

**LOCTITE**®

**nexa3D**®

**xMED412**

**High Impact  
Ultra Clear**

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**nexa3D**®

# xMED412 High Impact Ultra Clear

## Description

xMED412 is a strong, durable, photopolymer material exhibiting mechanical characteristics like polypropylene. The product attributes include excellent elongation, impact strength, and compression strength for use in applications where wear resistance is critical. Parts manufactured with xMED412 are biocompatible in addition to being machinable, tapped, or polished.

Available Colors: Ultra Clear

Mechanical Properties	Method	Green	Post Processed
Tensile Strength at Break	ASTM D638	20.3 ± 1.3 MPa <sup>[12]</sup>	38 ± 1.4 MPa <sup>[1]</sup>
Tensile Stress at Yield	ASTM D638	18.5 ± 2.5 MPa <sup>[12]</sup>	29.36 ± 1.3 MPa <sup>[1]</sup>
Young's Modulus	ASTM D638	797 ± 106 MPa <sup>[12]</sup>	1245 ± 43 MPa <sup>[1]</sup>
Elongation at Failure	ASTM D638	149 ± 6.5 % <sup>[12]</sup>	141 ± 4% <sup>[1]</sup>
Flexural Stress at Yield	ASTM D790		37.6 ± 2.56 MPa <sup>[2]</sup>
Flexural Modulus	ASTM D790		1022 ± 76 MPa <sup>[2]</sup>
Flexural Strain at Break	ASTM D790		>10% <sup>[2]</sup>
<b>Other Properties</b>			
IZOD Impact Strength (Notched)	ASTM D256		42.6 ± 5 J/m <sup>[3]</sup>
HDT @ 0.455 MPa	ASTM D648		40°C <sup>[15]</sup>
Shore Hardness (0s, 3s) D scale	ASTM D2240		74,70 <sup>[4]</sup>
Water Absorption (24 hr)	ASTM D570		0.36% <sup>[5]</sup>
Ec (mJ/cm <sup>2</sup> )	Internal		7.81 mJ/cm <sup>2</sup> <sup>[14]</sup>
Dp (mm)	Internal		0.166 mm <sup>[14]</sup>
Solid Density	ASTM D1475	1.129 <sup>[16]</sup>	1.146 <sup>[16]</sup>

## Liquid Properties

Viscosity @ 25°C (77°F)		637 ± 150 cP <sup>[6]</sup>
Liquid Density	ASTM D1475	1.0614 <sup>[16]</sup>

"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, 5mm/min, D790-B, 2mm/min, D256 Notched IZOD (Machine Notched), 6 mm x 12 mm, D648, D2240, Type "D" (0, 3 seconds), D570 0.125" x 2" Disc 24hr@ 25°C, D1475, D7867@ 25°C (77°F)

1. TaskID Reference: FOR17060  
 2.TaskID Reference: FOR17061  
 3.TaskID Reference: FOR17059  
 4. TaskID Reference:FOR20031

5.TaskID Reference: FOR17058  
 6.TaskID Reference: FOR17057  
 7.TaskID Reference:FOR17470  
 8. TaskID Reference:FOR17471

9. TaskID Reference: FOR17473  
 10.TaskID Reference: FOR17479  
 11.TaskID Reference: FOR17478  
 12.TaskID Reference: FOR17689

07/13/2020

Preliminaryv2.0



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## Ultra Clear Color Properties

Method: ASTM E308, Total Transmission

Part State	L*	a*	b*	C*	h	dE
Green / no post-processing <sup>[17]</sup>	94.61	-1.4	2.23	2.64	122.17	NA
Dymax 5000EC 10 minutes / side <sup>[17]</sup>	94.16	-0.46	0.76	0.89	121.33	1.801943
Loctite CL36 30min/side <sup>[18]</sup>	93.77	-0.5	1.01	1.13	116.3	1.733205

## QUV exterior weathering conditions (ASTM G-154—Cycle 1): Ultra Clear Color

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

QUV Exposure Time (Hrs)	L*	a*	b*	C*	h	dE
0	93.49	-0.63	1.1	1.27	119.63	NA
325	92.03	-0.66	2.45	2.54	105.14	1.988718
650	91.69	-0.8	3.46	3.56	102.96	2.972961

## QUV exterior weathering conditions (ASTM G-154—Cycle 1): Ultra Clear Color Mechanical Properties

Method: ASTM G-154—Cycle 1

QUV Exposure Time (Hrs)	Tensile Stress at break (MPa)	Yield Stress (MPa)	Young's Modulus (MPa)	Elongation at break (%)
0	38 ± 1.4	29.4 ± 1.3	1245 ± 43	141 ± 4
24	36.0 ± 4	26.0 ± 1.9	1170 ± 84	145 ± 15
192	32.0 ± 3	23.0 ± 0.3	1025 ± 15	142 ± 17
325	28.1 ± 4	32.9 ± 0.64	1394 ± 32.85	80.8 ± 28.78
650	27 ± 0.84	26.5 ± 0.68	1297 ± 27.77	105 ± 6.357

# xMED412 High Impact Ultra Clear

## Machine Settings

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xMED412 is formulated to print optimally on any DLP machine. It is recommended to print with 405 nm wavelength projectors with irradiance between 3-7 mW/cm<sup>2</sup>. Layer time is given below at 6 mW/cm<sup>2</sup>:

	25 µm	50 µm	100 µm
Base Cure Time:	45 s	45 s	45 s
Model Layer Cure Time:	2 s	3.5 s	6 s

## Post Processing

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xMED412 requires postprocessing to achieve specified properties. Prior to post curing, support structures should be removed from the printed part, and the part should be washed in a compatible cleaner. Nexa3d recommends either IPA or Cleaner C™ in 2 minute interval wash cycles. Use compressed air to remove residual solvent from the surface of the material between intervals. Exact times and methods can be found by contacting us at [www.nexa3d.com](http://www.nexa3d.com).

## Post Curing

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xMED412 requires post curing to achieve specified properties. A wide array of post cure equipment can be used to cure appropriately. Exact devices with detailed information can be found by contacting us at [www.nexa3d.com](http://www.nexa3d.com)

## Additional Development Options

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Colors: xMED412 formula is made with additional pigment colors.  
Formula Modification xMED412 has potential for tensile property adjustments.

## Limitations

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Post Cure: xMED412 requires a UV/ Visible light post cure.

# xMED412 High Impact Ultra Clear

## Note

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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.

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