

SilGrip™ PSA590LD Low Dusting Silicone Pressure Sensitive Adhesive

Description

SilGrip PSA590LD silicone pressure sensitive adhesive is a toluene solution of polysiloxane gum and resin. It is supplied at 60 percent silicone solids and may be further diluted with aromatic or aliphatic solvents. SilGrip PSA590LD adhesive may be blended with SR545 resin dispersion or with other methyl based silicone pressure sensitive adhesives to obtain specific performance properties.

Key Features and Typical Benefits

- Wide temperature range performance; maintains good shear and tack properties at intermittent temperatures up to 500 °F
- Adhesion to a wide variety of surfaces including low energy surfaces such as silicones release liners
- Resistance to moisture, weathering, certain chemicals and biological attack
- Accepts filler
- Low dusting

Typical Physical Properties

| Property | Value |
|--------------------|-------|
| Silicone Solids, % | 60 |
| Specific Gravity | 0.99 |
| Density, lbs/gal | 8.27 |

| | |
|--|-------------|
| Viscosity @ 25° (77 °F), cps (Brookfield RVF #3 spindle, 20 rpm) | 18,000 |
| Color | Light Straw |
| Flash Point, PMCC, °C (°F) | 2.0 (36) |
| Solvent | Toluene |

Typical Cured Adhesive Properties

| | |
|---|-----|
| • Peel Adhesion ⁽¹⁾ , oz/inch | 40 |
| • Tack ⁽²⁾ , g/cm ² | 870 |

(1) 2 mil dry adhesive thickness, 1mil polyester film, 1.5% benzoyl peroxide, curing cycle: 10 minutes air dry, 90 seconds at 177 °C, stainless steel, 12 inches/minute, 180° angle

(2) Polyken Tack Tester, 100g weight, 0.5 sec dwell time, 0.5 cm/sec draw speed, 2 mil dry adhesive thickness, 1mil polyester film, 1.5% benzoyl peroxide, curing cycle: 10 minutes air dry, 90 seconds at 177 °C

The properties of a cured silicone adhesive are affected by several factors such as type and amount of catalyst, cure cycle, adhesive thickness and backing type and thickness. Higher benzoyl peroxide catalyst concentration will increase cohesive strength of the adhesive and improve shear strength, but it can also reduce its adhesive strength, resulting in lower tack and peel values.

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

Potential Applications

SilGrip PSA590LD adhesive has been selected by many customers for use in coating of film and fabric substrates for manufacturing industrial pressure sensitive tapes. It is an excellent candidate to consider for splicing tapes designed to splice silicone release liners.

Processing Considerations

Application

SilGrip PSA590LD silicone adhesive is supplied at a viscosity typically ready for use in conventional tape coating equipment. If necessary, it may be thinned with toluene, xylene or other compatible solvents. After the adhesive is applied to the backing, it is exposed to a two-step process: solvent removal and curing.

Solvent Removal

To achieve optimum adhesive properties, it is essential to optimize the drying step of the process in order to assure that the solvent is removed from the adhesive film before the curing step of the process starts. Improper drying will result in residual solvent entrapment within the adhesive. If the adhesive is then exposed to temperatures higher than 93.5 °C (200 °F), decomposing peroxide catalyst can cause crosslinking reaction between solvent and adhesive through methyl groups on siloxane chains and on solvent molecules and adversely affect the properties of the adhesive. Typical temperature range for the drying step of the process is 83 °C (180 °F) to 90 °C (194 °F). A typical drying cycle is approximately 2 minutes at 90 °C (194 °F).

Curing Process

Once the solvent is removed from the adhesive film, the peroxide cure should be initiated by exposure to heat. A typical curing cycle is approximately 2 minutes at 165° C (329° F). The exact conditions required to achieve a complete cure will depend on oven length and efficiency, peroxide type and type of substrate used, and should be established during experimental trials on the machine.

Catalysts

High purity, 98% benzoyl peroxide in the quantity of 1 to 3% based on silicone solids has been found to give the most consistent results in curing of silicone pressure sensitive adhesives. In applications requiring low temperature cure, 2,4-dichlorobenzoyl peroxide, which is activated at 132 °C (270 °F), can be used. It should be noted that 2,4-dichlorobenzoyl peroxide may generate polychlorinated biphenyls during the curing process. Please refer to applicable law (in the United States, 40 CFR) regarding incidental PCB byproducts if 2,4-dichlorobenzoyl peroxide is utilized.

The peroxide should be dispersed in solvent before it is mixed with the adhesive. Thorough mixing of the peroxide and adhesive to achieve homogeneous dispersion is essential for consistency of finished product.

Priming

In certain applications, the anchorage of the adhesive to the backing may be insufficient and the coating of a primer prior to the adhesive coating may be required. A sample formulation for a primer may be found in Table 1 below. The formulation may need to be adjusted depending on required bath life, coating equipment and backing material. The primer may be coated by direct gravure, wire wound rod or other coating technique suitable for solvent based coatings, and must be cured prior to adhesive application. The curing conditions will depend on equipment capabilities, substrate type and formulation used, and should be established during experimental trials on the machine.

Table1. Sample Primer ⁽⁷⁾ Formulation

| Component | Parts by Weight |
|-------------------------------------|-----------------|
| SS4191A Gum Solution | 13.30 |
| SS4191B Methyl Hydrogen Crosslinker | 0.16 |
| SS4192c Catalyst | 0.50 |
| SS4259c Accelerator | 0.30 |
| Solvent ⁽⁸⁾ | 85.74 |

(7) Refer to Momentive SS4191A Silicone Release Coating System, for more information.

(8) Typical solvents: toluene, heptane, toluene/heptane mixtures

Product formulations are included as illustrative examples only. Momentive makes no representation or warranty of any kind with regard to any such formulations, including, without limitation, concerning the efficacy or safety of any product manufactured using such formulations.

Potential Applications

SilGrip PSA590LD adhesive is available in 5 gallon pails (40 lbs.) and 55 gallon drums (300 lbs.).

Patent Status

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Product Safety, Handling and Storage

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Limitations

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

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