



**Micro Pump Technology &
Advanced Engineering Services**

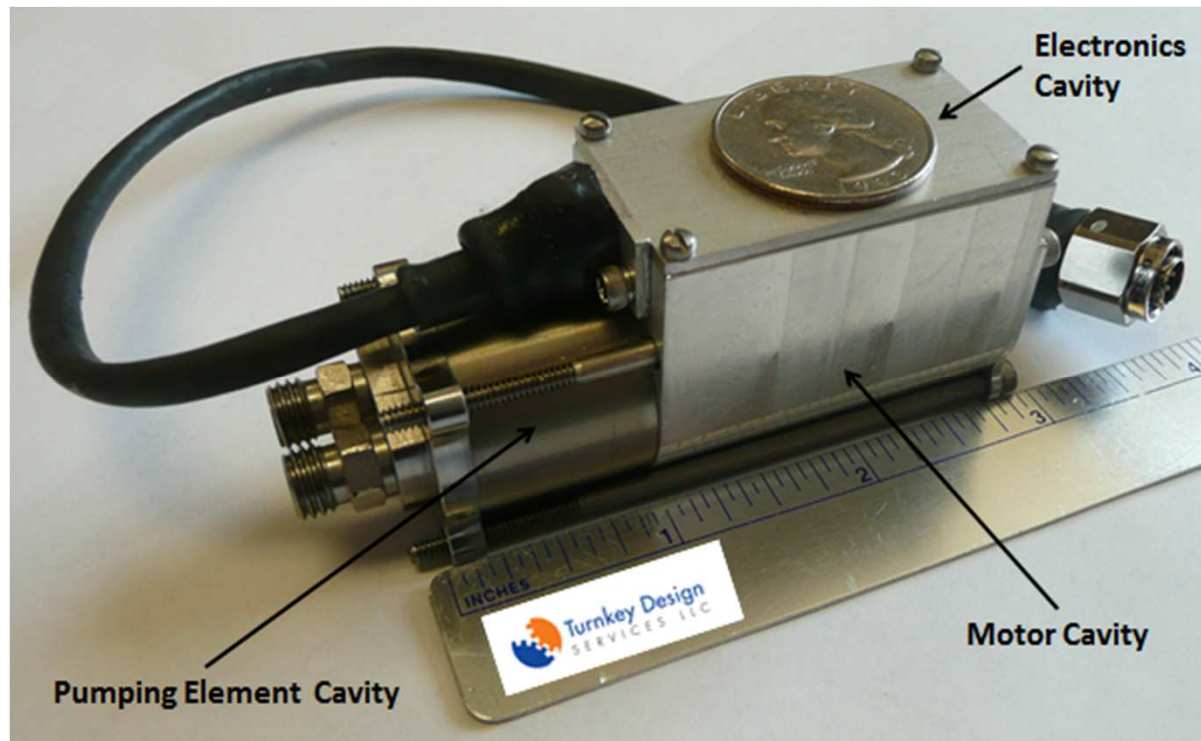
Flow On Demand Technology *12757 S. Western Ave. Suite 229, Blue Island, IL 708-293-1120*

Turnkey Design Services Micro Pump Technology

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Flow On Demand Technology



Turnkey Design Services MFP30-1 Pump



Technology Description

Flow On Demand Technology

- **Baseline and Smart Configurations**
 - Input voltage range: 24-32 Vdc, 28 Vdc nominal regulated
 - Flow set by 4 to 20 mA or 0-5 V command input
 - Fuel inlet temperature: -40°F to 160°F
 - Flow metering accuracy $\pm 1.5\%$
 - Over a 12 inch dry lift and self-priming capability
 - Can operate with an interrupted fuel/oil supply for 5 minutes with no performance degradation
 - Can handling fluid viscosities up to 5500 cSt
 - 1s rise and fall transient response time



Smart Pump Configuration

Flow On Demand Technology

- Capable of delivering the commanded flow independent of temperature
 - Measure fluid temperature
 - Look up required motor speed for set flow command
 - Closed loop control on speed
- Communicate with engine controller
 - Transmit and receive signals
 - Status signal
 - Fault
 - Health status
 - Uses flow sensor to monitor flow at set motor speed and compare to baseline for health status (internal wear/life)
 - Monitor current and compare to baseline for health status (bearing wear/life)



Advantages over Competitors

Flow On Demand Technology

- **Smaller and Lighter**
 - Fully integrated pump, motor and controller
 - All components are designed in-house
 - Capability to operate at higher motor speeds
 - Patent pending technology
 - Higher hydraulic efficiency and suction performance
 - Less leak paths and easier to control mfg. tolerances
- **Better Performance**
 - Metering accuracy
 - Transient response
 - Lower power consumption



Advantages over Competitors

Flow On Demand Technology

- V/L Capability
 - Better filling capabilities
 - Lower required charging pressure
 - Less prone to cavitation
 - Break up bubbles
 - When vapor enters pump it is broken up to smaller manageable pieces
 - Accumulator
 - Pump inlet is feed thru a filled accumulator so that inlet remains charged
- Higher Resistance to Contamination
 - Torturous path before entering pump inlet (bubble masher)
 - Metal particles are attracted to the motor permanent magnets
 - Heavier dirt particles are slung to the outside and flow to inlet is inside



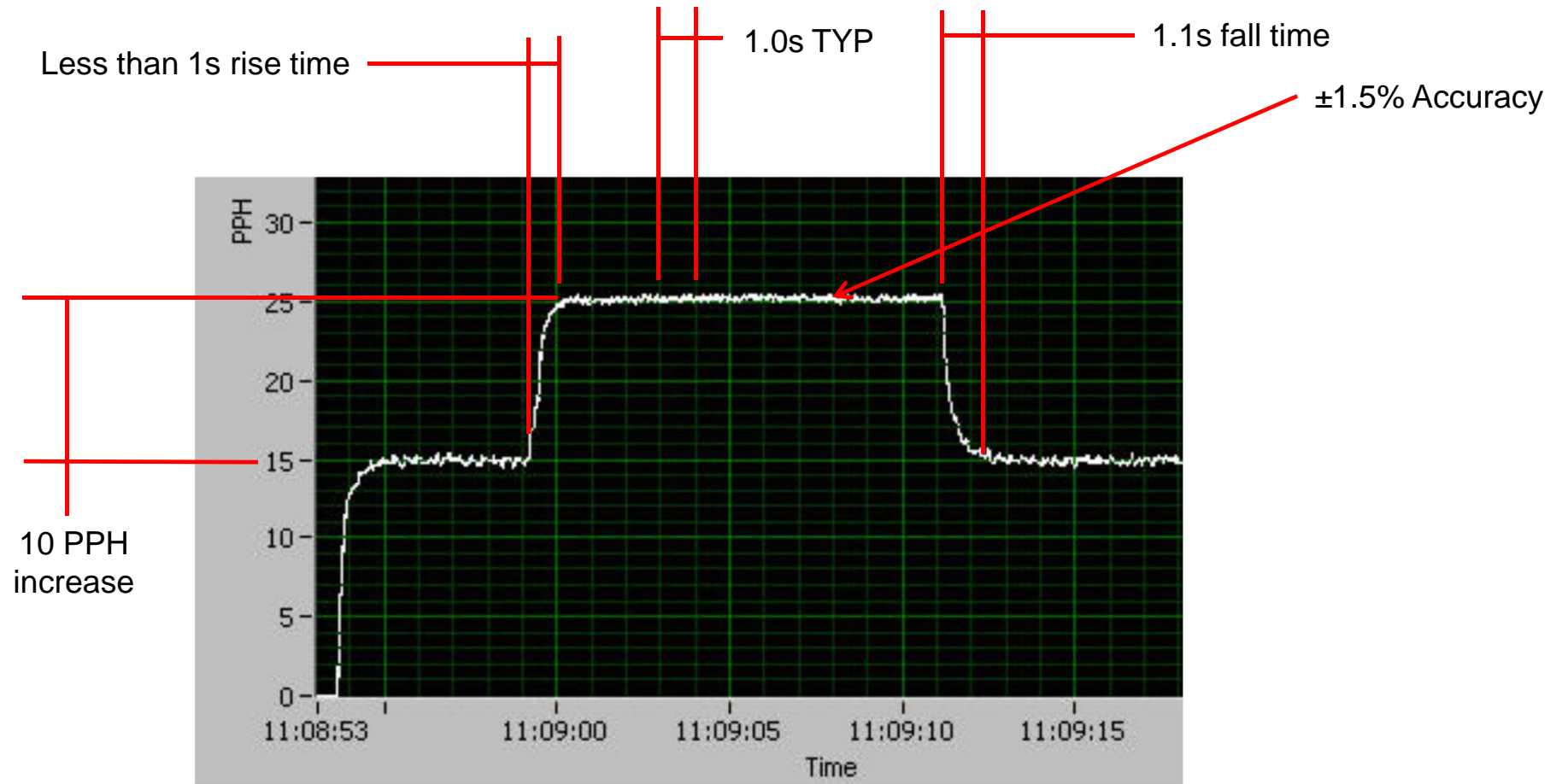
Advantages over Competitors

Flow On Demand Technology

- Lower Cost
 - Many flow/pressure variations using common generic hardware
 - Microprocessor, cam eccentricity and rotor
 - High cost materials/coatings not required to meet life requirement
 - Easier to machine hardware (simple shapes)
 - No hall effect sensors, bonding and wiring

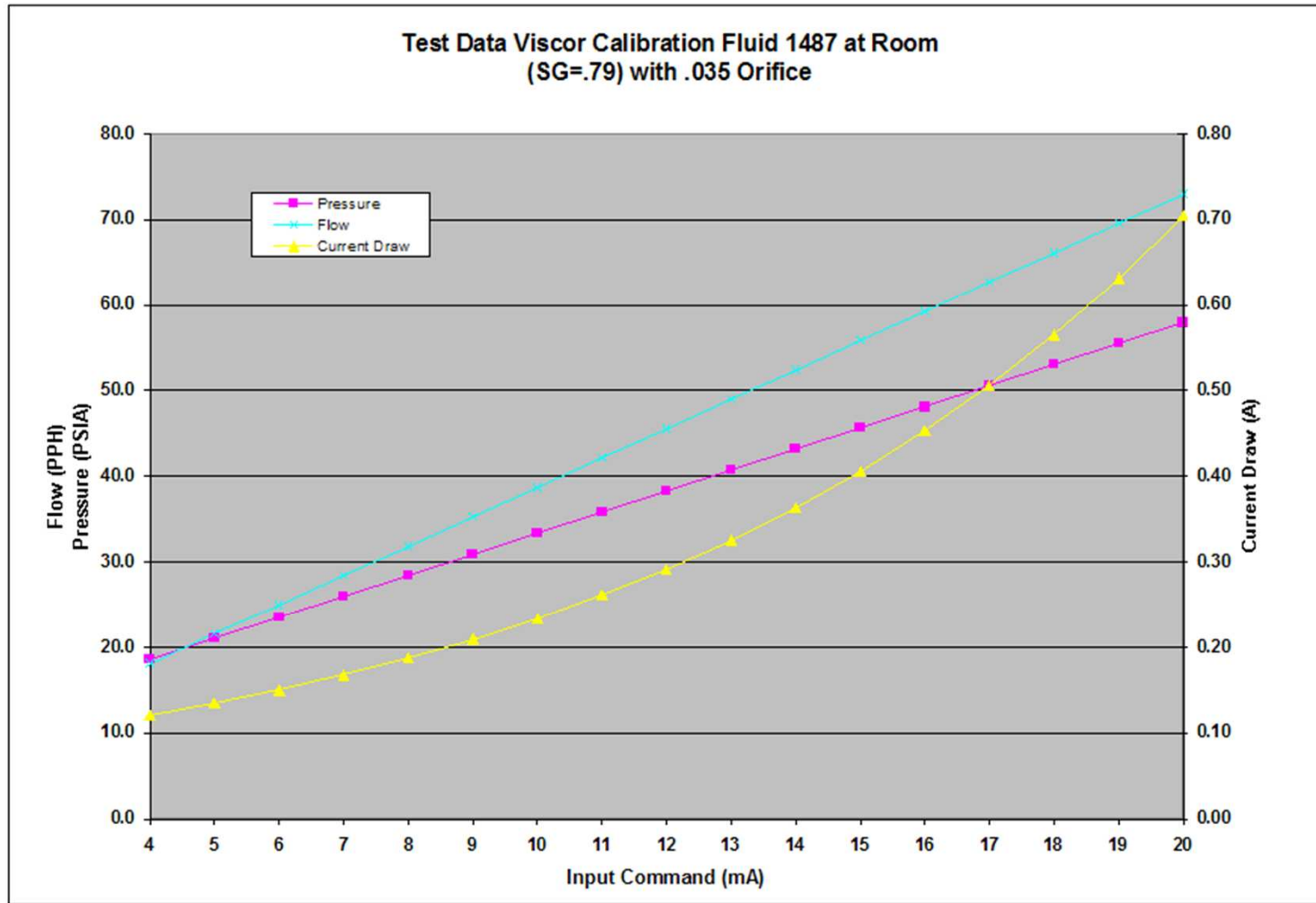
Transient Response

Flow On Demand Technology



Typical Flow Data

Flow On Demand Technology



Typical Flow Data

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