



## Application Note

## Tgel 600 Directions for Use

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*This application note provides general instructions for use for Tgel 600.*

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## Overview

Tgel™ 600 is a new Thermal Interface Material classification. It is an all-in-one dispensable that can be used in minimum bondline, constant pressure applications (grease) and used as a thick gap filler in a constant gap up to 2mm (dispensable gap filler/gel/putty). This would simplify operations by consolidating TIM materials and increases throughput dispensing only one material instead of multiple materials or placing pads. Tgel 600 can meet the need of the highest powered components, offering best in class thermal resistance while also 6.4 W/mK reliable gap filler providing outstanding performance up to 2mm gaps.

## Shipping and Storage

### Shelf Life:

- Cartridges and syringes: 6 months from date of manufacture when stored at below conditions.
- Cartridges and Syringes once loaded in dispensing systems: 30 days
- Pails and Cans: 24 months from date of manufacture when stored at below conditions.

### Storage Conditions:

- Cartridges and Syringes: 15C to 30C and < 50% relative humidity.
- Pails and Cans: 15C to 30C
- Tgel™ 600 should be stored in original product packaging until ready for use.

**Storage under High Pressure:** Tgel™600 should not be stored under high pressure dispensing conditions. If stored for long periods under pressure some separation may be noticed. It is recommended to relieve system pressure at the end of a shift.

**Packaging:** Tgel™600 can be provided with below standard packages to support various application options.

TYPE	FILL VOLUME	FILL WEIGHT
Quart Can	500cc	1.3 kg
Pint Can	250cc	650 g
1 Gallon Can	2000cc	5.2 kg
5 Gallon Pail	8000 cc	20.8 kg
30cc Syringe	30 cc	78 g
360cc Cartridge	360cc	936 g



## Preparation and Clean-up

**Preparation for Use:** Tgel<sup>TM</sup>600 is ready to use out of the container and no curing is needed. Ensure surfaces to be covered are clean and dry. Mixing before use is not recommended.

**Clean-up:** Excess material can be cleaned up using a dry rag. Residual silicone oil can be removed using a clean rag and acetone solvent.

**Exposure to solvents:** Tgel<sup>TM</sup>600 is a silicone material filled with thermally conductive fillers. Exposure to organic solvents and strong bases can result in swelling or removal of the silicone carrier material resulting in degradation or loss of performance. For specific chemical resistance consult Chemical Resistance Tables for silicone materials such as the one listed at the following URL:

[https://www.engineeringtoolbox.com/silicone-chemical-resistance-d\\_1879.html](https://www.engineeringtoolbox.com/silicone-chemical-resistance-d_1879.html)

**First Aid:** Safe handling, disposal, and first aid measures are included in the SDS. Please read the SDS before using or handling this product. For further questions, please contact Laird.

## Dispensing Recommendations and Equipment

Tgel™600 can be dispensed with a variety of dispensing systems. The following is a partial list of example equipment for low- and high-volume dispensing and typical results that can be expected.

### Prototype and Low-Volume Dispensing

A manual dispensing gun or Nordson EFD Performus X100 Dispenser is recommended for prototype and low-volume dispensing. 300cc cartridges can also be dispensed with pneumatic caulking guns such as Cox 63001.

Manual dispensing guns:



30cc

Pneumatic dispensing gun



300 cc (Cox 63001)









Benchtop dispensing



Nordson EFD Performus X100 Dispenser

## High-Volume Dispensing

A complete dispensing system includes a Supply System, Dispensing Platform, and Dispensing Valve.

	Raw Material Supply System	Dispensing Platform	Dispensing Valve
Simple Solution	Syringe dispensing by direct air  Cartridge dispensing by direct air or with air cylinder	3-axis X-Y table such as Fisnar F4000 ADVANCE  	No valve or time-pressure valve  
	Scheugenpflug A90 C for 300cc cartridges  	Scheugenpflug Dispensing Cell  	Scheugenpflug Dos P016 TCA  
High-Precision Solution	Graco DynaMite 190 HD for 1-gallon pails  	Graco UniXact C300/C500 System  	Graco PC Pump Progressive Cavity Valve or Graco Dispensit Positive Displacement Metering Rod Valve  

## Dispensing Part Considerations

Once a material has been selected, the next step is to analyze the part to ensure that the volume of dispensed material is correct, with the correct shape and in the correct locations.

Before selecting a dispensing system, the part's largest dimension and the dispensing weight tolerance requirements should be identified. These are critical inputs leading to dispensing platform size and dispensing valve selection.

As a starting point, take the following steps to guide the part analysis:

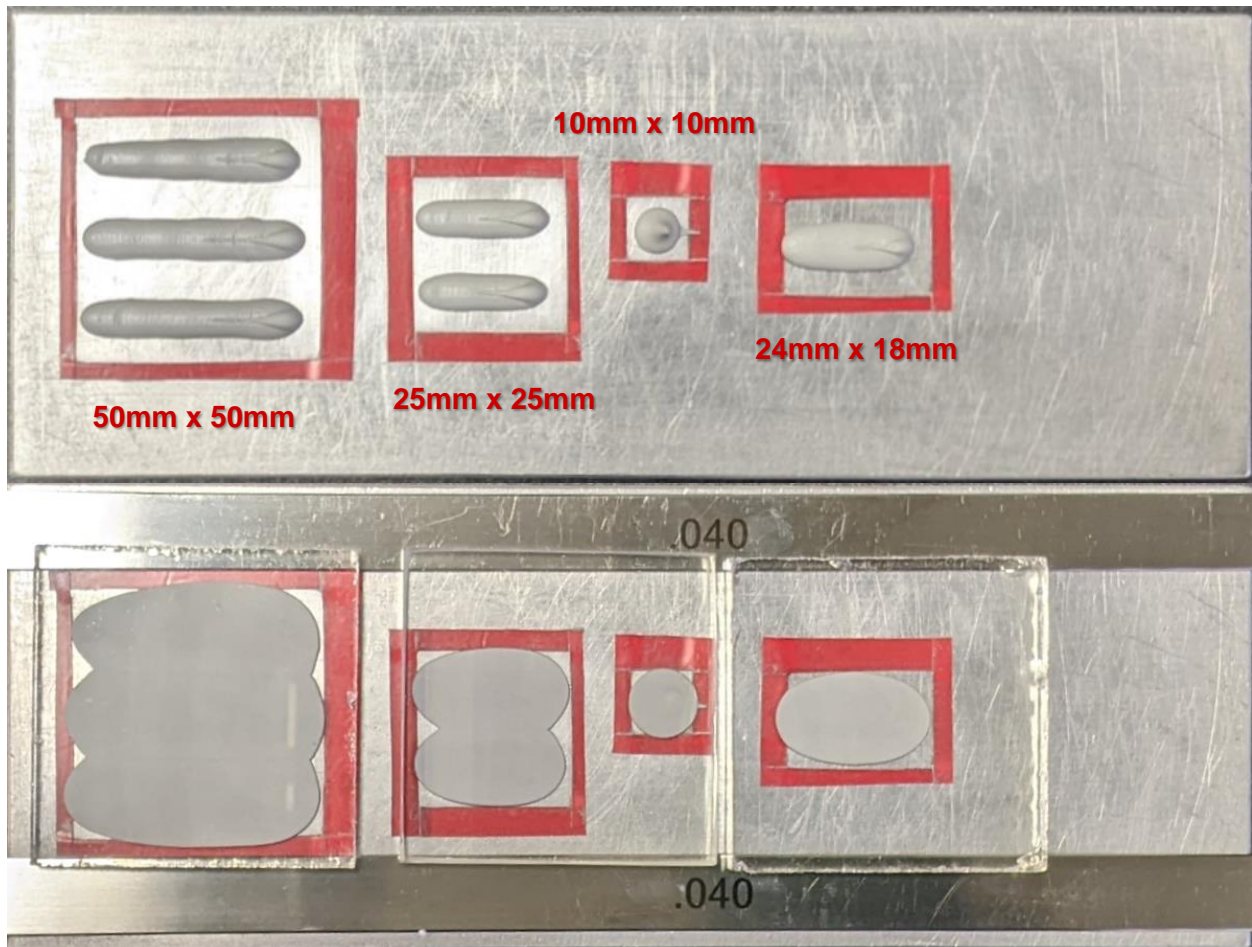
- Define the number of target locations
- Determine whether material will be dispensed on component side or heat sink side
- Consider all operations that occur post dispense and prior to final assembly that may affect form, placement, cleanliness, position, etc.
- Consider any physical obstructions around which the dispense head must navigate
- Calculate shot size per dispense location (function of the area of coverage, gap, and shape)
- Assess the surfaces that will be in contact with the material: composition, roughness, and geometric features
- Address cleanliness for proper wetting and thermal performance



## Dispensing Patterns and Process Considerations

Patterns should be designed to achieve adequate coverage with fast cycle time and minimum air entrapment.

- Generally, small squares should be covered with individual dots and large squares with parallel lines.
- Nozzle size should be selected based on the smallest area on the part. A larger nozzle will provide faster cycle times but may cause adhesion issues when trying to dispense too small a dot.
- The 10mm square below is covered easily with a single dot, and the same nozzle can achieve good coverage over the 25mm square and the 50mm square using sets of lines.
- The 24mm x 18mm rectangle can be covered well with a single line; if more accurate coverage is required, then parallel lines can be used.
- The most accurate rectangular coverage will be achieved with a spiral or meander; however, spirals and meanders are not recommended as they are slower than lines and they may trap air during assembly.



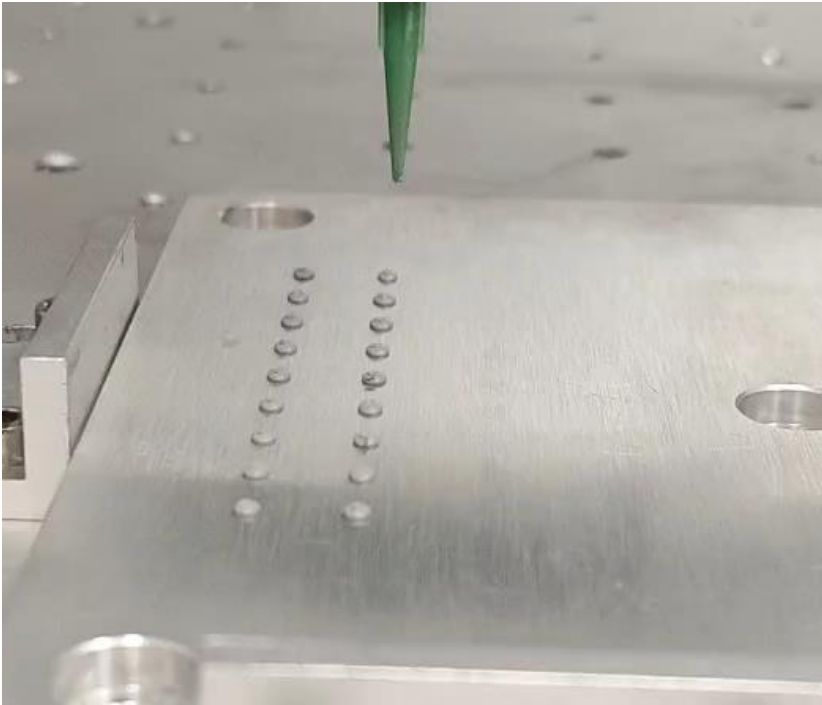
Example of four different sizes of areas and how they might be covered on one part. Samples were compressed to 1mm (0.040”) under glass to show coverage.



Volumetric dispensing can achieve fast, repeatable, small dots, such as these 3.5-mm dots with volume 0.0078 cm<sup>3</sup>, dispensed using an 18-gauge needle (ID = 0.84 mm).



A variety of dot sizes and shapes can be dispensed with a single nozzle by varying the dispense height and other dispense parameters. For a 10-gauge nozzle (ID = 2.92 mm), dots with diameters as low as 4.4 mm can be dispensed.



To remove potential strings on moving to the next application the dispenser can be programmed to perform a small quick Zig-Zag pattern. See attached video.



Tgel 600  
dispensing to elimin

## Silk Screening

Place heat sink approximately 1 inch under the taut silk screen. For best results use a 61 threads per inch screen. Finer screens up to 140 threads per inch can be used however application may be slower. Place a dollop of Tgel<sup>TM</sup> 600 Tgel across one side of the screen. Run a hard rubber (70 – 90 Shore A Durometer) squeegee across the Tgel<sup>TM</sup> 600 dollop passing across the screen. Turn the hard rubber squeegee over to pass the screened grease a second time with the clean side of the squeegee. Lift off the screen to reveal the printed grease.

## Stencil Printing

Place the heat sink under the stencil. Place a dollop of Tgel<sup>TM</sup> 600 across one side of the stencil. Run a hard rubber (70 – 90 Shore A Durometer) squeegee across the Tgel<sup>TM</sup> 600 dollop passing across the stencil. Repeat if necessary. Remove the stencil to reveal the printed grease. When using the squeegee, it is important that it remain stiff throughout and not be allowed to flex. Flexing may cause thickness variation. Measure grease thickness after application