ELITE CONSTRUCTION

HIGH WEAR RESISTANCE FOR HIGHLY ABRASIVE MATERIAL

PROVEN QUALITY. LEADING TECHNOLOGY.

ELITE
CONSTRUCTION

Extreme material abrasiveness? Problem solved with Elite™

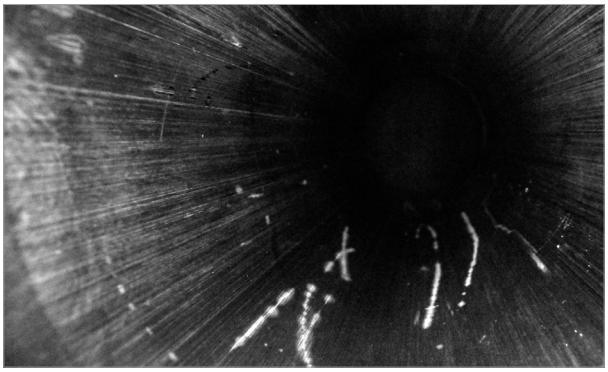
Some thermal interface materials (TIMs) are so abrasive that it's like pumping diamond dust or liquid sandpaper.

What is Thermal Interface Material, and why is TIM so abrasive?

Thermal interface material (TIM) dissipates heat away from components, thus improving their speed, longevity, and dependability. Batteries and electronics especially need heat dissipation so that they perform as consumers expect.

Thermal interface materials (TIMs) contain high-thermal-conductivity particles suspended in medium to high viscosity carrier fluid. The nature of these particles is extremely hard. The higher their concentration in the fluid, the more abrasive the material becomes.

More and more manufacturers are using advanced TIMs that are so abrasive, it's like pumping diamond dust or liquid sandpaper. Such material abrasiveness etches away the surface of fluid paths and seals as it moves through factory dispense pumps and valves for an extended period.



Fluid paths etched by TIMs

Abrasion resistant construction that handles highly abrasive materials with ease

Highly abrasive materials challenge traditional dispense pump construction for electric vehicle battery, electronics and general industrial manufacturing. And the most notorious equipment-shredding culprit is thermal interface material (TIM).

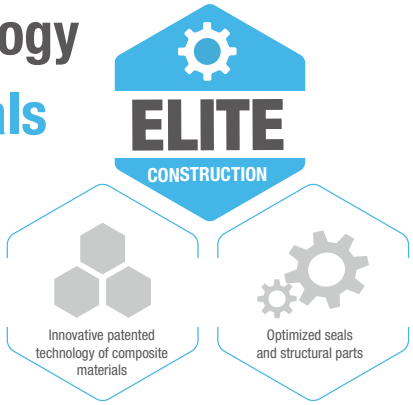
Equipment faces frequent replacement of spare parts. What's more, once the equipment is down, it not only slows down production, it also diverts time and money that would be better spent on improving business.

Graco upgrades the entire dispensing system to improve life performance against highly abrasive material.

To make sure Graco dispense pumps and valves withstand extremely abrasive materials, our innovation team took a new look at their fluid path structures, seals, and mechanism.

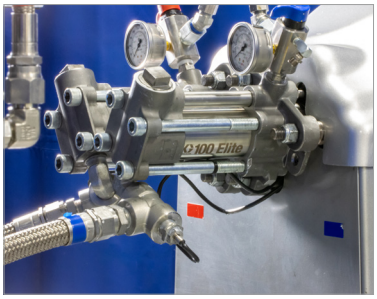
Superior High Wear Resistance Technology

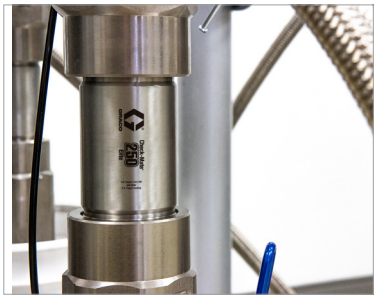
The Best Choice for Abrasive Materials



Elite high wear resistance construction came out of iteration after iteration of design and testing. It combines the innovative patented technology of composite materials with optimized seals and structural parts.

Graco supply pumps, metering systems, and dispense valves with ELITE CONSTRUCTION™, ideal for dispensing highly abrasive epoxies, silicone, TIMs and polyurethanes. Elite series products utilize wear-resistant seals and surface materials to deliver a service life 8 to 10 times than that of equivalent equipment.

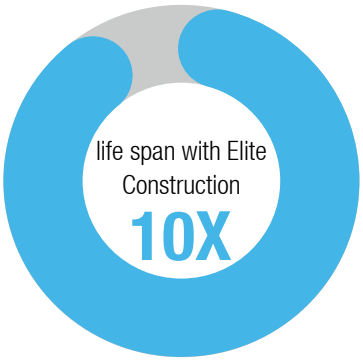




Before noticing any wear on pump pistons and cylinders

200,000 liters

(≈50,000 gallons)



Dispense at least 200,000 liters (50,000 gallons) before noticing any wear on pump pistons and cylinders.

- Get at least 8-10 times more life out of products with Elite construction, compared to standard supply and dispense systems.*

* Results may vary. Variables affecting component life include, but are not limited to, material chemistry/fillers, flow rate, cycle rate, maintenance diligence, and system pressure.

Choose Graco systems with Elite construction to dispense:

- Thermal interface materials (TIMs)
- Thermal conductive adhesives (TCAs)
- Silicone
- Epoxies
- Polyurethane

Applications:

Thermal gap filling | Thermal bonding | Thermal potting

Graco Systems with Elite Construction:

Solutions for New Energy Battery Assembly

The performance of a battery is highly dependent on efficient thermal management. Thermal interface materials (TIMs) or gap fillers dissipate heat away from battery modules to the cooling circuits on the battery pack.

Ideal heat-conduction performance often requires high-flow dispensing with robust pumping and precise metering, and air gaps must be avoided during dispensing for optimal heat transfer.

SUPPLY SYSTEMS

> 5 gallons

Check-Mate®

Pneumatic Supply Pump

- Ideal for medium to high viscosity materials
- Used alone or with elevator/piston
- 23:1 to 55:1 pressure ratio range
- Minimizes residues and waste
- High quality, durable parts
- Trackable material usage and flow

> 5 gallons

E-Flo® SP

Electric Supply Pump

- Improved process and system performance
- Advanced material control
- Significant energy savings
- Electric pump that does not need compressed air; noise-free motor
- Minimized downtime
- Lower maintenance costs

TWO-COMPONENT METERING SYSTEMS

0.03–100 cc

PR-Xv™

Variable Ratio Meter, Mix and Dispense

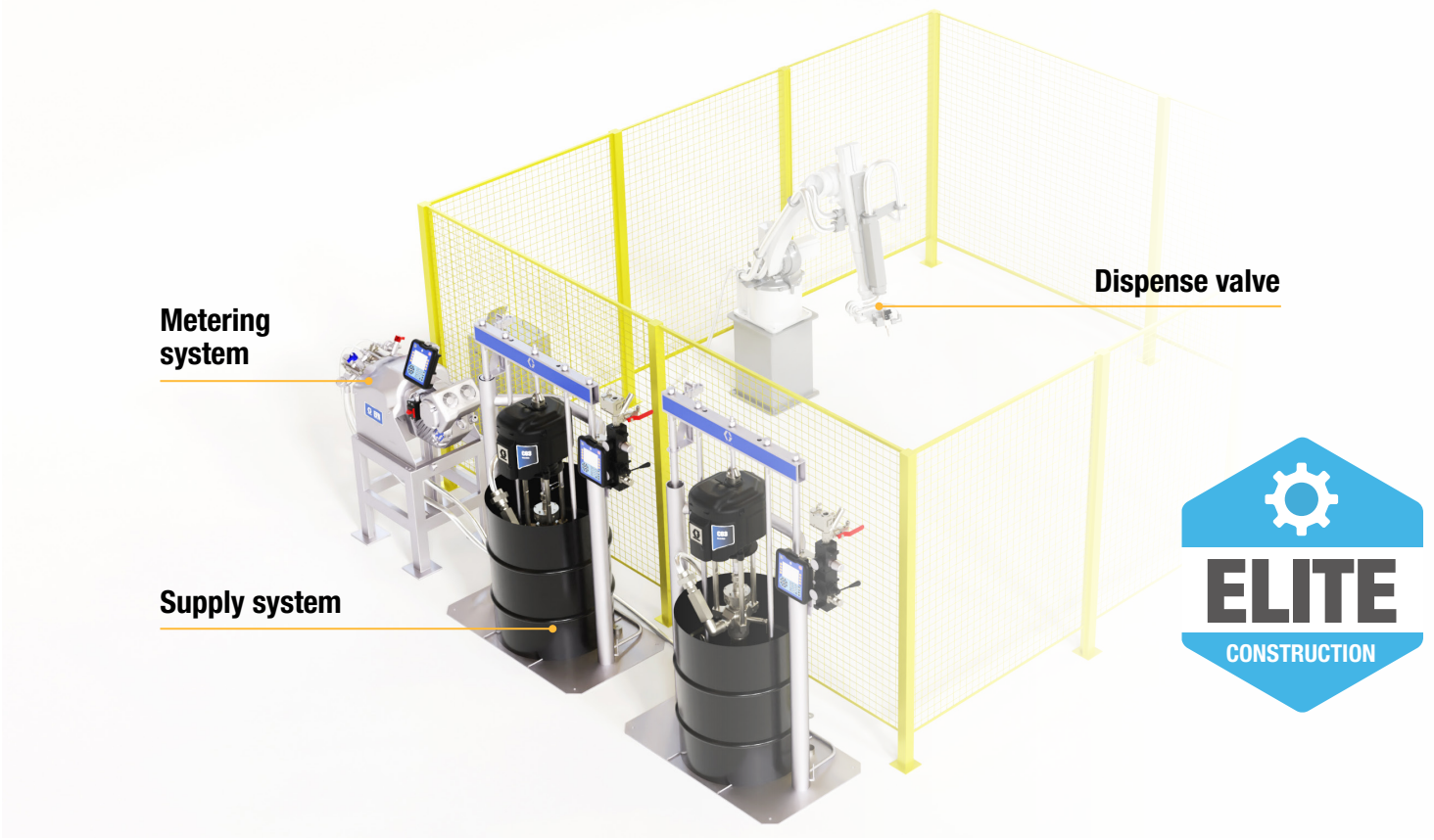
- Variable ratio improves flexibility and adaptability to a variety of applications
- A wide range of shot sizes for low to high flow dispensing
- The base purge function minimizes mixer consumption and material waste

0.1 cc to continuous flow

EVR / EFR

Electric Variable Ratio or Electric Fixed Ratio Meter, Mix and Dispense

- Highly accurate, even at low flow rates
- Capable of shots, beads and continuous flow dispense
- Superior repeatability
- Capable of handling a wide range of materials
- Easy to set up, operate and maintain
- Flexibility and adaptability to a variety of applications



ELITE CONSTRUCTION

TWO-COMPONENT DISPENSE VALVES

1 cc to continuous flow

HFR™
Hydraulic Fixed Ratio Meter, Mix and Dispense

- High precision and repeatability, ideal for medium to high viscosity materials and high flow dispensing applications
- Modular design and affordable price lower the barrier to advanced technology
- Compact and space-saving design
- Advanced controls to monitor the system

* For the specific part number, please contact a Graco representative

MD2
Mixing Dispense Valve

- Fewer parts for easy cleaning
- Complete modular design adapts to different installation needs
- Minimizes maintenance time and costs

TC
Twin Control Valve

- Controls A/B fluid path independently for less maintenance and higher efficiency
- Base purge allows for minimizing material waste

MDX
High Flow Mixing Dispense Valve

- Maximum flow rate: 150 cc/s (depending on the material viscosity)
- Compact structure and advanced materials compatibility allow for easy integration

Graco Systems with Elite Construction:

Solutions for Electronics Assembly

Automotive electronics are increasingly characterized by high levels of integration and power density, allowing for a significant increase in electrical performance.

Thermal conductive adhesives for chips and thermal interface materials can efficiently dissipate the heat generated in electronic vehicles. This includes the battery management system (BMS), on-board charger (OBC), inverter, the electronic control unit (ECU), automotive display, and radar. Structural thermal paste also provides heat conduction and structural bonding in automotive lights.

SUPPLY SYSTEMS

SINGLE-COMPONENT METERING SYSTEMS

Cartridge to 1 gallon tank

> 5 gallons

0.005-25 cc

0.03 cc to continuous flow

DynaMite™

Supply Pump

- Compact design with a small footprint
- High wear resistance for extended service life
- Highly precise fluid delivery
- Built for harsh environments

Check-Mate®

Pneumatic Supply System

- Ideal for medium to high-viscosity materials
- Used alone or with elevator/piston
- The pressure ratio range of the Elite series: 23:1 to 55:1
- Minimizes residues and waste
- High-quality, durable parts
- Trackable material usage and flow

PSM™

Precision Shot Meter

- Servo-driven motor and high precision meter ensure high accuracy and consistency in micro dispensing
- Multiple shot sizes
- Compact, lightweight and easy to integrate
- Ultra wear resistant materials and structure for dispensing abrasive TIMs with minimum maintenance required
- Adjustable configuration and flow rate for multiple applications

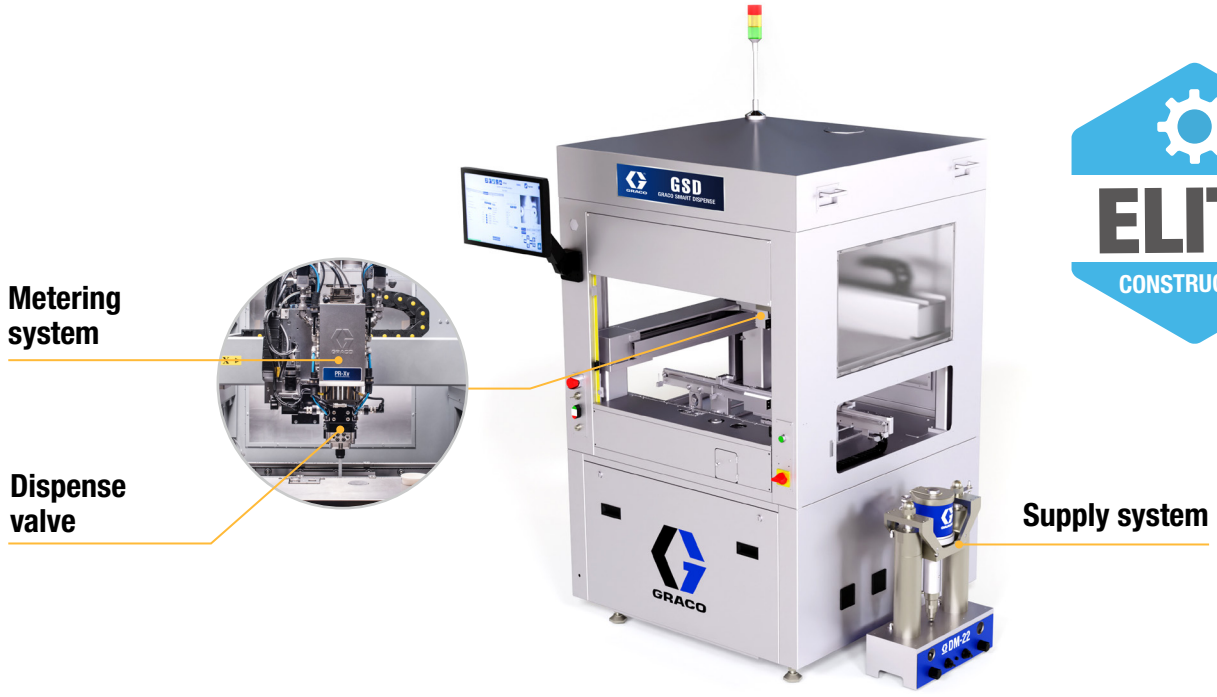
* For the specific part number, please contact a Graco representative

PCP

Progressive Cavity Pump

- Ideal for medium to high-viscosity fluids
- Handles abrasive materials with ease
- Longer service life
- Easy to maintain

* For the specific part number, please contact a Graco representative



ELITE CONSTRUCTION

TWO-COMPONENT METERING SYSTEMS

0.01–50 cc

0.1 cc to continuous flow

PR-X or PR-Xv30

Fixed or Variable Ratio Meter, Mix and Dispense

- High accuracy and repeatability
- High wear resistance and advanced fluid path
- Ideal for dispensing high viscosity and abrasive materials
- Compact, lightweight, and easy to integrate into automated production lines
- Flexibility and adaptability for a variety of application needs
- Shot size: PR-X 0.03-50cc, PR-Xv30 0.01-30cc

* For the specific part number, please contact a Graco representative

EVR or EFR

Fixed or Variable Ratio Meter, Mix and Dispense

- Highly accurate, even at low flow rates
- Capable of shots, beads and continuous flow dispense
- Superior repeatability
- Capable of handling a wide range of materials
- Easy to set up, operate and maintain
- Flexibility and adaptability for different applications

TWO-COMPONENT DISPENSE VALVES

TC

Twin Control Valve

- Controls A/B fluid path independently for less maintenance and higher efficiency
- Base purge allows for minimizing material waste

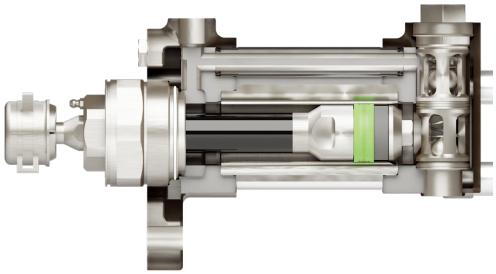
MD2

Mixing Dispense Valve

- Fewer parts for easy cleaning
- Complete modular design adapts to different installation needs
- Minimizes maintenance time and costs

Ordering Information

System	Part No.	Description
Supply system	EMCK273	ESP electric supply system, D200, CM500CE, 240V, ADM, ELITE abrasion-resistant
	EMCM123	ESP electric supply system, D60, CM250CE, 240V, ADM, ELITE abrasion-resistant
	EMCM273	ESP electric supply system, D200, CM250CE, 240V, ADM, ELITE abrasion-resistant
	EMCK271	ESP electric supply system, D200, CM500CE, 240V, w/o ADM, ELITE abrasion-resistant
	EMCM121	ESP electric supply system, D60, CM250CE, 240V, w/o ADM, ELITE abrasion-resistant
	EMCM271	ESP electric supply system, D200, CM250CE, 240V, w/o ADM, ELITE abrasion-resistant
	CM5059	Pneumatic supply pump, 14:1, 3.0 RAM, 200L, ELITE abrasion-resistant
	CM5N79	Pneumatic supply pump, 42:1, 6.5 RAM, 200L, ELITE abrasion-resistant
	CM5K59	Pneumatic supply pump, 26:1, 3.0 RAM, 200L, ELITE abrasion-resistant
	CM3K59	Pneumatic supply pump, 29:1, 3.0 RAM, 200L, ELITE abrasion-resistant
	CM3K4B	Pneumatic supply pump, 29:1, 3.0 RAM, D60, 20L, ELITE abrasion-resistant
	25T471	DynaMite supply pump, 300 cc, 22:1
	25T472	DynaMite supply pump, 600 cc, 22:1
	25T473	DynaMite supply pump, 1 GAL, 22:1
Metering system	2006052	PSM15 system, supply pump feed, direct, abrasion-resistant, I/O
	2006932	PSM15 system, supply pump feed, direct, abrasion-resistant, PROFINET
	2006934	PSM15 system, supply pump feed, direct, abrasion-resistant, ETHERNET IP
	25S148	PSM25 system, supply pump feed, direct, abrasion-resistant, I/O, Snuff-Back
	2000829	PSM25 system, supply pump feed, direct, abrasion-resistant, I/O, Tip Seal
	2001634	PSM25 system, supply pump feed, direct, abrasion-resistant, I/O, Ball Seat
	25R129	PR-X system, supply pump feed, direct, abrasion-resistant MD2 valve, 1:1
	2001181	PR-X system, supply pump feed, direct, abrasion-resistant MD2 valve, 2:1
	25S182	PR-Xv system, supply pump feed, direct, abrasion-resistant TC valve, 1:1 to 5:1
	25S198	PR-Xv system, supply pump feed, direct, abrasion-resistant TC valve, 2:1 to 10:1
	SN9299	EVR system, 240V, ADM, stainless steel, without Z pump
	EFR2AXXX	EFR, 240V, ADM, without Z pump
Z Pumps	L020S8	Z pump, 20 cc, S8
	L040S8	Z pump, 40 cc, S8
	L080S8	Z pump, 80 cc, S8
	L100S8	Z pump, 100 cc, S8
	L120S8	Z pump, 120 cc, S8
	L160S8	Z pump, 160 cc, S8
Dispense valve	26D919	TC valve, abrasion-resistant
	255900	MD2 dispense valve, 1:1, Elite with hard seats, Adjustable stroke
	255901	MD2 dispense valve, 1:1, ELITE abrasion-resistant, snuff back
	26D274	MDX two-component high-flow dispense valve



Cutaway of Z Pump with Elite Construction

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Contact us today!

Please call 86 512 62605711 or
email CSChina@Graco.com to contact a Graco representative.

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