Technical Data Sheet

# SILASTIC™ RBL-9694-30P Liquid Silicone Rubber

Two-part silicone elastomer for integrated compression seals

## Features & Benefits

- Two-part addition cure silicone elastomer
- Hardness suitable for sealing applications under medium clamping loads
- Non-sag nature yields accurate, uniform gasket beads of precise dimensions as defined by robot application parameters
- User-friendly, easy to handle 1:1 mix ratio
- Fast cure at elevated temperatures, no post-curing
- Low compression set
- Good adhesion to many substrates
- Long term stability over a wide temperature range (-50ºC to 200ºC)
- Does not require solvents, CFCs or other environmentally harmful materials for processing

## Applications

- SILASTIC™ RBL-9694-30P Liquid Silicone Rubber is designed to be dispensed and cured directly on automotive and other industrial components to form integrated gaskets.
- Typical applications include gaskets for components which require medium clamping forces, e.g. intake systems, front covers and throttle valves.

## Typical Properties

Specification Writers: These values are not intended for use in preparing specifications.

| CTM[1] | ASTM[2] | Property | Unit | Result | |
|---|---|---|---|---|---|
| | | As supplied | | Part A | Part B |
| 0176 | | Consistency | | Pumpable paste | Pumpable paste |
| 0063 | | Color | | Black | White |
| 0364 | MIL-S 8802D | Extrusion rate[3] | g/minute | 75 | 178 |
| 0090A | D56 | Flash point - closed cup | °C | > 100 | > 100 |
| | | As mixed 1:1 ratio | | | |
| 0063 | | Color | | Grey | |
| 0097 | D1298 | Specific gravity | | 1.20 | |
| 1059 | D5289 | Cure time T90% (115°C) | s | 46 | 92 |

1. CTM: Corporate Test Method, copies of CTMs are available on request
2. ASTM: American Society for Testing and Materials
3. Extrusion rate: 3.2 mm nozzle at 0.63MPa

## Typical Properties (Cont.)

| CTM | ASTM | Property | Unit | Result | |
|---|---|---|---|---|---|
| | | As cured (5 minutes 150°C) - Physical Properties | | Part A | Part B |
| 0099 | D2240 | Durometer hardness, Shore A | | 32 | |
| 0137 | D412C | Tensile strength, Die C | MPa | 7.2 | |
| 0137 | D412C | Elongation at break | % | 820 | |
| 0137 | D412C | Modulus 100% | MPa | 0.80 | |
| 0159 | D624B | Tear strength, Die B | kN/m | 14 | |
| 0085 | D395B | Compression set, -25% Compression for 22 hours at 177°C | % | 31 | |
| 0243 | D816 | Lap Shear Adhesion (10 minutes 150°C) on Aluminum | MPa | 1.0 | |
| | | As supplied | | | |
| | | on PA 66 GF 30 | MPa | 1.6 | |
| | | on Vinyl Ester | MPa | 1.2 | |

## Description

SILASTIC RBL-9694-30P Liquid Silicone Rubber is a two component heat-cure silicone elastomer, designed to be easily mixed and dispensed via meter-mix equipment. It is cured directly on automotive and other industrial components to form an integrated, high strength compression seal. It is resistant to many industrial fluids (e.g. engine oils, water/glycol mixtures) over a broad temperature range with the exception of fuels and non-polar solvents.

## The Cured-In-Place-Gasket Concept (CIPG)

The 'Cured-in-Place-Gasket' concept made possible with SILASTIC RBL-9694-30P Liquid Silicone Rubber Elastomer provides a successful alternative to traditional gasketing methods using manually installed preformed rubber gaskets. This approach provides greater design flexibility as the robotically applied liquid silicone beads can easily follow complex surface geometries.

Additionally, changes in part design can be rapidly accommodated by reprogramming the dispensing system. The extruding seals are applied and positioned with excellent reproducibility time after time, ensuring good sealing performance. Equally important, the sealing/curing process lends itself ideally to a continuous, fully automated operation thus providing meaningful savings on the costs associated with manual gasket installation.

## How To Use

### Substrate Preparation

SILASTIC RBL-9694-30P Liquid Silicone Rubber adheres to many metallic and plastic substrates (normally without using primer). This feature ensures the cured gaskets will not be displaced during packaging or handling of the sealed component. Regardless of the substrate, the sealing surfaces should be clean and free of dirt, oils, and release agents to ensure good adhesion. In most instances washing with water based industrial detergents will remove these contaminants. Some substrates however will require additional treatment to achieve good adhesion. This could mean plasma, corona, flame treatment or chemical priming.

### Processing

SILASTIC RBL-9694-30P Liquid Silicone Rubber is optimally mixed, dispensed and applied to the components to be sealed using a fully automated and integrated process.

## How To Use (Cont.)

### Metering/Mixing

The mixing step is successfully carried out with commercially available two component meter-mix pumps designed to work on a 1:1 weight ratio. The A and B components are pumped from pails or drums using follower-plate mounted piston pumps, then fed into smaller, precise gear or piston pumps where the actual metering takes place. The precisely metered A and B components are then mixed by means of standard multi-element static mixers. The working time of the A/B mixture at room temperature is about 4–6 hours and this eliminates the danger of blocking the mixer with cured product during normal production stops.

### Application

For automated bead application the mixing head is attached to a robotic arm or alternatively the wrist applicator of an XYZ table gantry. Typically the meter-mix equipment and the robot or XYZ table are fully integrated in a system which dispenses precisely metered volumes of uncured elastomer in a preprogrammed path onto the component to be sealed. The desired bead dimensions are achieved by a combination of parameters involving the pump throughput rate, the dispensing head diameter and tip speed, and the distance from tip to component surface.

The non-sag nature of SILASTIC RBL-9694-30P Liquid Silicone Rubber ensures that the dispensed bead dimensions remain unchanged after the bead is cured. The gasket bead size is a function of the sealing gap and the flange width.

### Curing

Curing and adhesion of SILASTIC RBL-9694-30P Liquid Silicone Rubber gasket beads are achieved by submitting the uncured elastomer to a temperature of 150°C for 6–8 minutes. In an automated process the components to be sealed will typically be mounted on a conveyor system and the bead applied by robot with a typical cycle time of 10 to 45 seconds per component (depending on size). The gasket beads are then cured by passing the sealed components through a heating tunnel.

The required cure time of 6–8 minutes is obtained by appropriate dimensioning of the tunnel length for a given conveyor speed. A particularly efficient way to transfer heat to the elastomer for effective curing, and to minimize heat dissipation in the mass of the component, is the use of focused infrared heating elements.

## Handling Precautions

PRODUCT SAFETY INFORMATION REQUIRED FOR SAFE USE IS NOT INCLUDED IN THIS DOCUMENT. BEFORE HANDLING, READ PRODUCT AND SAFETY DATA SHEETS AND CONTAINER LABELS FOR SAFE USE, PHYSICAL AND HEALTH HAZARD INFORMATION. THE SAFETY DATA SHEET IS AVAILABLE ON THE DOW WEBSITE AT WWW.CONSUMER.DOW.COM, OR FROM YOUR DOW SALES APPLICATION ENGINEER, OR DISTRIBUTOR, OR BY CALLING DOW CUSTOMER SERVICE.

## Useable Life And Storage

Product should be stored at or below 35°C (95°F) in original, unopened containers.

## Limitations

This product is neither tested nor represented as suitable for medical or pharmaceutical uses.

## Health And Environmental Information

To support customers in their product safety needs, Dow has an extensive Product Stewardship organization and a team of product safety and regulatory compliance specialists available in each area.

For further information, please see our website, www.consumer.dow.com or consult your local Dow representative.

## Heat Ageing And Fluid Immersion Resistance

| | | |
|---|---|---|
| As cured - Heat Aged | | |
| Hot air, 2016 hours at 150°C | | |
| Change in hardness | points | +5 |
| Change in tensile strength | % | -8 |
| Change in elongation | % | -28 |
| Change in modulus at 100% | % | +15 |
| Hot air, 1008 hours at 200°C | | |
| Change in hardness | points | +4 |
| Change in tensile strength | % | -19 |
| Change in elongation | % | -38 |
| Change in modulus at 100% | % | +46 |
| As cured - Fluid Immersion Resistance | | |
| BASF Glysantin®/Water 1:1, 1008 hours at 108°C | | |
| Change in hardness | points | 0 |
| Change in tensile strength | % | -14 |
| Change in elongation | % | -15 |
| Change in modulus at 100% | % | +12 |
| Volume swell | % | +1.6 |
| ASTM #1 Oil, 1008 hours at 150°C | | |
| Change in hardness | points | -7 |
| Change in tensile strength | % | -28 |
| Change in elongation | % | -32 |
| Change in modulus at 100% | % | +11 |
| Volume swell | % | +6 |
| Shell® TMO 10W-40, 1008 hours at 150°C | | |
| Change in hardness | points | -16 |
| Change in tensile strength | % | -63 |
| Change in elongation | % | -47 |
| Change in modulus at 100% | % | -27 |
| Volume swell | % | +25 |
| As cured - Compression Stress Relaxation[1] | | |
| Retention of the initial sealing force (initial value = 100%) | | |
| Hot air, 1008 hours at 150°C | | 58 |
| BASF Glysantin®/Water 1:1, 1008 hours at 105°C | | 58 |
| ASTM #1 oil, 1008 hours at 150°C | | 22 |
| ASTM #3 oil, 1008 hours at 150°C | | 8 |
| Wintershall Referenz 15W-40, 1008 hours at 150°C | | 11 |
| BP® Strato 10W-40, 1008 hours at 150°C | | 6 |

[1]According to DIN 53 537, punched rings with rectangular cross-section, test medium only inside

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Shell is a registered trademark of Shell Oil Corp.
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