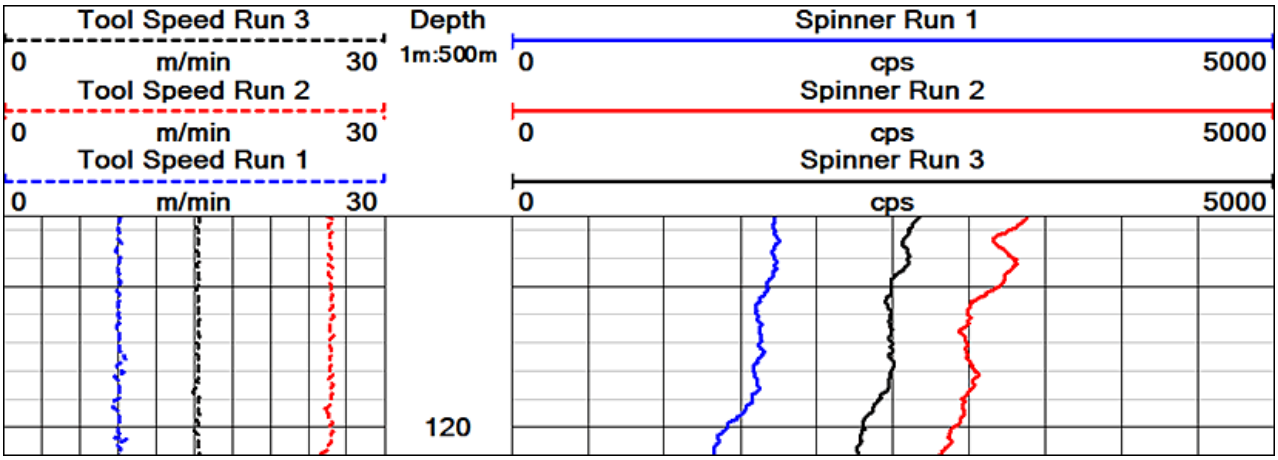
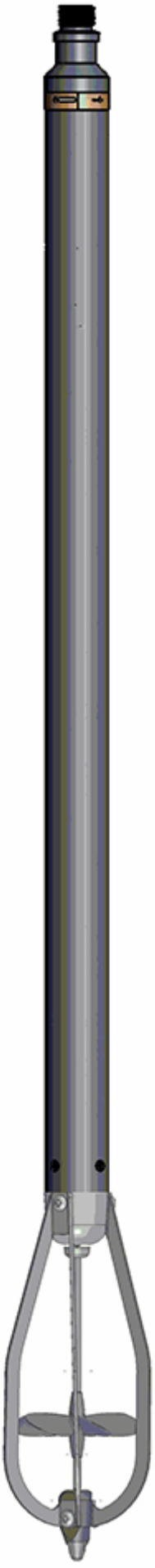
# QL40-SFM – Spinner Flowmeter

mountsopris.com/ql40-sfm-spinner-flowmeter

April 8, 2021





## Description

The QL40-SFM Spinner Flowmeter probe measures impeller rotation caused by groundwater flow in the borehole. It uses a magnetically coupled pick-up which drives a low friction, high resolution encoder located inside the lower pressure housing. The encoder produces 256 pulses per shaft rotation. It has quadrature sensing electronics that instantaneously detect flow direction changes.

The QL40-SFM flowmeter tool is stackable within the Quick Link (QL) product line or it can be run as a standalone tool.

## Applications

- Pumping flow profiles in screened or perforated cased holes
- Identification of hydrostratigraphic units
- Determine quantitative interval specific flow rates
- Confirmation of predicted transmissive zones in open hole

## Operating Conditions

**Borehole Fluid**
[X] Water
[_] Mud
[_] Dry

**Casing**
[X] Uncased
[X] PVC Borehole
[X] Steel

**Centralization**
[_] Required
[X] Not Necessary

**Logging Conditions:** Static/dynamic or dynamic while pumping
**Borehole Conditions:** Fluid-filled, open borehole or perforated screen casing

## Features & Benefits

- In comparison with tools from competitors, the QL40-SFM records exceedingly accurate flow data, collecting 256 pulses per shaft rotation.
- Supplied with 102, 76, or 51 mm (2 , 3 or 4 inch) cages to provide optimum results in a variety of borehole diameters
- Operates on any standard wireline (Mono, 4, 7 conductor, or Coax)
- Slim, 40 mm diameter. One-person operation.
- Can be combined with other logging tools of the QL product line or operated as a standalone tool.

## Specifications – Metric/English

| Specification | Metric | Imperial |
|---|---|---|
| Diameter | 40 mm | 1.57 in. |
| Length | 0.9 m | 35.4 in. |
| Weight | 3.2 Kg | 7 lbs. |
| Max. Temp. | 70ºC | 158ºF |
| Max. Pressure | 200 bar | 2900 psi |

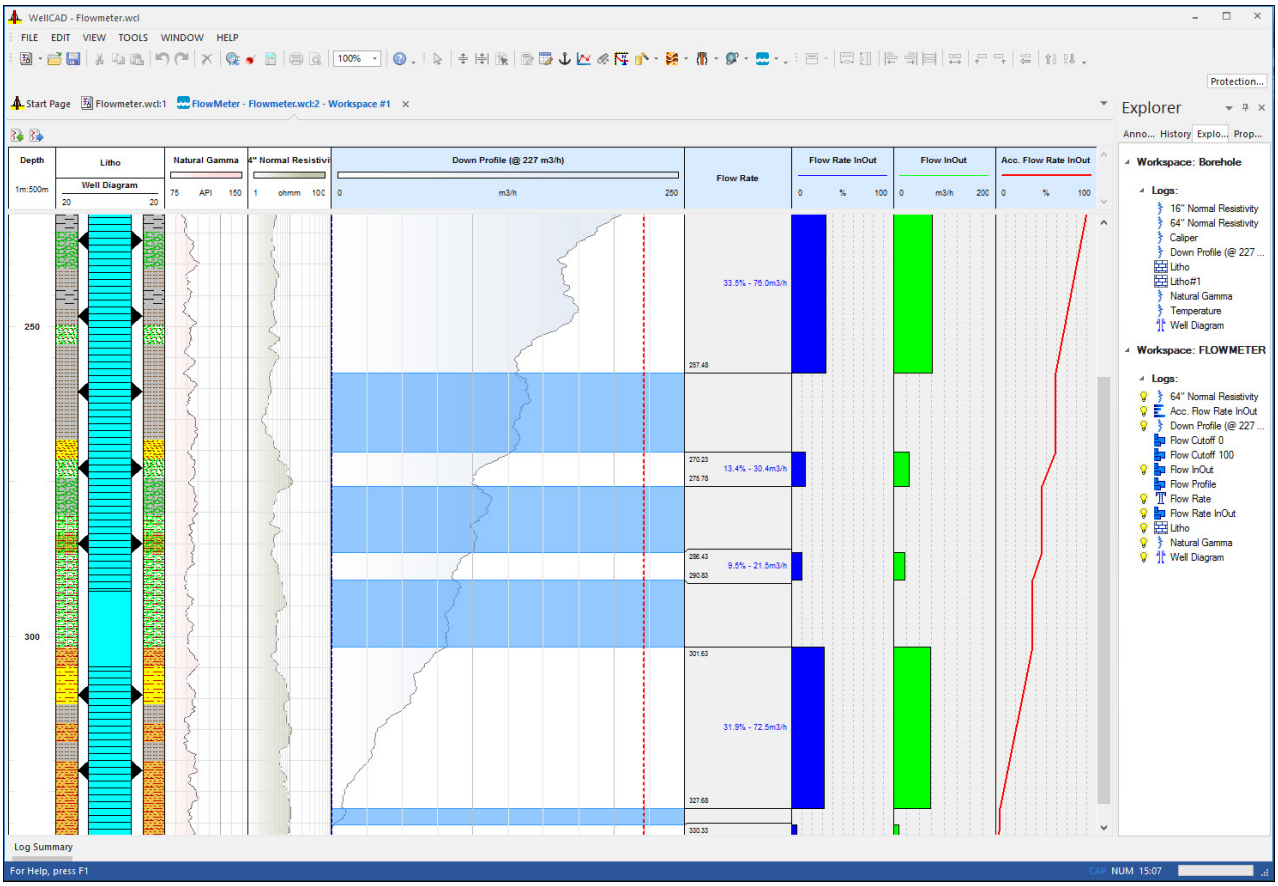
**Sensor:** Pick-up Sensor
**Spinner Range:** 0-3000 rpm
**Accuracy:** better than 1%
**Resolution:** 256 ppr
**Cage Sizes:** 102, 76, or 51 mm (2 , 3 or 4 inch) cages available

Spinner Flowmeter probe

## New! Flowmeter Workspace in WellCAD Software

WellCAD Software has a new Flowmeter Workspace built in to WellCAD Basic. After initializing the workspace the user can interactively pick identified No Flow zones. The contribution of the flow zones will automatically be computed and displayed as percentage, absolute and cumulated values in text as well as in graphic form.

Additional data such as geophysical logs, lithology columns or well sketches can be added as reference logs to the workspace aiding the interpretation. Templates can be saved and applied when initializing a new workspace to save valuable time.




## QL Stack Possibilities

- **QL40SFM** + QL40GR (Gamma): Identify and Characterize Flow zones
- **QL40SFM** + QL40CAL (Caliper): Borehole volume, Quantitative Flow Calculations, Water well Production Investigations
- **QL40SFM** + QL40FTC-I (Inline Fluid Temp, Conductivity): Hydrogeologist's Fluid Flow Tool Combination

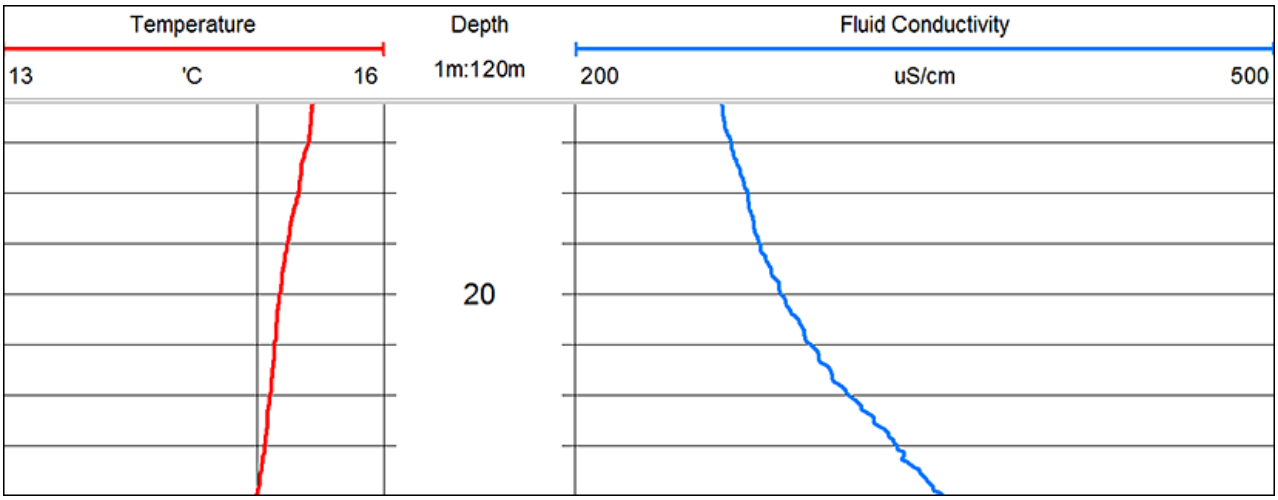
## Documentation

QL40-SFM Spinner Flowmeter Probe Brochure
User Guide

# QL40-FTC – Fluid Temperature + Conductivity

mountsopris.com/ql40-ftc-fluid-conductivity-and-temperature

August 27, 2014




## Description

The QL40-FTC, QL40-FTC-I, and 40FTC probes provide borehole temperature and fluid conductivity measurements.  The standard temperature log, based on a thermister, is designed to provide a measure of the ambient geothermal gradient and is helpful to detect anomalies caused by events such as fluid flow into the borehole.

The borehole fluid conductivity is directly proportional to the concentration of dissolved minerals. It is generally used in hydrogeology to determine the concentration of dissolved ions in the aquifers and to locate the fluid flows occurring in the borehole, especially if some time has passed and the temperature features have dissipated. It is important to differentiate between fluid inflow anomalies and formation conductivity anomalies identified on the temperature logs.

The QL40-FTC can be combined with other logging tools of the QL (Quick Link) product line as a bottom-sub only sonde or used inline as the QL40-FTC-I. This tool can also be operated as a standalone, non-stackable tool known as the 40FTC.

## Applications

- Fluid conductivity – salinity
- Salt-water intrusion studies
- Identification of fluid flow in open/cased hole
- Localization of the water table
- Localization of water intervals of different quality
- Water-well monitoring
- Geothermal gradient logging
- Often used in the implementation of temperature compensation equations for other logs

## Operating Conditions

**Borehole Fluid**
[X] Water
[X] Mud
[X] Dry

**Casing**
[X] Uncased
[X] PVC Borehole
[X] Steel

**Centralization**
[_] Required
[X] Not Necessary

## Features & Benefits

- In comparison with tools from competitors, this fluid temperature and conductivity tool is capable of recording a wide range of conductivity from fresh to highly saturated water.
- Easy to calibrate. Measurements are accurate and consistent.
- Operates on any standard wireline (mono, 4 or 7 conductor, coax)
- Slim, 40 mm diameter. One-person operation.

## Specifications – Metric/English

### QL40-FTC Bottom sub

| Specification | Metric | Imperial |
|---|---|---|
| Diameter | 40 mm | 1.6 in. |
| Length | 0.81 m | 32.1 in. |
| Weight | 3.35 kg | 7.2 lbs. |
| Max. Temp. | 80ºC | 176ºF |
| Max. Pressure | 200 bar | 2900 psi |

### QL40-FTC-I Inline sub

| Specification | Metric | Imperial |
|---|---|---|
| Diameter | 52 mm | 2.05 in. |
| Length | 0.94 m | 37.1 in. |
| Weight | 6.2 kg | 13.7 lbs. |

| | | |
|---|---|---|
| Max. Temp. | 80ºC | 176ºF |
| Max. Pressure | 200 bar | 2900 psi |

**Conductivity Sensor:** Seven electrode mirrored Wenner array
**Conductivity Range:** 5 µS/cm to 300,000 µS/cm
**Conductivity Accuracy:** 1%

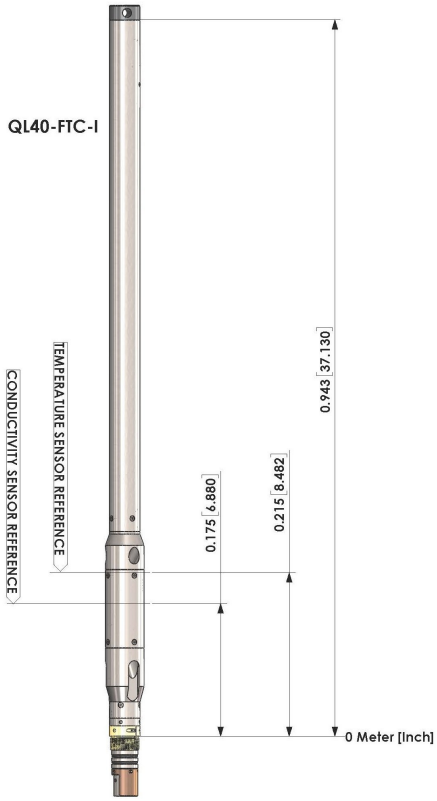
**Temperature Sensor:** Linear, fast-response semi-conductor
**Temperature Range:** -20 to 80ºC
**Temperature Accuracy:** < 1%
**Temperature Resolution:** 0.004ºC

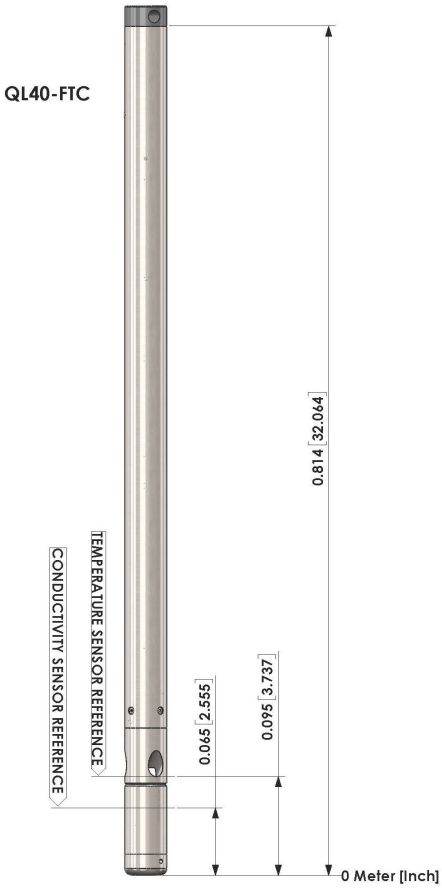
## QL Stack Possibilities

- **QL40FTC-I** + QL4SFM (Spinner Flowmeter): Water-well Fluid flow studies
- **QL40FTC** + QL40GR (Gamma): Water-well Monitoring, Contaminant Intrusion Studies
- **QL40FTC** + QL40GR (Gamma) + QL40ELOG (Resistivity): Identification of Aquifers
- **QL40FTC** + QL40GR (Gamma) + QL40ELOG (Resistivity) + QL40CAL (Caliper): Hydrogeologist's Tool, Groundwater exploration, assessment, and well completion

## Documentation

Data Sheet
User Guide

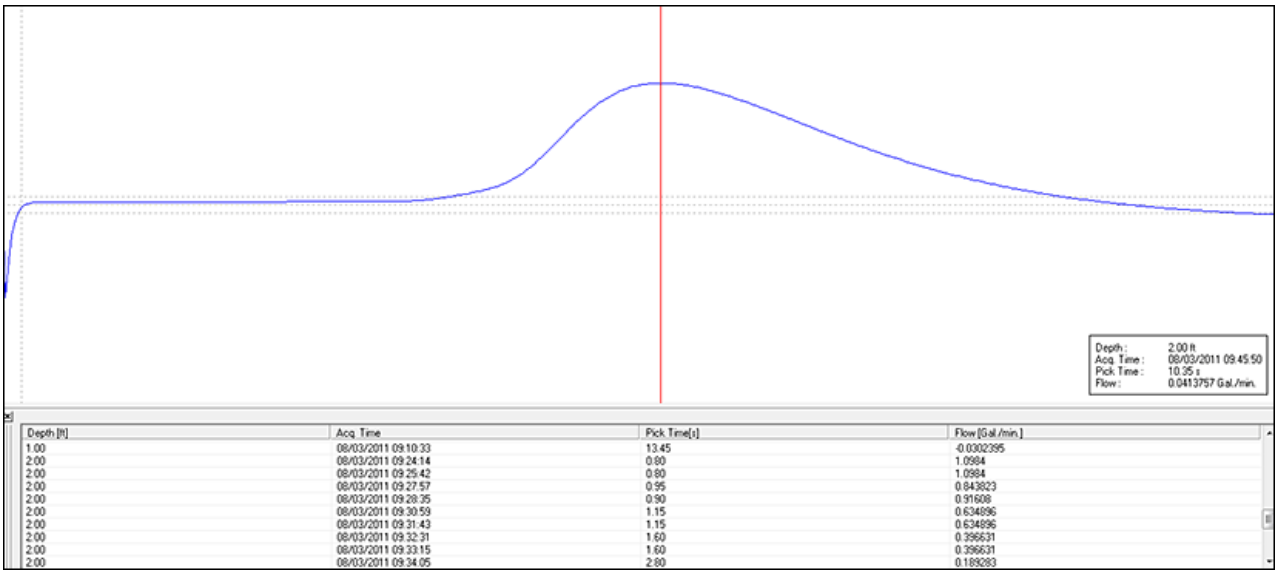



QL40-FTC
0.814 [32.064]
TEMPERATURE SENSOR REFERENCE
CONDUCTIVITY SENSOR REFERENCE
0.065 [2.555]
0.095 [3.737]
0 Meter [Inch]

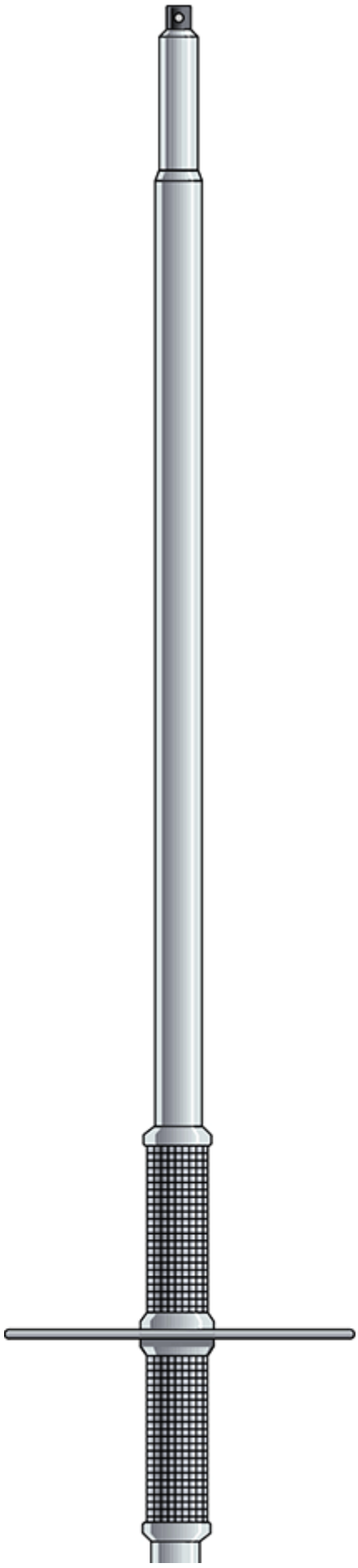
# HFP-2293 – Heat Pulse Flowmeter

mountsopris.com/hfp-2293-heat-pulse-flowmeter

August 8, 2014




| Depth [ft] | Acq. Time | Pick Time[s] | Flow [Gal./min.] |
|---|---|---|---|
| 1.00 | 08/03/2011 09:10:33 | 13.45 | -0.0302395 |
| 2.00 | 08/03/2011 09:24:14 | 0.80 | 1.0984 |
| 2.00 | 08/03/2011 09:25:42 | 0.80 | 1.0984 |
| 2.00 | 08/03/2011 09:27:57 | 0.95 | 0.843823 |
| 2.00 | 08/03/2011 09:28:35 | 0.90 | 0.91608 |
| 2.00 | 08/03/2011 09:30:59 | 1.15 | 0.634896 |
| 2.00 | 08/03/2011 09:31:43 | 1.15 | 0.634896 |
| 2.00 | 08/03/2011 09:32:31 | 1.60 | 0.396631 |
| 2.00 | 08/03/2011 09:33:15 | 1.60 | 0.396631 |
| 2.00 | 08/03/2011 09:34:05 | 2.80 | 0.189283 |



## Description

The HFP-2293 Heat Pulse Flowmeter is a unique flowmeter tool designed to measure low flow rates in the borehole environment.  It will also give the direction of the flow of fluid vertically. To detect these low flow rates, measurements must be made while the probe is stationary at different depths within the borehole. The probe is run standalone.

Matrix Heat software is used with the HFP-2293 and is compatible Matrix Logging Systems. Individual heat-flow waveforms can be saved, and text files with depth and flow rate can be imported into WellCAD for a histogram-type presentation.

The Mount Sopris Heat Pulse was recently upgraded based on customer recommendations. For a full discussion of what was upgraded please see our Blog Post on the topic and the New User Manual.

*“The HPFM updates are a great improvement.  The tool functions predictably as intended and provides a line of evidence that is critical at many of our clients’ sites.  The MSI staff have been great to work with, showing persistence and professionalism.  The flow of new products is truly impressive and we are always eager to see (and apply) what is next!”* - James L. Peterson, PG, LSRP – President, Princeton Geoscience, Inc.

## Applications

- Measure interval and/or fracture-specific low flow rates
- Identification of hydrostratigraphic units
- Determine transmissivity and hydraulic head
- Confirmation of predicted transmissive zones in open hole

## Operating Conditions

**Borehole Fluid**
[X] Water
[_] Mud
[_] Dry

**Casing**
[X] Uncased
[X] PVC Borehole
[X] Steel

**Centralization**
[X] Required
[_] Non-Necessary

## Features & Benefits

- Designed by the USGS, industry standard tool for use in very low flow zones.
- Supplied with diverters for 4”, 6” & 8” (100, 150, 200mm) boreholes to provide optimum results in a variety of borehole diameters
- Includes Matrix Heat acquisition (waveform viewing & time picking) and processing software
- Slim, 41 mm diameter. One-person operation.

## Specifications – Metric/English

| Specification | Metric | Imperial |
|---|---|---|
| Diameter | 41 mm | 1.63″ |
| Length | 1.22 m | 48″ |
| Weight | 5.5 Kg | 12 lbs. |
| Max. Temp. | 70ºC | 158ºF |
| Max. Pressure | 200 bar | 2900 psi |

**Sensor:** Two thermistors
**Measuring Range:** 0.113 lpm to 3.785 lpm (0.03 gpm to 1.0 gpm)
**Measuring Range:** 0.046 m/min to 3.962 m/min (0.15 ft/min to 13 ft/min)
**Accuracy:** 5% midrange to 15% extremes
**Resolution:** 5%

## Documentation

Data Sheet
User Guide
Matrix Heat Software User Guide