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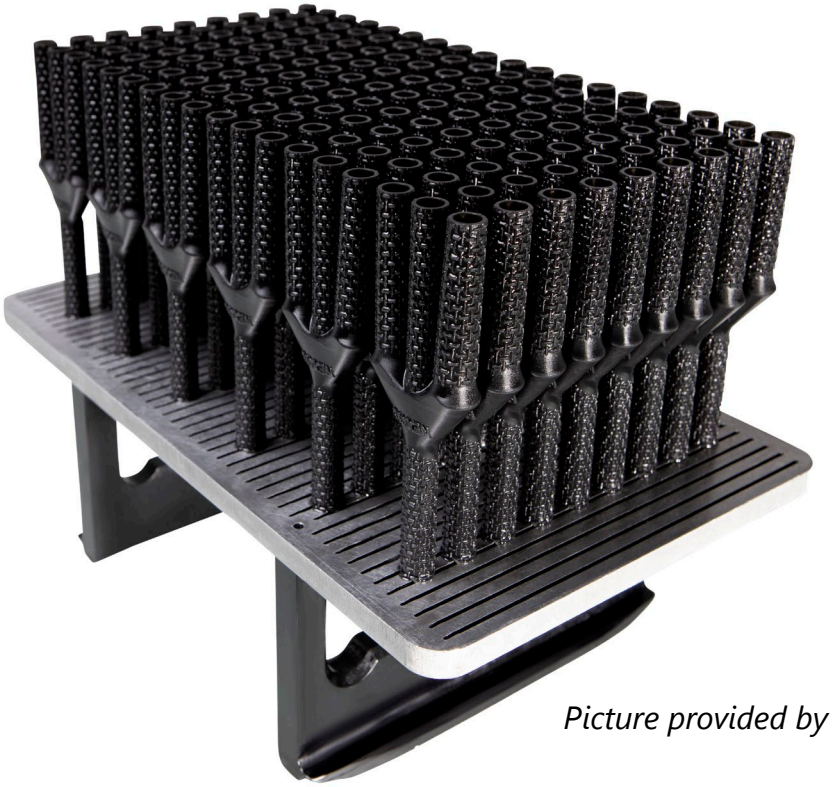

Picture provided by Nexa3D

LOCTITE® 3D IND405™

TOUGH

Black, Clear

LOCTITE®
Henkel Corporation
loctite3dp@henkel.com

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LOCTITE 3D IND405™

LOCTITE 3D IND405 is a rigid, high-strength, high elongation engineering material with outstanding impact resistance and excellent surface finish properties.

This stiff and durable high-performance material is ideal for a wide variety of tools in the production floor, including manufacturing aids and final parts such as housings and consumer goods applications.

Parts can be printed with various DLP printers and machined, tapped, or polished for final finish.

Benefits:

- High impact resistance with high elongation
- Easy to print (one-part material)
- Tough and Durable
- The toughest clear resin (only applicable for clear material)
- Functional Prototyping

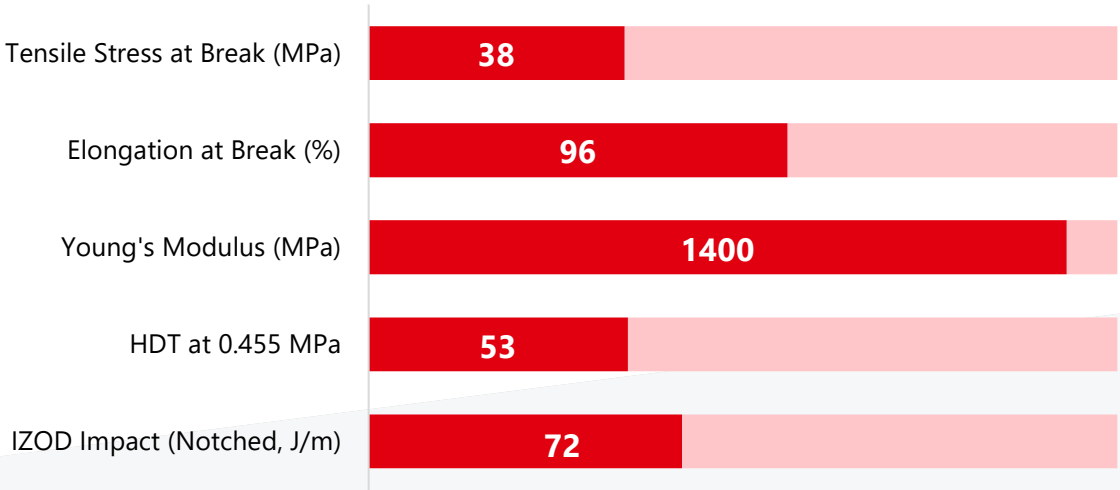
Ideal for:

- Clear prototypes (clear version)
- Fluid routing & consumer goods prototypes
- Manufacturing aids/tools
- Housings

Markets:

Industry

Consumer Goods



**Values shown are linked to LOCTITE IND405 Clear as reference, please refer to the specific mechanical properties for each of the colors shown in this document*

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PROPERTIES

Mechanical Properties	Measure	Method	Green	Post Processed
Tensile Modulus	MPa	ASTM D638	897 ± 20 [1]	1,434 ± 80 [2]
Tensile Stress at Yield	MPa	ASTM D638	25 ± 1 [1]	44 ± 1 [2]
Elongation at Yield	%	ASTM D638	4.7 ± 0.2 [1]	5.0 ± 0.3 [2]
Tensile Stress at Break	MPa	ASTM D638	24 ± 1[1]	45 ± 2 [2]
Elongation at Break	%	ASTM D638	89 ± 9 [1]	101 ± 11 [2]
Poisson's Ratio	-	ASTM D638	-	0.44 ± 0.03 [14]
Flexural Modulus	MPa	ASTM D790	826 ± 27 [10]	1383 ± 63 [10]
IZOD Impact (Notched)	J/m	ASTM D256	-	51 ± 4 [4]
Shore Hardness (3s)	D	ASTM D2240	-	76 [6]
Other Properties				
HDT at 0.455 MPa	°C	ASTM D648	-	52.8 [3]
HDT at 1.82 MPa	°C	ASTM D648	-	43.4 [11]
Water Absorption (24hr)	%	Internal	-	1.0 [5]
Solid Density	g/cm^3	ASTM D1475	1.116 [7]	1.121 [7]
Thermal Conductivity	W/(m·K)	ASTM D5930	-	0.19 [8]
Heat Capacity	J/(g·K)	ASTM D5930	-	0.70 ± 0.07 [8]
CTE (-30°C to 45°C)	µm/(m·K)	ASTM E831	-	98.47 [9]
Tg	°C	ASTM E1640	-	97.8[12]
Horizontal Burning Test	-	UL94	-	HB [13]

"All specimen are printed unless otherwise noted. All specimen were conditioned in ambient lab conditions at 19-23C / 40-60% RH for at least 24 hours." ASTM Methods: D638 Type IV, 50mm/min, D790-B, 13mm/min, D256 Notched IZOD (Machine Notched), 6 mm x 12 mm, D2240, Type "D" (3 seconds), UL 94 at 2 mm thickness, D638 Type I for Poisson's Ratio, 5 mm/min

Internal Data Sources:
[1] FOR19614, [2] FOR18201, [3] FOR18828, [4] FOR18611, [5] FOR18206, [6] FOR18207, [7] FOR18208, [8] FOR604294, [9] FOR76890 [10] FOR324512 [11] FOR215430 [12] FOR233524, [13] FOR408663 [14] FOR663149

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PROPERTIES

Liquid Properties	Measure	Method	Value
Viscosity at 25°C (77°F)	cP	ASTM D7867	2,200 – 2,400 [5]
Liquid Density	g/cm^3	ASTM D1475	1.046 [4]

Electrical Properties	Measure	Method	Green	Post Processed
Volume Resistivity	Ω·cm	ASTM D257	-	2.75E +15 [1]
Surface Resistivity	Ω	ASTM D257	-	7.79E +15 [1]
Dielectric Strength	kV/mm	ASTM D149	-	24.9 [2]
AC Relative Permittivity (Dielectric Constant)[3]				
at 50 Hz (XY)	none	ASTM D150	-	4.7
at 1 kHz (XY)	none	ASTM D150	-	4.2
at 1 MHz (XY)	none	ASTM D150	-	3.6
AC Loss Characteristic (Dissipation Factor)[3]				
at 50 Hz (XY)	none	ASTM D150	-	0.017
at 1 kHz (XY)	none	ASTM D150	-	0.014
at 1 MHz (XY)	none	ASTM D150	-	0.150

Internal Data Sources:
[1] FOR106272 [2] FOR106273 [3] FOR106274, [4] FOR18208, [5] FOR48490

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WORKFLOW

Validated workflows need to be followed to achieve properties as provided in the TDS. Examples of validated workflow steps are listed below. Users should defer to the most current workflow information for best results which can be found at https://www.loctiteam.com/printer-validation-settings

PRINTER SETTINGS

LOCTITE 3D IND405 BK is formulated to print optimally on industrial DLP printer. Read the safety data sheet carefully to get details about health and safety instructions.

- Shake resin bottle well before usage
- Temperature: 20°C to 35°C
- Intensity: 3 mW/cm² to 7 mW/cm²

Exposure time for an intensity of 5 mW/cm²

Layer Thickness (µm):	25	50	100
First layer time (s)	15	25	45
Burn in region (s):	8	15	30
Model Layer Exposure (s):	3	4	8

E_C (mJ/cm²)	6.1
D_P (mm):	0.14

CLEANING

LOCTITE 3D IND405 BK requires post processing to achieve specified properties. Prior to post curing, support structures should be removed from the printed part, and the part should then be washed. Use compressed air to remove residual solvent from the surface of the material between intervals.

Post Process Step	Agent	Method	Duration	Interval	Additional Info
Cleaning	IPA	Orbital	2.5 min	2	
Dry	n.a.	Compressed air	10 to 60 s	1	Air pressure (30psi)
Wait before post curing	n.a.	Ambient condition	60 min	1	Room temperature

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WORKFLOW

Validated workflows need to be followed to achieve properties as provided in the TDS. Examples of validated workflow steps are listed below. Users should defer to the most current workflow information for best results which can be found at https://www.loctiteam.com/printer-validation-settings

POST CURING

LOCTITE 3D IND405 Black requires post curing to achieve specified properties. It is recommended that either an LED or wide spectrum lamp be used to post cure parts.

UV Curing Unit	UV Source	Intensity	Cure time per side	Additional Settings (Shelf, Output Energy)
Loctite UVALOC 1000	Mercury Vapor (H-bulb)	30 mW/cm^2 at 405 nm	10 min	Second shelf from bottom
Loctite CL36	405nm LED	80 mW/cm^2 at 405 nm	20 min	100% top & side
Uvitron Intelliray 600W	Mercury Arc Bulb (broad spectrum)	66% Intensity	10 min	

STORAGE

Store LOCTITE 3D IND405 Black in the unopened container in a dry location. Optimal Storage: 8°C to 30°. Storage below 8°C or above 30°C can adversely affect product properties. Material removed from containers may be contaminated during use. For this reason, filter used resin with 190µm mesh filter before placing back into proper storage container.

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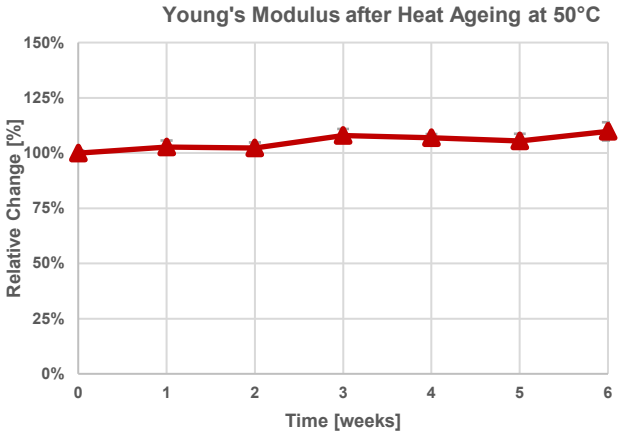
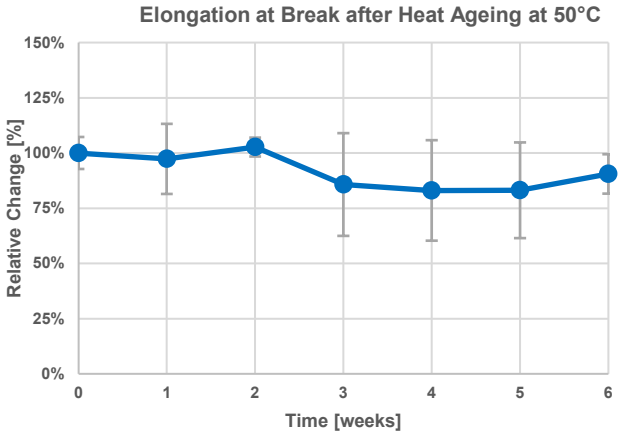
AGEING AND ENVIRONMENTAL EFFECTS – HEAT AGEING

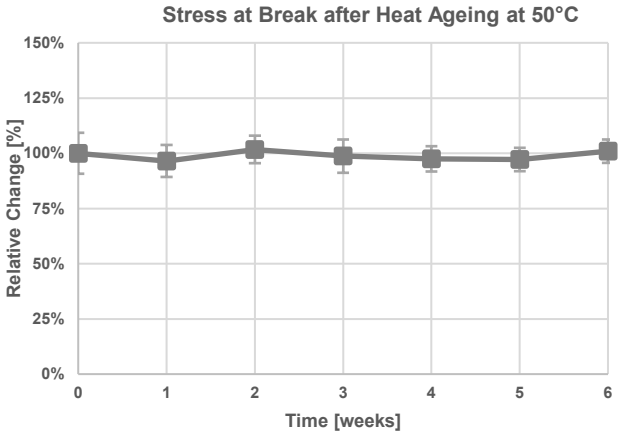
LOCTITE 3D IND405 BK was heat aged without load according to ASTM D3045. Test samples were exposed for a defined time at 50°C and conditioned for 24 hours at 22°C before mechanical testing. Control samples were stored at a constant 22°C. All samples were printed in the same print job using a validated workflow. Mechanical testing was conducted according to ASTM D638 at standard lab conditions (22°C).

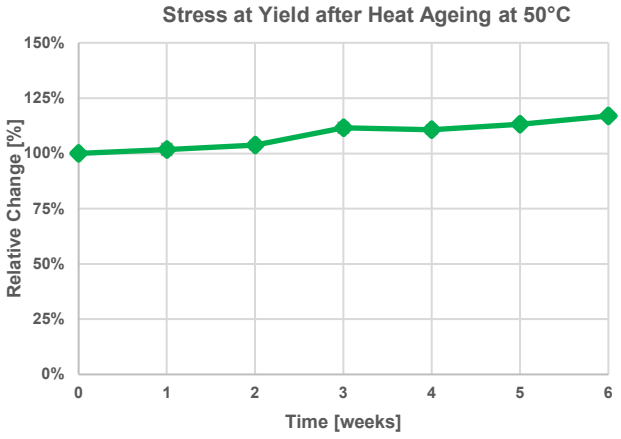
"0 weeks" represents non-aged samples stored at 22°C and tested 24 hours after post-processing.

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.









Test parameters:
ASTM D638: Type IV, Pull speed: 50 mm/min, Young's modulus measured at 0.1-1.0% (regression), 22°C

Internal Data Sources:
FOR184762, FOR184774

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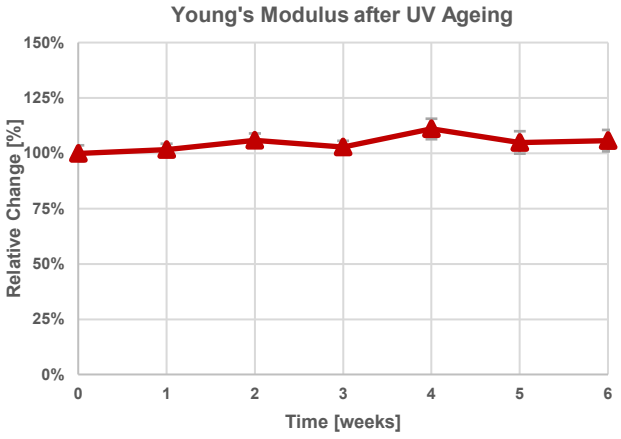
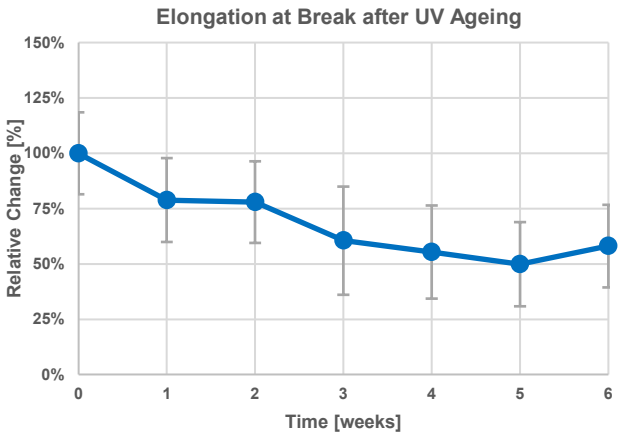
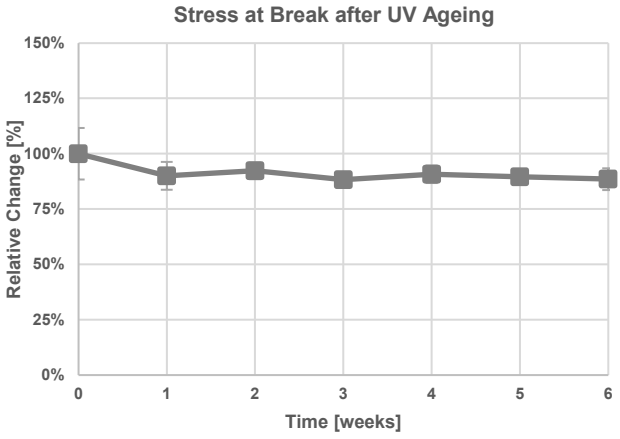
AGEING AND ENVIRONMENTAL EFFECTS – ACCELERATED WEATHERING (UV AGEING)

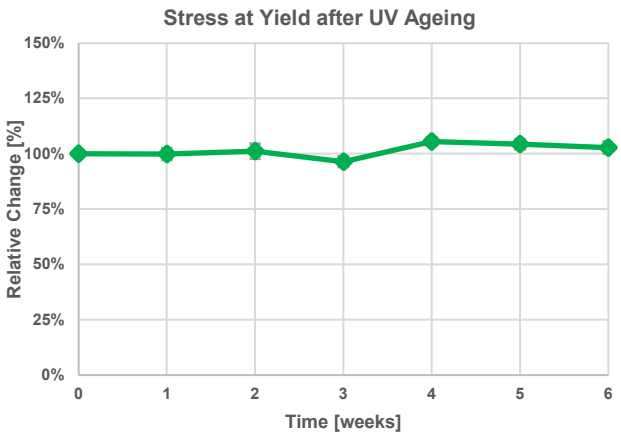
LOCTITE 3D IND405 BK has been tested after accelerated outdoor weathering according to ASTM D4329 (Cycle A). Test samples were exposed to defined conditions of heat, water condensation and UV light. Exposed samples were conditioned for 24 hours at 22°C before mechanical testing. Control samples were 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 D638 at standard lab conditions (22°C). "0 weeks" represents non-aged samples stored at 22°C and tested 24 hours after post-processing.

Please note, accelerated weathering testing can never fully represent real outdoor conditions and complexity. It is therefore recommended to conduct additional (outdoor) testing relevant for your specific application needs.









Test parameters:
ASTM D638: Type IV, Pull speed: 50 mm/min, Young's modulus measured at 0.1-1% (regression), 22 °C
ASTM D4329: cycle A for general applications, QUV/se, UVA 340 nm, 0.89 W/m2·nm, 8 hours UV light at 60°C followed by 4 hours at 50°C condensation in the dark. To reduce any sample warpage during test time samples were placed in tailor-made holders without any fixation clamps or mechanical load. Exposed samples were always removed from QUV before next condensation cycle to avoid samples that are soaked excessively with water before testing.

Internal Data Sources:
FOR176912, FOR176906

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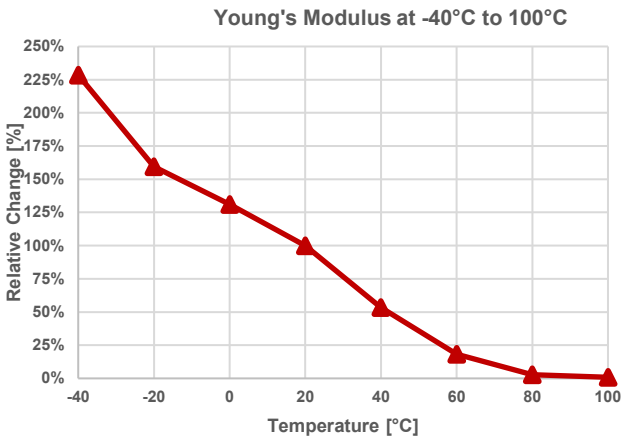
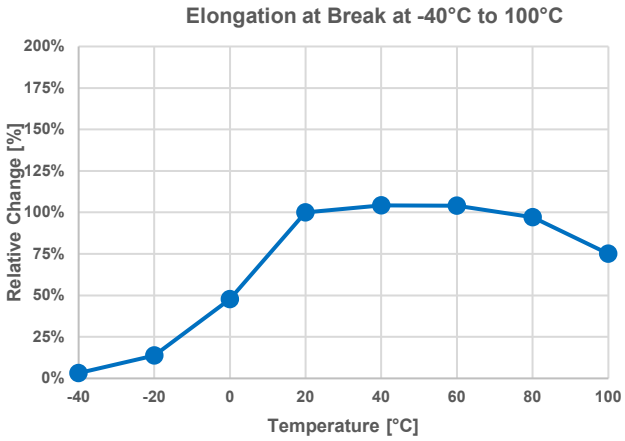
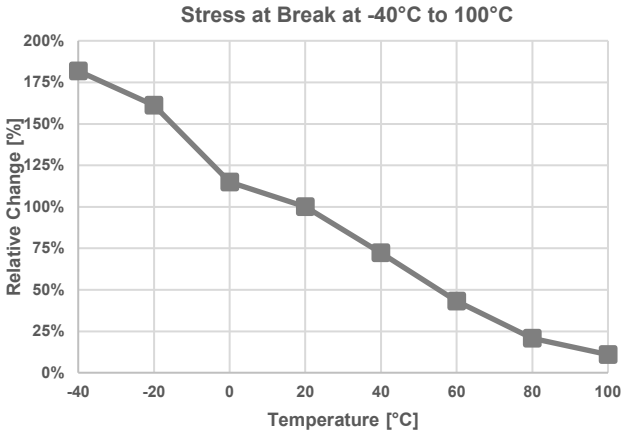
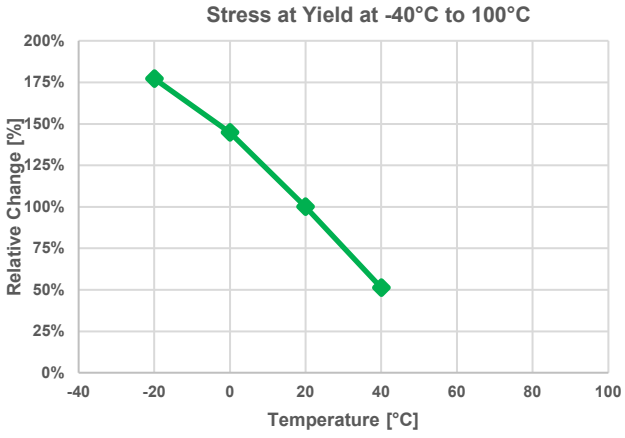
THERMAL INFLUENCE ON MECHANICAL PROPERTIES

LOCTITE 3D IND405 BK has been tested according to ASTM D638 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 D638. Before each test series samples were conditioned for 60 minutes at the specific test temperature.









Test parameters: ASTM D638, Type IV, Pull speed: 50 mm/min, Young's modulus measured at 0.1-1% (regression),

Internal Data Sources:
FOR188878

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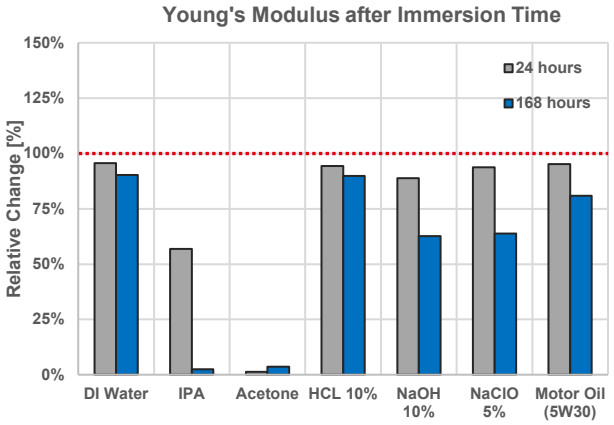
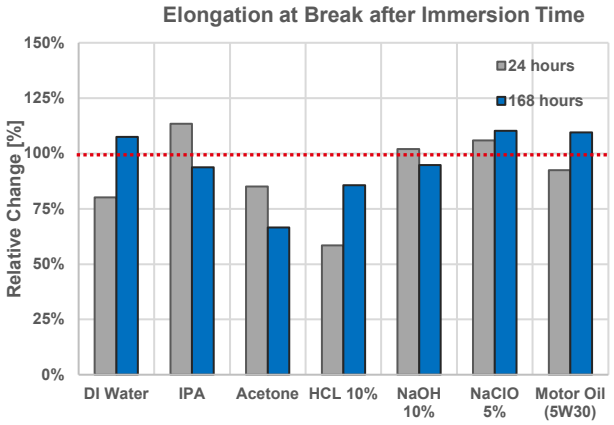
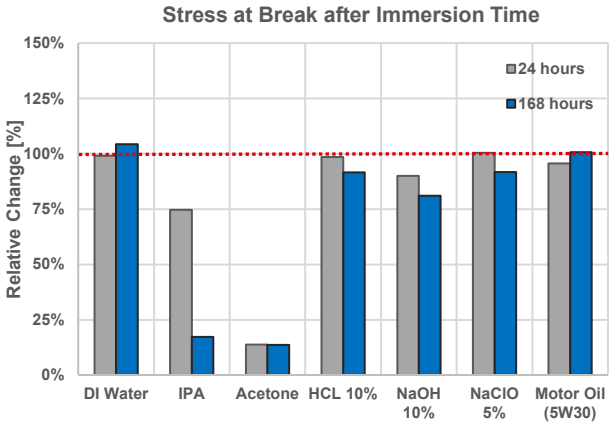
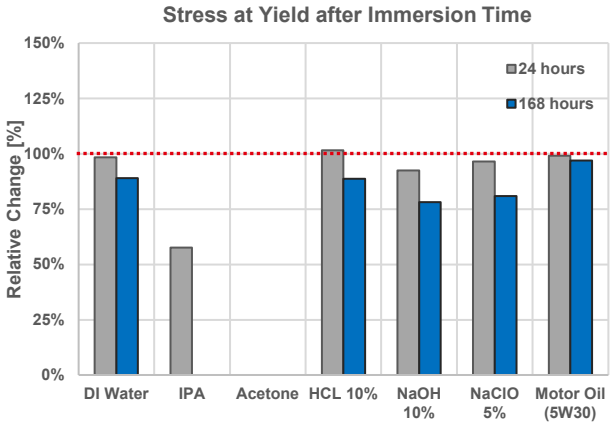
AGEING AND ENVIRONMENTAL EFFECTS – CHEMICAL RESISTANCE (1/2)

LOCTITE 3D IND405 BK has been tested 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 D638 at standard lab conditions (22°C). "100%" represents non-aged samples stored at 22°C and tested 24 hours after post-processing.









Test parameters:
ASTM D638: Type IV, Pull speed: 50 mm/min, Young's modulus measured at 0.1-1.0% (regression), 22°C.
ASTM D543: Samples immersed in different chemicals were stored at 22°C. Samples immersed in Motor Oil were stored at 50°C.

Internal Data Sources:
[1] FOR198775, FOR199485, FOR199486, FOR199488, FOR203081, FOR203082, FOR203083

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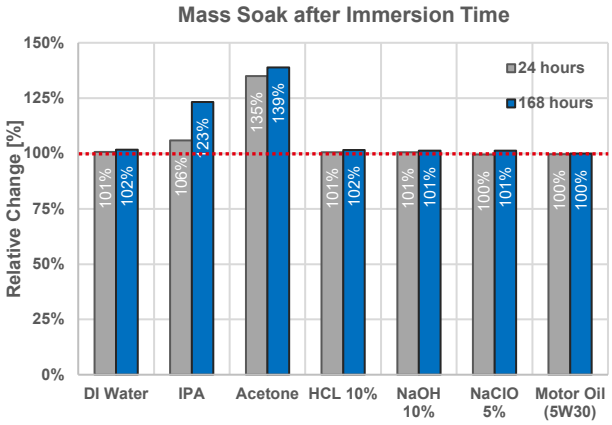
AGEING AND ENVIRONMENTAL EFFECTS – CHEMICAL RESISTANCE (2/2)

LOCTITE 3D IND405 BK has been tested 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.



Test parameters:
ASTM D543: Samples immersed in different chemicals were stored at 22°C. Samples immersed in Motor Oil were stored at 50°C.

Internal Data Sources:
[1] FOR199489, FOR199490, FOR199491, FOR199492, FOR203084, FOR203085, FOR203086

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PROPERTIES

Mechanical Properties	Measure	Method	Green	Post Processed
Young's Modulus	MPa	ASTM D638	847 ± 26 [1]	1,429 ± 52 [2]
Tensile Stress at Yield	MPa	ASTM D638	23 ± 1 [1]	42 ± 1 [2]
Elongation at Yield	%	ASTM D638	4.9± 0.3 [1]	5.0 ± 0.3 [2]
Tensile Stress at Break	MPa	ASTM D638	35 ± 3 [1]	38 ± 2 [2]
Elongation at Break	%	ASTM D638	166 ± 14 [1]	96 ± 4 [2]
Poisson's Ratio	-	ASTM D638	-	0.42 ± 0.05 [15]
Flexural Modulus	MPa	ASTM D790	884 ± 39 [12]	1287 ± 57 [12]
IZOD Impact (Notched)	J/m	ASTM D256	-	72 ± 2 [4]
Shore Hardness (3s)	D	ASTM D2240	-	76 [6]
Other Properties				
HDT at 0.455 MPa	°C	ASTM D648	-	53 [3]
HDT at 1.82 MPa	°C	ASTM D648	-	46 [8]
Water Absorption (24hr)	%	Internal	-	0.9 [5]
Solid Density	g/cm^3	ASTM D1475	1.126 [7]	1.134 [7]
Thermal Conductivity	W/(m·K)	ASTM D5930	-	0.18 [14]
Heat Capacity	J/(g·K)	ASTM D5930	-	0.91± 0.11 [14]
CTE (-30°C to 45°C)	µm/(m·K)	ASTM E831	-	91.14 [11]
Tg	°C	ASTM E1640	-	101.2[7]
Horizontal Burning Test	-	UL94	-	HB [13]
Biocompatibility				
Cytotoxicity		ISO10993-5	-	Comply [9]
Irritation		ISO10993-23*	-	Comply [10]

"All specimen are printed unless otherwise noted. All specimen were conditioned in ambient lab conditions at 19-23C / 40-60% RH for at least 24 hours." ASTM Methods: D638 Type IV, 50mm/min, D790-B 13mm/min, D256 Notched IZOD (Machine Notched), 6 mm x 12 mm, D2240, Type "D" (3 seconds), UL94 at 1.5 mm thickness, D638 Type I for Poisson's Ratio, 5 mm/min

*The biological assessment has been performed based on the in vitro method according to ISO10993-23

Internal Data Sources:
[1] FOR19711, [2] FOR126698, [3] FOR18829, [4] FOR16321, [5] FOR16322, [6] FOR18476, [7] FOR213644, [8] FOR367581, FOR367589, [9] FOR40216, [10] FOR52782 (in-vitro), [11] FOR76865 [12] FOR324513 [13] FOR435862 [14] FOR598646 [15] FOR663169

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PROPERTIES

Liquid Properties	Measure	Method	Value
Viscosity at 25°C (77°F)	cP	ASTMD7867	2,100 - 2,300 [5]
Liquid Density	g/cm^3	ASTMD1475	1.050 [4]

Electrical Properties	Measure	Method	Green	Post Processed
Volume Resistivity	Ω·cm	ASTM D257	-	8.55E +14 [1]
Surface Resistivity	Ω	ASTM D257	-	1.24E +15 [1]
Dielectric Strength	kV/mm	ASTM D149	-	27.4 [2]
AC Relative Permittivity (Dielectric Constant)[3]				
at 50 Hz (XY)	none	ASTM D150	-	4.4
at 1 kHz (XY)	none	ASTM D150	-	4.2
at 1 MHz (XY)	none	ASTM D150	-	3.8
AC Loss Characteristic (Dissipation Factor)[3]				
at 50 Hz (XY)	none	ASTM D150	-	0.025
at 1 kHz (XY)	none	ASTM D150	-	0.017
at 1 MHz (XY)	none	ASTM D150	-	0.428

Internal Data Sources:
[1] FOR106275 [2] FOR116477 [3] FOR106277 [4] FOR17633 [5] FOR43175

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CLEAR COLOR PROPERTIES

In order to assess clear properties, color variation is measured as Delta-E (dE) to define parts transmittance.

dE measures changes from L*a*b*C*h. The table below shows the color variation for two different workflows: Method: ASTM E308, Total Transmission

Part State	L*	a*	b*	C*	h	dE
Green / no post-processing	92.425	-1.205	2.195	2.5	118.74	NA
Dymax 5000EC 5 minutes / side	92.255	-0.52	1.265	1.37	112.28	1.17
Loctite CL36 60 min/side	92.18	-0.32	0.89	0.94	109.88	1.83

The table below shows color variation after ageing

A dE of 1.0 - 2.0 change is the smallest color difference, in average, that the human eye can perceive

QUV exterior weathering conditions (ASTM G-154—Cycle 1): Clear color

Method: ASTM G-154—Cycle 1 & ASTM E308, Total Transmission

QUV Exposure Time (Hrs)	L*	a*	b*	C*	h	dE
0	90.86	-0.65	1.03	1.22	122.49	NA
240	91.06	-0.47	1.42	1.49	108.47	0.47

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WORKFLOW

Validated workflows need to be followed to achieve properties as provided in the TDS. Examples of validated workflow steps are listed below. Users should defer to the most current workflow information for best results which can be found at https://www.loctiteam.com/printer-validation-settings

PRINTER SETTINGS

LOCTITE 3D IND405 CL is formulated to print optimally on industrial DLP printer. Read the safety data sheet carefully to get details about health and safety instructions. Recommended print parameters:

- Shake resin bottle well before usage
- Temperature: 20°C to 35°C
- Intensity: 3 mW/cm² to 7 mW/cm²

Exposure time for an intensity of 5 mW/cm²

Layer Thickness (µm):	25	50	100
First Layer Time (s):	10	20	40
Burn In Region Time (s):	6	12	25
Model Layer Exposure (s):	2	3	6

Ec (mJ/cm²)	6.2
Dp (mm):	0.15

CLEANING

LOCTITE 3D IND405 Clear requires post processing to achieve specified properties. Prior to post curing, support structures should be removed from the printed part, and the part should then be washed. Use compressed air to remove residual solvent from the surface of the material between intervals.

Post Process Step	Agent	Method	Duration	Intervals	Additional Info
Cleaning	IPA	Manual	2 min	1	
Dry	n.a.	Compressed air	10 to 60 s	1	Air pressure (30psi)
Wait before post curing	n.a.	Ambient condition	60 min	1	Room temperature

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WORKFLOW

Validated workflows need to be followed to achieve properties as provided in the TDS. Examples of validated workflow steps are listed below. Users should defer to the most current workflow information for best results which can be found at https://www.loctiteam.com/printer-validation-settings

POST CURING

LOCTITE 3D IND405 CL requires post curing to achieve specified properties. It is recommended that either an LED or wide spectrum lamp be used to post cure parts.

UV Curing Unit	UV Source	Intensity	Cure time per side	Additional Settings (Shelf, Output Energy)
Uvitron Intelliray 600W	Mercury Arc Bulb (broad spectrum)	66% Intensity	2 min	Shelf Second from Bottom
Dymax 5000 EC Flood	Mercury Arc Bulb (broad spectrum)	148 mW/cm² at 380 nm	2 min	400W, Shelf K
Loctite CL36	405nm LED	80 mW/cm² at 405 nm	10 min	100% top & side

POST PROCESSING OPTIONS

Polishing/ Clear Coating is needed for optimum clarity to be obtained. The following steps can be used as initial guidance, the exact steps and method will be determined by the end user's requirements:

1. Mark both sides of the printed object with a black ink or an available guide coating material.
2. Using 240 grit sandpaper, evenly sand the surface in an opposing 45-degree angle pattern until the surface has been fully sanded and the guide coat has been removed.
3. Remove sanding dust and any other debris from the surface of the part before proceeding.
4. Repeat steps 1 through 3 stepping up the numerical grit size: 400, 600, 800 and finishing at a buffing compound until the surface is smooth and has achieved the desired level of clarity.
5. Optional step: After using the above sanding method through grit size 800, thoroughly clean the surface of the part removing all dust and debris. Using multiple light coats of a high quality automotive clear coat, coat the surface of the printed part. Once the clear coating has fully cured buff the surface as needed to achieve the desired level of clarity.

Color/Dyeing - Laboratory testing shows that dyeing LOCTITE 3D IND405 CL using solvent solutions is possible. In order to maintain mechanical properties, we recommend dyeing after post cure is completed. Dyeing prior to post cure, results may vary and effect mechanical properties.

STORAGE

Store LOCTITE 3D IND405 Clear in the unopened container in a dry location. Optimal Storage: 8°C to 30°. Storage below 8°C or above 30°C can adversely affect product properties. Material removed from containers may be contaminated during use. For this reason, filter used resin with 190µm mesh filter before placing back into proper storage container.

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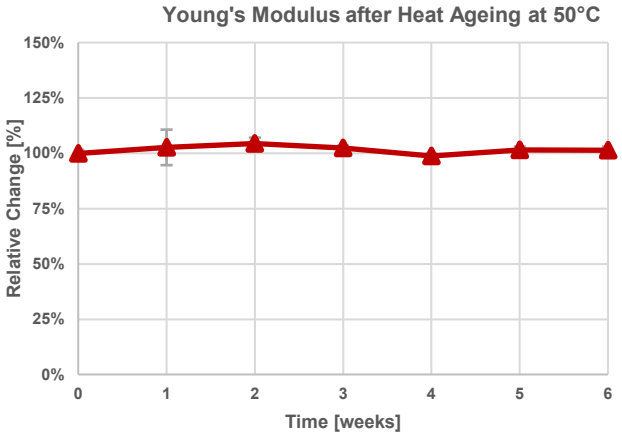
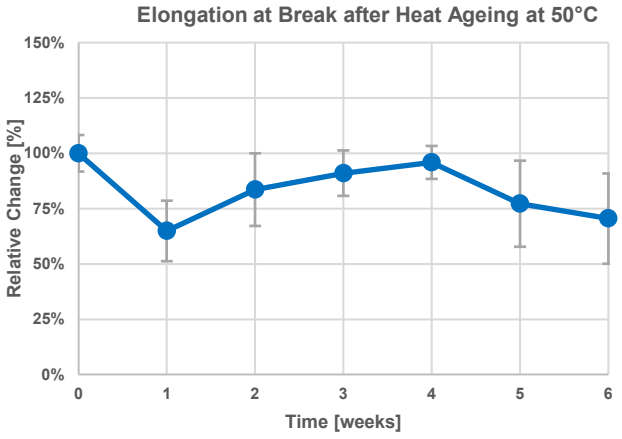
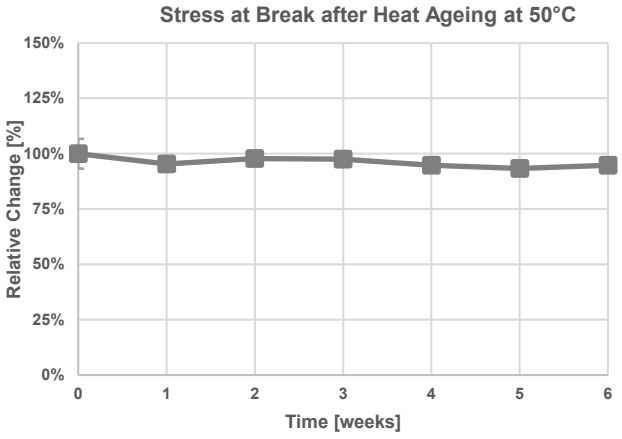
AGEING AND ENVIRONMENTAL EFFECTS – HEAT AGEING

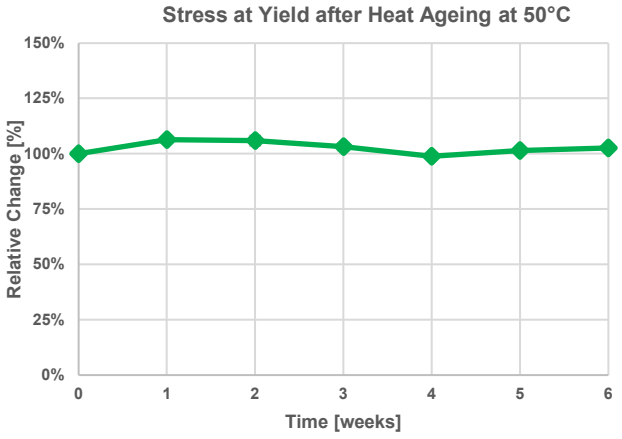
LOCTITE 3D IND405 CL was heat aged without load according to ASTM D3045. Test samples were exposed for a defined time at 50°C and conditioned for 24 hours at 22°C before mechanical testing. Control samples were stored at a constant 22°C. All samples were printed in the same print job using a validated workflow. Mechanical testing was conducted according to ASTM D638 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.









Test parameters:
ASTM D638: Type IV, Pull speed: 50 mm/min, Young's modulus measured at 0.1-1.0% (regression), 22°C

Internal Data Sources:
FOR104794, FOR104795

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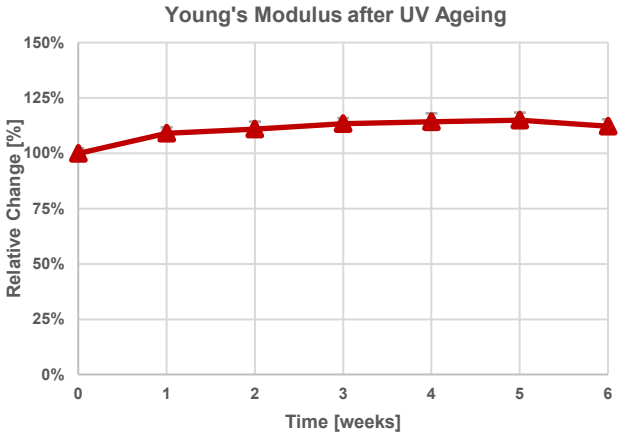
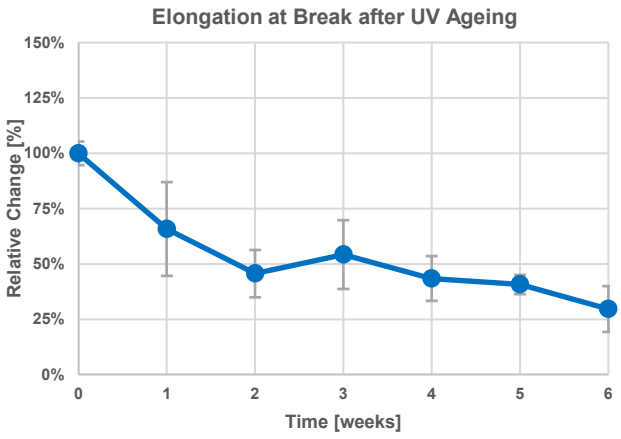
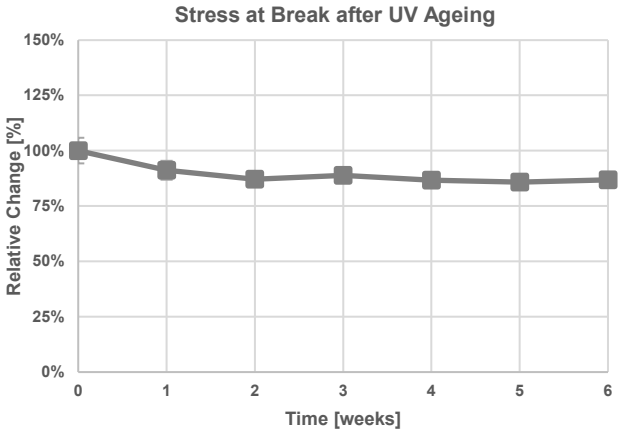
AGEING AND ENVIRONMENTAL EFFECTS – ACCELERATED WEATHERING (UV AGEING)

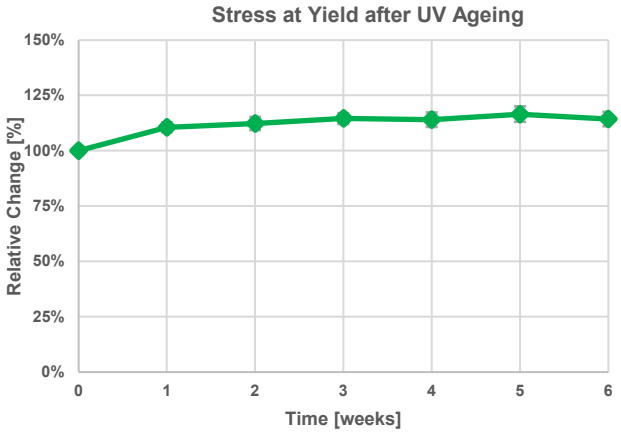
LOCTITE 3D IND405 CL has been tested after accelerated outdoor weathering according to ASTM D4329 (Cycle A). Test samples were exposed to defined conditions of heat, water condensation and UV light. Exposed samples were conditioned for 24 hours at 22°C before mechanical testing. Control samples were 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 D638 at standard lab conditions (22°C). "0 weeks" represents non-aged samples stored at 22°C and tested 24 hours after post-processing.

Please note, accelerated weathering testing can never fully represent real outdoor conditions and complexity. It is therefore recommended to conduct additional (outdoor) testing relevant for your specific application needs.









Test parameters:
ASTM D638: Type IV, Pull speed: 50 mm/min, Young's modulus measured at 0.1-1% (regression), 22 °C
ASTM D4329: cycle A for general applications, QUV/se, UVA 340 nm, 0.89 W/m2·nm, 8 hours UV light at 60°C followed by 4 hours at 50°C condensation in the dark. To reduce any sample warpage during test time samples were placed in tailor-made holders without any fixation clamps or mechanical load. Exposed samples were always removed from QUV before next condensation cycle to avoid samples that are soaked excessively with water before testing.

Internal Data Sources:
FOR143233, FOR143235

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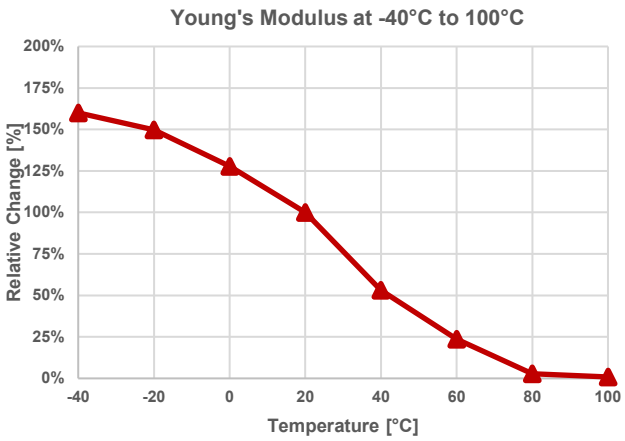
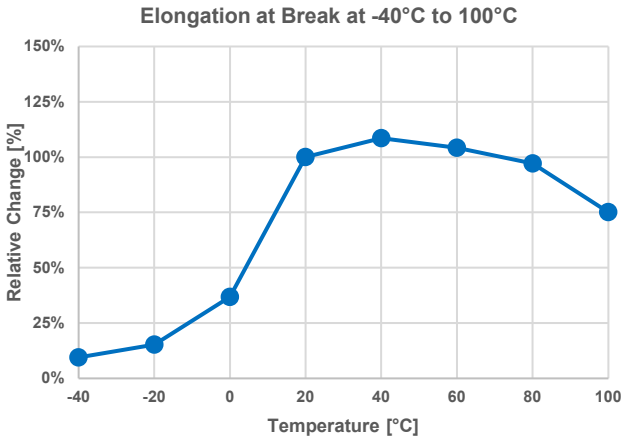
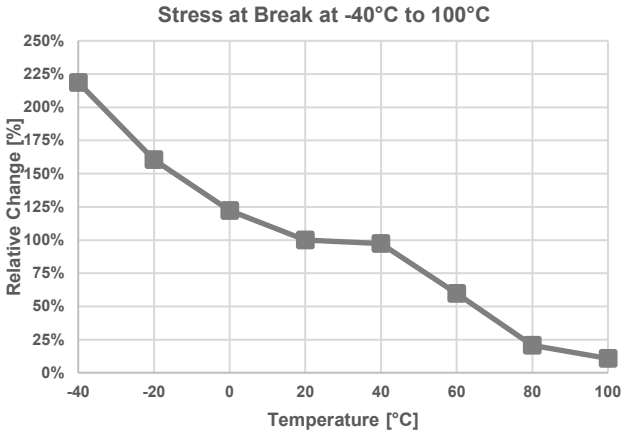
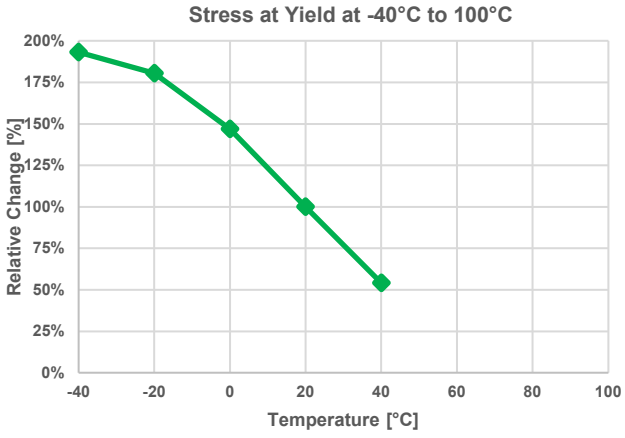
THERMAL INFLUENCE ON MECHANICAL PROPERTIES

LOCTITE 3D IND405 CL has been tested according to ASTM D638 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 D638. Before each test series samples were conditioned for 60 minutes at the specific test temperature.









Test parameters:
ASTM D638, Type IV, Pull speed: 50 mm/min, Young's modulus measured at 0.1-1% (regression)

Internal Data Sources:
FOR176839

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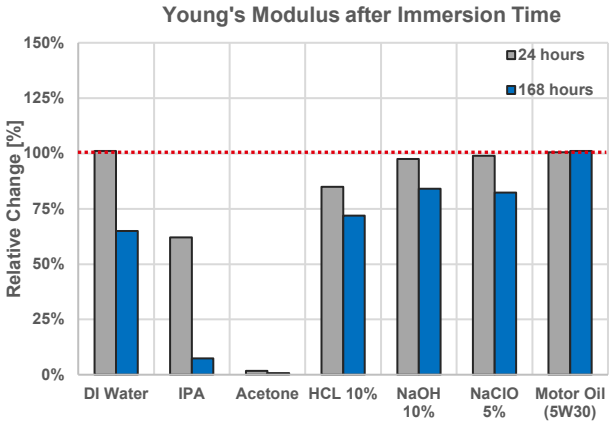
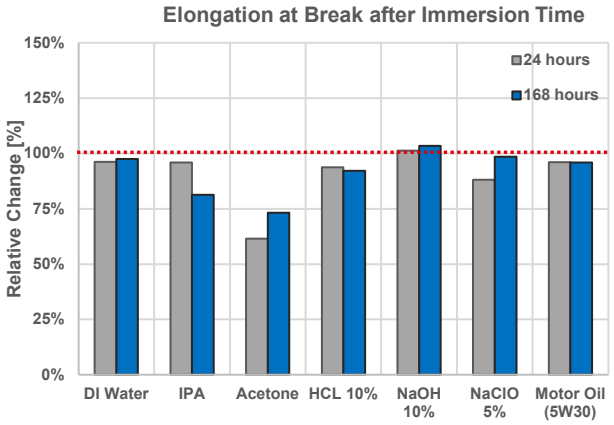
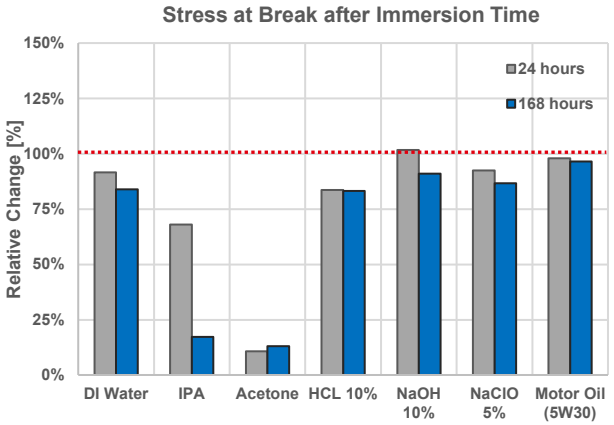
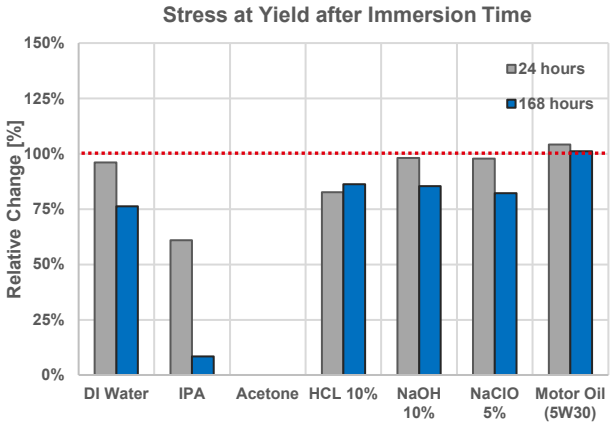
AGEING AND ENVIRONMENTAL EFFECTS – CHEMICAL RESISTANCE (1/2)

LOCTITE 3D IND405 CL has been tested 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 D638 at standard lab conditions (22°C). "100%" represents non-aged samples stored at 22°C and tested 24 hours after post-processing.









Test parameters:
ASTM D638: Type IV, Pull speed: 50 mm/min, Young's modulus measured at 0.1-1.0% (regression), 22°C
ASTM D543: Samples immersed in different chemicals were stored at 22°C. Samples immersed in Motor Oil were stored at 50°C

Internal Data Sources:
FOR208490, FOR208504, FOR208506, FOR208514, FOR213130, FOR213134, FOR213138

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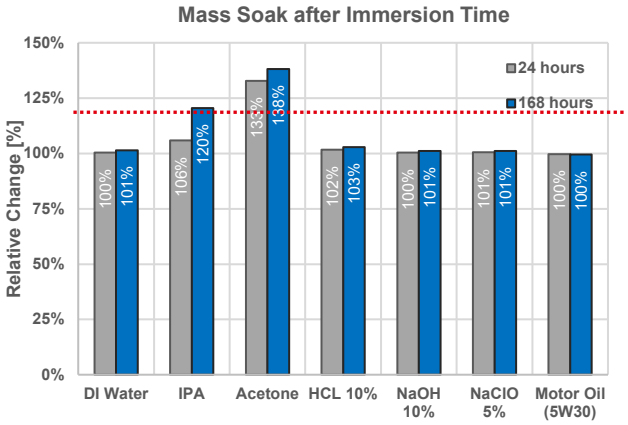
AGEING AND ENVIRONMENTAL EFFECTS – CHEMICAL RESISTANCE (2/2)

LOCTITE 3D IND405 CL has been tested 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.



Test parameters:
ASTM D543: Samples immersed in different chemicals were stored at 22°C. Samples immersed in Motor Oil were stored at 50°C

Internal Data Sources:
FOR208521, FOR208522, FOR208523, FOR208524, FOR213142, FOR213143, FOR213145

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NOTE

The information provided in this Technical Data Sheet (TDS) including the recommendations for use and application of the product are based on our knowledge and experience of the product as at the date of this TDS. The product can have a variety of different applications as well as differing application and working conditions in your environment that are beyond our control. Henkel is, therefore, not liable for the suitability of our product for the production processes and conditions in respect of which you use them, as well as the intended applications and results. We strongly recommend that you carry out your own prior trials to confirm such suitability of our product.
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