LOCTITE®

WE MAKE ADDITIVE MANUFACTURING HAPPEN

OUR 3D PRINTING MATERIAL SOLUTIONS

Henkel

Why Digital Light Processing (DLP) is the right technology for you

DLP PRINTING HAS NUMEROUS ADVANTAGES COMPARED TO OTHER ADDITIVE MANUFACTURING TECHNOLOGIES:

- High resolution and great surface finish
- Broad range of high-performance materials available from LOCTITE
- Faster printing speeds
- Excellent isotropic properties
- Less infrastructure costs, less maintenance and lower energy consumption
- Easy and convenient change over for managing multiple materials, with the same equipment

How to Select the Right Material

1 PROCESS CONSIDERATION

- What technology are you using? Which SLA or DLP printer do you use?
- Part requirements including...
  - Size
  - Surface finish
  - Level of accuracy

2 END USE OF THE PART

- What is the current solutions and challenges it poses?
- What is the application type and key industry?
- What is the reference material? (PP/ABS/rubber)
- What environments will the part be exposed to?
- Other considerations including temperature resistance, stiffness/ elongation requirements, impact resistance and other physical properties

3 SPECIAL CONSIDERATIONS

- Flame and Smoke Toxicity (FST)
- Medical approval and certifications (skin contact, biocompatibility)
- Environmental durability (long-term aging resistance)
  - Media resistance
  - UV aging
  - Thermal aging
- End-to-end cycle time
- Cost considerations

APPLICATION EXAMPLE – THE **RIGHT MATERIAL** CHOICE

Adhesive Fixture for Bonding Assembly

By leveraging LOCTITE 3D 3172 HDT High Impact and design optimization, it was possible to achieve the same functionality as previous designs with improved ergonomics while reducing material usage by 83%. Lead time was also significantly reduced from 2 weeks to just 5 hours production time with a 50% cost reduction.

- Utilizing existing DLP printer to create a medium sized part with high surface finish and precision

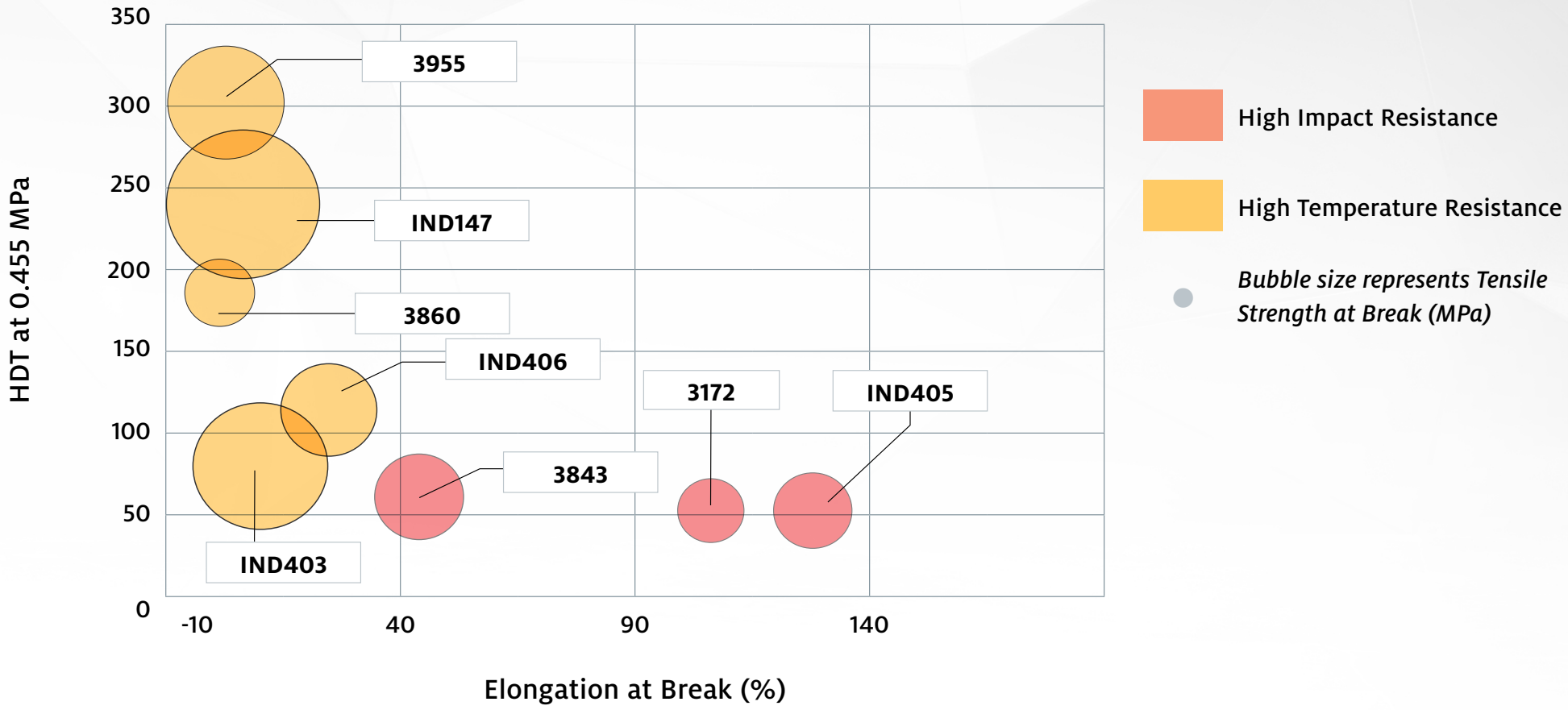
- Current design used heavy aluminum part with long lead times
- Fixture required for adhesive bonding in assembly line
- Parts used at room temperature and managed directly by operators
- High stiffness and impact resistance needed

- Parts need to be durable and delivered quickly with a competitive costs when compared to aluminum milling
- No FST or medical approval needed

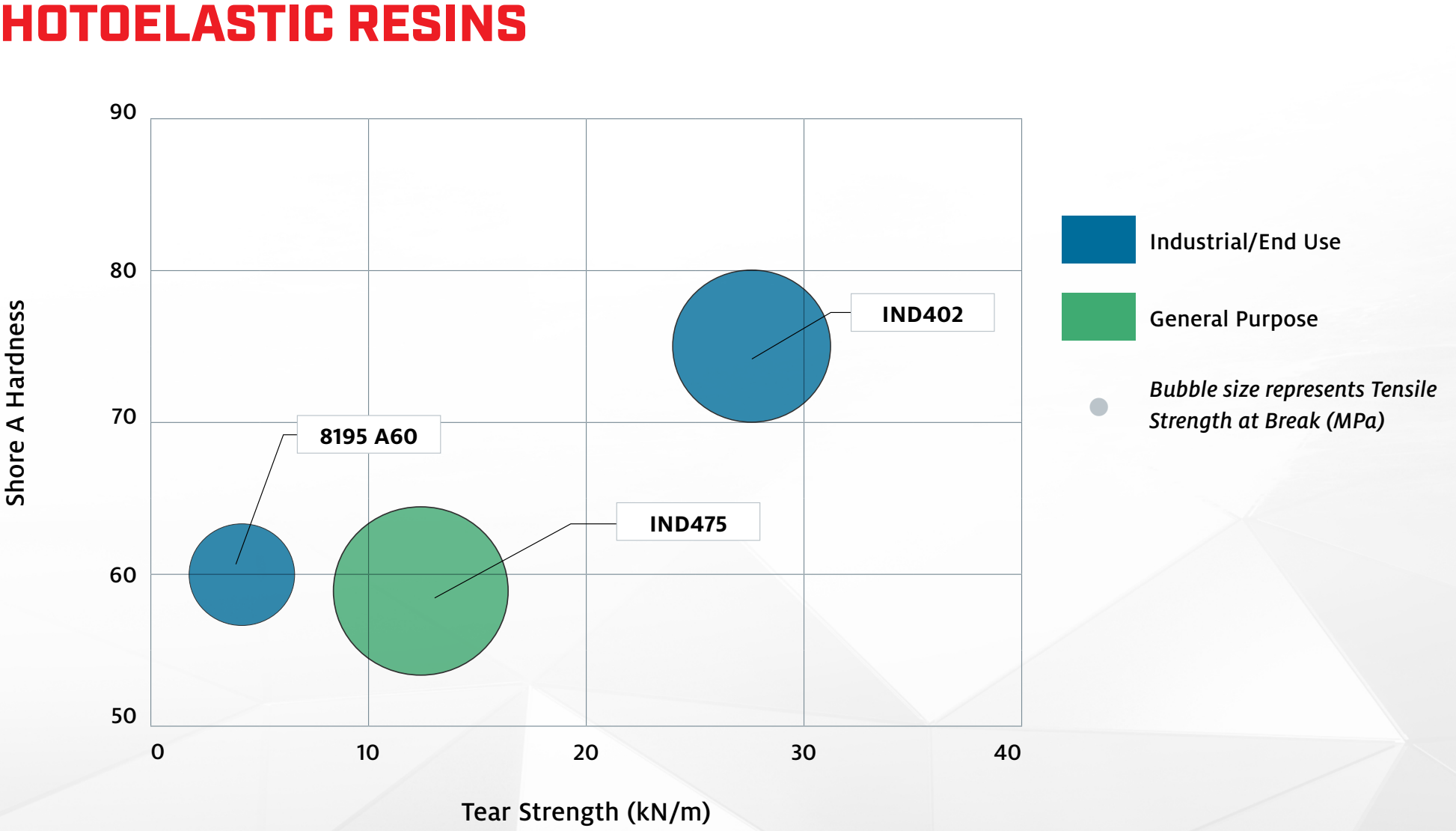
A BROAD RANGE OF MATERIALS TO MEET YOUR INDUSTRIAL REQUIREMENTS ACROSS MULTIPLE APPLICATIONS

LEARN MORE ABOUT LOCTITE ENGINEERING RESINS, CUSTOMIZED FOR DLP PRODUCTION PROCESSES

PHOTOPLASTIC RESINS



PHOTOELASTIC RESINS



LOCTITE 3DP Product Overview

		PHOTOPLASTIC						
	ASTM	High Impact Resins						
Product		**3172**		**3843**			**IND405[3]**	
Colour		Gray*	Clear	Matte Black*	White	Clear	Black*	Clear
Packaging	1 kg bottle, 5 kg jerry can, *metal can	1 kg	1 kg	1 kg, 5 kg	1 kg, 5 kg	1 kg, 5 kg	1 kg, 5 kg	1 kg, 5 kg
HDT at 0.455 (MPa) in °C	ASTM D648	51	40	63	60	63	53	53
Tensile Stress at Break (MPa)	ASTM D638 (D412[5])	39	38	51	49	44	45	52
Elongation at Break (%)	ASTM D638 (D412[5])	105	141	43	48	41	101	127
Young's Modulus (MPa)	ASTM D638	1,494	1,245	1,806	1,720	1,752	1,434	1,378
Flexular Modulus (MPa)	ASTM D790	1,150	1,022	1,783	1,673	1,878	1,181	1,500
IZOD Impact (Noched, J/M)	ASTM D256	73	43	53	58	65	51	72
Shore Hardness	ASTM D2240	63 D	70 D	74 D	70 D	68 D	80 D	79 D

		PHOTOPLASTIC					PHOTOELASTIC		
	ASTM	High Temperature Resistant Resins					Elastomeric Resins		
Product		**3860**	**3955**	**IND147[3]**	**IND403[3]**	**IND406**	**8195**	**IND402[3]**	**IND475**
Colour		Black	Black	Black	Black	Black	Gray*	Black, Gray	White, Black
Packaging	1 kg bottle, 5 kg jerry can, *metal can	1 kg	1 kg[6], 5 kg[6]	1 kg, 5 kg	1 kg, 5 kg	1 kg, 5 kg	1 kg, 5 kg	1 kg, 5 kg	1 kg
HDT at 0.455 (MPa) in °C	ASTM D648	185	>300	291	82	107	-	-	-
Tensile Stress at Break (MPa)	ASTM D638 (D412[5])	39	66	67	67	55	3	6	3.1
Elongation at Break (%)	ASTM D638 (D412[5])	2	2.1	2.4	10	25	65	230	201
Young's Modulus (MPa)	ASTM D638	3,500	3,556	3,190	2,572	1,610	4	42	1.1
Flexular Modulus (MPa)	ASTM D790	-	4,643	3,690	2,654	-	-	-	-
IZOD Impact (Noched, J/M)	ASTM D256	-	23	14.6	27	35	-	-	-
Shore Hardness	ASTM D2240	80 D	84 D	94 D	80 D	79D	60 A	73A	57A

[1] For further information please see TDS, contact Technical Service Centre or Customer Service Representative. The physical properties provided in this document are typical results of printed parts and are provided for reference purposes only. [2] All data after post-cure. [3] Preliminary test data. [4] HDT: Heat Deflection Temperature. [5] Test method: D412.
[6] Stored in metal cans. * Data shown reflects properties from resin highlighted with " * ", for additional information please refer to the respective TDS

High Impact Resins

TOUGH MATERIALS FOR FINAL PARTS PRODUCTION

Unique high impact resistant 3D printing materials for durable, functional and production parts.

IDEAL FOR

- Manufacturing aids
- Housings and coverings
- Jigs and fixtures
- Insoles

PROPERTIES

- Printable at room temperature
- Excellent performance and durability vs. other resins in the market
- Printable at high resolution
- Outstanding surface finishing

3172 HDT50 HIGH IMPACT

TOUGH & HIGH IMPACT MATERIAL

Resin that functional parts production that require high stiffness with a good surface finish and high impact resistance. Attributes are similar to Polypropylene (PP).

Benefits

- Tough & durable
- Superior impact strength
- Nice surface finish, machine-able

PROPERTY[1]	METHOD	
Colour	-	Gray*, Clear
HDT at 0.455 MPa	ASTM D648	51°C
Tensile Stress at Break (MPa)	ASTM D638	39
Elongation at Break (%)	ASTM D638	105
Young's Modulus (MPa)	ASTM D638	1,494
IZOD Impact (Noched, J/m)	ASTM D256	73

3843 HDT60 HIGH TOUGHNESS

HIGH STRENGTH, SEMI-FLEXIBLE RESIN

Semi-flexible resin with moderate temperature resistance HDT60, high impact strength, and versality for a broad range of applications. Ideal for a wide variety of tooling applications on the production floor.

Benefits

- Moderate heat resistance, HDT 60° C
- Tough with outstanding surface finish
- Superior strength and impact resistant

PROPERTY[1]	METHOD	
Colour	-	Matte Black*, White, Clear
HDT at 0.455 MPa	ASTM D648	63°C
Tensile Stress at Break (MPa)	ASTM D638	51
Elongation at Break (%)	ASTM D638	43
Young's Modulus (MPa)	ASTM D638	1,806
IZOD Impact (Noched, J/m)	ASTM D256	53
Shore Hardness (D)	ASTM D2240	74

[1] All data after post-cure in accordance with TDS.
[2] % value of visible light through a 3D printed object (standard 7.0 mm block).
For further information please see TDS, contact Technical Service Centre or Customer Service Representative.
The physical properties provided in this document are typical results of printed parts and are provided for reference purposes only.

High Impact Resins

TOUGH MATERIALS FOR FINAL PARTS PRODUCTION

Unique high impact resistant 3D printing materials for durable, functional and production parts.

Flame Retardant Resin

FST MATERIAL WITH UL94 V0 FLAMMABILITY

IND405 HDT50 HIGH ELONGATION

HIGH IMPACT, HIGH ELONGATION RESIN

Rigid, high elongation and high tough one-part material with excellent surface finish properties. Properties are comparable to an unfilled thermoplastic like Polypropylene (PP).

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)

3955 HDT280 FST*

FST MATERIAL WITH UL94 V0 FLAMMABILITY

First photopolymer with flame retardancy that passes vertical burn and aerospace FST standards .

Benefits

- Fire Safety Material
- Halogen Free
- Excellent flexural and tensile physical properties
- UL94 V-0 flammability
- FST (AITM2-0002, AITM2-0007, AITM3-0005)

PROPERTY[1]	METHOD	
Colour	-	Black*, Clear
HDT at 0.455 MPa	ASTM D648	53°C
Tensile Stress at Break (MPa)	ASTM D638	45
Elongation at Break (%)	ASTM D638	101
Young's Modulus (MPa)	ASTM D638	1,434
IZOD Impact (Noched, J/m)	ASTM D256	51

PROPERTY[1]	METHOD	
Colour	-	Black
HDT at 0.455 Mpa	ASTM D648	>300
Tensile Stress at Break (MPa)	ASTM D638	65
Elongation at Break (%)	ASTM D638	2
Young's Modulus (MPa)	ASTM D638	3,556
Flexural Modulus (MPa)	ASTM D790	4,643
Shore Hardness (D)	ASTM D2240	84

[1] All data after post-cure in accordance with TDS.
[2] % value of visible light through a 3D printed object (standard 7.0 mm block).
For further information please see TDS, contact Technical Service Centre or Customer Service Representative.
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High Temperature Resistant Resins

TEMPERATURE RESISTANT MATERIALS FOR FINAL PARTS PRODUCTION

Unique 3D printing materials for functional production parts that withstands high temperature requirements.

IDEAL FOR

- Functional prototyping
- Encapsulation
- Mounts and housings
- HVAC Components
- Clips and Plugs for Control Systems/Cabinets
- Connectors, Electronic Housings

PROPERTIES

- Printable at room temperature
- Outstanding performance and durability vs. other resins in the market
- Easy to print at high resolution

3860 HDT180 HIGH TEMPERATURE

RIGID RESIN WITH HIGH TEMPERATURE RESISTANCE

Rigid resin that withstands high temperature stress and it is ideal for applications where high resolution and high HDT is required.

Benefits

- No deformation, more durable
- Survives longer to temperature stress
- Easy to print with high print resolution

PROPERTY[1]	METHOD	
Colour	-	Black
HDT at 0.455 MPa	ASTM D648	185°C
Tensile Stress at Break (MPa)	ASTM D638	39
Elongation at Break (%)	ASTM D638	2
Young's Modulus (MPa)	ASTM D638	3,500
Shore Hardness (D)	ASTM D2240	80

IND147 HDT230 HIGH HEAT

HIGH TEMPERATURE RESIN FOR TOOLING & MOLDING

Rigid resin designed for tooling and molding applications owing to its high stiffness and high temperature resistance withstanding up to 230°C

Benefits

- Good dimensional stability
- Good surface finish

PROPERTY[1]	METHOD	
Colour	-	Black
HDT at 0.455 MPa	ASTM D648	291°C
Tensile Stress at Break (MPa)	ASTM D638	67
Elongation at Break (%)	ASTM D638	2.4
Young's Modulus (MPa)	ASTM D638	3,190
Flexural Modulus (MPa)	ASTM D790	3,690
Shore Hardness (D)	ASTM D2240	94

[1] All data after post-cure in accordance with TDS.
[2] % value of visible light through a 3D printed object (standard 7.0 mm block).
For further information please see TDS, contact Technical Service Centre or Customer Service Representative.
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High Temperature Resistant Resins

TEMPERATURE RESISTANT MATERIALS FOR FINAL PARTS PRODUCTION

Unique 3D printing materials for functional production parts that withstands high temperature requirements.

IND403 HDT80 HIGH MODULUS

HIGH MODULUS TOUGH RESIN FOR TOOLING

Rigid resin ideal for tooling and end use parts up to 80°C service temperature. Great dimensional accuracy and printability at high resolution.

Benefits

- High heat deflection temperature, HDT 80 °C
- Tough with good dimensional stability
- Good surface finish

PROPERTY[1]	METHOD	
Colour	-	Black
HDT at 0.455 MPa	ASTM D648	82°C
Tensile Stress at Break (MPa)	ASTM D638	67
Elongation at Break (%)	ASTM D638	10
Young's Modulus (MPa)	ASTM D638	2,572
IZOD Impact (Noched, J/m)	ASTM D256	27

IND406 HDT100 HIGH ELONGATION

OUR TOUGHEST HIGH TEMPERATURE RESIN

Tough resin designed for interior applications in Automotive, due to its high surface quality, dimensional accuracy and temperature resistance.

Benefits

- High heat deflection temperature, HDT >100 °C
- Tough and durable
- Good surface finish

PROPERTY[1]	METHOD	
Colour	-	Black
HDT at 0.455 MPa	ASTM D648	107°C
Tensile Stress at Break (MPa)	ASTM D638	55
Elongation at Break (%)	ASTM D638	25
Young's Modulus (MPa)	ASTM D638	1,610
IZOD Impact (Noched, J/m)	ASTM D256	35
Shore Hardness (D)	ASTM D2240	79

[1] All data after post-cure in accordance with TDS.

Elastomeric Resins

ELASTOMERIC MATERIALS FOR FUNCTIONAL PROTOTYPING AND FINAL PARTS PRODUCTION

Unique 3D printing materials for durable, functional, production parts with elastomeric behavior.

IND475 A60 HIGH REBOUND

EASY TO PRINT

An industrial strength UV resin that cures to a soft, elastomeric material. IND475 is suitable for applications where resilience, snap back, and tear resistance is desired, such as lattice structures and functional prototyping. This single component resin is easy to print of a variety of platforms, making it a superior material for elastomeric applications.

Benefits

- True elastomeric behavior
- Fast Printing with low shrinkage behavior
- High resilience / High energy return
- Exceptional durability compression forces

PROPERTY[1]	METHOD	
Colour	-	White, Black
Tensile Stress at Break (MPa)	ASTM D638	3.1
Elongation at Break (%)	ASTM D638	201
Young's Modulus (MPa)	ASTM D638	1.1
Shore Hardness (A)	ASTM D2240	57

IND402 A70 HIGH REBOUND

HIGH REBOUND ELASTOMERS

Single component elastomer material with high elongation and high resilience, excellent tensile strength and high energy return while also not requiring thermal post processing.

Benefits

- True elastomeric behavior
- Excellent interlayer adhesion
- Good rebound performance

PROPERTY[1]	METHOD	
Colour	-	Black
Tensile Stress at Break (MPa)	ASTM D638	6
Elongation at Break (%)	ASTM D638	230
Young's Modulus (MPa)	ASTM D638	42
Energy Return (J/m)	Internal method	33
Shore Hardness (A)	ASTM D2240	76

[1] All data after post-cure in accordance with TDS.

Elastomeric Resins

ELASTOMERIC MATERIALS FOR FUNCTIONAL PROTOTYPING AND FINAL PARTS PRODUCTION

Unique 3D printing materials for durable, functional, production parts with elastomeric behavior.

IDEAL FOR

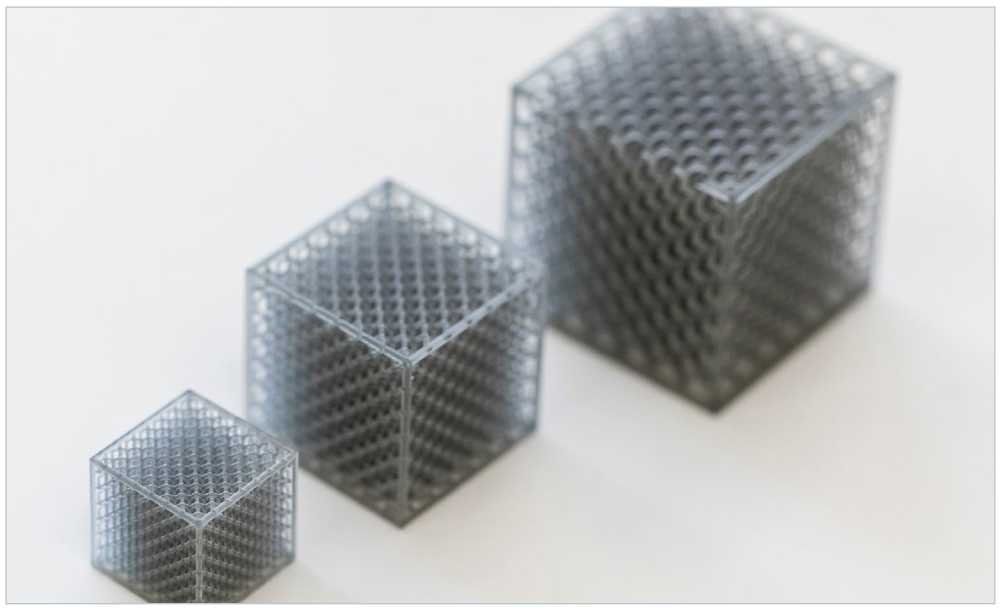
- Gaskets
- Seal prototyping
- Anatomical models
- Consumer products
- Tube's prototyping
- Gaskets, seals prototyping
- Lattice structures for sportswear

PROPERTIES

- Printable at room temperature
- True elastomeric behavior
- Stable -20 to +100°C
- Good interlayer adhesion with low shrinkage
- Outstanding performance and durability

8195 A60 HIGH REBOUND

FLEXIBLE & EASY TO PRINT



One-part elastomeric material formulated to have firm compression properties with quick rebound performance to match soft rubber like materials. Flexibility, high resilience and good energy return make this material ideal for gasketing, sealing and anatomical model type applications.

Benefits

- Excellent surface finish
- Fast printing
- High resilience & energy return

PROPERTY[1]	METHOD	
Colour	-	Gray
Tensile Stress at Break (MPa)	ASTM D638	3
Elongation at Break (%)	ASTM D638	65
Young's Modulus (MPa)	ASTM D638	3.5
Shore Hardness (A)	ASTM D2240	60

[1] All data after post-cure in accordance with TDS.
[2] % value of visible light through a 3D printed object (standard 7.0 mm block).
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SUMMARY

- Every application has its own unique requirements, and we are here to support your journey towards additive manufacturing at industrial scale
- LOCTITE offers you a broad material portfolio of general purpose, high impact, high temperature resistant and elastomeric resins for a broad range of leading DLP systems
- We work with industry leaders and equipment manufacturers to ensure our materials are validated within a qualified industrial workflow
- LOCTITE materials allow you to produce functional, repeatable and reliable parts

Value for You

Technology Experts

We are the photopolymer technology experts

Promise of LOCTITE Branding

We leverage decades of industrial experience of solving real manufacturing challenges, across markets

Trusted Eco-System Partners

We work with ecosystem partners like service bureaus, OEM printer partner and experts in post processing to ensure production of functional, repeatable and reliable parts

Validation

Unlocking Customer Readiness with validated

- Workflows
- Materials properties/ customization
- Parts design
- Quality management system

Test your application with our materials.

Contact our engineers to get support:
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Learn more about our application cases.
Visit LoctiteAM.com

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