REACTOR®
RATIO ASSURANCE

Multi-tiered system to monitor, detect and prevent off-ratio conditions

PROVEN QUALITY. LEADING TECHNOLOGY.

MADE IN THE USA WITH GLOBAL COMPONENTS

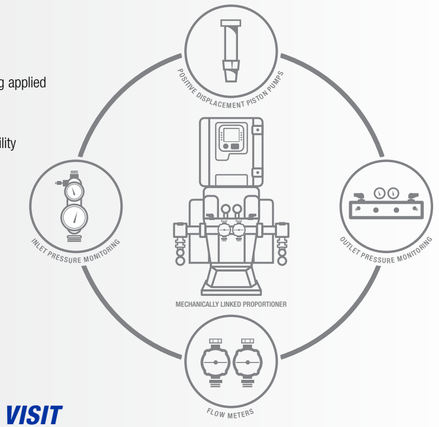
GRACO'S RATIO ASSURANCE SYSTEM

THE NEED FOR RATIO ASSURANCE

- Peace of mind for the customer and contractor
- Eliminate costly repairs and call backs
- Detect issues quickly and stop off-ratio foam from being applied
- Reduce the risk of applying 'bad foam'
- Ensuring and maintaining on-ratio spraying allows for optimized mixing, improved yield and improved profitability

A ROBUST MULTI-TIERED RATIO ASSURANCE SYSTEM WILL PROVIDE THE BEST RESULTS IN MAINTAINING ON-RATIO SPRAYING

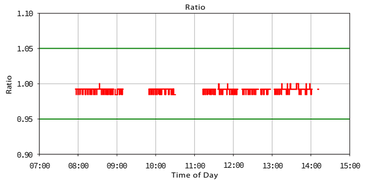
- Mechanically linked pumps
- Positive displacement piston pumps
- Inlet pressure monitoring
- Outlet pressure monitoring
- Flow meters



TO LEARN MORE, VISIT GRACO.COM/REACTORRATIO

REACTOR RATIO GRAPH

- Easily view, save, and print a ratio graph using Reactor Connect
- Quick visual way to identify the ratio variability throughout the day
- Use the graph as a sales tool and as documentation for your own liability protection



SINGLE-POINT VARIABLES

It is important to understand the types of issues that may cause off-ratio foam to be sprayed. These issues are called 'Single-point variables'. One detection method can not quickly catch all issues. It is important to have a robust ratio monitoring system that incorporates both pressure and flow meter monitoring.

GOOD:
The device will detect the issue but detection will take the longest. This detection method is the least sensitive method of detection and should not be relied upon as the primary detection method

BETTER:
The device will detect the issue but detection may take longer. The issue may also have to become more severe to be detected

BEST:
The device is the preferred method to detect the issue. This detection method will be the most sensitive so detection will be the fastest

Category Type	Single-Point Variables	Reactor Detection Method		
		Inlet Pressure Sensor	Outlet Pressure Sensor	Flow Meters
Air in fluid stream	Run away feed pump/Running out of chemical	NA	Better	Better
	Trapped air in the feed line and/or proportioner	NA	Good	Best
Undersized feed pump	Too large of a mix chamber being used	Best	Good	Better
	Too high of proportioner pressure setting	Best	Good	Better
	Too long of a trigger pull	Best	Good	Better
Poor material feed to proportioner	Cold material(s)	Best	Better	Good
	Feed pump pressure set too low	Best	Good	Better
	Damaged feed pump (seals, check ball, air motor)	Best	Good	Better
	No feed pump pressure	Best	Good	Better
	Plugging inlet filter	Best	Good	Better
Proportioner pump issue	Damaged proportioner pump foot valve ball/seat	Best	Good	Better
	Damaged proportioner pump piston ball/seat	NA	Better	Best
	Damaged proportioner pump seal	NA	Better	Best
Fluid leaks	Leak between proportioner pump and flow meter	NA	Better	Best
	Leak in heated hose	NA	Best	NA
Restriction after flow meter	Blockage in heated hose, build-up on ID of hose(s) **	NA	Best	NA
	Plugged gun filter **	NA	Best	NA
	Gun impingement port plugging **	NA	Best	NA

Not Applicable (NA): Device cannot detect this type of issue

*** May not cause off-ratio dispensing but may cause impingement mix issues.*

COMPONENTS OF GRACO'S RATIO CONTROL SYSTEM

POSITIVE DISPLACEMENT PISTON PUMPS

- Provide consistent volumetric performance over a large range of temperatures, pressures and viscosities
- More accurate for use in start and stop applications and for holding stall pressure

INLET PRESSURE MONITORING

- Best way to detect feed pump and inlet filter issues
- Best at detecting: Poor material feed to the proportioner, a feed pump too small for the desired flow rate, damaged proportioner pump foot valve ball/seat

OUTLET PRESSURE MONITORING

- Can help detect conditions that may cause poor impingement mixing of the A and B chemicals in the mix chamber of the gun. Even when chemicals are on ratio
- Best at detecting: running out of chemical, a leak in the heated hoses and restrictions in the gun

FLOW METERS

- Flow meters tie the complete system together as a way to measure, monitor, and record true volumetric flow.
- Best at detecting running out of chemical, trapped air in the feed hoses, damage to the proportioner pump

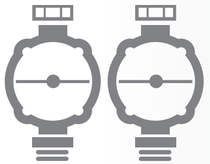
COMPARING PUMP TYPES

MECHANICALLY LINKED PUMPS

- All Reactors use mechanically linked pumps
- Mechanically linked pumps naturally want to pump equal amount of A and B chemical on each stroke
- **The Reactor's ratio is not dependent on the flow meters.** No system adjustments are being made using the flow meter data

NON-MECHANICALLY LINKED GEAR PUMPS

- **Must rely on flow meters to control the pump and the ratio since the pumps are not accurate enough to control ratio directly**
- Non-Mechanically linked systems are constantly adjusting flow rates, which results in continuously over and under shooting the desired ratio
- These systems have an inherent risk of being off ratio if there is an issue with a flow meter. The system may be making decisions based on faulty feedback from the flow meter, yet the systems thinks it is on ratio and allows you to continue to dispense material
- Risk of complete shutdown if flow meters stop working or stop communicating with the controller



UNDERSTANDING FLOW METERS

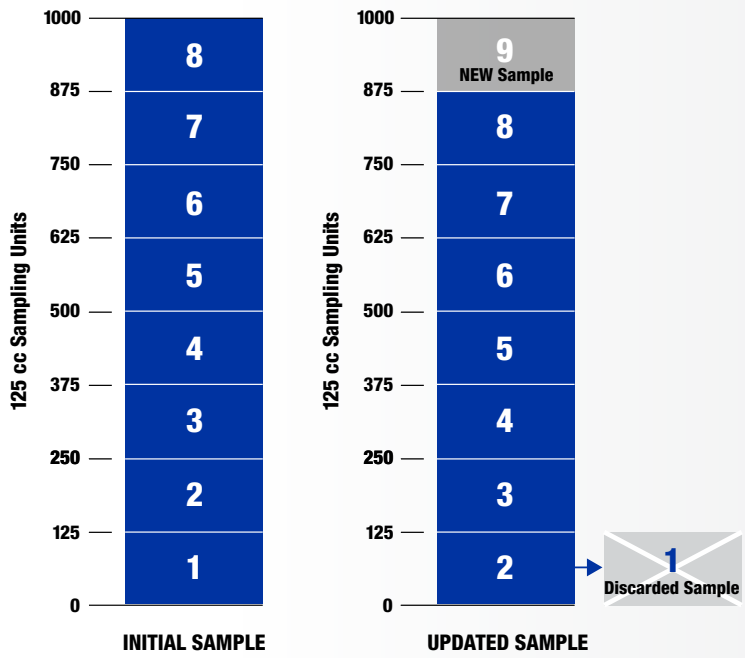
- A flow meter is an instrument used to measure volumetric flow rate
- There are many types of flow meters available Reactor's use oval gear flow meters
- Oval gear flow meters are a type of positive displacement flow meter
- Oval gear flow meters are a simple, accurate, cost effective and robust flow meter ideally suited for fluids having a range of viscosities

HOW OVAL GEAR METERS WORK

- Two interlocking oval shaped gears offset by 90 degrees rotate within a chamber of known volume
- As these gears turn, they repeatedly fill and empty a very precise volume of fluid between the outer oval shape of the gears and the inner chamber walls
- Each complete 180 degree rotation of the gears is called a pulse. The flow rate is then calculated based on the number of pulses recorded
- The Reactor is capable of measuring hundreds of pulses per second

VOLUME IS IMPORTANT TO RATIO

Calculating ratio using the correct volume of material is important to detect true ratio issues and to avoid nuisance alarms. Graco is calculating ratio using the most recent 1000cc volume (0.26 gal) of material dispensed.



THE GOAL IS TO DETECT AN OFF-RATIO CONDITION IN REAL TIME

- The ratio is constantly recalculating based on 125 cc samples
- Every time 125 cc's of new material is sprayed that oldest sample of 125 cc's is dropped and the new 1000 cc ratio is recalculated using the 8 most recent 125 cc samples

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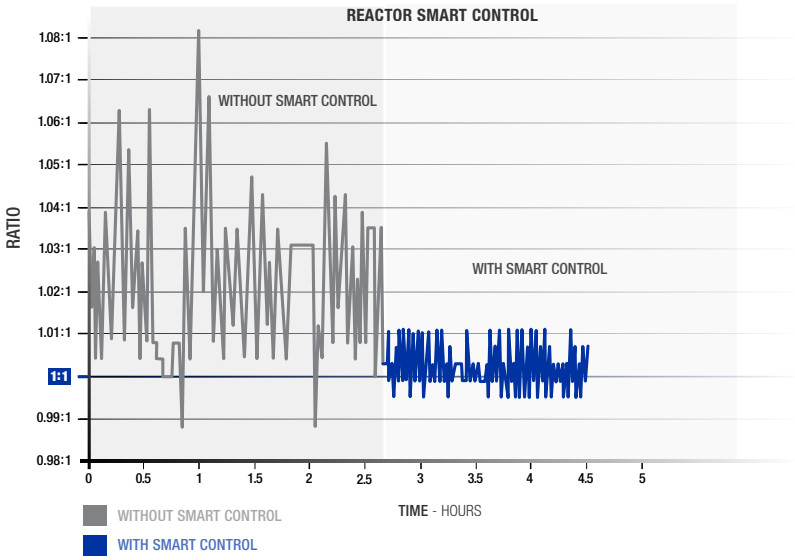
REACTOR SMART CONTROL

Graco has developed new software for Reactor 2 and Reactor 3 electric models called Smart Control. Smart Control will automatically make adjustments to the Reactor to prevent off-ratio dispensing.



HOW THIS WORKS:

- Electric Reactor pumps are double-acting. This means chemical is pumped out on the UP and DOWN stroke of the pump. However, chemical is only taken into the pump on the fill stroke (UP direction)
- Smart Control runs the pump at a speed to allow for proper material feed. When the inlet pressure is insufficient to properly feed chemical into the pump, the Reactor will run slower on the UP stroke To compensate for the loss of speed, the pump runs faster on the DOWN stroke
- Running pumps slower on the up stroke and faster on the downstroke maintains consistent pressures at the gun

Every Graco purchase comes with A+ Customer Service.

Questions?
Call (844) 241-9499

For more information visit graco.com/contractor