SILASTIC™ 3D 3335 Liquid Silicone Rubber
Bringing the performance benefits of silicone elastomers to additive manufacturing

IMAGiN3D™ printing technology is an innovation platform created by Dow to give designers and manufacturers greater design freedom, help shorten product development cycles, and offer distinct performance benefits.

Breaking new ground
SILASTIC™ 3D 3335 Liquid Silicone Rubber (LSR) is a groundbreaking silicone material formulated specifically to combine the performance benefits of silicone rubber with the design and processing advantages of liquid additive manufacturing (LAM) 3D printing. 3D printing with SILASTIC™ 3D 3335 Liquid Silicone Rubber can help optimize your supply chain and eliminate the need for injection-molding machines and tooling. This LSR also can speed up the time to market for new articles in a manner that cannot be achieved through conventional technology.

In addition to providing new design options for automotive, consumer, industrial and other applications where traditional LSRs are used, SILASTIC™ 3D 3335 LSR is ideal for the preparation of functional silicone rubber prototypes with properties that are comparable to injection-molded components. Plus, it facilitates low-volume manufacturing as well as highly customized manufacturing of complex parts.

Tracking with the trends
Once used primarily for prototyping, 3D printing has entered the realm of production-scale manufacturing, where end users require both outstanding performance and color choices. SILASTIC™ 3D 3335 Liquid Silicone Rubber is transparent, which is ideal for applications where clarity and transparency are vital attributes. Through the use of compatible color packs and precision dosing equipment, designers also have the ability to 3D-print this high-performing LSR in a range of colors – all with the same base product. This helps to ensure that the final performance will be virtually the same, regardless of which color the designer chooses.

Key benefits
- Performance benefits of silicone elastomers
- Properties comparable to injection-molded components
- Transfers easily to injection-molding processes
- Expands design options
- Speeds time to market

Typical applications
- Fast prototyping
- Small manufacturing trials of complex parts
- Creation of customized parts and/or new designs
- Applications where typical LSRs are used
**Liquid additive manufacturing with SILASTIC™ 3D 3335 Liquid Silicone Rubber**

SILASTIC™ 3D 3335 LSR is a two-part (1:1 mix ratio) platinum-catalyzed, thermoset liquid silicone rubber designed specifically for 3D printing. The material is supplied in a cartridge system; however, pails also are available. Individual color packs, available in a range of standard colors, are sold separately.

**Dispensing**

The LSR is layered, one bead at a time in X/Y dimensions, while the 3D printing table moves in the Z dimension. Pressure is adjusted automatically by an upstream pressure regulator. The use of different dosing nozzles enables you to process both fine and large objects.

Printing in color requires the addition of a precision color-dosing system that is suitable for use with LAM printers. This ensures consistent printing of high-quality colored parts.

**Cure**

Near-instantaneous curing is achieved through an integrated heat source that moves over one or several layers of printed SILASTIC™ 3D 3335 LSR. Layer-to-layer adhesion is strong, and z-dimension properties are similar to x- and y-dimension properties. The travel speed of the heating source (IR-lamp) is tuned to the size of the object being produced, and the thermal crosslinking greatly reduces printing time.

---

**Figure 1. 3D printing processes and methods**

3D Printing

- **PROCESSSES**
  - Solidifying
  - Lamination
  - Additive

**METHODS**

- Stereolithography (SLA)
- Digital Light Processing (DLP)
- Selective Laser Sintering (SLS)
- Selective Laser Melting (SLM)
- Electron Beam Melting (EBM)
- Laminated Object Manufacturing (LOM)
- Fused Deposition Modeling (FDM)

**Liquid Additive Manufacturing (LAM)**
Property and performance test results

RDAbbott Laboratory conducted a series of tests to study 3D-printed LSR versus injection-molding LSR.

In these tests, the properties and performance of ASTM slabs and buttons of 3D-printed SILASTIC™ 3D 3335 LSR and a standard 50 Shore A injection-molding LSR were compared.

Test results showed that the properties and performance of 3D-printed SILASTIC™ 3D 3335 LSR components were comparable to those of the standard injection-molding LSR. This suggests that SILASTIC™ 3D 3335 LSR can be used to 3D-print high-performance prototypes that can be used to validate fit, form and function, significantly reducing the concept/design/testing cycle and speeding product commercialization.

Figure 2. Typical properties

Typical properties of 3D-printed SILASTIC™ 3D 3335 LSR and standard injection-molding LSR – not to be construed as specifications.
Typical properties of 3D-printed SILASTIC™ 3D 3335 LSR

- Hardness: ~50 Shore A
- Tensile strength: ~8.3 MPa
- Elongation: ~25%
- Tear strength up to ~51 N/m
- Compression set to ~25% (70 hr at 175°C)
- Temperature range from -60°C to +200°C
- Volume resistivity ~1 x 10E14 to 16 (insulating)
- Hydrophobicity (water resistance)
- Ozone and UV resistance
- High clarity (water clear)

Specification Writers: These values are not intended for use in preparing specifications. Please contact your local Dow Sales Application Engineer or Dow Customer Service before writing specifications on this product.

More than materials

When you specify SILASTIC™ silicone elastomers by Dow, you not only receive successful, high-performance materials that have earned the trust of product designers and rubber fabricators worldwide; you also receive the benefit of our compounding expertise and technical and product development support.

For more information

For technical information or product samples, or to connect with one of our silicone elastomer specialists, visit dow.com/consumer3Dprint.