



# Understanding Gear Pumps Part I



This is the first article in a three-part series on gear pumps. In this article we provide a limited response to a competitor publication regarding gear pumps. As we mentioned in a previous post, the information provided in the publication was inaccurate, and often taken out of context and missing some very relevant facts. Also, where opinions are represented as facts, we have included follow up questions should you want to follow up with your equipment manufacturer.

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It has always been our goal to advance our industry through providing accountability and transparency. This is good for the industry as a whole. In the following, we will address the various topics and provide the correct context to the content that was provided.

## Competitor Statement:

### 1. Accurate, repeatable dispensing with every stroke

Gear Pumps	Piston Pumps
<ul style="list-style-type: none"><li>• Gear Pumps experience “fluid slip”.</li><li>• Fluid slip is the quantity of fluid that leaks from the higher-pressure discharge area to the lower-pressure suction area of the pump</li><li>• Fluid slip occurs because all gear pumps require some clearance between the rotating elements and the pump housing. This clearance provides a leak path between the discharge and suction sides.</li><li>• Gear pump components will also wear over time, causing an increase in fluid leakage and fluid shear.</li></ul>	<ul style="list-style-type: none"><li>• Positive displacement piston pumps provide consistent volumetric performance over a large range of temperatures, pressures and viscosities.</li><li>• Piston Pumps are designed to hold stall pressure and can maintain accurate volume per cycle over long periods of use, even with aggressive fluids.</li></ul>

## Akurate Response:

- Gear pumps do experience fluid slip. Akurate’s systems are computer driven and calculate for this occurrence.
- We agree with bullets 2 and 3 for systems that are not calculating to compensate for these fluid slips, the system would not be operating correctly. As stated above, we account for this.
- Gear pumps can wear. It’s important to use the best materials.
- Our gear pumps are not “off the shelf”. They are specifically designed for the fluids in this industry.
- Piston pump rebuild and maintenance can be a significant expense and is necessary for on-ratio spraying per Graco’s White Paper on Ratio Assurance.
- Akurate offers a guarantee on our gear pumps. If maintenance is required, customers can exchange their gear pumps to avoid future downtime.
- If this is true, why is ratio assurance needed? How is this proven today, numerically?
- This is misleading. Piston pumps do hold stall pressure. Gear pumps also hold stall pressure if the system is designed with a check valve. Our system does have a check valve (input and output side), therefore making it a non-issue for comparison purposes.

# Competitor Statement:

## 2. Capable of maintaining ratio

Gear Pumps	Piston Pumps
<ul style="list-style-type: none"><li>• Due to fluid slip, gear pumps depend on flow meters to maintain ratio</li><li>• In this equipment set-up, it is imperative that the flow meters are calibrated often to maintain accuracy</li><li>• If flow meters are not calibrated, they may drive the system unknowingly off-ratio by attempting to make ratio corrections and adjustments without knowing the true ratio</li><li>• This provides a false sense of security because the system is reporting the ratio to be correct when in reality it may be dispensing off-ratio product</li></ul>	<ul style="list-style-type: none"><li>• Graco proportioners utilize mechanically linked positive displacement piston pumps that are not dependent on flow meters to control volume dispensed or to maintain ratio</li><li>• By mechanically linking the pumps each time the A pump is cycled the B pump must also cycle. This results in automatically pumping equal volumes of both A and B materials</li><li>• Mechanically linked pumps provide consistent ratio in a tight tolerance band</li></ul>

## Akurate Response:

- We agree that due to fluid slip, gear pumps depend on flow meters to maintain ratio. Flow meters are an integral part of our system functionality and the reason we use high resolution flow meters vs low resolution flow meters (2,400 pulses per liter vs. 8 pulses per liter).
- Flow meter calibration is dependent on the metals and application of the flow meters
- Regarding our flow meters, our flow meters should be recalibrated approximately once every 7-10 years per our calculations and manufacturer specification (exact numbers are not offered due to trade secrets). We would not define this as "often".
- We agree with bullet point #3. We have selected the most reputable, high-resolution flow meter for that exact purpose. Junk products provide junk results. We invested in the best.
- Our system is verifiable and therefore reporting correct ratio.
- Piston pumps are not dependent on flow meters yet are required for ratio assurance. They recognize the importance of flow meters on page 5 of Graco's Ratio Assurance White Paper.
- We feel that many variables need to be accounted for in order for there to be consistent volume disbursement; tolerance stack up, diameter of pump housing, strong length consistency and piston alignment.
- Flow meters in this capacity function as a monitoring/alarm mechanism which can be activated or deactivated depending on user-determined tolerances. The alarms can be deactivated or ignored by the user.
- Quantitatively how do you define consistent? Akurate stands by a 2% tolerance, "close enough" or "really close" is not measurable.
- Will Graco stand behind a contractor in court regarding their consistency in pumping ratio?



## Competitor Statement:

### 3. Able of handling a range of ambient conditions

Gear Pumps	Piston Pumps
<ul style="list-style-type: none"><li>• For high temperature applications, it is important to ensure that the operating temperature range is compatible with the pump specification.</li><li>• Thermal expansion of the casing and gears reduces clearances within a pump and this can also lead to increased wear, and in extreme cases, pump failure</li></ul>	<ul style="list-style-type: none"><li>• Temperature has little to no effect on the function of piston pumps when designed with appropriately temperature related seals</li></ul>

## Akurate Response:

- This is the same in both systems. We constantly educate our contractors to heat their rigs to ensure material is at manufacturer specifications when being processed.
- Our system is designed to analyze pressures, fluid rates, and temperatures to dynamically adjust the system (motor speeds or pre-heater temperatures) to ensure the equipment sprays on ratio.
- Specific to gear pumps and extreme temperatures, temperatures would need to be un-livable to impact our equipment. The foam would lose blowing agent or other equipment would fail before the proportioning system being impacted.
- We disagree, temperatures of materials can impact either proportioning system. Biggest difference, does the system auto-correct, or do you get an alarm?
- Graco's White Paper on Ratio Assurance (page 21) states that the temperature of material is one of the single-point variables that can impact off-ratio application. If temperature doesn't impact your system, why is it a variable?