nexa3D

xCERAMIC3280

Basic Property

Measurement	Unit	Test Method	2x30min in XiP Cure, 1x60min in xCure,	2x10min 100% in xCure Desktop	UV + 3hrs @150°C
Tensile Property					
Tensile Modulus	MPa	ASTM D638	10300	9900	10300
Ultimate Tensile Strength	MPa	ASTM D638	85	72	69
Elongation at Break	%	ASTM D638	1.2	0.91	0.65
Thermal Properties					
HDT at 1.82 Mpa	°C	ASTM D648	120	98	153
HDT at 0.45 Mpa	°C	ASTM D648	205	194	278
Glass Transition Temperature (DMA, tan(d))	°C	ASTM D4065	168		171
General Property					
Viscosity at 25°C (77°F)	cP	ASTM D7867	300		
Viscosity at 30°C (86°F)	cP	ASTM D7867	230		
Liquid Density	g/cm^3	ASTM D4052-18a	1.65		
Solid Density	g/cm^3	ASTM D792	1.73		

BASF Extended Property Value

Measurement	Unit	Test Method	Post Processed
Flexural Property			
Flexural Modulus	MPa	ASTM D790	8780
Flexural Stress	MPa	ASTM D790	73
Impact Property			
IZOD Impact (Notched)	J/m	ASTM D256	24
Charppy (Notched)	kJ/m^2	ISO527-2	0.98
Advanced Thermal Property			
C.T.E. (-40°C to 0°C)	µm/(m·K)	ASTM E831	23.2
C.T.E. (0°C to 50°C)	µm/(m·K)	ASTM E831	30.2
C.T.E. (50°C to 100°C)	µm/(m·K)	ASTM E831	61.4
C.T.E. (100°C to 150°C)	µm/(m·K)	ASTM E831	56.8
Thermal Conductivity, 23°C	W/(m·K)	MTPS	0.47
Thermal Conductivity, 20°C	W/(m·K)	MTPS	0.69
Specific heat capacity, 23°C	J/(g·K)	MTPS	1.01
Specific heat capacity, 200°C	J/(g·K)	MTPS	1.81
FST Property			
Flammability		UL94	HB (1.8mm)

Electrical Property			
Volume Resistivity	Ω·cm	DIN EN 62631-3-1	2.80E+16
Surface Resistivity	Ω	DIN EN 62631-3-2	3.40E+16
Electric Strength	kV/mm	DIN EN 60243-1	29
Other Property			
Water Absorption (24hr)	%	ASTM D570	0.29
Water Absorption (>1500hrs)	%	ASTM D570	2.6
Shore Hardness	D	ASTM D2240	96
Biocompatible Property			
Cytotoxicity		ISO 10993-5	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

xCERAMIC3280 requires post processing to achieve specified properties. Prior to post curing, the part should be washed. Nexa3D recommends using IPA as standard cleaning solvent and gentle washing is recommended. Parts should not be cleaned with xClean or IPA with ultrasonic as this may cause the final part to crack.

Option1: Cleaning with IPA wipes.

- **Step1:** Remove excess resin from the specimens using wipes/paper towel.
- **Step2:** Rinse the parts with clean IPA for a few minutes. Fine structures or holes may be better cleaned by using IPA and a syringe or with a fine brush. Afterwards wipe again. Repeat the procedure until all the resin is removed.
- **Step3:** Blow-dry the parts with compressed air/nitrogen, until the parts are clean.

Option2: Cleaning with IPA in XiP Wash or container.

- **Step1:** Wash parts in a XiP Wash for a few minutes. The recommended cleaning time depends on the IPA condition and printed geometry but should be kept as short as possible to have the best final part performance.
- **Step2:** Rinse the parts with clean IPA for a few minutes. Fine structures or holes may be better cleaned by using IPA and a syringe or with a fine brush. Afterwards wipe again. Repeat the procedure until all the resin is removed.
- **Step3:** Blow-dry the parts with compressed air/nitrogen, until the parts are clean.

Note: whichever cleaning method is applied, the exposure to the cleaning solvent should be kept as shortas possible, maximum 2-3 minutes or preferably even shorter. Longer cleaning may lead to cracking in the final parts especially during the thermal baking process and also to a decrease in mechanical performance.

For this resin, we recommend to just blow-dry the parts or leave them for a short time at room temperature to dry. We do not recommend drying at elevated temperatures as this can lead to lower tensile properties and lower temperature stability. Also try to keep the time between printing, washing and UV post-curing short, as the material is quite sensitive in the green state.

Examples of Additional Thermal Treatment After UV Post-Curing (Optional)

	Thermal Oven	
Ramp up phase	2 hours	Room temperature to 150 °C
Holding phase	3 hours	150 °C
Ramp down phase	2 hours	150 °C to Room temperature

These proceedings are only general guidelines. In the end, the user has to determine the optimum post-curing procedure based on their specific requirements and the equipment used.

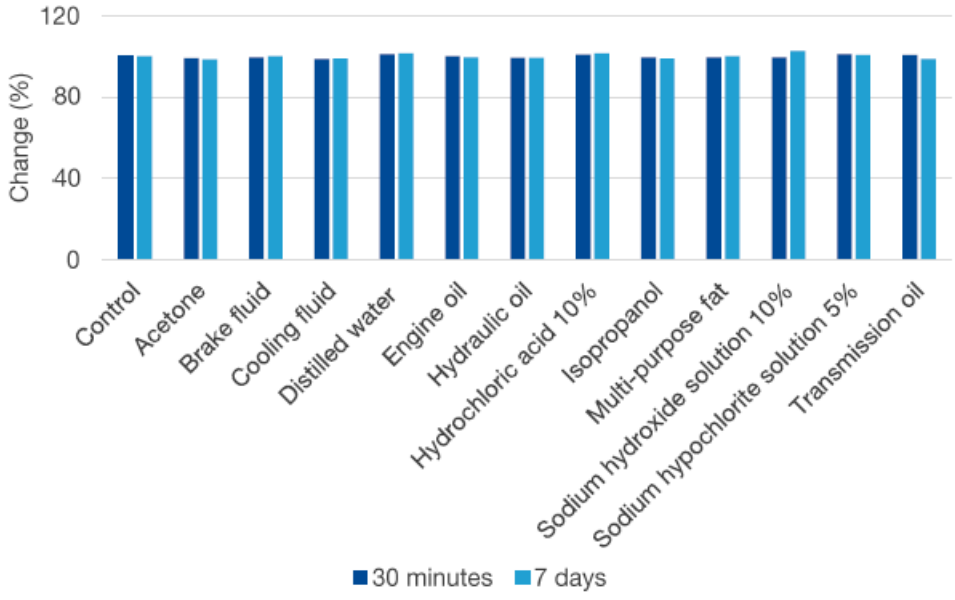
Industrial Chemical Resistance

The resistance of resin materials against chemicals, solvents and other contact substances is an important criterion of selection for many industrial applications. General chemical resistance depends on the period of exposure, the temperature, the quantity, the concentration, and the type of the chemical substance. When exposed to industrial chemicals, the chemical bonds of photopolymers can break or degrade, causing a change in the mechanical properties.

Test Method and Specimens

ASTM D638 type IV tensile bars were soaked in each fluid at room temperature, one set for 30 minutes and one set for 7 days. Upon completion of the soaking time, the parts were removed from the test fluid and were dried to measure the weight and the mechanical properties.

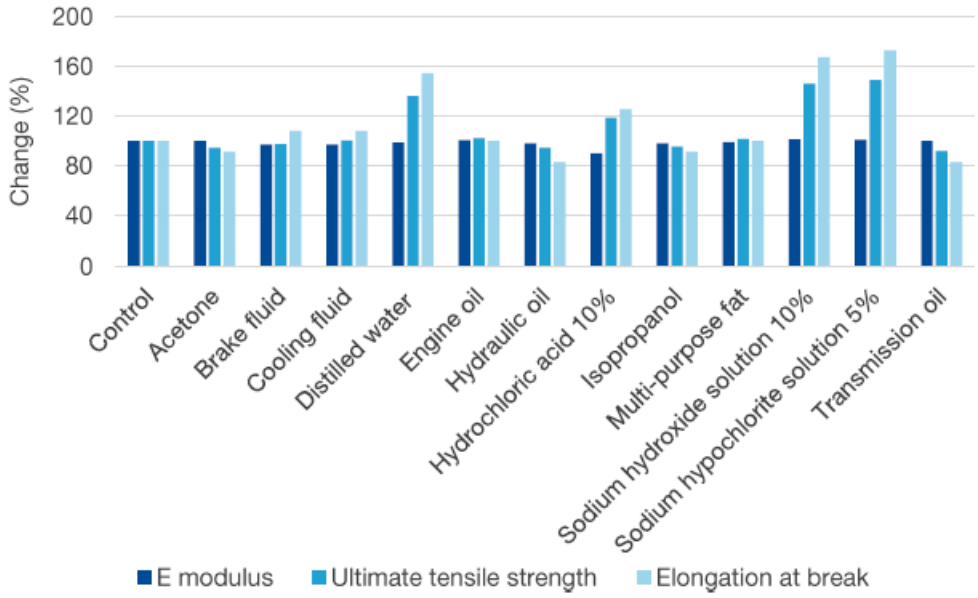
Weight Measurement



Change in weight after immersion time

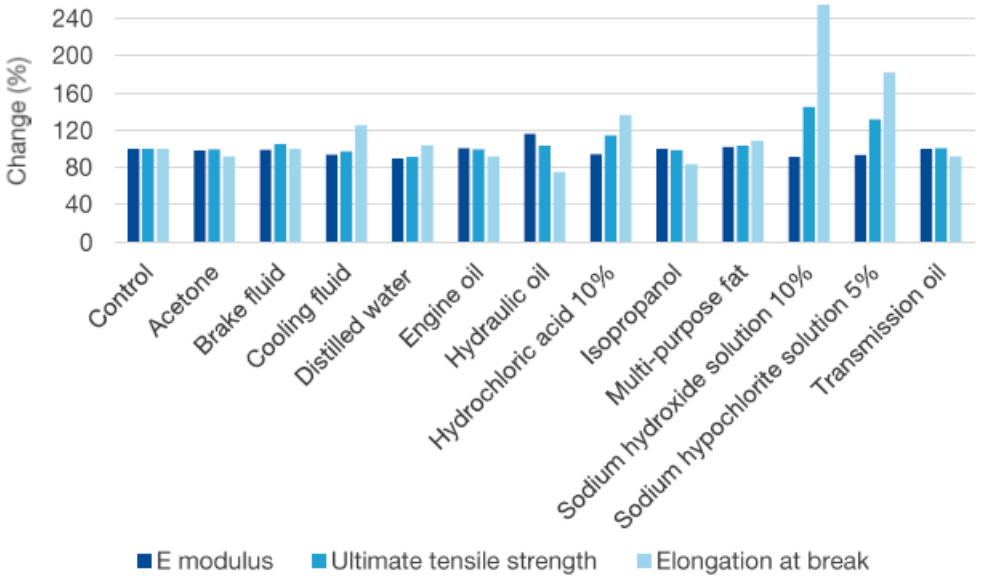
Mechanical Testing

30 minutes



Change in mechanical properties after 30 minutes immersion

7 days



Change in mechanical properties after 7days immersion

Sterilization

Sterilization is an essential requirement in many applications, especially when used in the medical field. Testing not only ensures the material quality but also determines how effectively the chosen sterilization process is eliminating potential microorganisms.

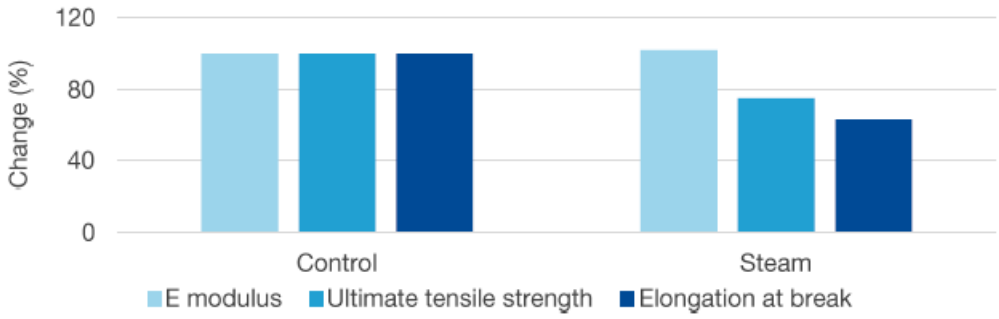
Test Method and Specimens

Steam Sterilization

Steam sterilization parameters	Settings
Vacuum pulses	4
Temperature	134°C
Pressure	210kPa
Holding time	4 minutes
Drying time	20 minutes

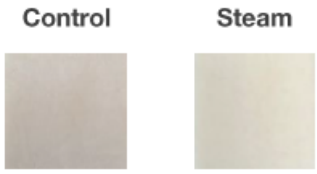
Testing conditions steam sterilization

Mechanical Testing



Change in mechanical properties after sterilization

Coloration



Color samples before and after sterilization

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. Nexa3D 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.

The following Disclaimers may apply depending on country of delivery:

Any liability in respect of the information in the Technical Data Sheet or any other written or oral recommendation(s) regarding the concerned product is excluded, except if otherwise explicitly agreed and except in relation to death or personal injury caused by our negligence and any liability under any applicable mandatory product liability law.
In case Nexa3D would be nevertheless held liable, on whatever legal ground, Nexa3D's liability will in no event exceed the amount of the concerned delivery. The data contained herein are furnished for information only and are believed to be reliable. We cannot assume responsibility for the results obtained by others over whose methods we have no control. It is the user's responsibility to determine suitability for the user's purpose of any production methods mentioned herein and to adopt such precautions as may be advisable for the protection of property and of persons against any hazards that may be involved in the handling and use thereof. In light of the foregoing, Nexa3D Inc. specifically disclaims all warranties expressed or implied, including warranties of merchantability or fitness for a particular purpose, arising from sale or use of Nexa3D products. Nexa3D specifically disclaims any liability for consequential or incidental damages of any kind, including lost profits. The discussion herein of various processes or compositions is not to be interpreted as representation that they are free from domination of patents owned by others or as a license under any Nexa3D patents that may cover such processes or compositions.
We recommend that each prospective user test his proposed application before repetitive use, using this data as a guide. This product may be covered by one or more United States or foreign patents or patent applications.

Trademark usage

Except as otherwise noted, all trademarks in this document are trademarks of either Nexa3D in the U.S. and elsewhere. ® denotes a trademark registered in the U.S. Patent and Trademark Office.