

# HFP-2293 Heat-Pulse Flow Meter Probe

► [Borehole Probes](#)

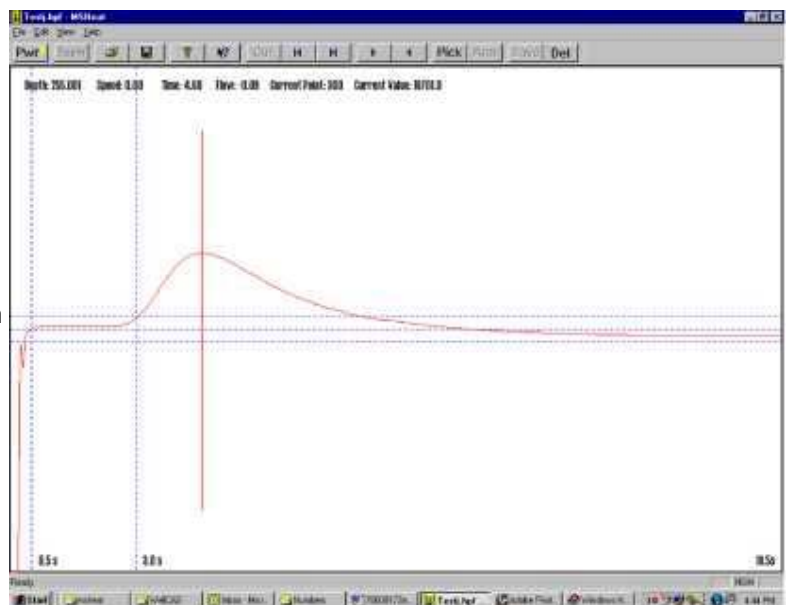
## Theory of Operation

The Heat Pulse flow meter operation is as follows. The tool is lowered into the borehole via a cable attached to a winch. When the tool is in position to take a flow measurement the trigger assembly button is pressed. This sends a pulse down the center conductor which when detected by circuitry in the probe, fires the heat grid and signals the surface monitoring equipment and software to begin a flow measurement cycle. The grid heats ambient fluids and if there is up or down flow in the well, this heated fluid mass is detected at thermistor sensors (2 cm from grid) allowing the time (and flow rate) through a known x-sectional area to be recorded by an amplifier. The output of this amplifier is then converted to a frequency. This frequency is then driven up the cable line and monitored by the surface equipment. When the tool is pulsed by the surface system, the tool immediately begins to charge the capacitors that produce the voltage for the heat grid in preparation for the next measurement cycle. A complete flow measurement is made when the time is accurately measured from when the heat grid is fired to when a peak temperature change, carried by the flow, is detected by either the upper or lower sensor.



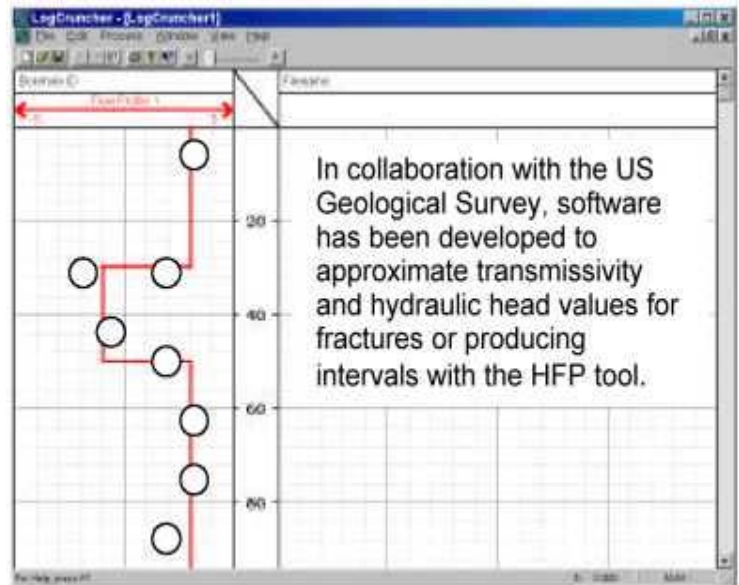
## Software

MSHeat is the Windows acquisition software for the HFP-2293. This software is compatible with MGX II systems running MSLog. 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.



## Specifications:

- Measuring Range:
  - 0.113. liters/minute to 3.785 liters/minute (0.03 gallons/minute to 1.0 gallons/minute)
  - 0.046. meters/minute. to 3.962 meters/minute (0.15 feet/minute to 13 feet/minute)
- Resolution: . 5%
- Accuracy: . 5% (Mid-Range) to 15% (Extremes)
- Dimensions: .
  - Length: . 122 cm (48 inches)
  - Diameter: . 4.1 cm (1.63 inches)
  - Weight: . 5.5 kg (12 lbs)



Flow Meter Log Example

## Ordering Information

Description	Order Number
HFP-2293 Heat-Pulse Flow Meter	530-HPF-10-01