resilience by Vertical Rebound	%	ASTM D2632	45
Shore Hardness (1s)	A	ASTM D2240	82
Shore Hardness (5s)	A	ASTM D2240	83
General Properties			
Viscosity at 25°C (77°F)	cP	ASTM D7867	14500
Viscosity at 35°C (95°F)	cP	ASTM D7867	8400
Viscosity at 40°C (95°F)	cP	ASTM D7867	6000
Liquid Density	g/cm^3	ASTM D1475	1.044
Solid Density	g/cm^3	ASTM D1475	1.1

Henkel Extended Properties

Measurement	Unit	Test Method	Post Processed
Compression Property			
Compression Set (22hr)	%	ASTM D395	57.1
Additional Thermal Properties			
Thermal Conductivity	W/(m·K)	ASTM D5930	0.16
Heat Capacity	J/(g·K)	ASTM D5930	2.0
CTE (-40°C to 40°C)	µm/(m·K)	ISO 11359-2	187.1
Glass Transition (Tg)	°C	ASTM E1356	-66
Electrical Properties			
Volume Resistivity	Ω·cm	ASTM D257	2.0E11
Surface Resistivity	Ω	ASTM D257	4.7E12
Electric Strength	kV/mm	ASTM D149	21.3
AC Relative Permittivity (Dielectric Constant)			
at 50 Hz (XY)		ASTM D150	5.1
at 1 kHz (XY)		ASTM D150	4.8

at 1 MHz (XY)		ASTM D150	4.5
AC Loss Characteristic (Dissipation Factor)			
at 50 Hz (XY)		ASTM D150	0.24
at 1 kHz (XY)		ASTM D150	0.02
at 1 MHz (XY)		ASTM D150	0.03
Other Properties			
Water Absorption (24hr)	%	ASTM D570	3.62
Water Absorption (72hr)	%	ASTM D570	4.94
Biocompatibility			
Irritation		ISO 10993-23	Pass

Printing Process

The material should be processed at room temperature. Before usage, the material should be shaken well. Pour it slowly into the vat and wait a couple of minutes, until a smooth, bubble-free surface is obtained before starting the print job.

The 3D printer examples and settings stated above are only for general guidance. The fully optimized settings should always be determined by the users themselves, according to their specific needs. Please always refer to the user manual of the employed 3D printer for instructions on printer settings and handling.

Remove the parts carefully from the build platform with a suitable tool, for more information, refer to the user manual of the used 3D printer.

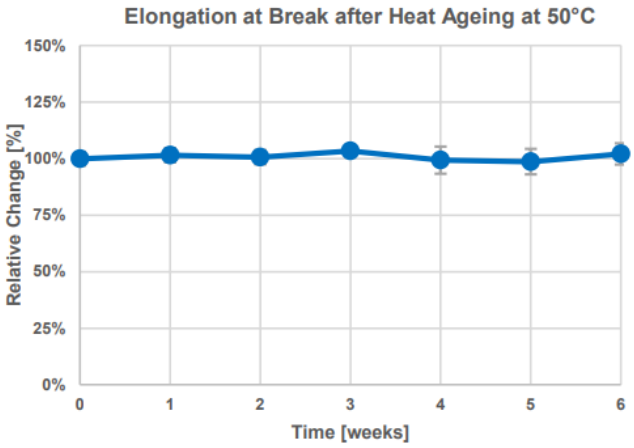
Washing

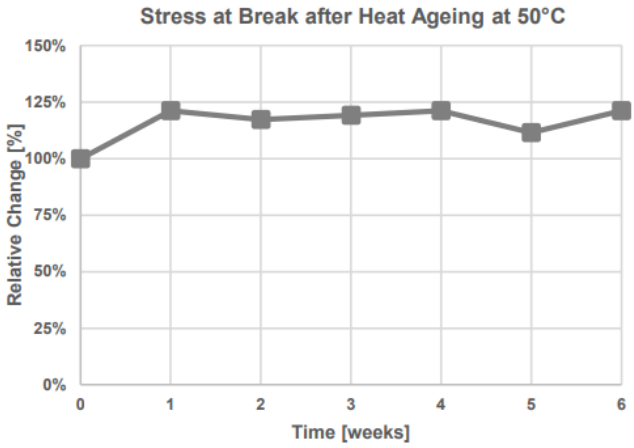
xFLEX402 requires post processing to achieve specified properties. Prior to post curing, the part should be washed. Nexa3D recommends using xClean followed by IPA as standard cleaning procedure. Parts should not be submerged in IPA for longer than 5 minutes to avoid any impact on performance.

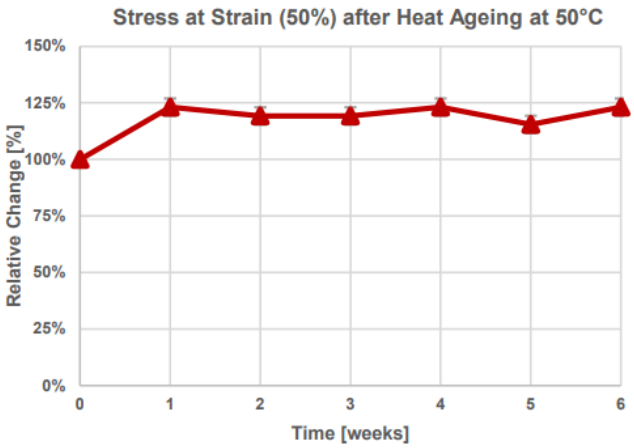
Heat Ageing

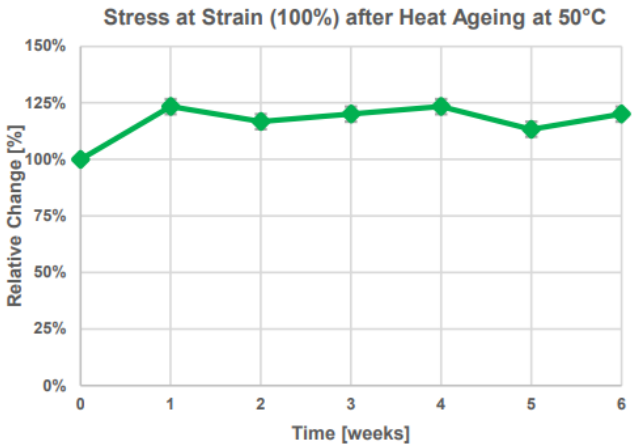
The samples were heat aged without load according to ASTM D3045. Test samples were exposed for a defined time at 50°C and conditioned for 24 hours at 22°C before mechanical testing. Control samples were stored at a constant 22°C. All samples were printed in the same print job using a validated workflow. Mechanical testing was conducted according to ASTM D412 at standard lab conditions (22°C). “0 weeks” represents non-aged samples stored at 22°C and tested 24 hours after post-processing.

Based on temperature dependence of reaction rates a test time of 6 weeks at 50°C can be interpreted as approximately 12 months at ambient temperature.



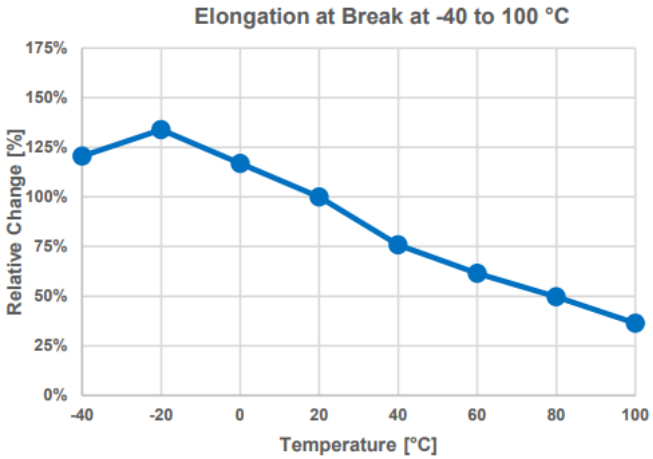


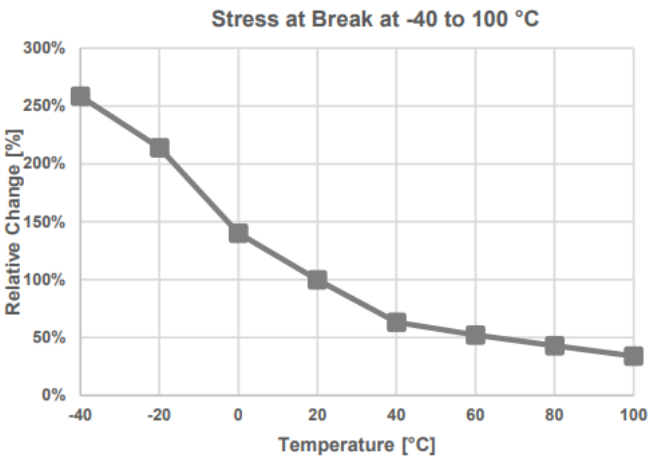




Temperature Dependence of Mechanical Properties

The test was conducted according to ASTM D412 at varied environmental temperatures, from -40°C to 100°C. All samples were printed in the same print job using a validated workflow. Mechanical testing was conducted according to ASTM D412. Before each test series samples were conditioned for 60 minutes at the specific test temperature.

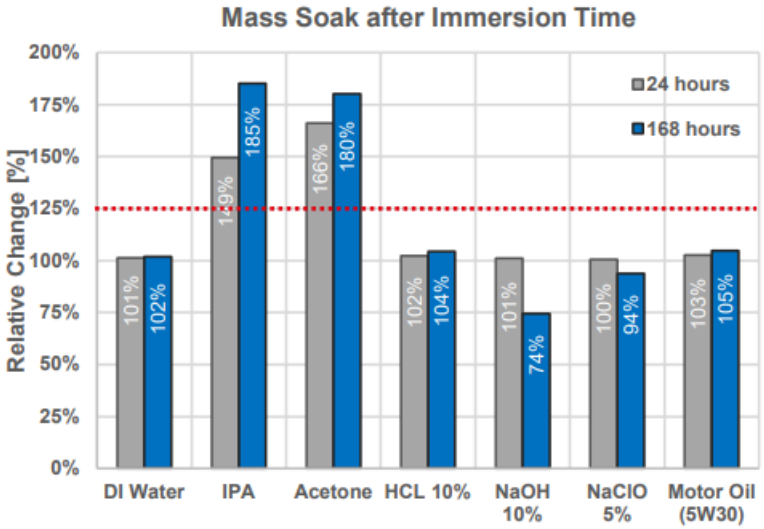




Industrial Chemical Resistance

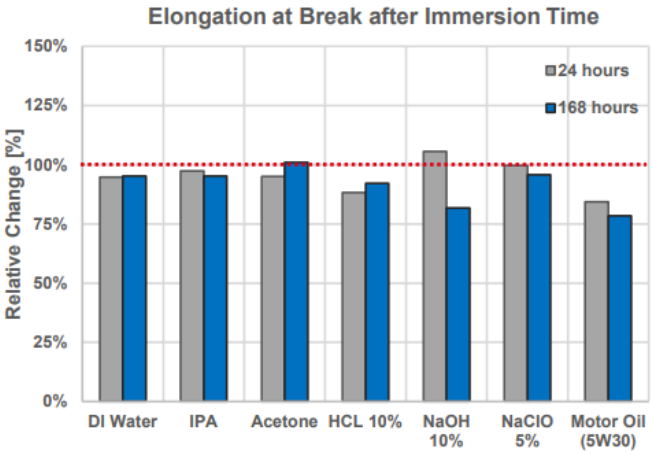
Weight Measurement

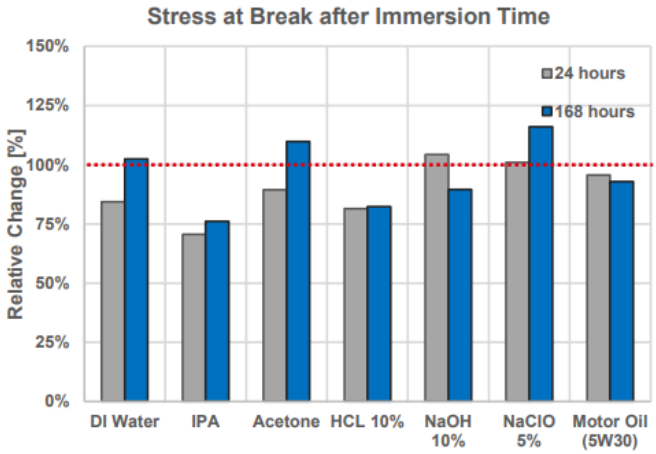
The test was conducted after chemical ageing according to ASTM D543. The influence of chemicals was tested by measuring the mass change after different test times (Immersion test for 24 and 168 hours). Exposed samples were stored in containers and fully immersed in different chemicals. Samples were stirred every 24 hours using a shaker. After removal exposed samples were washed, dried and immediately weighed. All samples were printed using a validated workflow. “100%” represents the initial weight 24 hours after post-processing.



Mechanical Testing

The test was conducted after chemical ageing according to ASTM D543. The influence of chemicals was tested by measuring mechanical properties after different test times (Immersion test for 24 and 168 hours). Exposed samples were stored in containers and fully immersed in different chemicals. Samples were stirred every 24 hours using a shaker. After removal, exposed samples were washed and conditioned for 24 hours at 22°C before mechanical testing. All samples were printed using a validated workflow. Mechanical testing was conducted according to ASTM D412 at standard lab conditions (22°C). “100%” represents non-aged samples stored at 22°C and tested 24 hours after post-processing.





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