Product Information

DOW CORNING

DOW CORNING® D94-20P

FEATURES

- Two-part addition cure silicone elastomer
- Hardness suitable for sealing applications under low 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

Two-part silicone elastomer for integrated compression seals

APPLICATIONS

- DOW CORNING D94-20P 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 low clamping forces, e.g. wiper modules, constant velocity joints and electronic devices.

TYPICAL PROPERTIES

Specification writers: These values are not intended for use in preparing specifications. Please contact your local Dow Corning sales representative prior to writing specifications on this product.

CTM*	ASTM*	Property	Unit	Value	
		As supplied		**Part A**	**Part B**
0176		Consistency		Pumpable paste	Pumpable paste
0063		Colour		Black	White
0364	MIL-S-8802D	Extrusion rate[1]	g/minute	119	282
0090A	D56	Flash point - closed cup	°C	>100	>100
		As mixed 1:1 ratio			
0063		Colour		Black	
0097	D1298	Specific gravity		1.17	
1059	D5289-92	Cure time T90% (115°C)	s	165	
		As cured (5 minutes 150°C) - Physical Properties			
0099	D2240	Durometer hardness, Shore A		21	
0137	D412C	Tensile strength, Die C	MPa	5.9	
0137	D412C	Elongation at break	%	925	
0137	D412C	Modulus 100%	MPa	0.39	
0159	D624B	Tear strength, Die B	kN/m	13	
0085	D395B	Compression set, -25% Compression for 22 hours at 132°C	%	36	
0243	D816	Lap Shear Adhesion (10 minutes 150°C) on Vinyl Ester	MPa	1.3	

1. Extrusion rate: 3.2mm nozzle at 0.63MPa.

* CTM: Corporate Test Method, copies of CTMs are available on request.
ASTM: American Society for Testing and Materials.

DESCRIPTION

DOW CORNING D94-20P 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 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 DOW CORNING D94-20P 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 accomodated 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

DOW CORNING D94-20P 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. Contact Dow Corning for more information.

Processing

DOW CORNING D94-20P is optimally mixed, dispensed and applied to the components to be sealed using a fully automated and integrated process.

Metering/Mixing

The mixing step is succesfully 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.
For information on suitable metering and mixing equipment, contact Dow Corning.

Application

For automated bead application the mixing head is attached to a robotic arm or alternatively the wrist applicator of an X-Y-Z table gantry. Typically the meter-mix equipment and the robot or X-Y-Z table are fully integrated in a system which dispenses precisely metered volumes of uncured elastomer in a pre-programmed 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 DOW CORNING D94-20P 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. Please consult Dow Corning for design recommendations.

Curing

Curing and adhesion of DOW CORNING D94-20P 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.

TECHNICAL SERVICES

For specific information and technical service relating to sealing technologies please refer to the Dow Corning Sealing & Gasketing Expertise Team located in Wiesbaden, Germany.

HANDLING PRECAUTIONS

PRODUCT SAFETY INFORMATION REQUIRED FOR SAFE USE IS NOT INCLUDED. 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 FROM YOUR LOCAL DOW CORNING SALES REPRESENTATIVE.

Part B is a possible skin sensitizer according to EU-Directive 88/379/EEC classification guidelines. The part B of DOW CORNING D94-20P can evolve hydrogen when in contact with hydroxy containing materials such as water, alcohols and others. Ensure that containers are properly closed after use in order to avoid contamination of the components.

USABLE LIFE AND STORAGE

When stored at or below 35°C in the original unopened containers, this product has a usable life of 12 months from the date of production.

PACKAGING

This product is available as kits in standard industrial container sizes

suitable for use in commercially available meter/mix equipment. For details please refer to your Dow Corning sales office.

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 Corning has an extensive Product Stewardship organization and a team of Health, Environment and Regulatory Affairs specialists available in each area.

For further information, please consult your local Dow Corning representative.

WARRANTY INFORMATION - PLEASE READ CAREFULLY

The information contained herein is offered in good faith and is believed to be accurate. However, because conditions and methods of use of our products are beyond our control, this information should not be used in substitution for customer's tests to ensure that Dow Corning's products are safe, effective, and fully satisfactory for the intended end use. Dow Corning's sole warranty is that the product will meet the Dow Corning sales specifications in effect at the time of shipment. Your exclusive remedy for breach of such warranty is limited to refund of purchase price or replacement of any product shown to be other than as warranted. Dow Corning specifically disclaims any other express or implied warranty of fitness for a particular purpose or merchantability. Unless Dow Corning provides you with a specific, duly signed endorsement of fitness for use, Dow Corning disclaims liability for any incidental or consequential damages. Suggestions of use shall not be taken as inducements to infringe any patent.

HEAT AGEING RESISTANCE

As cured - Heat Aged		
Hot air, 168 hours at 150°C		
Change in hardness	points	+11
Change in tensile strength	%	-3
Change in elongation	%	-4
Change in modulus at 100%	%	+8
Hot air, 2016 hours at 150°C		
Change in hardness	points	+13
Change in tensile strength	%	-9
Change in elongation	%	-38
Change in modulus at 100%	%	+10
Hot air, 168 hours at 200°C		
Change in Hardness	points	+15
Change in tensile strength	%	-16
Change in elongation	%	-44
Change in modulus at 100%	%	+85
Hot air, 2016 hours at 200°C		
Change in hardness	points	+12
Change in tensile strength	%	-55
Change in elongation	%	-68
Change in modulus at 100%	%	+135
As cured - Compression Stress Relaxation		
(according to DIN 53 537, punched rings with rectangular cross-section)		
Retention of the initial sealing force (initial value = 100%)		
Hot air, 1008 hours at 150°C	%	32

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