

Tufel* III Silicone Rubber 92006 Series

MARKETING BULLETIN

ELASTOMERS

Two component, low volatile, high resilience, biocompatible,⁽¹⁾ low compression set grades for extrusion

The products in this Tufel III rubber series are biocompatible⁽¹⁾ two-component silicone rubber compounds. Grades 92506 and 92656 are 50 and 65 durometer addition-curable silicone elastomers that offer low compression set and high resilience with no post bake required for most applications. The combination of these properties can help lengthen service life in highly mechanical applications. The Tufel III 92506 and 92656 elastomers can be considered for extruded and calendered parts with excellent permanent set resistance and for applications such as peristaltic pump tubing, gaskets and seals.

Key Features and Typical Benefits

- Low compression set
- Excellent elastic memory
- Biocompatible⁽¹⁾
- No post baking required for most applications
- Low volatile bases minimize porosity
- Peroxide-free cure system
- Broad processing window
- Can help enable high output rates
- Tight surface cure
- Non-blooming
- Translucency
- Low hysteresis

*Tufel is a trademark of Momentive Performance Materials Inc.

(1) Grades 92506 and 92656 have been tested in accordance with ISO 10993 and/or USP Class VI requirements.
List of testing can be provided upon request.

Potential Applications

Segment	Potential Applications
Healthcare	<ul style="list-style-type: none"> ▪ Fluid and drug delivery tubing <ul style="list-style-type: none"> ▪ Volumetric infusion pumps ▪ Enteral pumps ▪ Ambulatory pumps ▪ Hose/tubing used in pharmaceutical production ▪ Gaskets, seals and valves
Consumer Goods	<ul style="list-style-type: none"> ▪ Tubing used for dispensing of food and beverages ▪ Gaskets, seals and valves
General Industrial	<ul style="list-style-type: none"> ▪ Tubing used in chemical/industrial processing plants ▪ Tubing used in laboratory peristaltic pumps ▪ Gaskets, seals and valves

Typical Physical Properties of Uncured Tufel III Silicone Rubber - 92006 Series

Properties	92506	92656
Specific Gravity	1.12	1.16
Appearance	Translucent	Translucent
Polymer Classification (ASTM D-1418)	VMQ	VMQ
Williams Plasticity Range (ASTM D-926)	200-300	210-310

Typical Physical Properties of Tufel III Silicone Rubber - 92006 Series Catalyzed with 1.0 pphr of CA-6 per 99 pphr of base compound

ASTM Method	Press Cure - 10 minutes @ 177 °C (350 °F)	92506	92656
D-2240	Hardness, Durometer A	50	65
D-412	Tensile Strength, psi	1100	1300
	MPa	7.6	8.9
D-412	Elongation, %	450	350
D-624	Tear Resistance, Die B, ppi	100	120
	KN/m	17.5	21.0
D-412	100% Modulus, psi	200	375
	MPa	1.4	2.6
D-395	Compression Set, % 22 hrs. at 177 °C (350 °F)	30	31
D-2632	Bayshore Resilience	60	61
ASTM Method	Post Cure - 2 hrs at 177 °C (350 °F)	92506	92656
D-395	Compression Set, % 22 hrs. at 177 °C (350 °F)	15	14

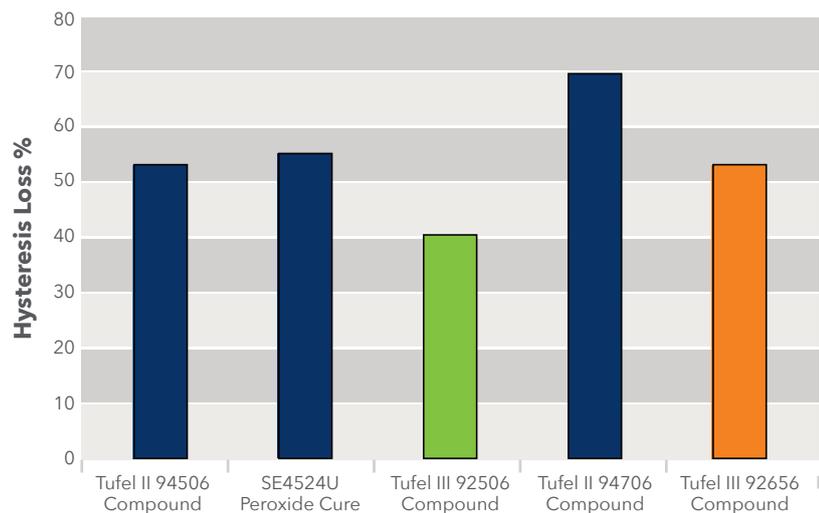
Typical properties are average data and are not to be used as or to develop specifications.

Test Performance Data

Mechanical Properties

Hysteresis

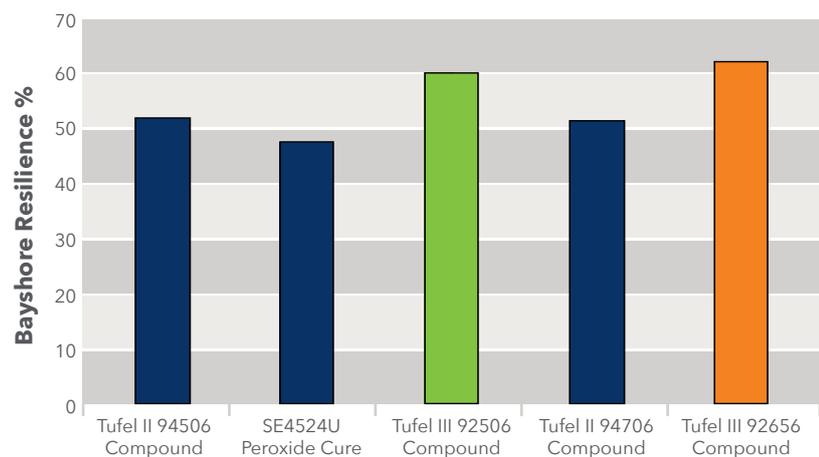
Hysteresis is a measure of the loss in elastic energy when an elastomer is dynamically deformed and then allowed to return to its original configuration. A common test consists of elongating a standard ASTM tensile dumbbell to 100% elongation and then allowing retraction to original gage position. The loss in mechanical energy is a measure of hysteresis when expressed as a percent. The chart below shows that Tufel III 92506 and 92656 silicone compounds had lower hysteresis loss when compared to conventional platinum and peroxide curable elastomers used in tubing applications. Lower hysteresis can reduce material fatigue over time in mechanically dynamic applications.



Samples press cured 10 minutes at 350 °F (177 °C).
 Note: Test data. Actual results may vary.

Resilience

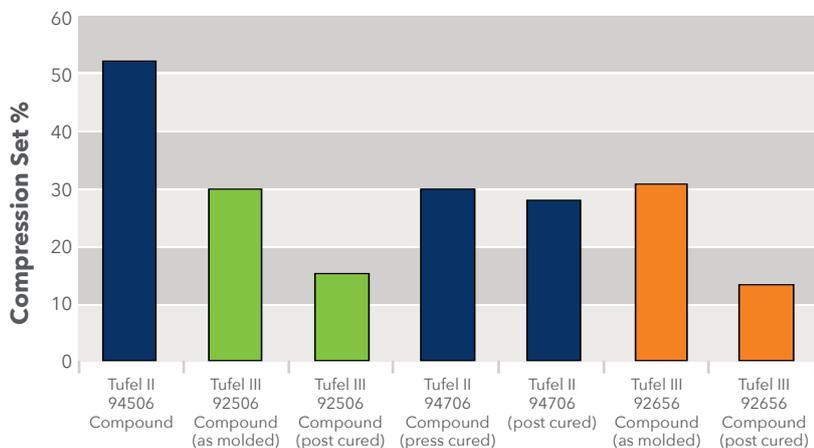
The Tufel III silicone rubbers also exhibited higher resiliency than conventional platinum and peroxide curable silicone elastomers. The chart below shows the enhanced bayshore resilience of the Tufel III 92506 and 92656 compounds.



Samples press cured 10 minutes at 350 °F (177 °C).
 Note: Test data. Actual results may vary.

Compression Set

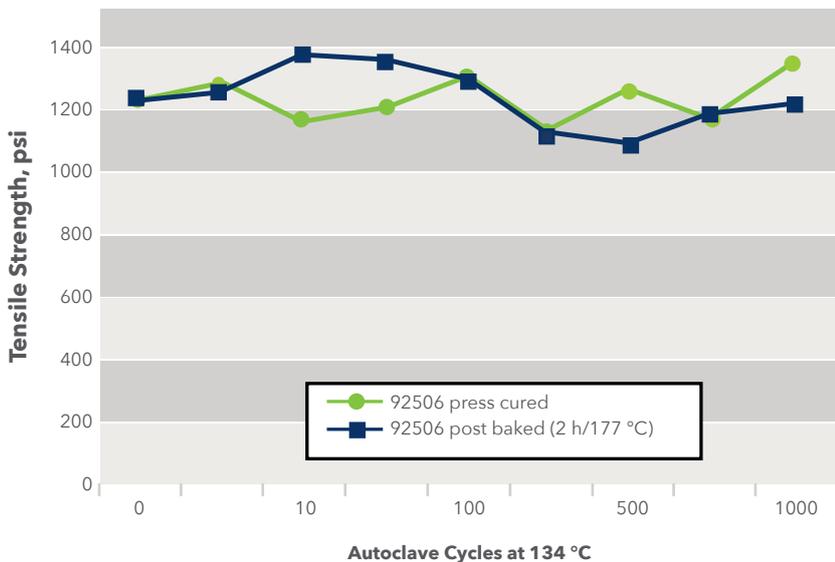
Tufel III 92506 and 92656 silicone rubber compounds offer low compression set properties without the need for a post cure. The chart below shows the reduction in compression set values when compared to traditional platinum catalyzed rubber. The compression set properties of the Tufel III elastomers can be further reduced by applying a post cure to the materials.



Samples press cured 10 minutes at 350 °F (177 °C); post cured 2 hours at 350 °F (177 °C).
 Note: Test data. Actual results may vary.

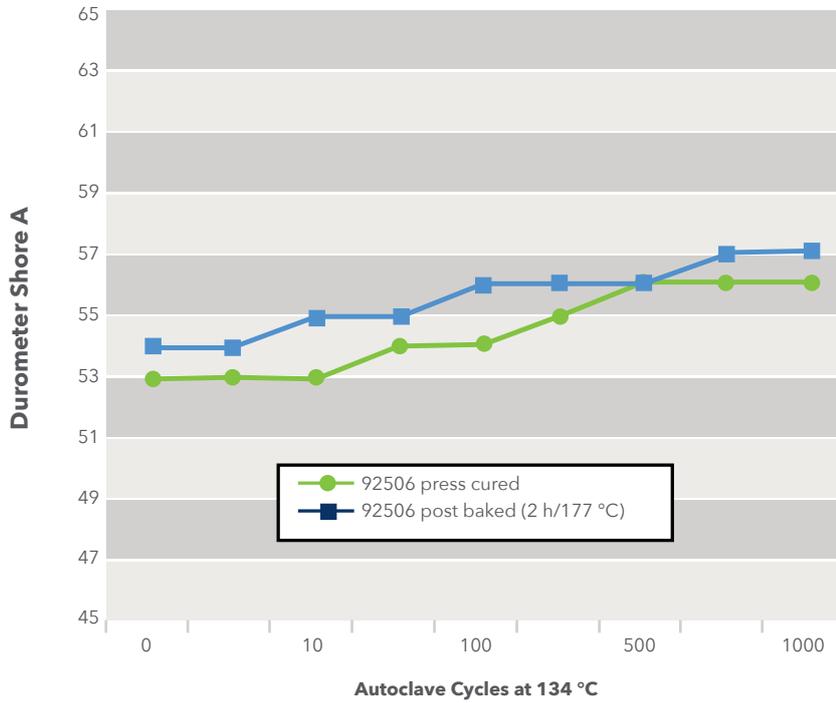
Autoclave Resistance

Tufel III 92506 and 92656 silicone rubber compounds may be considered for applications requiring repeat sterilization performance. The charts below and at right show the performance of Tufel III 92506 compound over exposure to 1000 autoclaving cycles.

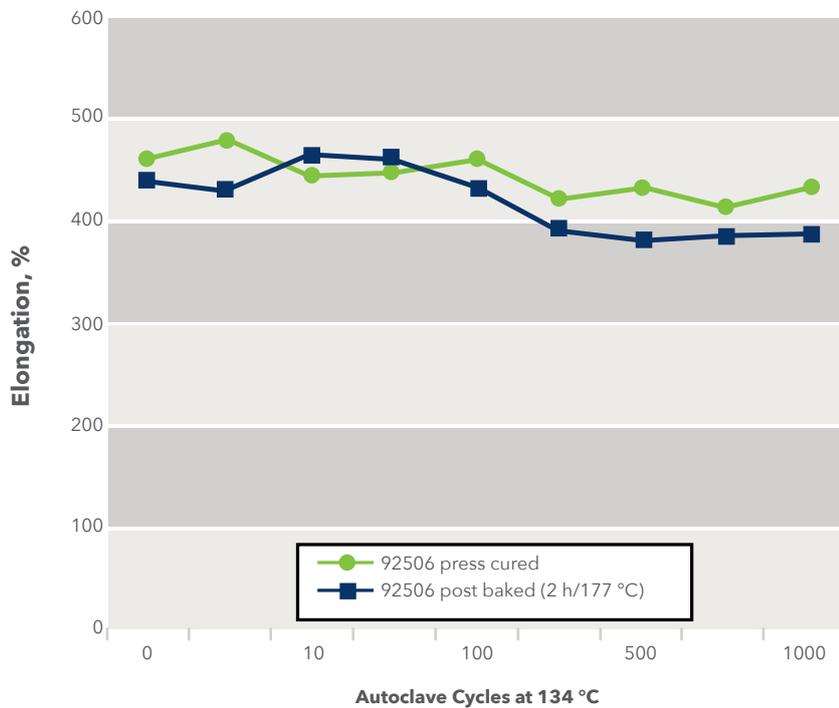


Note: Test data. Actual results may vary.

Autoclave Resistance (Continued)



Note: Test data. Actual results may vary.



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General Considerations for Use

Tufel III 92506 and 92656 compounds are two-component systems consisting of base rubber and CA-6 curing agent designed to be blended using a 99:1 ratio of base to catalyst.

The recommended mixing procedure is to pre-freshen the CA-6 on a cool, clean two roll mill and then remove from the mill. The base compound should then be freshened on the mill by itself, and the pre-freshened CA-6 then added to it. Cross-blending a minimum of eight times helps ensure a uniform mix.

Additional fillers, process aids and pigments can be added to the 92506 and 92656 grades but may cause cure variation or inhibition, so it is important to pre-evaluate any additive to ensure compatibility. Sulfur or amine containing additives will inhibit the cure, so it is essential to maintain an environment free from these materials when working with the 92506 and 92656 grades.

Curing Agent

The Tufel III 92506 and 92656 are packaged standard with CA-6 curing agent designed to yield rapid cure for extrusion applications. The 92506 and 92656 grades are also compatible with the Tufel multi-component cure system consisting of CA-7 catalyst and IN-7 inhibitor which offers additional flexibility for customizing the cure rate to suit particular application requirements.

To prevent premature crosslinking (scorching), the mill and compound should be kept below 25 °C (77 °F) during mixing. The rate of structure buildup is temperature dependent so that the mixed shelf life varies accordingly. Generally, at room temperature, one could expect 2 to 4 hours of mixed shelf life with CA-6 catalyst. Higher storage temperatures will shorten mixed shelf life, while lower storage temperatures (e.g. freezer storage) will extend mixed shelf life. If the product is mildly structured, it can usually be re-milled before final fabrication to reduce the degree of structure.

Compatibility

Food Contact

Tufel III products 92506 and 92656 are compositionally compliant with FDA 21 CFR 177.2600 - Rubber Articles intended for repeated use. The customer has the sole responsibility for determining that their product complies with all applicable FDA specifications and limitations and is fit for food contact use.

Biocompatibility

Representative samples of Tufel III products 92506 and 92656 have been tested in accordance to USP Class VI and/or ISO 10993 parts (5, 6, 10, and 11).

It is the responsibility of the customer to verify the compliance of the final fabricated product. Questions on the testing should be directed to the product regulatory department of Momentive Performance Materials.

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List of testing can be provided upon request.

Patent Status

Nothing contained herein shall be construed to imply the nonexistence of any relevant patents or to constitute the permission, inducement or recommendation to practice any invention covered by any patent, without authority from the owner of the patent.

Limitations

Customers must evaluate Momentive Performance Materials products and make their own determination as to fitness of use in their particular applications.

Product Safety, Handling and Storage

Customers should review the latest Safety Data Sheet (SDS) and label for product safety information, safe handling instructions, personal protective equipment if necessary, emergency service contact information, and any special storage conditions required for safety. Momentive Performance Materials (MPM) maintains an around-the-clock emergency service for its products. SDS are available at www.momentive.com or, upon request, from any MPM representative.

For product storage and handling procedures to maintain the product quality within our stated specifications, please review Certificates of Analysis, which are available in the Order Center. Use of other materials in conjunction with MPM products (for example, primers) may require additional precautions. Please review and follow the safety information provided by the manufacturer of such other materials.

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