DISPENSE ROBOTICS

Dispensing Solutions

TIM Dispensing

Automated dispensing of thermal interface materials — single- and two-component, from cartridge to 20 L pail.

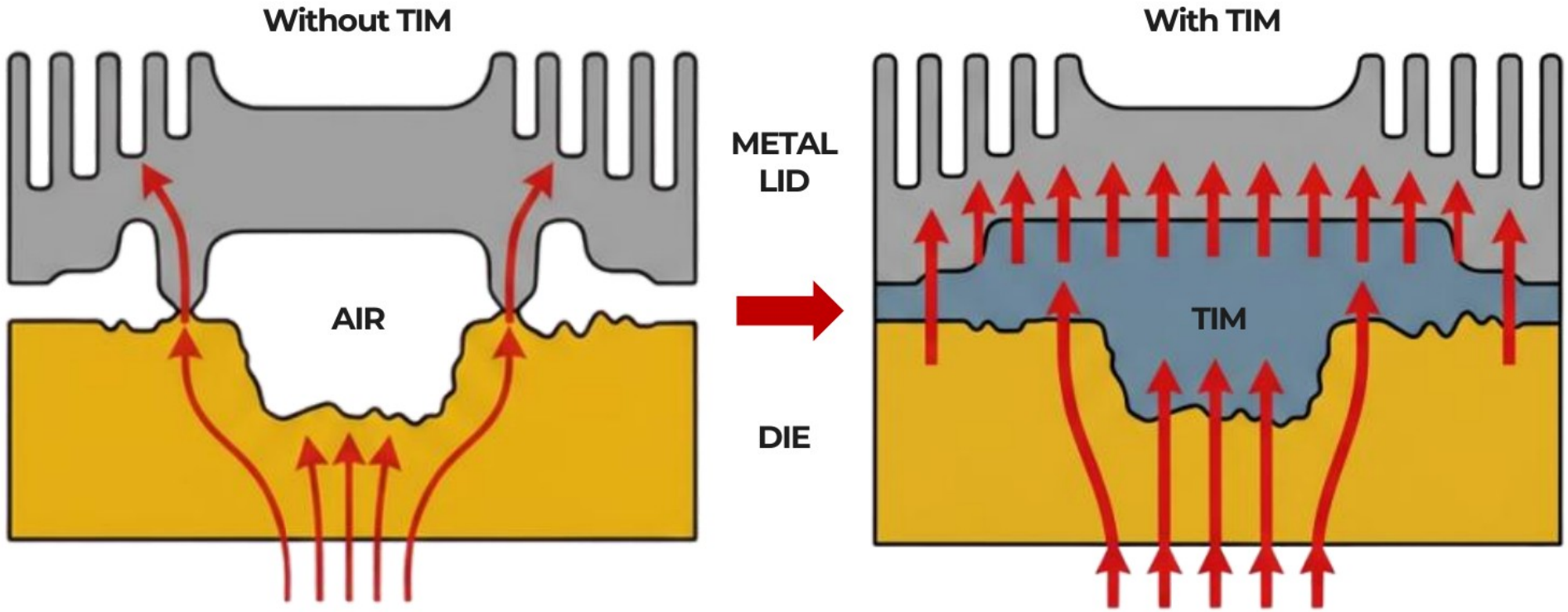
1029 S Nova Rd, Ormond Beach, FL · dispenserobotics.com

Introduction

As component power density climbs, managing heat has become the factor that decides product life. **A controlled TIM dispense process minimizes thermal resistance** and secures a stable, repeatable path for heat to leave the assembly.

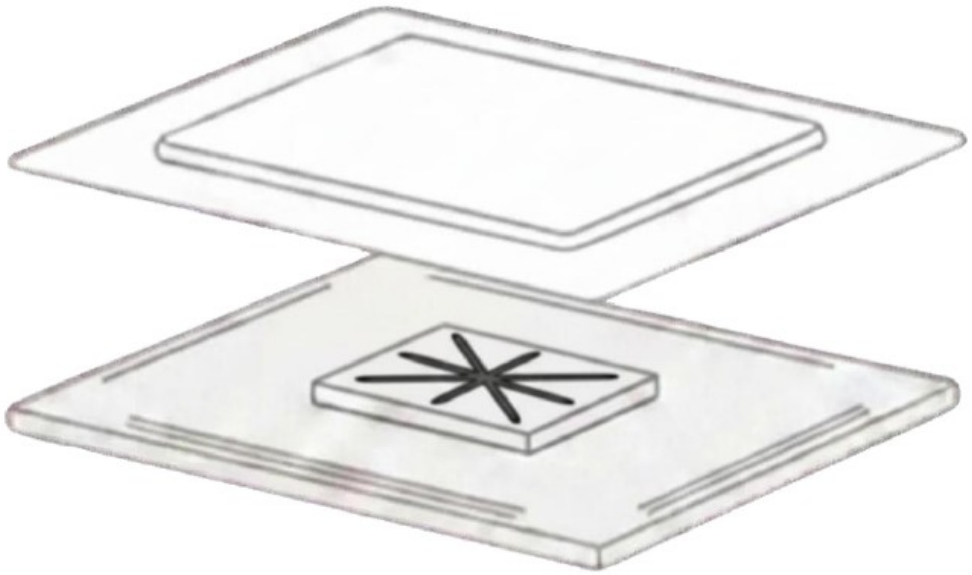
Why TIM

A high-performance TIM moves internal heat to the outside quickly and efficiently. **Filling surface to surface with no air gap** completes the thermal path all the way to the heat spreader.



Precision

Ultra-precise dispensing places the optimum quantity on the target area, every shot. **Controlled flow — no over-fill, no under-fill** — spreads to full, void-free contact across the whole interface.



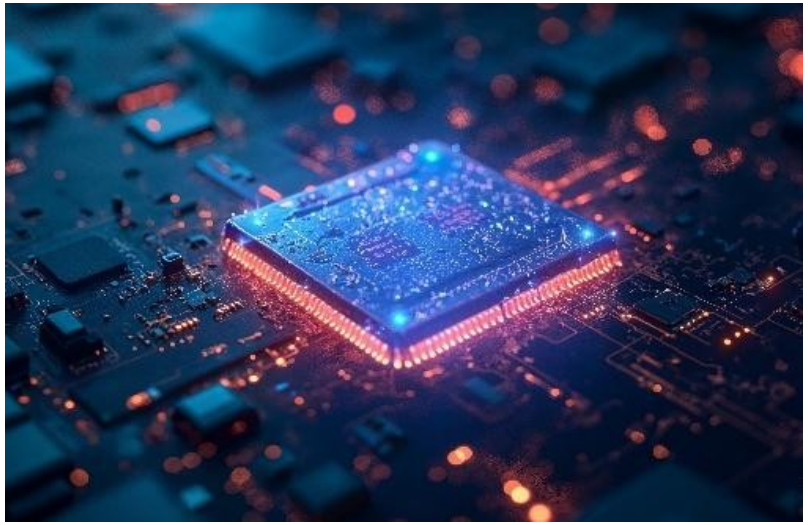
Star pattern as dispensed

Full coverage after compression

Industry

Automotive, semiconductor, telecom and more. **Precision dispensing that completes high-performance thermal management** across every industry we serve.

Electric vehicles



Semiconductor & power electronics

5G & telecom infrastructure

Pain points

Filled thermal materials punish ordinary dispensing equipment in three ways.

01

Wear and viscosity

Metal and ceramic fillers abrade pumps and valves, and high-viscosity material makes shot weight unstable as parts wear.

02

Nozzle clogging

Filler and carrier separate under pressure, blocking nozzles and orifices and stopping the line.

03

Ratio precision

Two-component materials with varied mix ratios and high filler loads cure incorrectly if the ratio drifts — a scrap and reliability risk.

EV

ICCU

Continuous, high-volume gap-filler dispensing

1K Material: Tputty 607, etc.

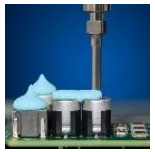
PCP + PU-SC (1K dispenser + push unit)

Push-unit pump, direct-mounted, for high-viscosity material

2K Material: TGF-NT300UL, etc.

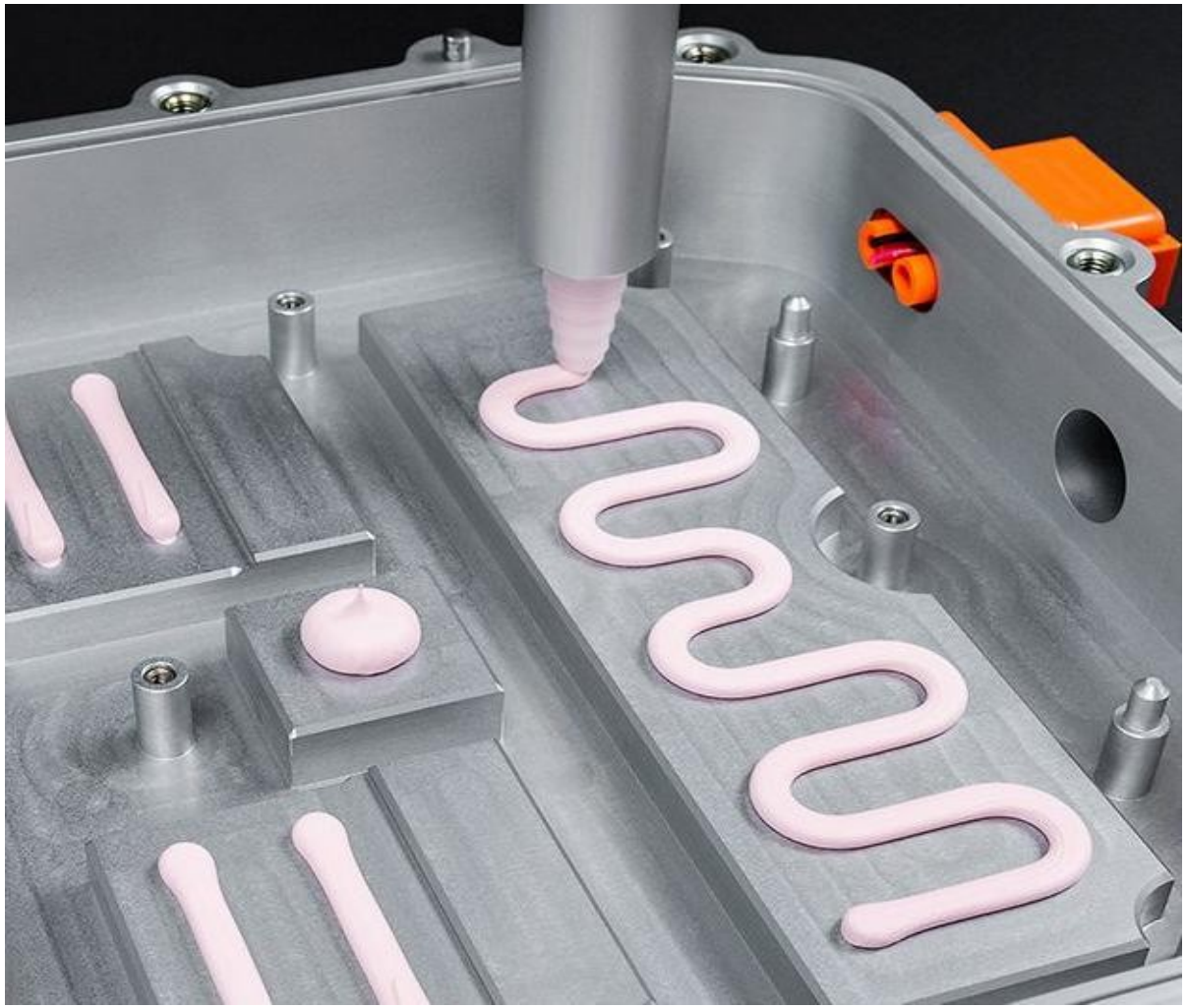
PDP (2K dispenser)

Accurate mix ratio and shot volume



PRO-CPD20 (2K 20 L can pump)

Continuous, stable supply of high-viscosity material



Pumps and feed systems manufactured by TAEHA Corporation, Korea · Supplied, integrated and supported in North America by Dispense Robotics

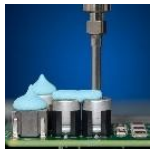
EV

Battery pack

Uniform-thickness gap-filler beads

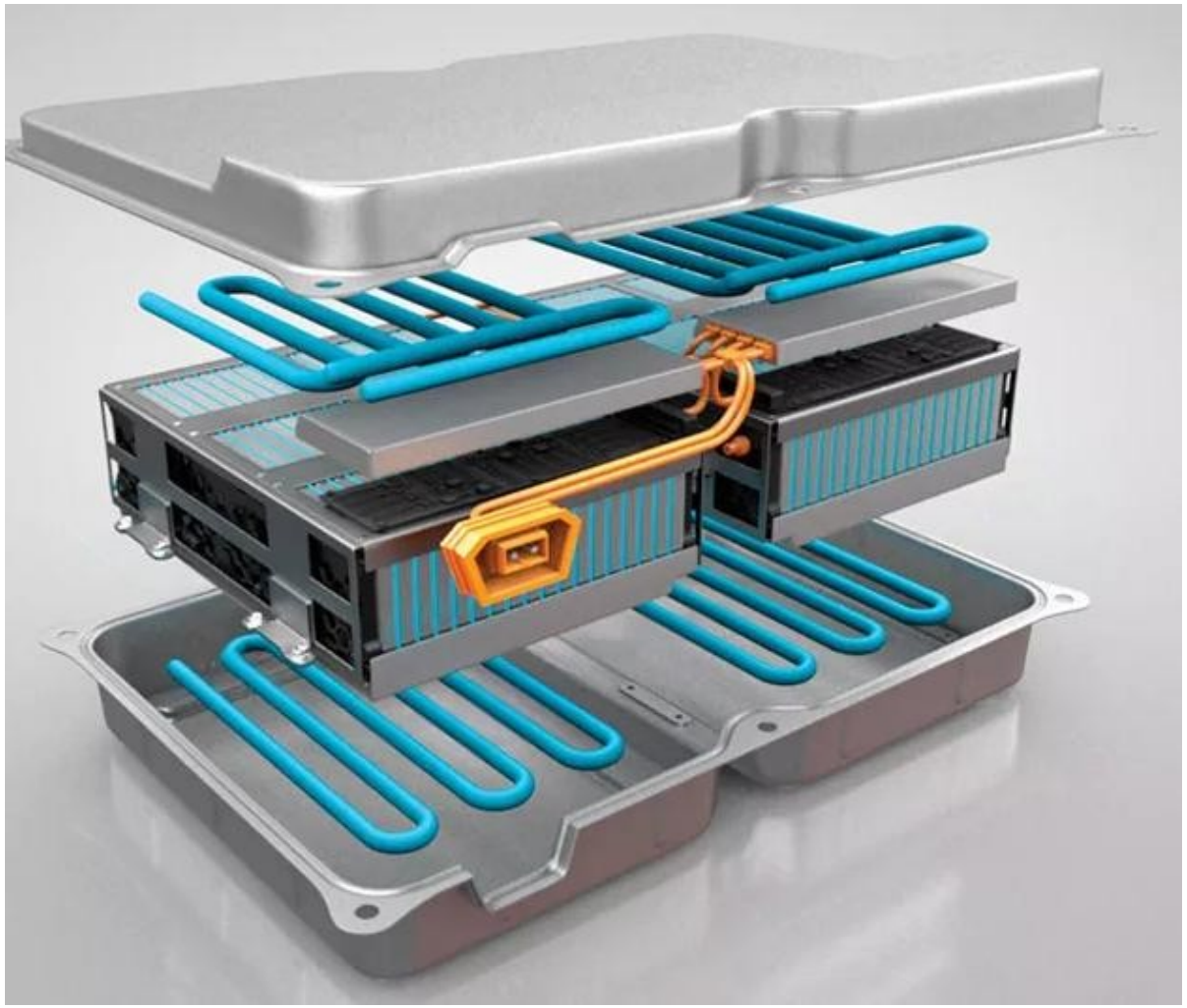
2K Material: TGF-NT300UL, etc.

PDP (2K dispenser)
Accurate mix ratio and shot volume

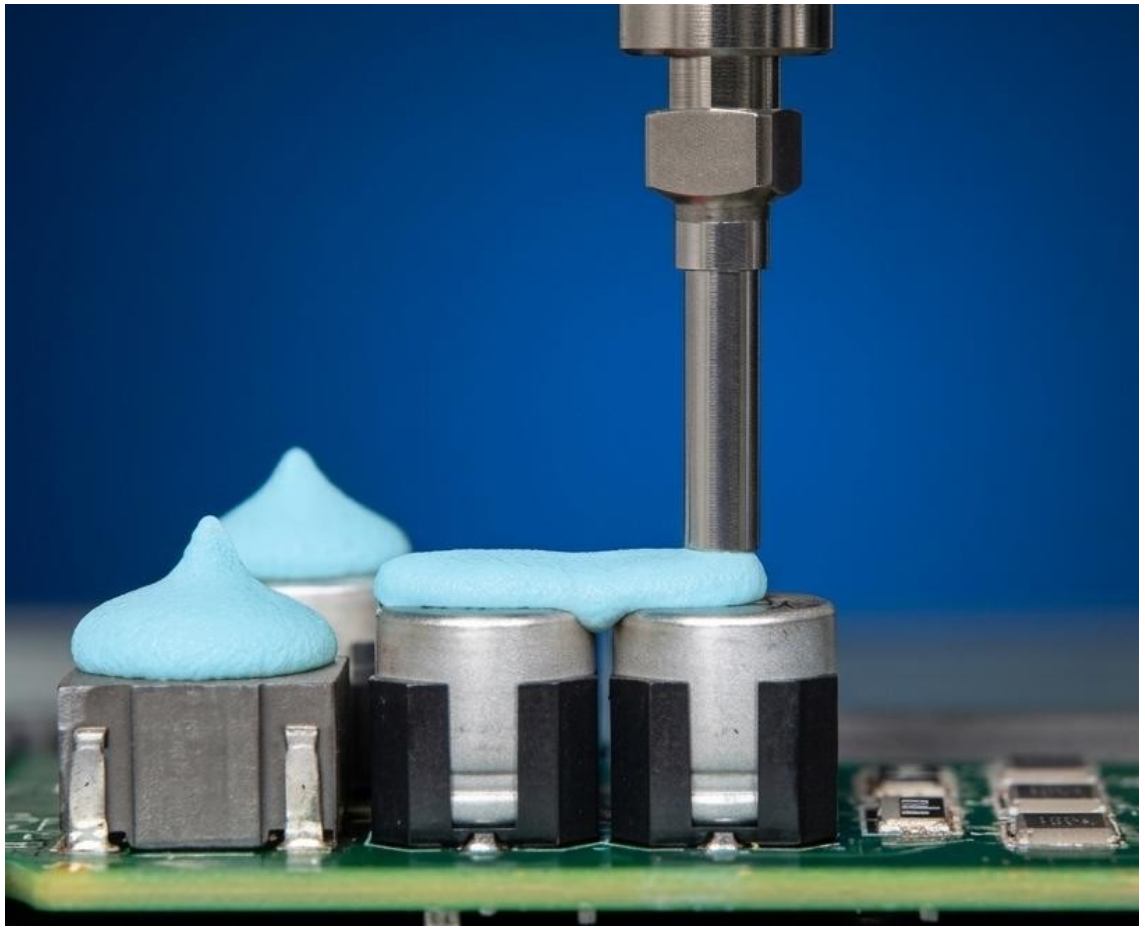


PRO-CPD20 (2K 20 L can pump)
Continuous, stable supply of high-viscosity material

Our systems lay filled, high-viscosity TIM in volume, exactly to pattern — for stable thermal performance in the harshest environments.



Pumps and feed systems manufactured by TAEHA Corporation, Korea · Supplied, integrated and supported in North America by Dispense Robotics



Semiconductor

Exact shot, exact location

1K Material: Tputty 607, etc.

PCP + PU-SC (1K dispenser + push unit)
Push-unit pump, direct-mounted, for high-viscosity material

2K Material: TGF-12000, etc.

PDP + PU-SC (2K dispenser + push units)
Accurate ratio; stable high-viscosity feed from cartridges

For high-filler materials

SHF (Super High Filler)
Wear-resistant motor, rotor and stator

ADV-1H
Anti-drip valve for filled material

To dispense high-performance TIM by exact shot, we pair wear-resistant wetted parts for filled materials with a feed lineup built for high viscosity.

Pumps and feed systems manufactured by TAEHA Corporation, Korea · Supplied, integrated and supported in North America by Dispense Robotics

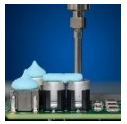
Electronics

5G module

Pattern design that fills to the corners

2K Material: CoolTherm SC-1600, etc.

PDP (2K dispenser)
Accurate mix ratio and shot volume



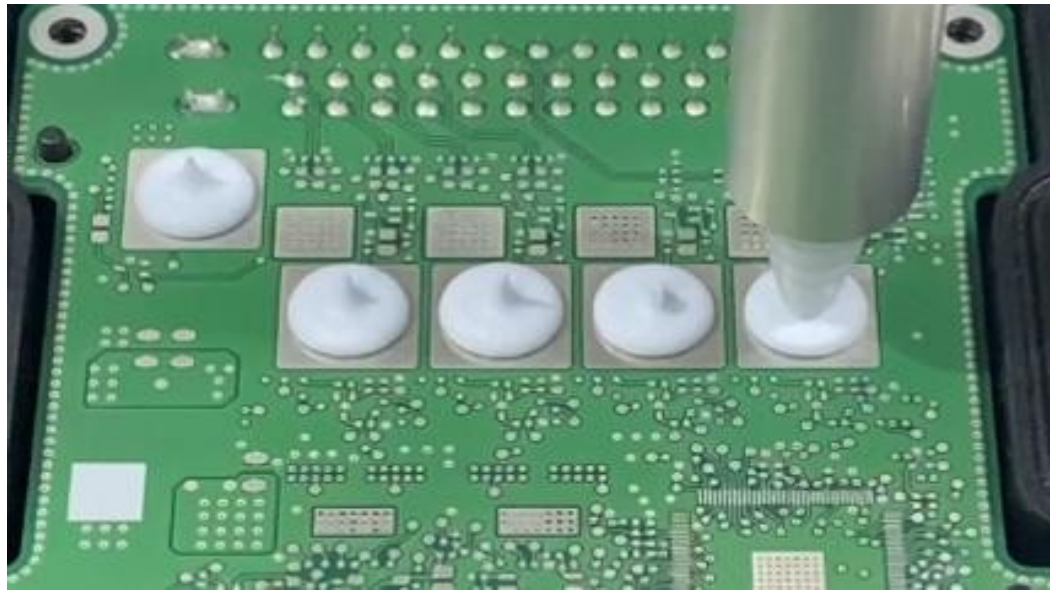
PRO-CPD20 (2K 20 L can pump)
Continuous, stable supply

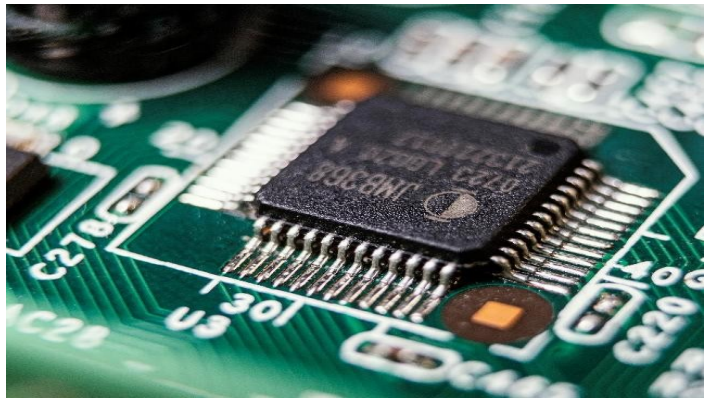
For high-filler materials

SHF (Super High Filler)
Wear-resistant motor, rotor and stator

ADV-1H
Anti-drip valve for filled material

Ultra-precise control lays high-viscosity gap filler exactly to pattern, maximizing heat removal from densely packed RF modules.



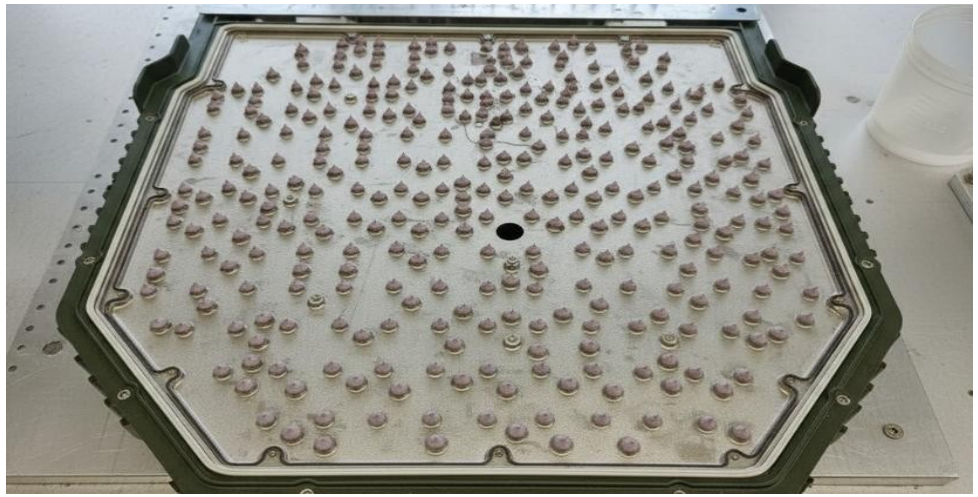


Pumps and feed systems manufactured by TAEHA Corporation, Korea · Supplied, integrated and supported in North America by Dispense Robotics

Electronics

Maritime repeater

A TIM process is essential to remove the internal heat of the repeater. Dispensing must be highly reliable so thermal performance holds through extreme vibration, shock, heat and humidity at sea.



Consistent shots across hundreds of points

1K Material: Compatherm Filler 9290, etc.

PCP + PU-SC (1K dispenser + push unit)

Push-unit pump, direct-mounted, for high-viscosity material

Pumps and feed systems manufactured by TAEHA Corporation, Korea · Supplied, integrated and supported in North America by Dispense Robotics

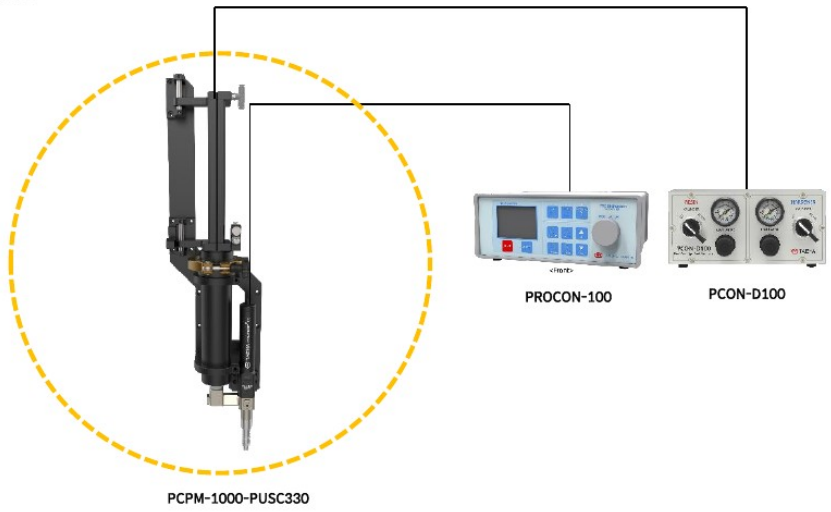
EV ICCU | Semiconductor | Maritime

PCP + PU

1K Pro Pump + Push Unit

A dedicated push unit that connects directly to the PRO-PUMP. Mount a single-component cartridge on the machine and the unit feeds high-viscosity material under pressure — no additional material plumbing. Accurate, smooth dispensing.

*Sample diagram



PCPM-1000-PUSC330

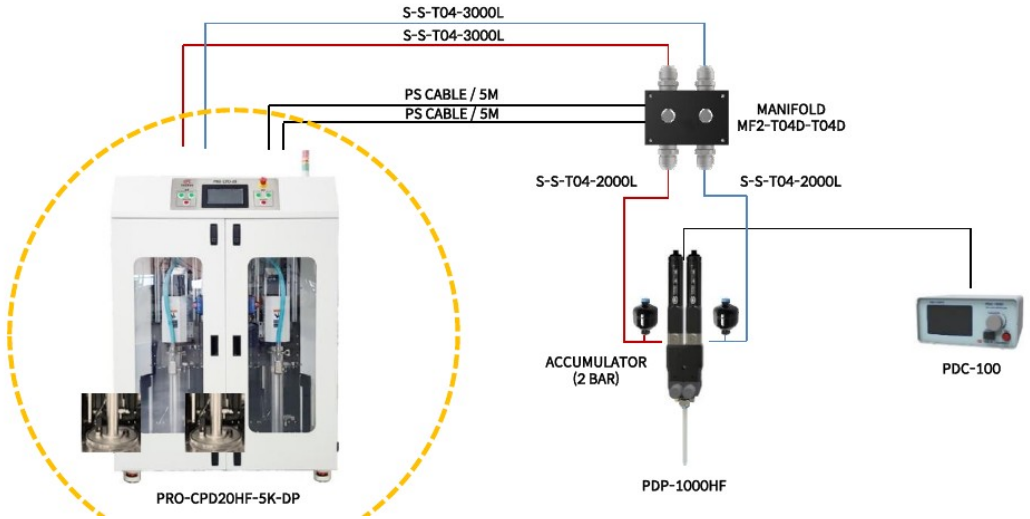
Pumps and feed systems manufactured by TAEHA Corporation, Korea · Supplied, integrated and supported in North America by Dispense Robotics

EV Battery | EV ICCU | 5G module

PDP

2K Pro Pump

A progressive-cavity (eccentric screw) design mixes and dispenses steadily over long runs under RPM control. Suits two-component materials with large differences in viscosity or mix ratio. Maintenance is a mixer-consumable swap — easy and economical to run.



PDP-500

PDP-5000

Pumps and feed systems manufactured by TAEHA Corporation, Korea · Supplied, integrated and supported in North America by Dispense Robotics

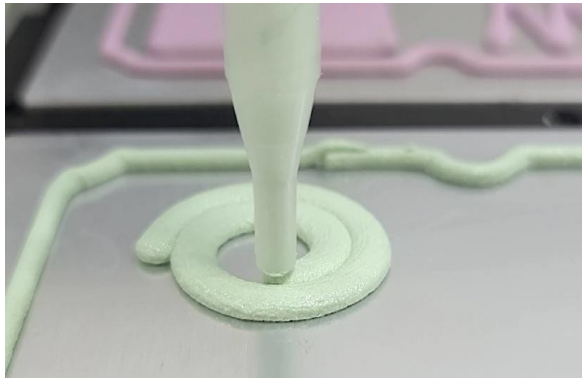
Semiconductor | 5G module

SHF

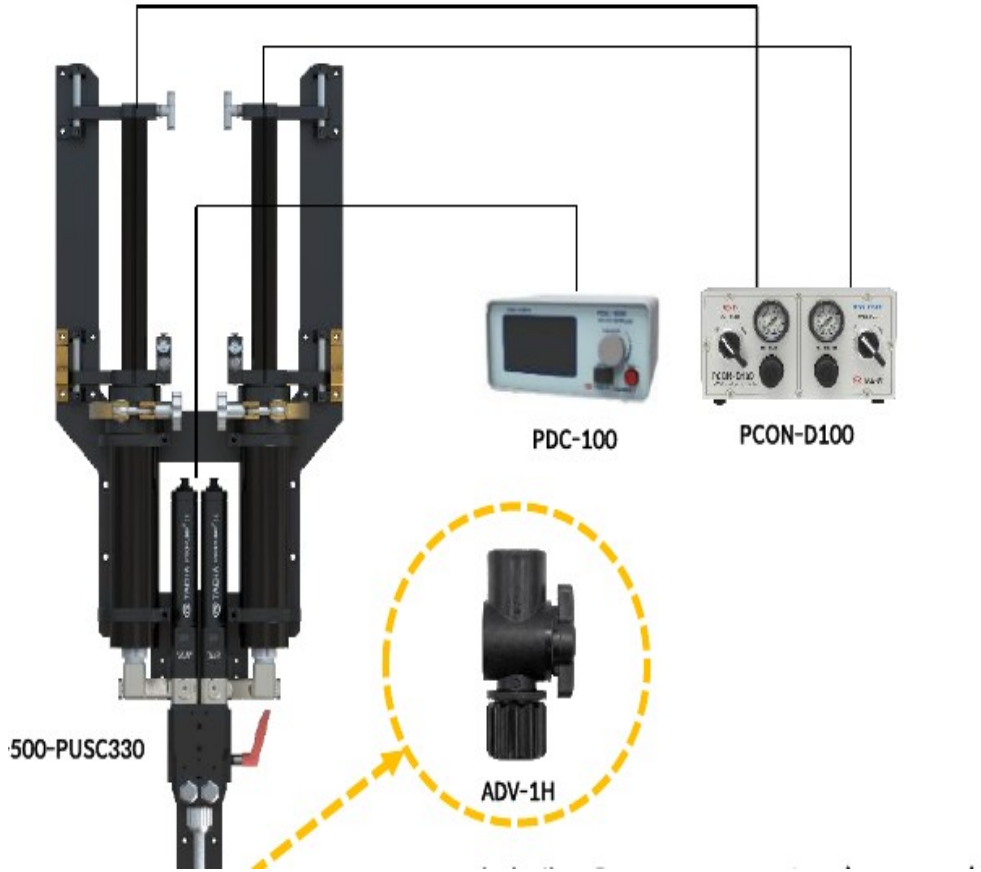
Super High Filler pump

For abrasive, high-filler materials: a rotor and stator lineup in wear-resistant special materials, for long trouble-free life and precise continuous dispensing.

A high-torque motor handles dilatant (shear-thickening) materials whose viscosity rises under load, keeping pump efficiency high.



ADV-1H anti-drip valve for filled material — relieves residual pressure in the mixer to stop drips, and holds pressure so the next shot starts without delay.



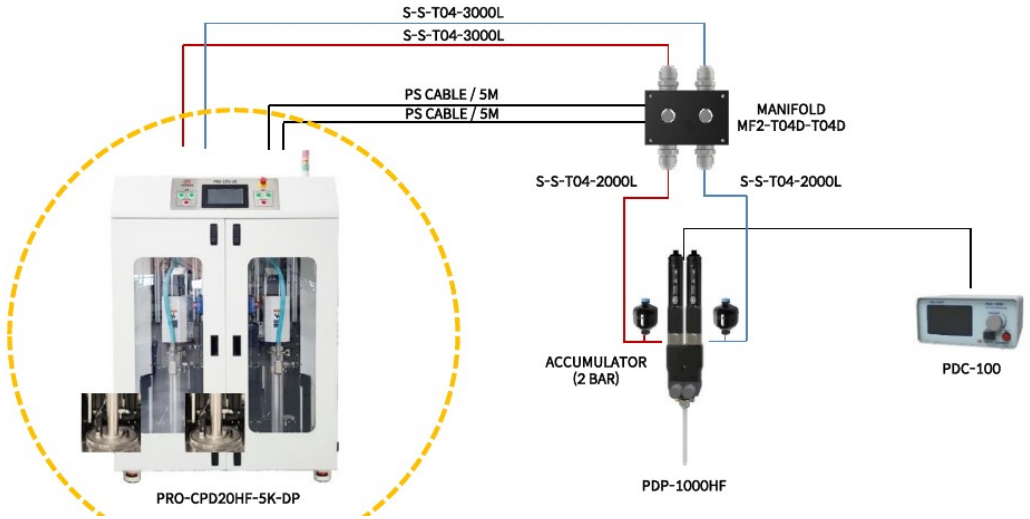
Pumps and feed systems manufactured by TAEHA Corporation, Korea · Supplied, integrated and supported in North America by Dispense Robotics

EV Battery · EV ICCU · 5G module

PRO-CPD20

2K 20 L Can Pump

Electric-motor, high-precision material feed with lineups sized to the pail. Supplies material free of contamination and entrained air, and a proprietary follow plate leaves less than 1% of the material in the pail.



PRO-CPD20HF-5K-DP

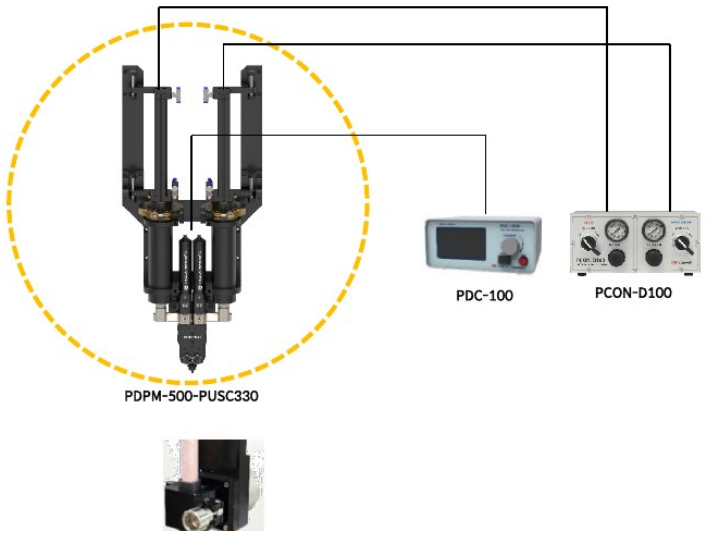
Pumps and feed systems manufactured by TAEHA Corporation, Korea · Supplied, integrated and supported in North America by Dispense Robotics

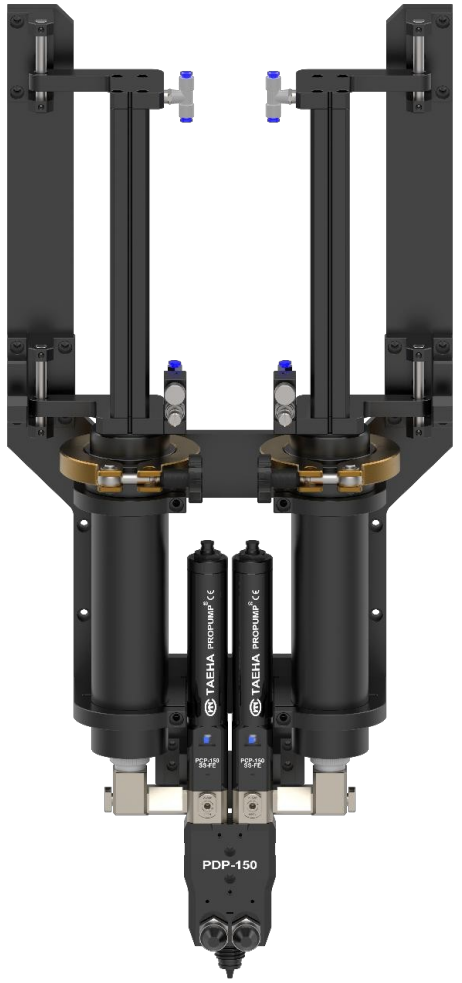
Semiconductor

PDP + PU

2K Pro Pump + Push Unit

Dedicated push units that connect directly to the PRO-PUMP. Mount two-component cartridges on the machine and feed high-viscosity A and B under pressure with no additional material plumbing. Accurate, smooth dispensing at the point of use.





PDPM-500-PUSC330 · PDP-150

Pumps and feed systems manufactured by TAEHA Corporation, Korea · Supplied, integrated and supported in North America by Dispense Robotics

Semiconductor | EV ICCU

Tputty™ 607

Laird · 1K ceramic-filled silicone · 6.4 W/m·K · 3.45 g/cc

PRODUCT DESCRIPTION

Laird Tputty™ 607 is a high thermally conductive single part dispensable material designed with automation and vertical stability in mind. Laird has leveraged its knowledge of thermally conductive fillers and resin systems to develop a single part dispensable that demonstrates reliability in a variety of application orientations.

Tputty™ 607 is ideal for applications that can benefit from automation and allows minimization of SKUs in applications with gap variability. In addition to providing application flexibility and variable gap adaptation, Tputty™ 607 will exert minimal stress on your component while maintaining interface contact to maximize thermal transfer. Combined with Laird's global technical support and global footprint, deploying Tputty™ 607 is easier than ever.

When it is time to integrate Tputty™ 607 into your production environment, Laird can work with your existing dispensing partner or provide recommendations for a dispensing equipment provider.

FEATURES AND BENEFITS

- RoHS compliant
- Complete dispensing solution options available
- 6.4 W/mK
- Demonstrated thermal cycling stability
- Low outgassing per ASTM E595

Available in cartridges (30cc, 75cc, 180cc, 360cc, 600cc) and pails (1 gallon and 5 gallon)

Packaging Size	Fill Volume	Fill Weight
30cc	30cc	105g
75cc (2.5 oz)	58cc	200g
180cc (6 oz)	161cc	556g
360cc (12 oz)	328cc	1130g
600cc (20 oz)	605cc	2090g
1 gallon	4090cc	14kg
5 gallon	5860cc	20kg

TYPICAL PROPERTIES

Laird
Smart Technology. Delivered.™

PROPERTY	TYPICAL VALUE	METHOD
Construction	Ceramic filled silicone dispensable	
Color	Blue	Visual
Thermal Conductivity	6.4 W/mK	Hot Disk
Flow Rate (75cc taper tip, 0.125" orifice, 90 psi)	60 g/min	Laird Test Method - A16724-00
Density	3.45 g/cc	Helium Pycnometer
Flammability	V-0	UL 94
Operating Temperature Range	-40 to 200°C	Laird Test Method
Outgassing TML (weight)	0.204 %	ASTM E595
Outgassing CVCM (weight)	0.01 %	ASTM E595
Dielectric Breakdown	>6000 VAC (at 1 mm)	ASTM D149
Dielectric Constant @ 1MHz	15.0	ASTM D150
Minimum Bond line Thickness	0.150 mm (0.006")	Laird Test Method - A16112-00
Volume Resistivity	10^{13} ohm-cm	ASTM D257

Excerpt reproduced from the manufacturer's technical data sheet for reference. Confirm current values with the material supplier.

EV Battery | EV ICCU

TGF-NT300UL

NanoTIM · 2K gap filler, 1:1 · 3.0 W/m·K · 1.85 g/cc

Features and Benefits

- Conformable
- Low Hardness
- Isolated Electrically
- Minimized Interfacial Resistance
- Superior Thermal Performance
- **Late Surface Curing**

Applications

- Display (LED, LCD, PDP TV etc.)
- Memory Devices
- Custom ASICS Chips
- LED Applications
- Digital Mobile Convergence
- Automobile (motors)

NanoTIM TGF is a thermally conductive gap filling material that is offered as two-part component. The purpose of this material is to improve the heat delivery from the heat source to the heat sink. Depending on the customer's request, the material is available in different viscosity and hardness.

Typical properties of the gap filling material consist of the following characteristics: Thermal conductivity, viscosity, hardness, working time, volume resistivity, etc. It is generally offered in either cartridges or containers, whereas the cartridges are used with a static mixing nozzle and a dispensing gun.

By mixing the two-part component into a single mixed material, the liquid form cures into a solid form depending on the curing time and temperature. Before the liquid form cures completely into the solid form, the material placed in the interface may be conformed or pressurized by the surrounding surfaces to remove as much air layers or gaps as possible.

NanoTIM a Part Number

TGF	NT000[ ]
Thermal Gap Filler	NT - NanoTIM
	000 - Thermal Conductivity
	[ ] - Product Characteristics
	N - Normal
	L - Light
	S - Glass bead add
	U - Ultra
	H - Hyper

ITEM	Test Conditions	Units	NanoTIM	Note
General				
Color	Visual	-	A : Gray B : White	1 : 1
Continuous Use temp	-	℃	-50 ~ 150	-
Viscosity(A)	25℃, 1rpm, No.52 Spindle	cps	150,000	ASTM D2196
Viscosity(B)	25℃, 1rpm, No.52 Spindle	cps	150,000	ASTM D2196
Viscosity(Mix)	25℃, 1rpm, No.52 Spindle	cps	150,000	ASTM D2196
Density	25℃, Gravimeter	g/cc	1.85	ASTM D792
Hardness	Shore	00	46	ASTM D2240
Elongation	-	%	90	ASTM D412
Electrical				
Flame Rating	Vertical Burning Test	-	V-0	UL 94
Withstand Voltage	AC, 3000V	mA	< 0.2	ASTM D149
Volume Resistivity	-	Ω·cm	$> 1 \times 10^{12}$	ASTM D257
Thermal				
Thermal Conductivity	-	W/m·K	3.0	ASTM D5470
Durability				
Heating stability (Thermal conductivity, Breakdown voltage)	150°C, 500hr	%	< 10	-
Cooling stability (Thermal conductivity, Breakdown voltage)	-40°C, 500hr	%	< 10	-
Thermos hygrostat (Thermal conductivity, Breakdown voltage)	500hr (85 ℃, humidity 85%)	%	< 10	-
Thermal Shock Test (Thermal conductivity, Breakdown voltage)	500 Cycle (-40℃ ~ 125℃)	%	< 10	-
Low molecular siloxane	D_3–D_6	ppm	< 100	-
Cure				
Pot life @ 25°C	Time for viscosity to double	Hours	2	-
Cure @ 25°C	Oven	Hours	24	-
Cure @ 100°C	Oven	minutes	30	-
Cure @ 120°C	Oven	minutes	20	-
Cure @ 150°C	Oven	minutes	15	-

Excerpt reproduced from the manufacturer's technical data sheet for reference. Confirm current values with the material supplier.

Bergquist Gap Filler TGF-12000

Henkel · 2K silicone gap filler, 1:1 · 12 W/m·K · 3.03 g/cc

PRODUCT DESCRIPTION

GAP FILLER TGF 12000 provides the following product characteristics:

Technology	Silicone Based 2K Gap Filler
Appearance	Part A: Red Part B: Grey
Mix Ratio in Volume	1:1
Cure	Cure in Room Temperature or High Temperature
Product Benefits	High thermal conductivity Good dispensing efficiency High thermal reliability
Application	Telecom, computing, consumer electronics

TYPICAL BERGQUIST GAP FILLER TGF 12000:

Thermally conductive interface material based on silicone system for electronics cooling applications. Ttro-component product is designed for easy dispensing, assembly and excellent thermal reliability. Specially selected raw materials used for low valablity and long-term reliability in sensitive electronics. Designed for high dispense rate and market leading batch-to-batch flow stability.

TYPICAL PROPERTIES OF UNCURED MATERIAL

Property	Method	Typical Value
Thermal Conductivity	ASTM D5470	12 W/m-K
Flow Rate, Separate Part A/B	30cc EFD tube @90psi	20 g/min
Flow Rate, Mix Part A/B	50cc tube @90psi, V12 tip mixing	2.2 g/min
Bond Line Thickness	Henkel method	0.23 mm
Density	ASTM D792	3.03 g/cc

CURING PROFILE

Cure Schedule	85°C 1 h fully cure
	25°C 1–2 days fully cure

The above cure profiles are guideline recommendations. Cure conditions (time and temperature) may vary based on customers' experience and their application.

TYPICAL PROPERTIES OF CURED MATERIAL

Physical Properties

Property	Method	Typical Value
Hardness, Shore 00	ASTM D2240	75
Volume resistivity	ASTM D257	2.23×10^{13} Ω-cm @1000V
Dielectric Strength	ASTM D149	10.7 kV/mm

GENERAL INFORMATION

For safe handling information on this product, consult the Material Safety Data Sheet.

Storage

Store product in the unopened container in a dry location. Storage information may be indicated on the product container labeling. **Optimal Storager <30°C. Storage greater than 30°C can adversely effect product properties.** Material removed from containers may be contaminated during use. Do not return products to the original container. Henkel Corporation cannot assume responsibility for product which has been contaminated or stored under conditions other than those previously indicated. If additional information is required, please contact your local Technical Service Center or Customer Service Representative.

NOTE

This product is a developmental product. It is not now, and may not be in the future, commercially available. The properties of the uncured material and the physical properties of the cured material have been established as a point of reference only. Henkel recommends that each prospective user test his proposed application before repetitive user using this data as a guide. The discussion herein of various processes or compositions is not to be interpreted as representation that they are free from domination of patents owned by others or as a license under any **Henkel Corporation and its affiliates ("Henkel")** patents that may cover such processes or compositions. This product may contain materials that are not regulatory listed on TSCA, EINECs and other global inventories.

Henkel cannot assume responsibility for the results obtained by others over whose methods Henkel has no control. It is the user's responsibility to determine suitability for the user's purpose of any production methods mentioned herein and to adopt such precautions as may be advisable for the protection of property and of persons against any hazards that may be involved in the handling and use thereof. In light of the foregoing. **Henkel specifically disclaims all warranties expressed or implied, including warranties of merchantability or fitness for a particular purpose, arising from sale or use of Henkel's products. Henkel specifically disclaims any liability for consequential or incidental damages of any kind, including lost profits.**

TRADEMARK USAGE

All trademarks in this document are trademarks and/or registered trademarks of Henkel in the U.S. and elsewhere.

Introduction

Effective thermal management is the key to ensure consistent performance and long-term reliability for many electronics devices. With a wide variety of applications requiring thermal management, the need for alternative thermal management material solutions continues to grow. Henkel has developed an innovative silicone-based 2k gap filler, BERGQUIST GAP FILLER TGF 12000, especially designed for ultimate thermal management and component assembly flexibility.

General Product Description

- Silicone based, 2k gap filler with extra high Thermal Conductivity of 12 W/m-K.
- This liquid dispensed material offers infinite thickness variation and imparts little to no stress on sensitive components.
- Available in separate 2*300cc cartridge.

Key Performance Benefits

- Dispensable liquid, 2K Silicone based Gap Filler
- High thermal conductivity
- Low thermal impedance
- Excellent surface wettability improving thermal performance
- Low curing temperature
- Offers stable adhesion between interfaces after cure.
- Excellent aging performance / reliability
- 2k dispensable liquid, compatible with existing dispensing equipment, providing manufacturing flexibility.

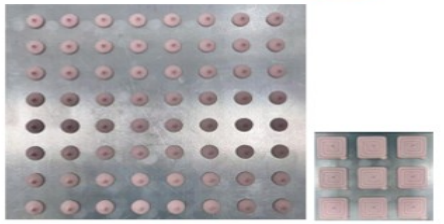


Figure 1. Showing different patterns (0.5 g dot and 3g aquare, mixing Part A/B, pink in color) consistency with a standard dispensing system.

Material Characteristics

Cure Time

There is cure time definition for 2k gap filler products, e.g. "cure time" defined as the point at which the Modulus reaches 90% of its peak value after mixing using Parallel rheometer to cure gap filler samples. Curing can happen at room temperature and can be accelerated with addition of heat. The following table shows the cure time of BERGQUIST GAP FILLER TGF 12000.

Cure schedule for handling stability	
Hours @ 85°C	1.0 hour
Hours @ 25°C	24 hours

Excerpt reproduced from the manufacturer's technical data sheet for reference. Confirm current values with the material supplier.

Compatherm® Filler 9290

Nolato · 1K non-curing thermal filler · 9.0 W/m·K · 3.16 g/cm³

Compatherm Filler 9290 is a one-part thermal filler from Nolato. It is formulated on a non-curing matrix that gives it a thixotropic gel-like consistency, making it highly suitable for automated dispensing.

Compatherm filler 9290 key properties
- High 9 W/(mK) thermal conductivity
- Operating temperature -40 to +150˚C
- Ultra-conforming
- Very good wetting
- Low contact resistance

1. Applications

The product is used to transfer heat from heat sources, such as components on a PCB, to a heat sink. Its thixotropic formulation gives it the ability to cover various gap heights and complex geometries as well as large areas with an extremely low closure force. Its property of not curing but always staying in a viscous state makes it ideal for applications where re-work is expected.

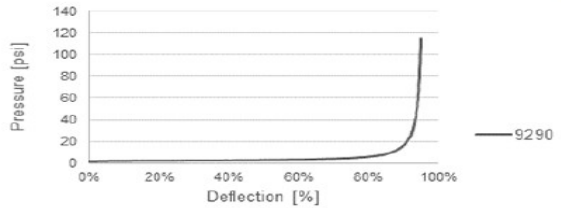
2. Typical Product Data

2.1. Material Properties

	Test procedure	Unit	9290
Base material			Silicone
Colour			Purple/Green
Density	ISO2781	g/cm³	3.16
Thermal conductivity	ISO 22007-2 (Hot Disk)	W/(mK)	9.0
	ASTM D5470	W/(mK)	9.0
Breakdown voltage	ASTM D149	VAC/mm	6000
Outgassing, TML [1)]	ASTM E595 (modified)	%	0.08

1) Outgassing 24h at 150 ˚C under ambient pressure

2.2. Filler Deflection



Test conditions: 10mm/min Gap 5mm

* Graph is provided for general reference only. Actual performance will depend on surface properties and other application specific conditions. Engineers are therefore strongly recommended to test materials in conditions realistic to final application.

2.3. Design Notes

	Test procedure	Unit	9290
Flow rate 3.18mm nozzle @ 90 psi	Nolato	[g/min]	26
Minimum bondline thickness	Nolato	mm	0.25

3. Ordering

When ordering Compatherm material please refer to the thermal guide (https://thermalguide.nolato.com/) or consult the Nolato marketing department.

4. Storage

Compatherm filler 9290 can be stored 6 months after production date at 0 to 30 °C. Cartridges are recommended to be stored nozzle down.

5. RoHS Information

Compatherm filler 9290 fulfils the requirements set by the EU Directive 2011/65 (RoHS).

6. Safety Instructions

Compatherm filler 9290 is not considered as hazardous according to EU Directive 1272/2008 (CLP) and is not subject to the directive of classification, packaging and labelling of dangerous goods. A material safety data sheet can be sent on request.

7. Warranty

The recommendations and data given are based on our experience to date, however, no liability can be assumed in connection with their usage and processing. The typical property data as shown above should not be used as a specification.

Excerpt reproduced from the manufacturer's technical data sheet for reference. Confirm current values with the material supplier.

CoolTherm® SC-1600

Parker Lord · 2K silicone gap filler, 1:1 · 3.7 W/m·K · SG 3.3

Uncured Material Properties*

	SC-1600 Resin	SC-1600 Hardener
Appearance	Pink Paste	White/Grey Paste
Viscosity, cP @ 25°C		
Shear rate** 10/sec	114,000	75,000
Shear rate** 1/sec	318,000	205,000
Specfic Gravity**	3.3	3.3

*Data is typical and not to be used for specification purposes.
**Individual lot values can be found on Certification of Analysis.

Application Recommendations:

Surface Preparation: Cure Inhibitors – Avoid applying CoolTherm SC-1600 gap filler to surfaces that contain cure inhibiting ingredients, such as amines, sulfur, or tin salts. If a bonding surface is in question, apply mixed CoolTherm SC-1600 gap filler to the surface and allow it to set for the normal cure time. A liquid layer of silicone will remain on the surface if an inhibitor is present.

The following is a list of chemical compounds that may inhibit or poison an addition-cured silicone:

Compounds containing Sulfur
- Sulfides
- Thio compounds

Organotin Compounds
- Tin alkoxides
- Tin carboxylates
- Tin catalysts

Compounds containing Nitrogen
- Amines
- Amides
- Nitriles
- Cyanates
- Oximo, Nitroso, Hydrazo, and Azo compounds
- Chelates
  - EDTA
  - NTA

Compounds containing Phosphorous
- Phosphines
- Phosphites

Compounds containing Unsaturated Bonds
- Alkenes and Olefins
- Alkynes
- Acrylates

These compounds can commonly be found in the following materials:
- Latex, vinyl, or neoprene gloves
- Mold release, including those in injection molding plastics
- Natural rubber, rubber bands
- EPDM
- Rubber o-rings, including some used in meter/mix/dispense (MMD) equipment
- RTV silicones containing organo-tin catalysts
- Tin-cured urethanes or amine-accelerated urethanes
- PVC tapes and masking tapes
- Modelling clay containing sulfur
- Polyesters
- Melamine
- Plastics containing residual plasticizers

Surface Preparation: Cleaning – Surfaces may need to be cleaned prior to application of CoolTherm SC-1600 gap filler to avoid cure inhibition. Isopropyl alcohol (IPA) is recommended for use with platinum cure silicones. Ensure that all solvent is dried before applying gap filler, as any remaining solvent could act as a contaminant.

Mixing – Mix CoolTherm SC-1600 resin with CoolTherm SC-1600 hardener at a 1:1 ratio, by weight or volume. Handheld cartridges or automatic meter/mix/dispense (MMD) equipment can be used to avoid any air entrapment in the material which will significantly impact mechanical, electrical, and thermal properties. Manual mixing is not recommended. Mixed & cured properties may vary with mix ratio.

Mix Ratio Checks – At least once a day (preferably at the start of each shift), perform a mix ratio check on each MMD unit dispensing CoolTherm SC-1600 gap filler. Simultaneously dispense the resin and hardener into separate cups, then record the weight of each. The weights should be within ± 5% of each other.

Hardness Checks – Checking the hardness of a mixed sample of material is a good way to check for issues with the MMD equipment, cure inhibition, and different cure profiles. A properly prepared sample can be compared to the batch Certificate of Analysis Shore OO value provided with each lot number. Be sure to use a calibrated durometer with test stand and follow ASTM D 2240-15 for reliable results.

Dispense Equipment Selection:

CoolTherm SC-1600 gap filler should be loaded onto MMD equipment as it arrives from the Parker Lord manufacturing plant. Containers should be shipped and handled upright. No pre-treatment or degas is recommended. Agitation should be avoided. The material should be used within its shelf life to ensure a good product.

Pails of CoolTherm SC-1600 gap filler come with thin protective liners that help reduce the amount of silicone 'bleed.' This is a thin layer of oily fluid that may appear on the top surface of the material. This is a normal condition inherent to silicone gap fillers and is often removed during the purge process performed each time a pail is changed out.

When selecting MMD equipment ensure compatibility with abrasive fillers. Metering units using rod displacement or progressive cavity technology will result in the least wear and tear, offering less frequent preventative maintenance and downtime.

Ask the MMD manufacturer to perform a compatibility test on nonmetallic components from their standard re-work kit for both the pumps and the metering unit. Test for cure inhibition by dispensing a mixed sample of CoolTherm SC-1600 gap filler to the surface and allow it to set for the normal cure time. A liquid layer of silicone will remain on the surface if an inhibitor is present.

For further questions regarding the automated MMD processing of CoolTherm silicone gap filler materials, please review Parker Lord Technical Tips: *Meter/Mix/Dispensing of Parker Lord Silicone Gap Filler Materials*. If technical assistance is needed, please contact your local Parker Lord representative, or e-mail electronicmaterials@parker.com for assistance.

Personal Protection Measures/Equipment:

Respiratory Protection – Respiratory protection is not required under normal working conditions where adequate ventilation is present.

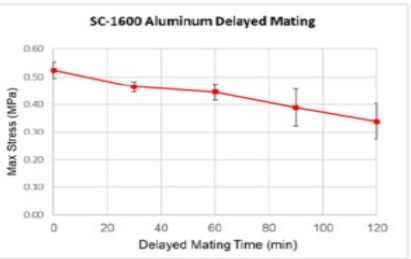
Note: If the exposure limit for formaldehyde is exceeded, a formaldehyde-specific, formaldehyde/organic vapor combination, or airline respirator may be required.

Skin Protection – Use only nitrile gloves to prevent skin contact. Other glove types may inhibit the cure of platinum catalyzed silicones.

Cure Profiles and Behaviors

Working Time	60 minutes @ 25°C
Mix Tip Purging Time & Volume	20 minutes @ 25°C, 60% of mix tip volume
Pot Life* @ 25°C	
10 Hz	244 minutes
1 Hz	208 minutes
Storage Modulus Development Time** When G' is 90% of max value	
@ 25°C	5.8 hours
@ 60°C	2.06 hours
@ 100°C	15.5 minutes

*Time to double viscosity.
**Time to 90% of full cure.



Cured Material Properties*

Thermal Conductivity, W/m-K @ 25°C Hot Disc Transient Method, ISO 22007-2	3.7
Hardness Shore OO with test stand, ASTM D 2240-15	89
Dielectric Breakdown Strength (DC), kV/mm @ 0.8 mm tested via ASTM D 149	12.1
Flammability Rating @ 1.0 mm thickness	UL 94 V-0
UL Relative Thermal Index (RTI)	150°C
Coefficient of Thermal Expansion, ppm/°C	
@ 25°C	55
@ 100°C	71

*Data is typical and not to be used for specification purposes.

Excerpt reproduced from the manufacturer's technical data sheet for reference. Confirm current values with the material supplier.

Dispensing Solutions

Let's talk about your application.

Dispense Robotics
Torch Products Group, Inc. dba Dispense Robotics
1029 S Nova Rd, Ormond Beach, FL 32174
gavin@dispenserobotics.com · dispenserobotics.com

DISPENSE ROBOTICS