

# Technical Data

**Thermoset polyurethanes  
with engineering-grade  
mechanical properties**

# Real materials

## Regular thermoset polyurethanes, made for industrial 3D printing.

Our polyurethanes have the same three-dimensional strength and compression set as injection-molded parts. They can be flexed, stretched, twisted and squeezed over and over – just like standard polyurethanes. The only difference is printability.

### The materials you know and trust

We offer polyurethanes with Shore A 50 to 90 and Shore D 65. In this guide you will find technical data sheets for our full portfolio.

Looking for something else? We can work with you to develop new grades or make your existing materials printable.

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✉ Email [info@c3dm.com](mailto:info@c3dm.com) for samples or questions.

### OUR MATERIALS AT A GLANCE

	ChromaFlow™ 50	ChromaFlow™ 70	ChromaFlow™ 90	ChromaLast™ 65	ChromaMotive™ 70	ChromaMotive™ D65
<b>Tensile Strength (XY)</b>	3.3 MPa / 484 psi	8.5 MPa / 1230 psi	18.4 MPa / 2662 psi	20.4 MPa / 2958 psi	21 MPa / 3052 psi	40.4 MPa / 5859 psi
<b>Tensile Strength (Z)</b>	3.1 MPa / 444	8.05 MPa / 1167 psi	14.8 MPa / 2149 psi	17.6 MPa / 2552 psi	19.4 MPa / 2807 psi	To be determined
<b>Elongation at Break (XY)</b>	569%	577%	391%	835%	940%	244%
<b>Elongation at Break (Z)</b>	441%	436%	250%	839%	706%	To be determined
<b>Modulus at 100% Strain (XY)</b>	1 MPa / 138 psi	2.3 MPa / 341 psi	8.5 MPa / 1235 psi	1.6 MPa / 232 psi	2.6 MPa / 375 psi	20.8 MPa / 2017 psi
<b>Modulus at 100% Strain (Z)</b>	1 MPa / 150 psi	2.6 MPa / 373 psi	8.6 MPa / 251 psi	1.4 MPa / 204 psi	3.0 MPa / 433 psi	To be determined
<b>Hardness</b>	Shore A 50	Shore A 74	Shore A 94	Shore A 63	Shore A 75	Shore D 65

# ChromaFlow™ 50

## Highly flexible polyurethane for additive manufacturing

ChromaFlow™ 50 is a medium-strong, highly flexible material with medium crosslinking. It was designed for oil-resistant applications of all types at low temperatures. It is well suited for seals and gaskets for automotive, marine, aircraft and off-road equipment.

### FEATURES

- Smooth parts without post processing
- Isotropic tensile properties (Z properties are 77-109% of XY properties)
- Easy color matching
- Fast elastic rebound

PROPERTY	MEAN	STD. DEVIATION	UNIT	STANDARD
Tensile Strength (XY)	3.3 (484)	0.3 (38)	MPa (psi)	ASTM 648
Tensile Strength (Z)	3.1 (444)	0.1 (13)	MPa (psi)	ASTM 648
Elongation at Break (XY)	569	57	%	ASTM 648
Elongation at Break (Z)	441	17	%	ASTM 648
Modulus at 100% Strain (XY)	1 (138)	0.1 (12)	MPa (psi)	ASTM 648
Modulus at 100% Strain (Z)	1 (150)	0.1 (9)	MPa (psi)	ASTM 648
Hardness	50	+/-5	Shore A	ASTM D2240

### PHYSICAL & THERMAL PROPERTIES

Cured Density	1.03 g/mL
Temperature Range	-40 to 110° C
Maximum Temperature (Short-Term)	125 / 10° C/min

### CHEMICAL PROPERTIES

Flame Retardancy	Slow Burning
Resistance to Oil	Very Good
Water Absorption	Low
Adhesion to Metals	Very Good
Adhesion to Fabrics	Very Good
Adhesion to Plastics	Good to Fair

### CHROMAFLOW™ RESINS

ChromaFlow™ resins are flexible, colored, translucent or opaque polyurethane resins available with a wide range of properties including various Shore A and Shore D hardnesses.

These resins have been developed for 3D-printing applications that require specific flow and viscosity parameters in order to work with Chromatic's RX-AM™ platform, a novel type of additive manufacturing that uses chemical reactions. RX-AM™ is suitable for a range of applications from automotive to textiles to industrial seals and gaskets.

To learn more about ChromaFlow, please contact us at [info@c3dm.com](mailto:info@c3dm.com).

# ChromaFlow™ 70

## Oil-resistant polyurethane for additive manufacturing

ChromaFlow™ 70 is a medium-strong, flexible polyurethane material with crosslinking. It was designed for oil-resistant applications of all types at low to medium temperatures. It is well suited for seals and gaskets as well as vibration damping applications, such as in engine mounts.

### FEATURES

- Smooth parts without post processing
- Isotropic tensile properties (Z properties are 64-101% of XY properties)
- Easy color matching
- Large parts without warping
- Solidly filled parts
- Gas-tight printing

PROPERTY	MEAN	STD. DEVIATION	UNIT	STANDARD
Tensile Strength (XY)	8.5 (1230)	1 (150)	MPa (psi)	ASTM 648
Tensile Strength (Z)	8.05 (1167)	0.8 (112)	MPa (psi)	ASTM 648
Elongation at Break (XY)	577	101	%	ASTM 648
Elongation at Break (Z)	436	49	%	ASTM 648
Modulus at 100% Strain (XY)	2.3 (341)	0.2 (25)	MPa (psi)	ASTM 648
Modulus at 100% Strain (Z)	2.6 (373)	0.1 (10)	MPa (psi)	ASTM 648
Hardness	74	+/-5	Shore A	ASTM D2240

### PHYSICAL & THERMAL PROPERTIES

Cured Density	1.1 g/mL
Temperature Range	-40 to 110° C
Maximum Temperature (Short-Term)	125 / 10° C/min

### CHEMICAL PROPERTIES

Flame Retardancy	Slow Burning
Resistance to Oil	Very Good
Water Absorption	Low
Adhesion to Metals	Very Good
Adhesion to Fabrics	Very Good
Adhesion to Plastics	Good to Fair

### CHROMAFLOW™ RESINS

ChromaFlow™ resins are flexible, colored, translucent or opaque polyurethane resins available with a wide range of properties including various Shore A and Shore D hardnesses.

These resins have been developed for 3D-printing applications that require specific flow and viscosity parameters in order to work with Chromatic's RX-AM™ platform, a novel type of additive manufacturing that uses chemical reactions. RX-AM™ is suitable for a range of applications from automotive to textiles to industrial seals and gaskets.

To learn more about ChromaFlow™, please contact us at [info@c3dm.com](mailto:info@c3dm.com).

# ChromaFlow™ 90

## Strong, rigid polyurethane for additive manufacturing

ChromaFlow™ 90 is a strong, rigid polyurethane with residual flexibility. It was designed for oil-resistant applications of all types at low to medium temperatures. It is well suited for seals and gaskets as well as vibration damping applications, such as engine mounts and for buffers and impact reduction.

### FEATURES

- Smooth parts without post processing
- Isotropic tensile properties (Z properties are 76-113% of XY properties)
- Easy color matching
- Large parts without warping
- Solidly filled parts
- Gas-tight printing

PROPERTY	MEAN	STD. DEVIATION	UNIT	STANDARD
Tensile Strength (XY)	18.4 (2662)	2.1 (299)	MPa (psi)	ASTM 648
Tensile Strength (Z)	14.8 (2149)	0.8 (109)	MPa (psi)	ASTM 648
Elongation at Break (XY)	391	47	%	ASTM 648
Elongation at Break (Z)	250	17	%	ASTM 648
Modulus at 100% Strain (XY)	8.5 (1235)	0.5(73)	MPa (psi)	ASTM 648
Modulus at 100% Strain (Z)	8.6 (1251)	0.2 (29)	MPa (psi)	ASTM 648
Hardness	94	+/-5	Shore A	ASTM D2240

### PHYSICAL & THERMAL PROPERTIES

Cured Density	1.12 g/mL
Temperature Range	-40 to 110° C
Maximum Temperature (Short-Term)	125 / 10° C/min

### CHEMICAL PROPERTIES

Flame Retardancy	Slow Burning
Resistance to Oil	Very Good
Water Absorption	Low
Adhesion to Metals	Very Good
Adhesion to Fabrics	Very Good
Adhesion to Plastics	Good to Fair

### CHROMAFLOW™ RESINS

ChromaFlow™ resins are flexible, colored, translucent or opaque polyurethane resins available with a wide range of properties including various Shore A and Shore D hardnesses.

These resins have been developed for 3D-printing applications that require specific flow and viscosity parameters in order to work with Chromatic's RX-AM™ platform, a novel type of additive manufacturing that uses chemical reactions. RX-AM™ is suitable for a range of applications from automotive to textiles to industrial seals and gaskets.

To learn more about ChromaFlow™, please contact us at [info@c3dm.com](mailto:info@c3dm.com).

# ChromaLast™ 65

## 3D-printable polyurethane for high temperature applications

ChromaLast™ 65 is a strong, flexible polyurethane material with a high degree of crosslinking. It was designed for high-temperature applications requiring high tensile strength and low compression set.

### FEATURES

- Low compression set
- Smooth parts without post processing
- Isotropic tensile properties (Z properties are 86-100% of XY properties)
- High tensile strength
- No warping during prints
- Solidly filled parts
- Seals tightly against gases and liquids

PROPERTY	MEAN	STD. DEVIATION	UNIT	STANDARD
Tensile Strength (XY)	20.4 (2958)	2.6 (383)	MPa (psi)	ASTM 648
Tensile Strength (Z)	17.6 (2552)	4.6 (669)	MPa (psi)	ASTM 648
Elongation at Break (XY)	835	110	%	ASTM 648
Elongation at Break (Z)	839	93	%	ASTM 648
Modulus at 100% Strain (XY)	1.6 (232)	0.1 (13)	MPa (psi)	ASTM 648
Modulus at 100% Strain (Z)	1.4 (204)	0.1 (14)	MPa (psi)	ASTM 648
Hardness	63	+/-5	Shore A	ASTM D2240

### COMPRESSION SET PROPERTIES

15% (70° C for 22 Hours, 34% Deflection)	35% (100° C for 22 Hours, 33% Deflection)
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### CHEMICAL PROPERTIES

Flame Retardancy	Slow Burning
Resistance to Compressor Oil	Very Good
Resistance to Mineral Oil	Very Good
Adhesion to Metals & Fabrics	Very Good

### CHROMALAST™ RESINS

ChromaLast™ resins are flexible, colored, translucent or opaque polyurethane resins. They have a very low compression set, making them suitable for applications with long-term static or dynamic load. They have been specifically developed for applications with our RX-AM™ platform. This unique system is being evaluated for applications ranging from rail and automotive to oil and gas to seals and gaskets. ChromaLast is available with a wide range of hardness.

To learn more about ChromaLast™, please contact us at [info@c3dm.com](mailto:info@c3dm.com).

# ChromaMotive™ 70

## Flexible 3D-printable polyurethane with high tensile strength

ChromaMotive™ 70 is a strong, flexible polyurethane material with a high degree of crosslinking. It was designed for medium-temperature applications requiring high tensile strength, such as rail applications. It has slow burning properties.

### FEATURES

- Smooth parts without post processing
- Isotropic tensile properties (Z properties are 75-115% of XY Properties)
- High tensile strength
- No warping during printing
- Seals tightly against gases and liquids
- Solidly filled parts

PROPERTY	MEAN	STD. DEVIATION	UNIT	STANDARD
Tensile Strength (XY)	21 (3052)	2.6 (373)	MPa (psi)	ASTM 648
Tensile Strength (Z)	19.4 (2807)	3.7 (536)	MPa (psi)	ASTM 648
Elongation at Break (XY)	940	57	%	ASTM 648
Elongation at Break (Z)	706	96	%	ASTM 648
Modulus at 100% Strain (XY)	2.6 (375)	0.1 (13)	MPa (psi)	ASTM 648
Modulus at 100% Strain (Z)	3.0 (433)	0.1 (14)	MPa (psi)	ASTM 648
Hardness	75	+/-5	Shore A	ASTM D2240
Tensile Set	21.6	Not applicable	%	ASTM 412
Tear Strength	17.2	Not applicable	kN/m	ISO 34

### PHYSICAL & THERMAL PROPERTIES

Cured Density	1.21 g/mL
Temperature Range	-40 to 125° C
Maximum Temperature (Short-Term)	150 / 10° C/min

### CHEMICAL PROPERTIES

Flame Retardancy	Slow Burning
Resistance to Compressor Oil	Very Good
Water Absorption	Low
Adhesion to Metals & Fabrics	Very Good

### CHROMAMOTIVE™ RESINS

ChromaMotive™ resins are flexible, colored, translucent or opaque polyurethane resins. They have been specifically developed for 3D-printing applications that require specific flow and viscosity parameters in order to work with the RX-AM™ platform. This unique system has been evaluated for applications ranging from automotive to textiles. ChromaMotive™ is available with a wide range of properties.

To learn more about ChromaMotive™, please contact us at [info@c3dm.com](mailto:info@c3dm.com).

# ChromaMotive™ D65

## Shore D thermoset polyurethane for additive manufacturing

ChromaMotive™ D65 is a rigid polyurethane with a high degree of crosslinking. It has high impact, hydrolysis and abrasion resistance. Designed for applications requiring a range of use temperatures, it exhibits very good low-temperature impact strength. This material is suitable for applications in automotive (e.g., bumpers and fenders), agricultural, marine, aerospace (e.g., aircraft interiors) and winter sporting equipment.

### FEATURES

- Smooth parts without post processing
- Isotropic tensile properties (Z properties are 75–115% of XY Properties)
- High tensile strength
- No warping during printing
- Seals tightly against gases and liquids
- Solidly filled parts

PROPERTY	MEAN	UNIT	STANDARD
Tensile Strength (XY)	40.4 (5859)	MPa (psi)	ASTM 648
Elongation at Break (XY)	244	%	ASTM 648
Modulus at 100% Strain (XY)	20.8 (2017)	MPa (psi)	ASTM 648
Tensile Modulus	74 (10733)	MPa (psi)	ASTM 648
Hardness	65	Shore D	ASTM D2240
Hardness after 24h at 100° C	66	Shore D	ASTM D2240
Notched Izod Impact 23° C	No Break	J/m	ASTM D256
Un-notched Izod Impact -30° C	1505	J/m	ASTM D256
Notched Izod Impact -30° C	198	J/m	ASTM D256
Notched Charpy Impact 23° C	Partial Break	kJ/m <sup>2</sup>	ISO 179
Un-notched Charpy Impact -30° C	No Break	kJ/m <sup>2</sup>	ISO 179
Notched Charpy Impact -30° C	8	kJ/m <sup>2</sup>	ISO 179
Flexural Strength	4.2	MPa	ASTM D790
Flex Modulus	99	MPa	ASTM D790

### CHROMAMOTIVE™ RESINS

ChromaMotive™ resins are flexible, colored, translucent or opaque polyurethane resins. They have been specifically developed for 3D-printing applications that require specific flow and reactivity to work with the RX-AM™ platform and Chromatic's RX-Flow™ printers.

To learn more about ChromaMotive, please contact us at [info@c3dm.com](mailto:info@c3dm.com).