



# TSE3331

## TSE3331

### Description

TSE3331 silicone rubber compound is a two component, heat curing liquid silicone for potting and encapsulation where flammability and/or thermal conductivity is of concern. It provides excellent flame retardant properties ( UL 94 V-0) and very stable dielectric properties over a broad range of operating temperatures. In addition, TSE3331 silicone rubber compound also offers superior thermal conductivity properties when compared to other conventional silicone encapsulants.

TSE3331 silicone rubber compound offers primerless adhesion to many different types of substrates and offers an extended catalyzed room temperature work life. It is supplied with curing agent in matched kits which are used at a convenient 1:1 ratio by weight.

### Key Features and Benefits

- Excellent flammability properties (UL 94 V-0 at 1.0mm / 0.040 inch)
- Excellent thermal conductivity properties
- Self-bonding, excellent adhesion to many substrates without the use of a primer
- Outstanding operating temperature performance (-55C to 200C / -67F to 392F)
- Solventless formulation for ease of handling
- No cure by-product / low shrinkage / non-exothermic allows for deep section application and use in enclosed assemblies
- Reversion resistant and hydrolytically stable
- Extended room temperature catalyzed work life
- Convenient 1:1 mix ratio for use with automated mixing and dispensing production operations

### Typical Physical Properties

Uncured Properties	TSE3331A	TSE3331B
Color	Dark Gray	White
Viscosity, cps	4100	3500

Uncured Properties(with curing agent added)	TSE3331(A:B mixed 1:1)
Color	Dark Gray
Consistency	Easily Pourable
Viscosity, cps	3500
Work Time (Pot Life), hours (at 25°C / 77°F)	8
Cured Properties(cured 1 hour at 120°C)	TSE3331(A:B mixed 1:1)
<b>MECHANICAL</b>	
Specific Gravity	1.51
Hardness, JIS A	60
Tensile Strength, kgf/cm <sup>2</sup> (psi)	30 (426)
Elongation, %	50
Tear Strength, kgf/cm (ppi)	3.4 (19)
Linear Shrinkage, %	1.2

<b>FLAMMABILITY</b>	
UL 94 Classification 1.00mm (0.040 in.)	V-0
<b>ELECTRICAL (1.9mm (0.075 in. thick))</b>	
Dielectric Strength, kV/mm (V/mil)	26 (661)
Dielectric Constant (60 Hz)	3.4
Dissipation Factor (60 Hz)	0.017
Volume Resistivity, ohm-cm	$2.0 \times 10^{14}$
<b>THERMAL</b>	
Useful Temperature Range, °C(°F)	-55 to 200(-67 to 392)
Thermal Conductivity gm• cal / (sec • cm <sup>2</sup> • °C/cm)	$1.5 \times 10^{-3}$
BTU / hr • ft <sup>2</sup> • °F/ft	0.37
W / m• °K	0.63

### FLAMMABILITY

TSE3331 silicone rubber compound is recognized by Underwriters Laboratories, Inc. under their Component Recognition Program (UL File Number E36952).

Underwriters Laboratories Inc. Standard 94 describes a vertical burning test to be performed under laboratory conditions. When tested by this procedure, TSE3331 silicone rubber compound has exhibited burning characteristics for a classification of UL94 as follows:

V-0 - in a minimum thickness of 1.00mm (0.040 inch) Refer to UL Standard 94 for details of test and classification limits.

Each potential user should determine for him/herself whether these test procedures are meaningful for his/her particular application and should run independent tests to determine whether TSE3331 silicone rubber compound is suitable for such an application.

The above test, claims, representations and descriptions regarding the flammability of TSE3331 silicone rubber compound are based on standard small scale laboratory tests and, as such, are not reliable for determining evaluating, predicting or describing the flammability or burning characteristics of TSE3331 silicone rubber compound under actual fire conditions, whether it is used alone or in combination with other products.

### Patent Status

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

### Product Safety, Handling and Storage

#### CAUTION

Uncured TSE3331B curing agent can generate flammable hydrogen gas upon contact with acidic, basic, or oxidizing materials. Such contact should be avoided.

The warranty period for the 25K container is 12 months from date of shipment from Momentive Performance Materials if stored in the original unopened containers at temperatures between 5C and 30C (41F and 86F). Warranty period for other container sizes may vary.

Customers should review the latest Material Safety Data Sheet (MSDS) and label for product safety information, safe handling instructions, personal protective equipment if necessary, and any special storage conditions required for safety. MSDS are available at [www.momentive.com](http://www.momentive.com) or, upon request, from any Momentive Performance Materials (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.

### Processing Recommendations

#### Compatibility

TSE3331 silicone rubber compound will cure in contact with most clean and dry surfaces. However, certain materials, such as butyl and chlorinated rubber, sulfur-containing materials, amines and certain metal soap-cure RTV silicone rubber compounds, can cause cure inhibition. Cure inhibition is characterized by

a gummy appearance of the silicone rubber compound at the interface between it and the substrate.

It is recommended that a sample patch test be performed with TSE3331 silicone rubber compound to determine if a barrier coating or other inhibition-preventing measures are necessary before using the material.

## Surface Preparation

The performance of any polymer system is highly dependent upon surface preparation. In order to maximize the properties of TSE3331 silicone rubber compound and minimize the potential for cure inhibition, all parts should be as clean and dry as possible prior to the application of the silicone rubber compound. Particular attention should be paid to those areas which will come in direct contact with the sealant during the curing process.

## Bonding

TSE3331 silicone rubber compound generally offers very good adhesion to a wide variety of substrate materials without the use of a primer. For best adhesion, surfaces to be bonded should be thoroughly clean and dry. If a solvent is used to clean the substrates prior to use, steps must be taken to ensure the solvent has completely evaporated prior to application of the silicone rubber compound.

For application substrates which require a primer, apply a uniform thin film of Momentive Performance Materials SS4155 silicone primer and allow the primer to air dry for one hour. Finally, apply catalyzed TSE3331 silicone rubber compound to the primed surface and cure as recommended. For more details on priming and adhesion, refer to Momentive performance materials data sheet on silicone primers (1873).

## Mixing

Since settling of filler occurs during storage, TSE3331A base compound and TSE3331B curing agent should be thoroughly stirred before mixing the two components together. TSE3331 silicone rubber compound is a two component product that needs to be thoroughly mixed at a ratio of 1:1 (A:B by weight) prior to application. To hand mix, select a clean mixing container 4-5 times larger than the volume of silicone rubber compound to be used. Weigh out equal amounts of the A & B components. With clean tools, thoroughly mix the A & B components together, scraping the sides and bottom of the container carefully to produce a homogeneous mixture. Care should be taken to minimize the amount of air entrapment.

For best results, TSE3331 silicone rubber compound may be either pumped and dispensed through two component automated mixing equipment, or, given the very long catalyzed pot life of the product, it can be premixed in power mixing equipment and applied as a one-component. When using power mixing equipment care should be taken to avoid high mixing speeds which can generate heat and cause premature curing of the material. For further details or equipment recommendations, please contact Momentive Performance Materials.

## Deaeration

When TSE3331 silicone rubber compound is hand mixed, or mixed with power mixing equipment, air entrapped during the mixing process should be removed to eliminate the formation of voids in the cured product. Expose the mixed material to a vacuum of 29 inches of mercury minimum (absolute pressure of 25mm). The material will expand, crest, and recede to about the original level as the bubbles break. Deaeration is usually complete about two minutes after frothing ceases.

## Curing

TSE3331 silicone rubber compound cures very rapidly when exposed to elevated temperatures. Typical cure times are as follows:

Cure Temp	Cure Time
100°C	10 minutes
150°C	5 minutes
200°C	2 minutes

The actual cure time will depend on the cross-sectional thickness of the TSE3331 silicone rubber compound, the thermal properties of the overall assembly, and type and efficiency of oven.

**TSE3331 must be cured in a well ventilated oven.**

## Limitations

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

## Contact Information

For product prices, availability, or order placement, contact our customer service by visiting [momentive.com/ContactSilicones](http://momentive.com/ContactSilicones).

For literature and technical assistance, visit our website at: [www.momentive.com](http://www.momentive.com)

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