Tflex™ CR550
Dispensing Guideline

Application Note

Date: April/26/2024

This application guideline provides general instructions for use for Tflex™ CR550.

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Overview

Tflex™ CR550 is a two-part, silicone-based high thermal conductivity dispensable gap filler providing low thermal resistance and high reliability, it has low viscosity prior to curing. The low viscosity makes it ideal for applications in which the components cannot withstand high pressure during assembly. Tflex™ CR550 is ideal for applications where large gap tolerances are present. The mixed material will cure at room temperature or can be accelerated with the addition of heat. Tflex™ CR550 composition provides excellent thermal performance and compliance.

Shipping and Storage

Shelf Life: Shelf life for Tflex™ CR550 stored in unopened original package is 6 months from date of manufacture.

Storage Conditions: Tflex™ CR550 should be stored in original product packaging until ready for use. Recommended storage conditions are up to 35°C with no special requirement on relative humidity when stored in original packaging. For cartridges, the direction to store the material is referred to the arrow from carton or sticker as in vertical tip-down dispense orientation). It's very important to keep the correct storage direction following the note of the packaging.

Using recommendation after the original packaging opened:

1. Material should not sit idle in the mixing nozzle longer than the stated pot life of the material.
2. For cartridge packaging (50/200/400cc), please purge 1~5g at the beginning to make sure the mixing ratio is 1:1, please use the remaining material within 72 hours after opening.
3. For pails packaging, please you make sure the metering dispensing valve is with the correct ratio 1:1 and purge 1~5g at the beginning, please use the remaining material within 7 days after opening.

Packaging: Tflex™ CR550 is a two-component product that is available in the below standard packaging sizes to support different application scenarios.

Table 1: Dual plastic cartridges, 1:1

PACKAGING SIZE	FILL
50cc (Dual plastic cartridge 1:1) (2*25cc)	50cc (164g)
200cc (Dual plastic cartridge 1:1) (2*100cc)	200cc (683g)
400cc (Dual plastic cartridge 1:1) (2*200cc)	400cc (1242g)

Table 2: Plastic cartridge and pails, size listed per cartridge or pail

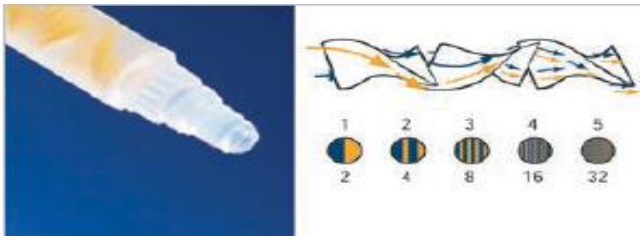
PACKAGING SIZE	FILL
600cc plastic cartridge*2	600cc*2 (3.9kg)
1 gallon plastic pail*2	4000cc*2 (26 kg)
5 gallons plastic pail*2	6150cc*2 (40 kg)

50cc/200cc/400cc dual plastic cartridge

1 gal and 5 gal pails

Application and Clean-up

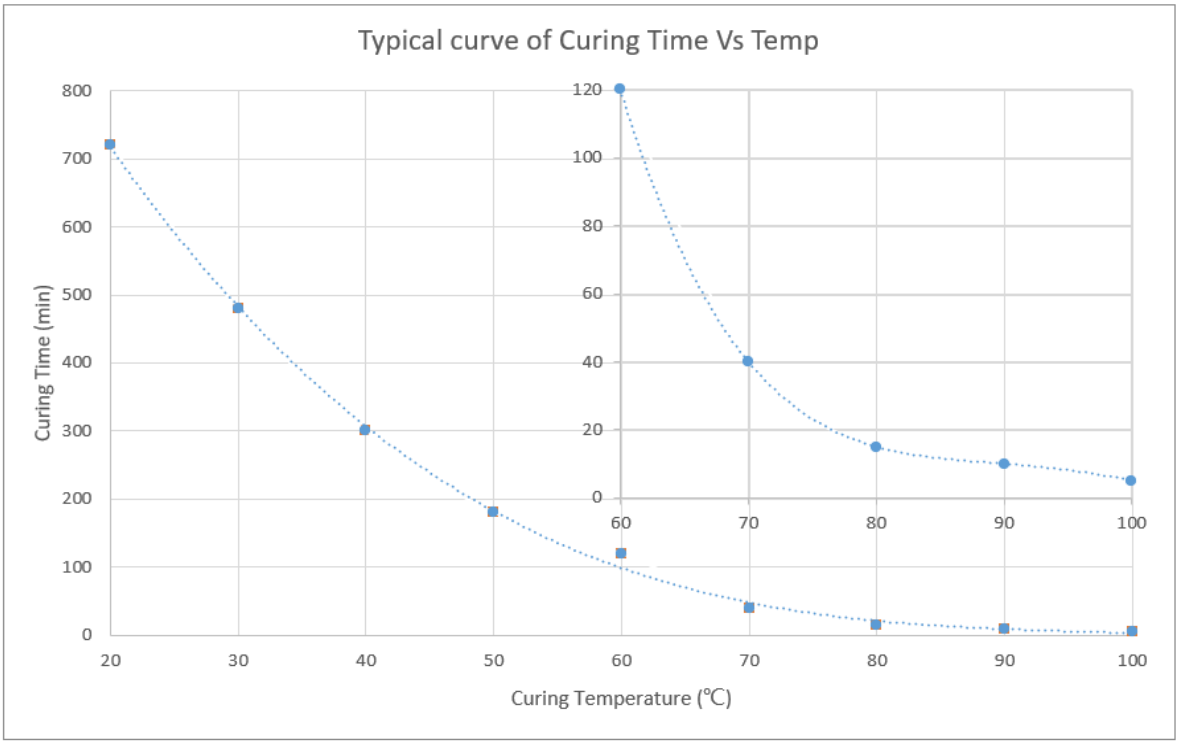
Mixing: Tflex™ CR550 is a two-part, silicone-based system and therefore requires mixing before use. Mixing should be done at a 1:1 ratio of part A (blue) to part B (white). Material must be used with matching part A and B batch numbers. Disposable plastic mixing nozzles can be used to mix parts A and B together. Mixing nozzles can be attached to the ends of cartridges or automated dispensing systems. Mixing nozzles with a minimum of 16 mixing elements are recommended to achieve proper mixing. Before attaching mixing nozzle, a small amount of material should be purged out of each cartridge to align pistons evenly and fill any air space in the tip of the cartridge.



How the static mixer work:
The spiral mixer provides thorough material mixing by simple yet mixing process with the material go through these mixing elements.

Pot life and Cure time: At 25°C pot life (double viscosity) is greater than 60 minutes.

Full cure is obtained at room temperature after a minimum of 12 hours. At 65°C cure time is 80 min. Make sure surfaces to be covered are clean and dry.



The above cure profiles are guideline recommendations. Cure conditions (time and temperature) may vary based on customers' experience and their application requirements, as well as customer curing equipment, oven loading and actual oven temperatures.

Cure Inhibition: Tflex™ CR550 is a silicone-based material that requires proper curing to fully function. Various elements and their compounds have been proven to cause problems by inhibiting the curing of silicone systems which mainly include three types.
(1) Elements and their compounds of the VA and VIA families in the periodic table including sulfur, phosphorous, and nitrogen containing compounds, urethanes. compounds containing antimony, arsenic, tellurium, and selenium.
(2) Compounds with unsaturated bonds, such as alkynals.
(3) Some metal or metal ions, such as tin, lead, mercury.
During handling and use of the uncured materials, pay attention to the elements and their compounds mentioned above, some residual solvents or monomers, and some primers. Do not use latex gloves when handling uncured material.

Post Dispense Cure Check: Cure in place materials require proper mixing and curing in order to perform. It is also possible that these materials are subject to contamination which would inhibit curing. To verify there are no curing issues we recommend doing a post dispense cure check. Dispense a small amount of product onto a clean substrate and place in oven at 65°C for 60 minutes or allow to sit at 25°C for 24 hours. After the specified time, check to make sure the material cured and is no longer a liquid putty.

Exposure to solvents: Tflex™ CR550 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

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.

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 & Equipment

Dispensing: Material can be dispensed with manual dispensing gun or automated dispensing systems for high volume in-line manufacturing.

- **Prototype & Low Volume Dispensing Method**
  The manual dispensing gun or pneumatic dispensing gun is recommended for the prototype and low volume dispensing.


50cc Manual Dispenser

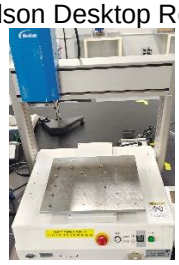

Manual Dispense Gun


Pneumatic Dispense Gun

Select the proper dispensing gun based on the size of the cartridge.

➢ High Volume Dispensing Methods

Normally the dispensing system includes the raw material supply system, dispensing platform and the dispensing valves:

	Raw Material Supply System	Dispensing Platform	Dispensing Valve
Simple Solution	Cartridge dispensing by air cylinder 50cc/200cc/400cc cartridge dispensing direct by air cylinder	3-axis X-Y table such as Nordson Desktop Robot 	No valve or time-pressure valve  
High-Precision Solution	Scheugenpflug A90 C for 600cc cartridges, PF(A)803 for 5 gallon pails  	Scheugenpflug Dispensing Cell 	Scheugenpflug Dos P016 TCA 
	Graco DynaMite 190 HD for 1-gallon pails, DynaMite 22 for 600cc cartridges  	Graco UniXact C300/C500 System, Multiple axis robot  	Graco Dispensit Positive Displacement Metering Rod Valve and PR-X 

➢ 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.

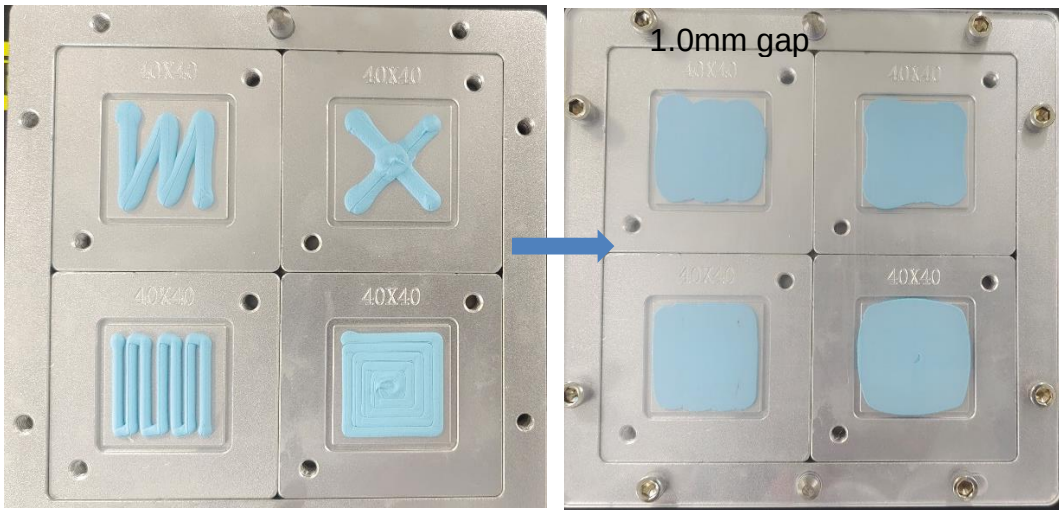
Before selecting a dispensing system, the part's largest dimension and the dispensing weight tolerance requirements should be identified. These are critical inputs leading to dispensing platform size and dispensing valve selection. The dispensing valve minimum shot volume can meet smallest dispensing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

➢ Dispensing Patterns and Process Considerations

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

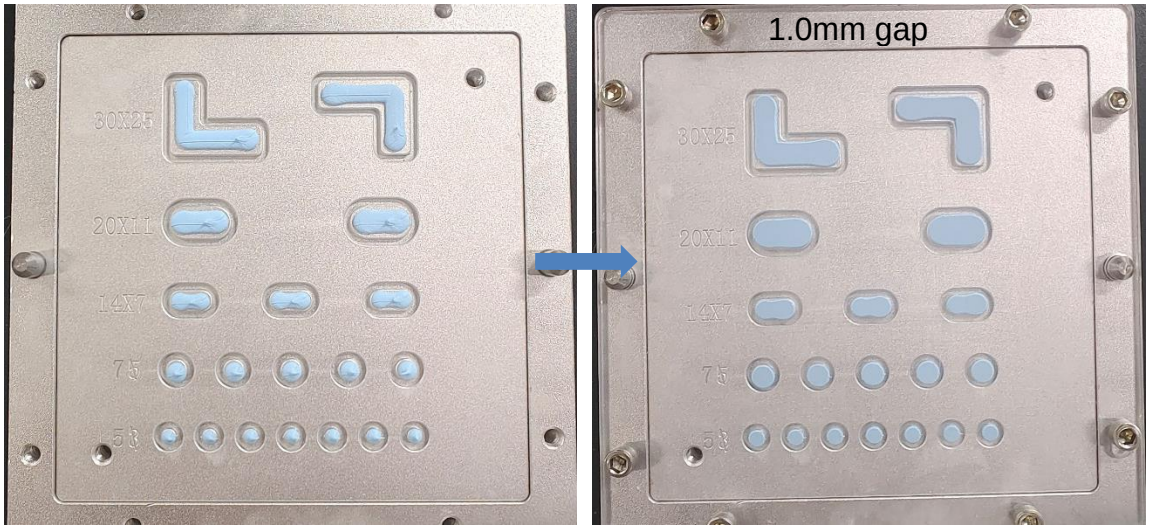
• Generally, small squares should be covered with individual dots and large squares with line, “X” or “N”.

• The most accurate rectangular coverage will be achieved with a spiral or meander; however, spirals and meanders are not recommended as they may trap air during assembly. A simple dot and the single line, provide an adequate coverage, the shortest cycle time, and least chance of introducing air into the material. The “N” and “X” is the best pattern for large squares to avoid trapped air.



• Mixing Nozzle size or tips 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 5mm circle below is covered easily with a single dot, and the same nozzle can achieve good coverage over the 20mm*11mm oval and the 30mm*25mm L-shape using sets of lines.



Troubleshooting of using static mixers	
Problem	**Recommendation**
Striation (i.e. Two colors in the material indicating that is not mixed very well)	Increase the number of the elements to the upper limits for that type of material. **Or** Reduce diameter if increased back pressure is acceptable.
Set time is slow	Increase the number of the elements to the upper limits for that type of material. **Or** Reduce diameter if increased back pressure is acceptable.
Surface is tacky	Increase the number of the elements to the upper limits for that type of material. **Or** Reduce diameter if increased back pressure is acceptable.
Material not coming out fast enough	Increase the diameter of elements towards the upper limits for the viscosity of materials
Difficult to dispense material through mixer **(When using a manual hand dispenser)**	Increase the diameter of elements towards the upper limits for the viscosity of materials