MIHPT

The MiHPT is a combined Membrane Interface Probe, *MIP* and Hydraulic Profiling Tool, HPT probe. It detects volatile contaminants with the MIP, measures soil electrical conductivity, *EC* with a standard dipole array, and measures *HPT* injection pressure using the same down-hole transducer as the stand-alone *HPT* system. Hydraulic conductivity, *K* and water table elevation can be estimated after processing the log data.

MIP

The *MIP* is a direct push tool used to log the relative concentration of volatile organic compounds, *VOCs* with depth in soil. As a logging tool, the MIP is useful for detecting and logging both *chlorinated* and *non-chlorinated VOC* contaminants. It is able to detect contaminants in coarse and fine grained soils and it works very well in saturated and unsaturated soils. Standard tool configurations combine the *MIP* with other sensors for lithology or permeability logging. A real time contaminant screening information is generated, allowing field adjustment of the site investigation.

MIP Principle of Operation

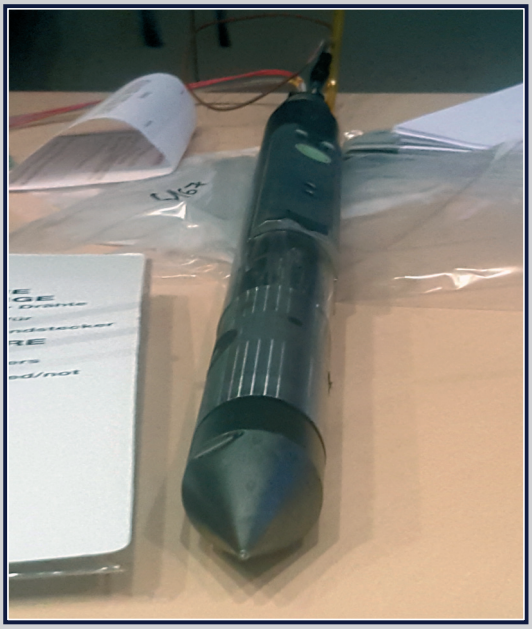
MIP is a screening tool with semi-quantitative capabilities acting as an interface between *volatile contaminates* at depth in the soil and gas phase detectors at the surface. The *MIP* membrane is semi-permeable and is comprised of a thin film polymer impregnated into a stainless steel screen for support. The membrane is placed in a heated block attached to the probe, which is heated to ~100-120° as the probe is advanced into the soil. Diffusion across the membrane is driven by the concentration gradient between the contaminated soil and the clean carrier gas behind the membrane. A constant gas flow of 35-45m*L/min* sweeps behind the membrane and carries the contaminants to the gas phase detectors at the surface. Travel time from the membrane interface to the detector(s) is ~30-45s. Sweep gas from the *MIP* membrane is directed to detectors that are part of the *MIP* instrument system at ground surface. The standard detectors include:

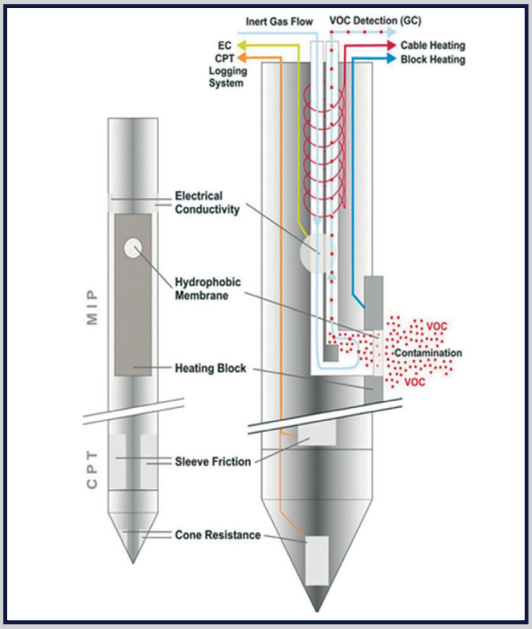
- Photoionization detector, *PID* – sensitive to *BTEX* and confirmation of chlorinated ethylene compounds
- Halogen specific detector, *XSD* - highly specific to halogenated compounds and best detector for chlorinated solvent plumes or source areas, *TCE, PCE, Carbon Tet,* etc
- Flame ionization detector, *FID* - general detector for hydrocarbon and for confirmation of high concentration of all compounds seen on the other two detectors, *PID* and *XSD*.

The MIP Log

The MIP log shows the response of the MIP detectors with depth in the soil.

The MIP data acquisition system makes this log by taking into account the travel time required for the membrane sweep gas to reach the *MIP* detectors at ground surface, thus converting the detector time data into *MIP* response with depth data.





HPT

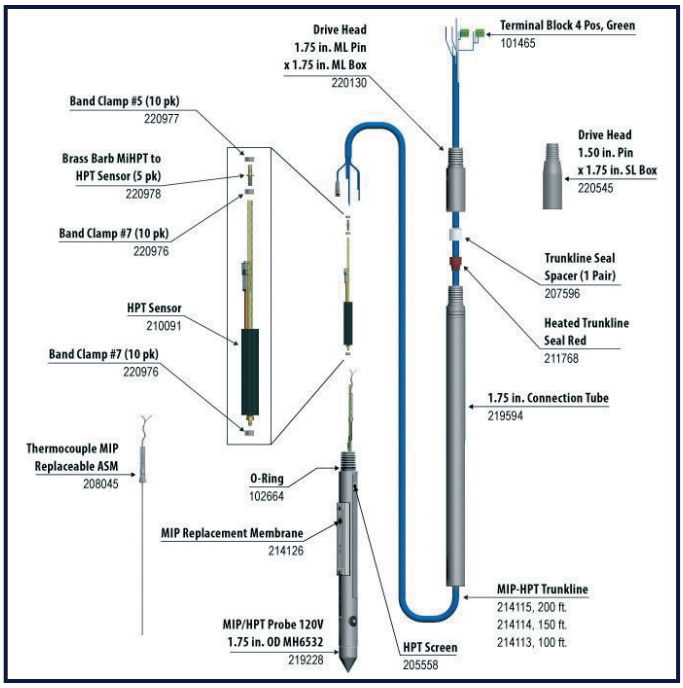
The *HPT* system is designed to evaluate the hydraulic behaviour of unconsolidated materials. As the probe is pushed at *2cm/s*, clean water is injected through a screen on the side of the *HPT* probe at a flow rate usually less than *300mL/min*. The injection pressure, which is monitored and plotted with depth, is an indication of the hydraulic properties of the soil.

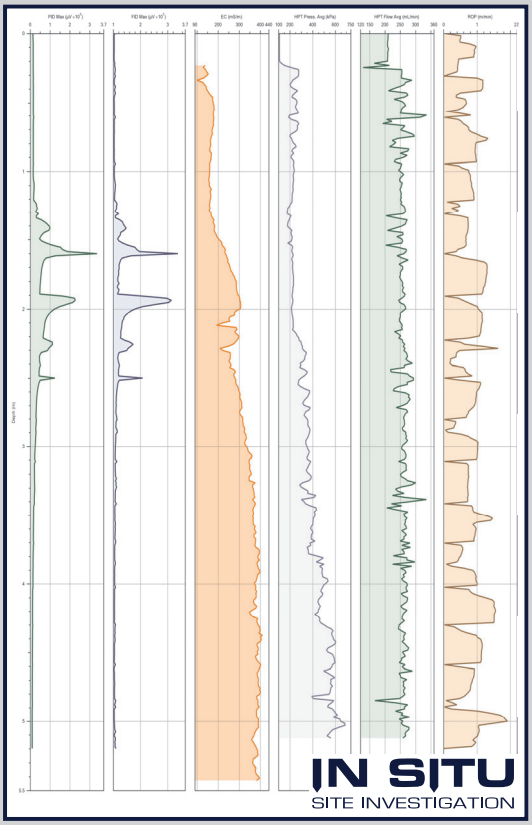
A relatively low pressure response indicates a relatively large grain size, and the ability to easily transmit water. However, a relatively high pressure response indicates a relatively small grain size, which correlates with the inability to transmit water.

There are five primary components of the *HPT* system:

1. The probe assembly
2. Controller
3. Pump
4. Trunk line
5. Field instrument

The probe assembly consists of the section that houses the *100psi* pressure transducer, water and electrical connections, and the probe body with the injection screen and electrical conductivity.





IN SITU SITE INVESTIGATION
Innovation Centre, Highfield Drive,
St Leonards On Sea, East Sussex,
TN38 9UH, UK

T: +44 (0) 845 862 0558
E: info@insitusi.com