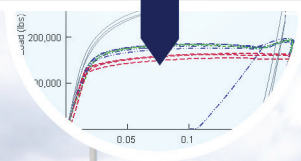
A Division of ARA

VERTEK



MADE IN THE USA

Geotechnical & Environmental Products

Company Profile

Vertek is a world leader in the development and manufacturing of advanced in-situ soil testing apparatus. Vertek, a division of Applied Research Associates, Inc., has 20 years of research and development experience in building and developing new CPT technologies. In 2005 Vertek acquired the Hogentogler & Co. line of CPT equipment. Thus bringing together two leaders in CPT technology. Vertek's R&D capabilities, coupled with Hogentogler's manufacturing and soil testing expertise, has helped to cement our place as one of the leading CPT companies in the world.

Vertek is currently one of the largest manufacturers of cone penetrometer equipment, as well as a supplier of in-situ environmental testing equipment for soil, soil gas, soil water sampling and monitoring, and related delivery and support vehicles. Over the past 20 years we have sold over 200 systems for onshore and offshore applications in both the domestic and international markets. These systems vary from simple drill rig mounted equipment to complex geotechnical and environmental testing rigs.

Our present capability to manufacture this type of equipment is approximately 30 units per year with the ability to increase production as the market dictates. Coupled with this manufacturing capability is Vertek's continuing research and development of new technology and methods of soil testing. We have partnered with leading universities to commercialize emerging new technologies with a focus on ease of use, cost effectiveness and precise measurement.

Vertek's technical ability is multi-disciplined with engineers in electronics, hydraulics, mechanical, software development and basic and applied physics. Because we employ personnel with such wide ranging capabilities in-house, we are able to integrate our probes, pushing platforms and data acquisition/reduction into a single seamless solution. In addition, we have the ability to customize our products to suit unique customer requirements.

As a leading manufacturer, our systems can be found in North America, Europe, South America, Australia, Africa and Asia. Our customers have come to trust us and our equipment for their complex engineering projects.

TABLE OF CONTENTS

As a leading manufacturer, our systems can be found in North America, Europe, South America, Australia, Africa and Asia. Our customers have come to trust us and our equipment for their complex engineering projects.

1.800.639.6315 | www.vertekcpt.com

Rent equipment locally and have it and the S4 delivered to the job site!

S4 Push System

Vertek's S4 is an agile, lightweight, inexpensive alternative to traditional CPT rigs.

Specifications

Hydraulics

Controls	Manual Levers
Pump Type	Carrier Specific
Pump Size	Up to 26 GPM
Reservoir Size	Carrier Specific
Operating Pressure	Up to 3000 psi
Jacks	Manual Screw with drop Leg

CPT System

Push Capacity	178 kn (20 Tons)
Pull Capacity	222 kn (25 Tons)
Stroke	112 cm (44")
Retract Cycle Time	Carrier Specific
Extend Cycle Time	Carrier Specific
Primary Clamp	Mechanical
Anchors	Up to 50 cm (20")

Dimensions

LxWxH	183 cm x 33 cm x 231 cm (72" x 13" x 91")
Weight	1,043 kg (2,300 lbs)

The S4 Push System is outfitted for 10cm^2 and 15cm^2 diameter CPT products, provides 20 ton push capacity and includes mechanical rod clamp. Hydraulic supply hoses are standard quick connect for easy set-up and take down. Anchor system delivers up to seven feet of reaction depth and is deployable in minutes. The S4 attaches to variety of common equipment. Also available attached to custom trailer system.

The S4 consists of the following components:

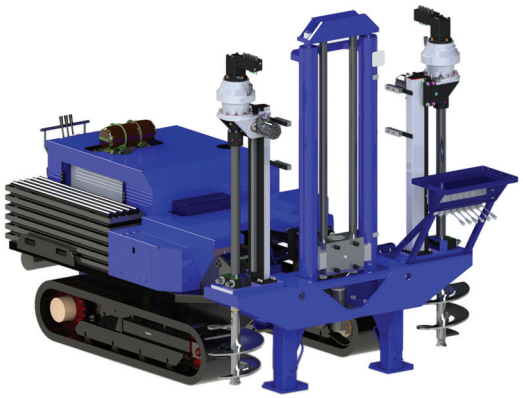
- 2 Motorized Anchor Heads
- 20 Ton Hydraulic ram
- Hydraulic Valves with Manual Controls
- Manual Jacks
- Universal Quick Attach Plate

Options include:

- Detachable Rod Rack
- Custom Quick Attach Plate
- Decontamination System
- Anchor Extensions
- Custom Trailer Mount

1.800.639.6315 | www.vertekcpt.com

S4 Mini-Track Rig



Vertek's S4 Mini-Track rig is the newest edition to our already robust line of self-powered CPT rigs.

Vertek's S4 Mini-Track rig is the newest edition to our already robust line of self-powered CPT rigs. As part of the S4 family of systems, the Mini-Track rig provides a powerful compact carrier at an affordable capital cost when compared to the cost of new construction equipment. The S4 combination gives you more options to meet your clients' needs with one versatile push system.

This rubber tracked rig is easy to maneuver, ideal for limited access and maintains a low ground pressure of 4.5 psi! Due to its compact size, the Mini-Track rig can be transported to jobsites with a conventional pick up and trailer avoiding the need for special permits or licensing. The tilt mount for the S4 enables better stability during movement on uneven terrain and a lower profile on the trailer during transport.

The S4 is capable of advancing either 10cm^2 (1.44" diameter) or 15cm^2 (1.75" diameter) cone penetrometers with 20 tons of push capacity. As an added bonus, the S4 push platform included with the Mini-Track can be removed and attached to a variety of common construction equipment or custom trailer allowing for any number of configurations to meet your testing needs.

Options include:

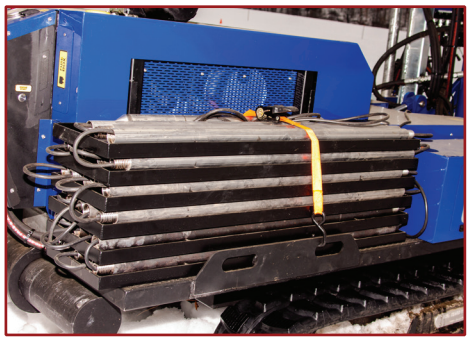
- Mechanical or Hydraulic Clamp
- Diesel or Gas Engine
- Anchor Size (300,350,400, or 500 mm)
- Decontamination System
- Anchor Extensions
- Auxiliary Hydraulic Clamp
- Hydraulic Jacks on Carrier
- Remote Operations – Belly Pack

1.800.639.6315 | www.vertekcpt.com

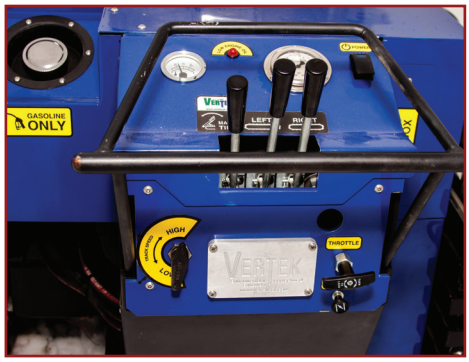
S4 Mini-Track Rig

Continued

Inverter



Rod Rack



Manual Controls

Specifications

Carrier

Power Unit	37 hp Gasoline
Fuel Tank	10 Gallon
Propulsion	Tracked, Walk Behind
Track Motors	2 Speed Hydraulic
Track Ground Pressure	4.5 psi
Mast Tilt	-35 to +15 degrees

Hydraulics

Controls	Manual Levers
Pump Type	Fixed Displacement
Pump Size	18 gpm
Reservoir size	20 Gallon
Operating Pressure	3000 psi
Jacks	Manual Screw w/ Drop Leg

Electrical

Battery	12 VDC
Inverter	120 VAC , 300 Watts

CPT System

Push Capacity	178 kn (20 Tons)
Pull Capacity	222 kn (25 Tons)
Stroke	112 cm (44”)
Retract Time	11 Seconds
Extend Time	15 Seconds
Primary Clamp	Mechanical or Hydraulic
Anchors	Up To 50 cm (20“)

Dimensions

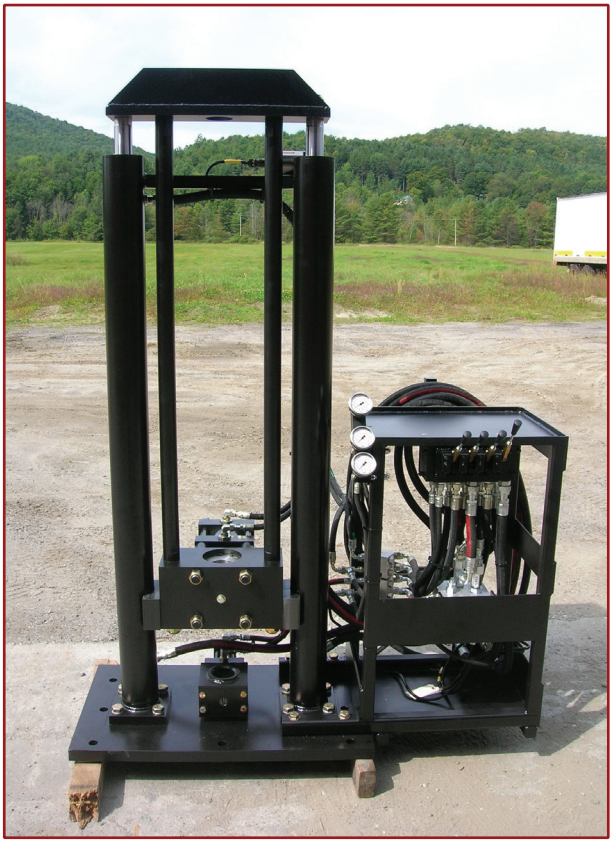
LxWxH	317 cm x 183 cm x 188 cm (125” x 72” x 74”)
Weight	2,681 kg (5,900 lbs)

Universal Push System

Adaptable to variety of existing platforms.

Vertek's Universal Push system can be easily mounted on a wide range of platforms including barges, crawlers, trucks and trailers. The Universal Push System's versatility enables access to push sites in rough or difficult terrain as well as making it easy to transport in urban work areas.

The Universal Push System is built for heavy use and is equipped with easy to use lever controls and quick power unit connections.



Specifications

Push Capacity	178 kn (20 Tons)
Pull Capacity	222 kn (25 Tons)
Power Unit	Gas, Diesel, Electric
Stroke	112 cm (44")
Weight	544 kg (1,200 lbs)
Dimensions	145 cm x 64 cm x 191 cm (57" x 25" x 75")

Our products are made, calibrated and serviced in the USA.

Light CPT Platform

Small scale CPT solution designed for locations with limited access.

Specifications	
Push Capacity	89 kn (10 Tons)
Pull Capacity	107 kn (12 Tons)
Power Unit	Gas, Diesel, Electric
Length	119 cm (47”)
Width	112 cm (44”)
Height	175 cm (69”)
Weight	218 kg (480 lbs)
Stroke	107 cm (42”)

The 10 Ton push system is the lightest, most portable hydraulic CPT unit available. This steel built unit is designed to be moved and anchored by two person teams. Anchoring system is independent of push system and is installed in minutes.

Heavy CPT Truck

Our largest and most powerful CPT system.

Our Heavy CPT Truck is designed for maximum production and deep investigations offering 20 to 40 tons of push force and ample workspace. It can be fully enclosed and climate controlled for operation in any weather. The hydraulic leveling system provides rapid setup once on site.

We build our Heavy CPT Trucks on a number of different models specified by the customer.

Please contact the Vertek sales team to discuss your particular application in detail so we can provide the best platform possible.

Our products are made, calibrated and serviced in the USA.

Medium CPT Truck

A more maneuverable version of our Heavy CPT Truck.

The Medium CPT Truck is capable of applying 15 tons of push force without anchoring. This system offers similar features as the Heavy CPT Truck but in a more mobile size. It can be fully enclosed and climate controlled for operation in any weather.

We build our Medium CPT Trucks on a number of different models specified by the customer including an all-terrain platform. The hydraulic leveling system provides rapid setup once on site.

Please contact the Vertek sales team to discuss your particular application in detail so we can provide the best platform possible.

Light CPT Truck

Designed for shallow investigations and maximum mobility.

Vertek Light CPT trucks are designed to be an economical platform for obtaining CPT data. Because of the Light Truck's small size, it does not require special permits, licenses, or increased insurance costs. In many states it can be licensed as a pickup truck. The combination of small size and lightweight makes it easy to access tight spots while providing economical operation and maintenance.

The Light CPT truck is furnished with an anchoring system allowing up to 20 tons of push force via manual hydraulic controls. This platform is recommended as an open-air design.

Our products are made, calibrated and serviced in the USA.

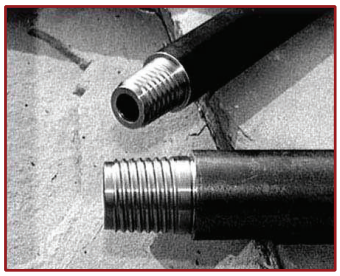
CPT Track Rigs

Designed for low ground pressure environment and rough terrain.

Vertek manufactures a full line of all-terrain, self-propelled CPT rigs for difficult to access areas offering 15 to 30 tons of push force. Our CPT platforms provide ample work area in an enclosed or open-air design.

Track Rigs can be tele-operated or controlled via the existing driving station.

1.800.639.6315 | www.vertekcpt.com



Fast, Easy, Strong!

A Division of ARA VERTEK

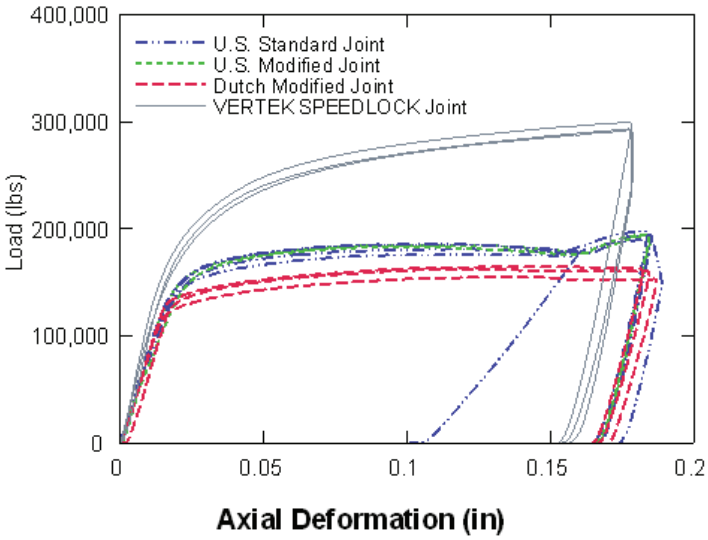
Speed Lock Rods

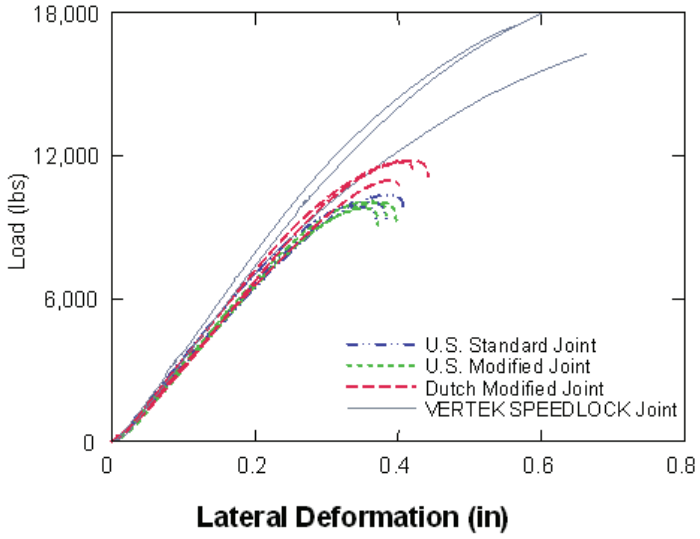
The best direct push rods on the market. Make the most of your rig!

Unsurpassed Strength
Vertek manufactures a full line of CPT push rods with our proprietary Speed Lock dual-lead thread design. Speed Lock Rods provide unsurpassed joint strength-up to 50% stronger than industry standard V-threads. Our unique rope thread design uses less of the available wall thickness and balances the strength between the male and female thread ends. Speed Lock coupled joint achieves nearly 90% of the strength of the heat treated rod stock.

Increase Speed, Reduce Operator Fatigue
Our dual-lead thread provides fast coupling; 2.5 turns to couple or uncouple compared with 5-7 turns for competitor's rods improving worksite productivity.

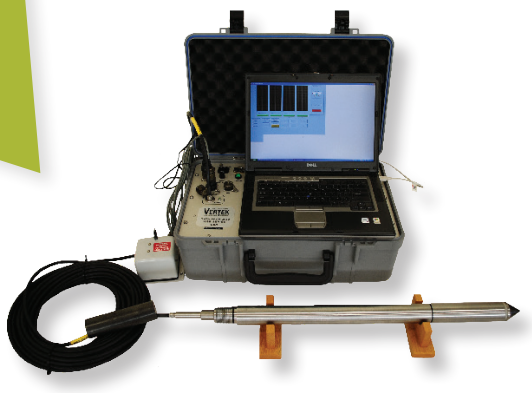
Flexibility and Adaptability
Speed Lock Rods are available in standard 10cm^2 and 15cm^2 diameters. Custom sizes include 20 cm^2, 26cm^2 and 32cm^2. Vertek also manufactures custom adapters to permit use of our advanced thread design with your current inventory of CPT equipment.





Our products are made, calibrated and serviced in the USA.

Expandable for Environmental Applications

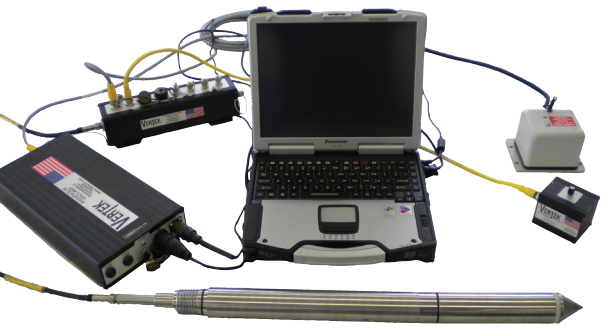


Hand Carried DataPack

VTK DataPack

CPT Data Acquisition Unit

Vertek's DataPack 2010 is a field portable Cone Penetrometer Test (CPT) data acquisition and analysis package combining the capabilities of our digital CPT cones, the FFD (Fuel Fluorescence Detector) probes, seismic geophone equipped cones, and other specialized Vertek probes. Developed as a simple 'all-in-one' solution for the Geotechnical and Environmental CPT service providers, this version incorporates USB for ease of connectivity.



Modular DataPack

Field Portable
The DataPack is housed in a water-resistant instrument case and requires use of a COTS, Windows based laptop. Vertek recommends use of a ruggedized computer for CPT applications.

GPS Ready
The DataPack 2010 is equipped with a USB port to accept GPS input from most portable GPS units. This location information can be attached to each CPT test data file.

Expandable
The DataPack has an auxiliary channel which provides a 4 VDC excitation voltage with a 200 V/V gain. This allows the use of an optional tip, sleeve and pore pressure verification package or other optional devices.

Report Quality Field Plots
The DataPack comes with a complete software package for acquisition, processing, and plotting CPT data. The DataPack generates report-quality plots in the field on any Windows supported printer (color or gray-scale). Plot scales can be set automatically and a wide variety of engineering parameters can be selected. With current communication technology data is easily transmitted to project engineers anywhere.

Efficient Data Collection
A digital CPT probe is the heart of the system. The standard probe includes tip, sleeve fiction, pore pressure sensors, triple axis geophones, and inclination. The system stores unlimited data points per channel for each test and is saved to disk after each

VTK DataPack

CPT Data Acquisition Unit

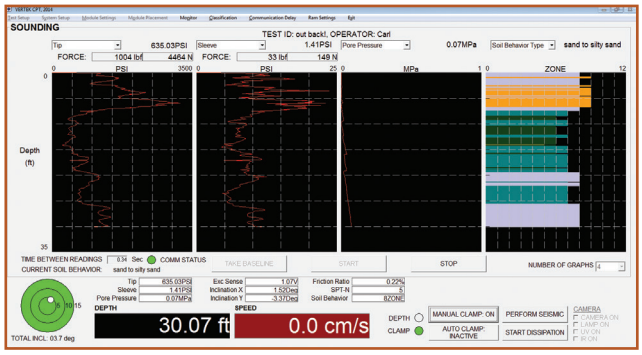
sample to ensure data integrity. Measurements are also plotted in real time on the computer screen during the push, providing immediate data from the probe and alerting the operator to potential problem layers. Optional shut down circuits can be incorporated to stop the push unit if pre-set stress alarm levels are exceeded.

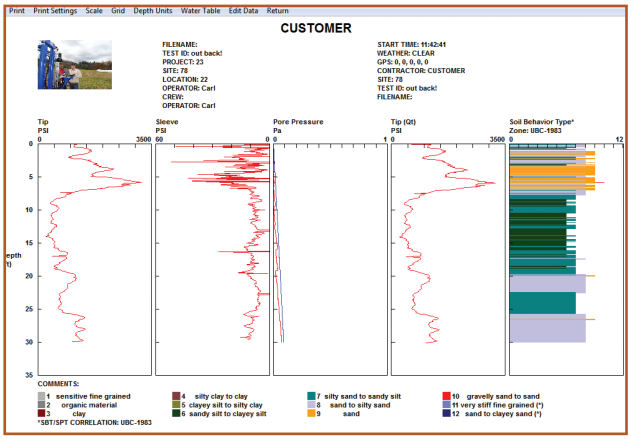
High-Powered Data Analysis
Data analysis software is included with the DataPack, allowing the operator to display both the test data and derived parameters in formats appropriate to client requirements. Standard classification algorithms based on sleeve friction and pore pressure ratios are included for classification of soil types. Journal published empirical correlation are employed to estimate friction angle, un-drained shear strength, standard penetration test (SPT) blow count, relative density, and over consolidation ratio. Pore pressure algorithms are built into the software and the results can be used to estimate the hydraulic conductivity of cohesive soils.

Computer Requirements
Vertek recommends use of ruggedized computers with daylight readable screen for CPT operations. Vertek can supply the computer or Vertek will outfit the customers desired computer. The computer should have a minimum of 4GB RAM. The CPT software will work with both Windows 7 and 8.

Physical Specifications:

- Power: 12VDC (5 amps) using provided power supply (100-240vac, 60hz)
- Enclosure is durable molded water resistant suitcast type.
- Size: 29.5" x 9" x 4.5"
- Weight: 20 pounds (9 kg)





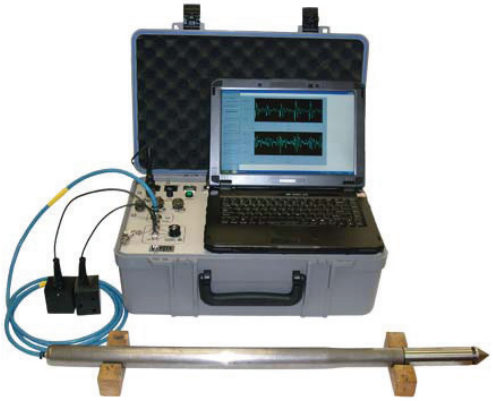
Our products are made, calibrated and serviced in the USA.

Most Popular VTK Cone

VTK 10cm² Digital Cone

Available in 2.5 Ton, 5 Ton, and 10 Ton Configurations

Rugged and Reliable Vertek's Digital Cones provide simple, easy-to-use CPT measurements in a compact system. Since analog-to-digital conversion is preformed downhole, the bulkiness of cabling and uphole electronics are reduced, and noise problems associated with cable length and low voltage signals of analog systems are eliminated. Vertek's 10 conductor cable with LEMO type connectors ensures reliable data transmission with each penetration test.



Industry Leading Performance
By decoupling the tip and sleeve load cells and sensing each independently, Vertek digital cones provide higher load capacity and better accuracy than industry standards. Accurate temperature compensation assures reliable performance in all environments.

VTK 10cm² Digital Cone

Max Tip Force	2.5 Ton	5 Ton	10 Ton
Tip			
Area (cm²)	10	10	10
Range (kn)	22	44	88
Range (lb)	5,000	10,000	20,000
Range (MPa)	22	45	90
Overload Capacity	150%	150%	150%
Accuracy (FSO)	0.5%	0.5%	0.5%
Sleeve			
Area (cm²)	150	150	150
Range (kn)	20	20	20
Range (lb)	4,400	4,400	4,400
Range (MPa)	1.3	1.3	1.3
Overload Capacity	150%	150%	150%
Accuracy (FSO)	0.5%	0.5%	0.5%
Pore Pressure Transducer			
Standard Range (kPa)	6,895	6,895	6,895
Standard Range (psi)	1,000	1,000	1,000
Burst Pressure	200%	200%	200%
Accuracy (FSO)	1%	1%	1%
Inclinometer (Dual Axis)			
Range (degrees)	±15	±15	±15
Resolution (degree)	0.1	0.1	0.1
Seismic			
Tri-axial geophone (G)	±2	±2	±2

Seismic signal is gained downhole by 1, 10, 100, or 1,000 and digitized in the DataPack. No extra wires or analog measurement required.

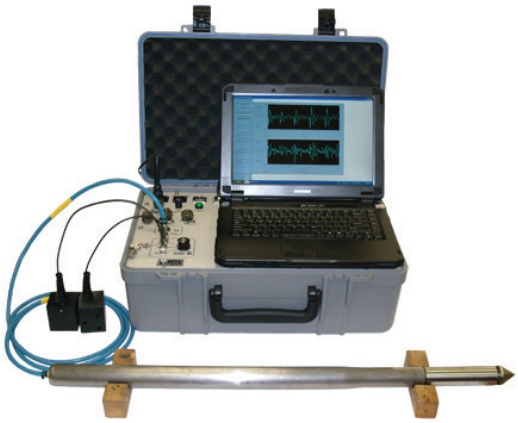
Our products are made, calibrated and serviced in the USA.

VTK 15cm² Digital Cone

Available in 2.5 Ton, 5 Ton, and 25 Ton Configurations

Rugged and Reliable
Vertek's Digital Cones provide simple, easy-to-use CPT measurements in a compact system. Since analog-to-digital conversion is preformed downhole, the bulkiness of cabling and uphole electronics are reduced, and noise problems associated with cable length and low voltage signals of analog systems are eliminated. Vertek's 10 conductor cable with LEMO type connectors ensures reliable data transmission with each penetration test.

Industry Leading Performance
By decoupling the tip and sleeve load cells and sensing each independently, Vertek digital cones provide higher load capacity and better accuracy than industry standards. Accurate temperature compensation assures reliable performance in all environments.



Expandability
The 15cm² VTK cone series allows for stacking modules behind the cone, such as FFD, Video, SMRT and Conesipper.

VTK 15cm² Digital Cone

Max Tip Force	2.5 Ton	5 Ton	25 Ton
Tip			
Area (cm²)	15	15	15
Range (kn)	22	44	222
Range (lb)	5,000	10,000	50,000
Range (MPa)	15	30	150
Overload Capacity	150%	150%	150%
Accuracy (FSO)	0.5%	0.5%	0.5%
Sleeve			
Area (cm²)	225	225	225
Range (kn)	44	44	44
Range (lb)	10,000	10,000	10,000
Range (MPa)	2	2	2
Overload Capacity	150%	150%	150%
Accuracy	1%	1%	1%
Pore Pressure Transducer			
Standard Range (kPa)	6,895	6,895	6,895
Standard Range (psi)	1,000	1,000	1,000
Burst Pressure	200%	200%	200%
Accuracy (FSO)	1%	1%	1%
Inclinometer (Dual Axis)			
Range (degrees)	±15	±15	±15
Resolution (degree)	0.1	0.1	0.1
Seismic			
Tri-axial geophone (G)	±2	±2	±2

Seismic signal is gained downhole by 1, 10, 100, or 1,000 and digitized in the DataPack. No extra wires or analog measurement required.

Our products are made, calibrated and serviced in the USA.

SMRT Module

Soil Moisture, Resistivity and Temperature (SMRT)

Soil moisture has become an important consideration in the design of environmental remediation processes and agricultural planning, and it is one of the most fundamental factors influencing soil strength. Vertek's SMRT Module provides real-time, in-situ logs of soil moisture, resistivity and temperature without sampling.

Soil Moisture Measurement
The SMRT module takes advantage of a relationship between the soil dielectric constant and moisture, widely known as Topp's Equation. The SMRT module utilizes high frequencies to minimize the impact of soil type.

Resistivity Measurement
The SMRT Module generates a constant amplitude AC signal that is passed through the soil. Based on the reading across the sampling resistor the soil resistivity is determined in ohm-meters.

Geotechnical and Environmental Applications
SMRT Modules are available in a variety of diameters and configurations for use in a number of applications, including geotechnical, environmental and agricultural.

An SMRT Module can be used in conjunction with a VTK 15cm^2 CPT cone to provide soil moisture, resistivity and temperature data simultaneously with tip, sleeve, and pore pressure data.

SMRT Module

Soil Moisture, Resistivity and Temperature (SMRT)

Long Term Monitoring
An array of SMRT probes can be permanently emplaced with a field-based data logging or acquisition system. Several communications options (cabled and wireless) are available for long-term monitoring to optimize irrigation of high value crops and to detect leakage into or from landfill areas and hazardous waste sites.

Reliable and Cost-Effective
The SMRT module does not require tuning or complicated maintenance. Continuous moisture logs can be generated at the standard CPT advance rate of 2cm (one measurement) per second, so moisture surveys can be completed with the geotechnical site characterization at no additional operating cost.

Compatibility
The SMRT module fits behind the VTK 15cm^2 cone and works with The VTK DataPack. No additional software is required.

Our products are made, calibrated and serviced in the USA.

VTK Video Module

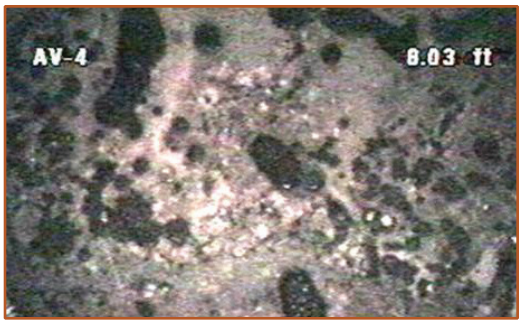
Contamination Confirmation
Visual In-Situ Screening Vertek's Video Module provides a view of the soil in real time, allowing the user to visually detect or confirm the presence of subsurface contaminants (hydrocarbons, NAPL) and sedimentary structures. The Video Module also shows soil texture, grain size, color, moisture and other features, reducing the need for expensive and time consuming soil sampling. Merging our existing hydrocarbon fluorescence technology into our video camera will allow users to view hydrocarbon contamination.

Video is obtained through the BNC port on the DataPack or through the built in H.264 MPEG-4 video encoder within the Datapack.

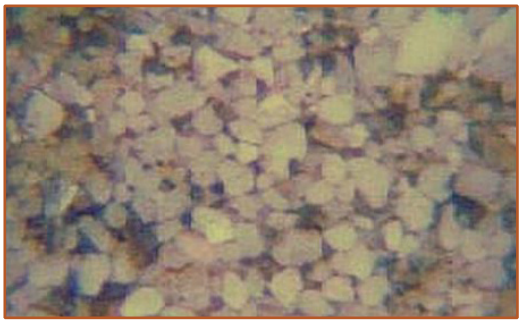
Hydrocarbon fluorescence using the UV illuminator on the Vertek Video Module.

Aromatic Hydrocarbon	Molecular Weight (g/	Fluorecence Range	Fluorecence Color
Toluene	92	270-310	Faint Purple
Naphthalene	128	310-370	Blue
Anthracene	178	370-470	Blue-Green
Benzo(a)pyrene	252	400-500	Green
Perylene	252	440-530	Green
Tetracene	228	470-580	Green-Yellow

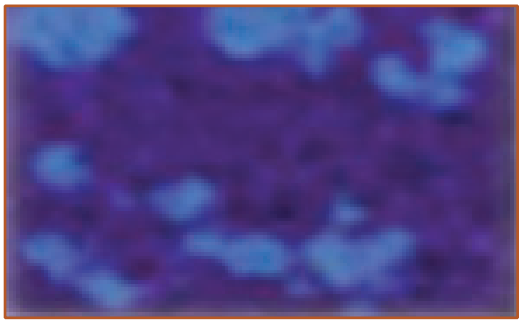
VTK Video Module



Video Image of Coal Tar Contamination



Video Image of Coarse Grain Clean Sand



Video Image of Motor Oil Contamination Under UV Illumination

Camera Housing:

4.9cm diameter, 61cm length, replaceable sapphire window

Optional Housing:

Thermal sprayed tungsten carbide 70-80 per Rockwell Hardness

Camera:

510 x 492 NTSC 9mm x 9mm field of view

Illimunation Sources:

Warm white LEDs

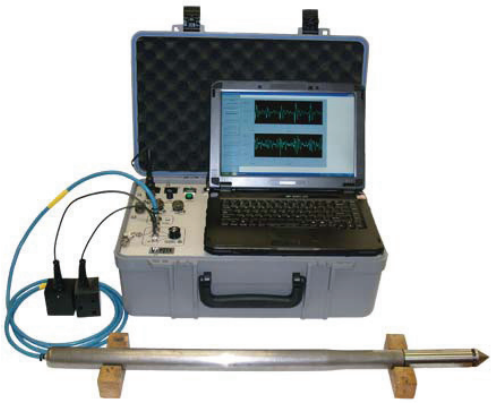
Optional Sources:

UV LEDs (351nm)
IR LEDs (854nm)

Our products are made, calibrated and serviced in the USA.

VTK 8cm² Digital Cone

This specialized light duty cone is designed for shallow investigations typically associated with agricultural, education and laboratory controlled tests. The operator can achieve combined data collection inclusive of geotechnical properties and SMRT measurements in a single integrated probe. Communicates with a specialized data pack.



VTK 8cm² Digital Cone

Max Tip Force	**2 Ton**
Tip	
Area (cm²)	7.8
Range (kn)	18
Range (lb)	4,000
Range (MPa)	22
Overload Capacity	150%
Accuracy (FSO)	0.5%
Sleeve	
Area (cm²)	117
Range (kn)	11
Range (lb)	2,500
Range (MPa)	1
Overload Capacity	150%
Accuracy (FSO)	1%
Pore Pressure Transducer	
Standard Range (kPa)	3,447
Standard Range (psi)	500
Burst Pressure	200%
Accuracy (FSO)	1%
Inclinometer (Dual Axis)	
Range (degrees)	±15
Resolution (degree)	0.1
Seismic	
Tri-axial geophone (G)	NA

Seismic signal is gained downhole by 1, 10, 100, or 1,000 and digitized in the DataPack. No extra wires or analog measurement required.

Our products are made, calibrated and serviced in the USA.

Conesipper®

Simultaneous In-line Sampling
The Vertek ConeSipper® module attaches directly behind a standard CPT cone to obtain soil gas or water samples as the CPT probe is advanced, saving substantial money and time by eliminating duplicate soundings. Developed and patented by Westinghouse Savannah River Corporation (WSRC) and Applied Research Associates, Inc., the ConeSipper® is manufactured by Vertek under an exclusive license to WSRC.

System Description
The ConeSipper® module contains a two stage stainless steel filtration system, an integrated pneumatic valve system, and an 80-ml stainless steel sample chamber. A non-absorptive conduit brings the sample to the surface from depths of more than 200 feet. A pneumatic control box on the surface meters the flow of inert gas to the module, controls the rate of sample collection, and allows the ConeSipper® to be purged and decontaminated down-hole.

High Quality Sampling
The ConeSipper® uses a dual filtration system to obtain samples that are generally free of sediment. The primary filter prevents sand from entering the ConeSipper®, and a secondary filter, removes clay and silt particles. The ConeSipper® does not require a vacuum in all circumstances, which can strip volatile compounds from the sample ensuring more representative samples. Vacuum usage is optional with your Conesipper®.

Durable
The ConeSipper® body is made from high-strength stainless steel to withstand the push forces of a 30-ton CPT truck, and features industrial grade pneumatic valves.

Simple Operation
The sample flows into the chamber under ambient pressure through a check valve that prevents back flow from the chamber. Once the ConeSipper® is full, gas pressure is applied through one of two pneumatic control tubes and the fluid is pushed up to the surface through the second tube. Compressed inert gases can be used to maintain strict sample quality standards. Both filters can be removed for cleaning or replacement without disassembling the ConeSipper® from the CPT probe, greatly improving production rates.

Fast, Cost-Effective, Multi-level Sampling
Remote (water or gas) flushing of the ConeSipper® internal chamber is a significant advantage over other CPT sampling tools as samples can be obtained from multiple depths without returning to the surface for cleaning. A rinsing fluid (e.g., distilled water) can also be ejected through the filtration system, allowing the operator to verify decontamination of the sampler by checking the cleanliness of the flush fluid, afterwards the probe can be pushed to the next sample depth. This capability is a significant economic advantage on jobs that require interval sampling.

Modular Soil Sampler

Vertek's patented Soil Sampler is built for reliable, cost-effective retrieval of soil samples in difficult geologies and is designed to be deployed by most common CPT equipment.

Cycleable and Reliable
The patented tip release system is strong enough to withstand heavy push loads in stiff soils, yet reliably retracts at the desired depth.

Our field replaceable wear surfaces are made from hardened alloy steel.

Simple Operation
The sample barrel with retractable tip is pushed to the desired depth, a lanyard lowered through the push rods then retracts the tip back into the catch housing. After tip release the lanyard is removed back to the surface and soil sampler is ready for sampling. The sampler and the rod string are then retracted, bringing the sample to the surface. Removing the tip releases the soil sample for ease of Examination and logging. Longer samples can be obtained by threading multiple sample barrels together. The sample sleeve can be clear plastic, stainless steel or split stainless steel depending on sampling requirements. The sampler can be rapidly disassembled for field decontamination.

Sample Diameter:	36mm (1.4")
Sample Length:	533mm (21")
Outer Diameter:	51mm (2")
Overall Length:	853mm (33.6")
Sample Tubes:	clear plastic (standard), stainless steel, or split stainless steel

Our products are made, calibrated and serviced in the USA.

Grouting Tools and Cone

To meet the growing needs of various contractors and state and federal agencies Vertek offers our self grouting tools which allow grouting of CPT holes while removing the rods. Vertek offers two types of grouting tools to fit your needs.

Non-Cycleable
The Self-Grouting Module is installed in the rod string above the cone and grout is pumped through during withdrawl. The sacrificial ring fits around the module and comes off when the rods are retracted. The design of the module does not allow for cycling and is not recommended for areas with very fine materials.

Cycleable
This Self-Grouting Module is comprised of a standard cone with blow-out plugs that allow grout to be dispensed during extraction. When the grout is pumped through the tube, the plugs are forced out and grout is released through two outlets.

Cost and Time Efficient
Vertek's Self-Grouting Modules save time and labor by allowing the operator to grout the hole without extracting the rods and then filling the hole by hand. Instead, the operator can seal the hole as the rods are being retracted and all this can be done from the operator control station.

Post-push Non-Cycleable Grouting Adapter (tremie method)
An additional method of grouting utilizes Vertek's Post-push grouting system, which requires a second push but is a simpler method than when combined with the CPT push. Our tremie adapter is applied to the end of the rod string with a disposable oversize tip. Tremie method requires a second set of push rods and associated grout mixing tools.

Vertek's Self-Grouting Modules run the grout tube through the center of the rods alongside the standard CPT cable through the innovative Grout Module Housing which allows the operator to run a probe, extract, and grout without work stoppage.

Grouting Tools and Cone

Max Tip Force	**25 Ton**
Tip	
Area (cm^2)	15
Range (kn)	222
Range (lb)	50,000
Range (MPa)	149
Overload Capacity	150%
Accuracy	0.5%
Sleeve	
Area (cm^2)	225
Range (kn)	44
Range (lb)	10,000
Range (MPa)	2
Overload Capacity	150%
Accuracy	1%
Pore Pressure Transducer	
Standard Range (kPa)	3,477
Standard Range (psi)	500
Burst Pressure	300%
Accuracy	1%
Inclinometer (Dual Axis)	
Range (degrees)	0-15
Resolution (degree)	0.1
Seismic	
Tri-axial geophone (G)	±2

Top View

Side View

Our Self-Grouting Modules run the grout tube through the center of the rods alongside the standard CPT cable through our innovative Grout Module Housing which allows the operator to run a probe, extract, and grout without work stoppage.

Our products are made, calibrated and serviced in the USA.

Cost Effective and Simple CPT System

HT Datapack

The HT DataPack is a field portable Cone Penetrometer Test (CPT) data acquisition and analysis package which works with all digital HT cones. Developed as a simple 'all-in-one' solution for the Geotechnical CPT service providers, this version incorporates USB for ease of connectivity.

Field Portable
The HT DataPack is housed in a water-resistant instrument case and requires use of a COTS, Windows based laptop. Vertek recommends use of a ruggedized computer for CPT applications.

Report Quality Field Plots
The HT Datapack comes with a complete software package for acquisition, processing, and plotting CPT data. The DataPack generates report-quality plots in the field on any Windows supported printer (color or gray-scale). Plot scales can be set automatically and a wide variety of engineering parameters can be selected. With current communication technology data is easily transmitted to project engineers anywhere.

Efficient Data Collection
A digital CPT probe is the heart of the system. The standard probe includes tip, sleeve fiction, inclination, pore pressure sensors, and dual axis geophones. The system stores unlimited data points per channel for each test and is saved to

HT Datapack

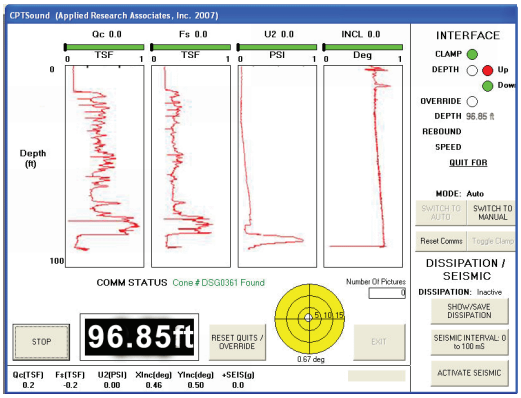
disk after each sample to ensure data integrity. Measurements are also plotted in real time on the computer screen during the push, providing immediate data from the probe and alerting the operator to potential problem layers. Optional shut down circuits can be incorporated to stop the push unit if pre-set stress alarm levels are exceeded.

High-Powered Data Analysis
Data analysis software is included with the DataPack, allowing the operator to display both the test data and derived parameters in formats appropriate to client requirements. Standard classification algorithms based on sleeve friction and pore pressure ratios are included for classification of soil types. Journal published empirical correlation are employed to estimate friction angle, undrained shear strength, standard penetration test (SPT) blow count, relative density, and over consolidation ratio. Pore pressure algorithms are built into the software and the results can be used to estimate the hydraulic conductivity of cohesive soils.

Computer Requirements
Vertek recommends use of ruggedized computers with daylight readable screen for CPT operations. Vertek can supply the computer or Vertek will outfit the customers desired computer. The computer should have a minimum of 4GB RAM. The CPT software will work with both Windows 7 and 8.

Physical Specifications

- Size: 36cm x 8cm x 20cm (14" x 3" x 8")
- Enclosure: Aluminum extrusion with water resistant seals and connectors
- Power: 12 VDC (5 amps) with provided power supply
- Weight: 3 kg (6 pounds)



CPTSound Penetration Screen

Calibration data for tip, local friction and pore pressure channels is stored in CPU nonvolatile memory. Digital cones conform to all international standards.

Our products are made, calibrated and serviced in the USA.

Most Popular HT Cone

HT 10cm² Digital Cone

Available in 2.5 Ton, 5 Ton, and 10 Ton Cone Configurations

The digital electronic 10cm² cone is designed to address the accuracy, sensitivity and durability problems inherent in other cone designs of the same or lower capacity. This cone provides excellent data for softer materials and provides excellent resolution in most materials.

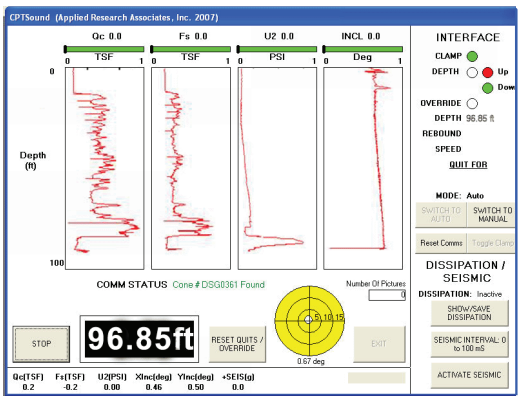
The cone consists of two strain gauge transducers, with the cone electronics packaged directly behind the transducers. In all configurations the cone channels are temperature compensated to provide stable readings during testing. The cone tip, sleeve (local friction element) and pore pressure element (filter) are easily and quickly changed when necessary by the operator.

The cone is available with our standard channels (tip, local friction, pore pressure, inclinometer, seismic, and temperature) and can be used in conjunction with our Vision or Resistivity modules.

Pore Pressure can be measured in either U1 or U2 position (on the face of the tip or just behind the tip).

Cone Channels:

- Tip
- Local Friction
- Pore Pressure
- Temperature
- Inclination
- Seismic
- Resistivity Module (optional)
- Vision Module (optional)



CPTSound Penetration Screen

Calibration data for tip, local friction and pore pressure channels is stored in CPU nonvolatile memory. Digital cones conform to all international standards.

1.800.639.6315 | www.vertekcpt.com

HT 10cm² Digital Cone

Max Tip Force	2.5 Ton	5 Ton	10 Ton
Tip			
Area (cm²)	10	10	10
Range (kn)	22	44	88
Range (lb)	5,000	10,000	20,000
Range (MPa)	22	45	90
Overload Capacity	150%	150%	150%
Accuracy (FSO)	0.5%	0.5%	0.5%
Sleeve			
Area (cm²)	150	150	150
Range (kn)	20	20	20
Range (lb)	4,400	4,400	4,400
Range (MPa)	1.3	1.3	1.3
Overload Capacity	150%	150%	150%
Accuracy (FSO)	1%	1%	1%
Pore Pressure Transducer			
Standard Range (kPa)	6,895	6,895	6,895
Standard Range (psi)	1,000	1,000	1,000
Burst Pressure	200%	200%	200%
Accuracy (FSO)	1%	1%	1%
Inclinator (Dual Axis)			
Range (degrees)	±15	±15	±15
Resolution (degree)	0.1	0.1	0.1
Seismic			
Dual-axial geophone (G)	±2	±2	±2

Our products are made, calibrated and serviced in the USA.

HT 15cm² Digital Cone

Available in 2.5 Ton, 5 Ton and 25 Ton Cone Configurations

The digital electronic 15cm² cone is designed to address the accuracy, sensitivity and durability problems inherent in other cone designs of the same of lower capacity.

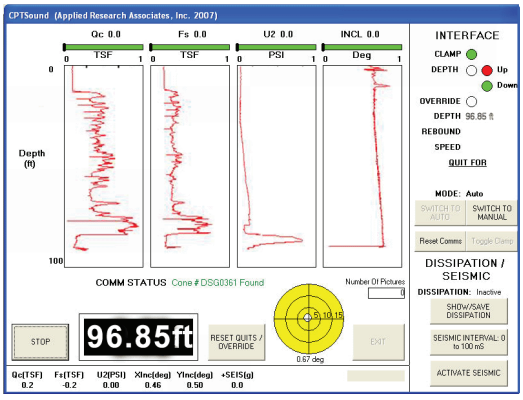
The Cones consist of two strain gauge transducers, with the cone electronics packaged directly behind the transducers. The cone channels are temperature compensated to provide stable readings during testing. The cone tip, sleeve (local friction element), and pore pressure element (filter) are easily and quickly changed when necessary by the operator.

The cone is available with our standard channels (tip, local friction, pore pressure, inclinometer, seismic, and temperature) and can be used in conjunction with our Vision or Resistivity modules.

Pore Pressure can be measured in either U1 or U2 position (on the face of the tip or just behind the tip).

Cone Channels:

- Tip
- Local Friction
- Pore Pressure
- Temperature
- Inclination
- Seismic



CPTSound Penetration Screen

Calibration data for tip, local friction and pore pressure channels is stored in CPU nonvolatile memory. Digital cones conform to all international standards.

1.800.639.6315 | www.vertekcpt.com

HT 15cm² Digital Cone

Max Tip Force	2.5 Ton	5 Ton	25 Ton
Tip			
Area (cm²)	15	15	15
Range (kn)	22	44	222
Range (lb)	5,000	10,000	50,000
Range (MPa)	15	30	150
Overload capacity	150%	150%	150%
Accuracy	0.5%	0.5%	0.5%
Sleeve			
Area (cm²)	225	225	225
Range (kn)	44	44	44
Range (lb)	10,000	10,000	10,000
Range (MPa)	2	2	2
Overload Capacity	150%	150%	150%
Accuracy	1%	1%	1%
Pore Pressure Transducer			
Standard Range (kPa)	6,895	6,895	6,895
Standard Range (psi)	1,000	1,000	1,000
Burst Pressure	200%	200%	200%
Accuracy	1%	1%	1%
Inclinometer (Dual Axis)			
Range (degrees)	±15	±15	±15
Resolution (degree)	0.1	0.1	0.1
Seismic			
Dual-axial geophone (G)	±2	±2	±2

Our products are made, calibrated and serviced in the USA.

Electric Conductivity (Resistivity) Module

The HT Series Resistivity Module combines the standard CPT measurements: tip, local friction, inclination and pore water pressure with electrical measurements of the soil. The combination of these parameters provides comprehensive information useful in determining the stratigraphy of the soil and the location of potential ground water problems in one test. Groundwater problems could include corrosive soils, salt water intrusion or environmental contamination. Any soil contaminate that has a typical electrical conductivity higher than that of water can be detected.

Features

The Electrical Module utilizes a four electrode array which eliminates errors due to gas generation and plating. The device has custom electronics ensuring accuracy over the entire 0-10,000m ground water range. The module also eliminates the effects of the electrical path through the steel body of the device.

Software

Our software provides tabular listings and digital plots of conductivity in mS/m (or resistivity in ohm-m).

Our products are made, calibrated and serviced in the USA.

Drilling to CPT Conversion Kit

Expand Your Equipment
The drill rig CPT adapter kit allows drilling service providers conducting site characterization activities to conduct Cone Penetrometer Testing (CPT) with existing drilling equipment.

Simple Application
A simple adapter screwed on to the drill head allows the existing push and pull hydraulic system to advance and retract the CPT equipment to and from the subsurface. This kit can expand your service capabilities and revenue streams with existing clients. The amount of total push force will depend on the size of your drilling platform and/or how it is anchored.

Common Kits Components

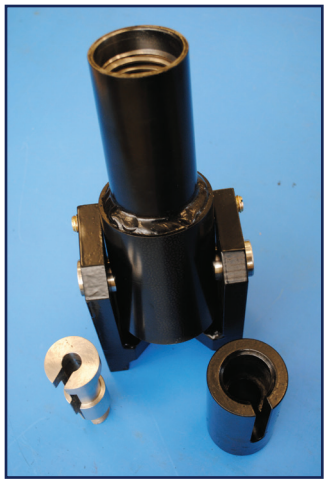
- $10cm^2$ or $15cm^2$ digital cone penetrometer (HT or VTK Series)
- Data Acquisition System (DAS)
- Depth marker
- Drill head adapter
- Push rods and/or rod adaptors
- Wear surface consumables and spares (tips, sleeves, pore pressure filters)
- Seismic shear wave equipment

System Options

- Vertek offers 2 options for the drill head adapter for use with VTK or HT series of equipment
- Customizable for either pin or box drill heads and different thread types (ex. NWJ, AWJ, etc.)
- Depth can be measured with ground based encoder via wheel system or string pot transducer
- Shear wave seismics can be conducted using our triggering system, steel plate placed under the drill rig jack, and sledge hammer
- Rod rack system available to secure the rods and protect the umbilical cable. String rods in the rear of a vehicle for the desired depth of exploration if not using rod rack.
- Two drill rig interfaces offers push & pull capabilities including push cap for advancing and slotted threaded adapter rod for retracting. The original four-piece system relies on threads for connection while the three-piece system features a latch for retraction.

Additional Consumables

- Tips
- Sleeves
- Saturated pore pressure filters
- Spare cone cable
- Snap rings for cabling (HT only)
- O-ring kit



Vertek CPT specializes in conveting traditional drill rigs to direct push. Contact us to discuss the proper adapters for your rig.

Our products are made, calibrated and serviced in the USA.

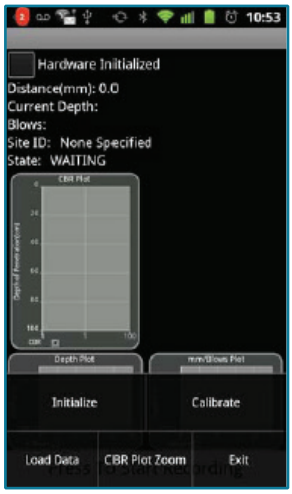
Handheld DCP System

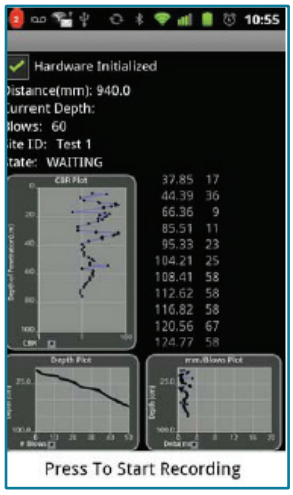
Accurate and Simple Data Acquisition
Vertek's DCP Data Acquisition System (DCP-DAS) is designed to operate with the Dynamic Cone Penetrometer (DCP) via our Android application, automatically measuring and recording the depth of penetration and number of drops, for evaluation of the in situ strength of sub-grade materials. DCP-DAS data is recorded in an electronic format that can be easily downloaded to a computer for further analysis. Manual data collection is also an option.

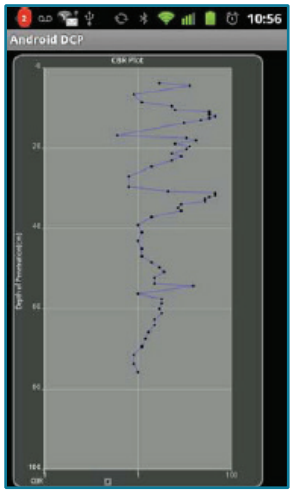
Cost-Effective One Person Operation
Automatic data acquisition allows one-person operation, reducing testing cost while improving the accuracy of the data collected. Android-based software is user-friendly and complements the sturdy DCP construction designed to withstand the rigors of field use.

DCP-DAS Operation
The DCP-DAS uses an Android smartphone connected via Bluetooth to a laser rangefinder mounted on the DCP and plots the depth difference per blow. Audio signals inform the operator of drop readiness and ensures consistent drop force and distance.

DCP-DAS Data Collection
DCP-DAS data is plotted on screen in real time and stored as plain text ASCII files on the phone. The data can be sent via email or uploaded to a PC for offline analysis.







1.800.639.6315 | www.vertekcpt.com

Save Time and Money with Single Person DCP

Handheld DCP System

DCP Special Features

- Touchscreen user interface (Android only)
- Real-time display of test data
- Data transfer to computer via Bluetooth or USB
- Displays mm per blow; blow counts vs. delta distance per blow (mm)
- Displays depth plot; depth (0-100cm) vs. number of blows
- Displays CBR plot; depth (0-100cm) vs. CBR%
- Fast setup / fast deployment
- Uses wireless Bluetooth laser depth transducer

ANDROID Minimum Requirements

- ANDROID OS version 2.2 or higher
- Bluetooth enabled ANDROID smart phone or tablet
- SD card

Our products are made, calibrated and serviced in the USA.

Automated DCP System

Simple, Automated Pavement Characterization

Vertek's Automated Dynamic Cone Penetrometer (ADCP) system is equipped with automatically switched lift/drop mechanism and Windows-based Data Acquisition System (DAS), providing an accurate, fast, and efficient test method for evaluating in-situ conditions of new and existing highway and airfield pavements as well as quality control of new pavement construction.

The ADCP-DAS determines the insitu strength and thickness of soils, unbound granular base and subbase pavement layers, and sub grades. The ADCP provides the same results as the manual DCP with improved efficiency and cost effectiveness.

Features

The Data Acquisition System (DAS), provides on-site, real-time registration of blow count and depth. Windows based software simplifies data processing and analysis. DAS also provides automatic conversion of data into California Bearing Ratio (CBR), Limestone Bearing Ratio (LBR), sub grade modulus K, resilient modulus E, and Soil Support Value (SSV).

The ADCP saves time and money. The lift/drop mechanism delivers up to 40 blows per minute, more than double the average manual speed, and since data is automatically recorded it eliminates the need for a second person.

The ADCP can test layers beneath asphalt and concrete pavement by drilling a 1-inch diameter hole and a hydraulic core drill is an option on all ADCP platform configurations; no drilling is required to test unsurfaced pavements and soils. The ADCP can be mounted on a variety of platforms including trailers, light trucks, and all terrain vehicles.

Trailer Mounted
The ADCP is mounted on a steel trailer with standard ball hitch that is approved for over-the-road transportation, and with a total weight of less than 1,500 pounds, it can be towed by any appropriately equipped lightduty vehicle. The ADCP system is powered by the tow vehicle's 12 VDC electrical system.

ADCP Unit and Core Drill

Trailer Mounted ADCP

ADCP mounted on all-terrain vehicle

Automated DCP System

Simple, Automated Pavement Characterization

All Terrain Vehicle
The ADCP can be mounted on a medium sized all terrain vehicle such as the ASV Scout shown at left. The ADCP utilizes the Scout's electric and hydraulic systems for power and the platform's high level of mobility allows you to perform testing in hard to access areas.

Truck Mounted
The ADCP can be mounted on lightweight, commercially available pickup trucks such as the Ford F-550s shown above. Because of the platform's light weight and small size, it does not require special permits, licenses, or increased insurance costs. In most states and counties it can be licensed as a pickup truck. This combination of small size and light weight makes it easy to access tight spots while providing economical operation and maintenance.

ADCP Method	VS	Manual Method
• Virtually eliminates worker fatigue and eliminates the risk of muscle strain and hand or finger injuries		• Induces worker fatigue, manual lifting and worker fatigue can result in irregular impact and inaccurate data
• Mechanical lifting of the hammer delivers an accurate impact every two seconds, resulting in accurate data		• Two (or three) person operation, 2 to 5 tests per hour (typical), results in high labor costs
• One person operation, 7 to 14 tests per hour (typical), results in approximately 1/5 the labor cost of manual DCP		• Data collected and recorded manually
• Data automatically collected, recorded, and available to the operator in real-time		• Removal of DCP shaft after test completion is difficult and sometimes damages
• Removal of ADCP shaft after test completion is automated and causes no damage to mechanism		

Our products are made, calibrated and serviced in the USA.

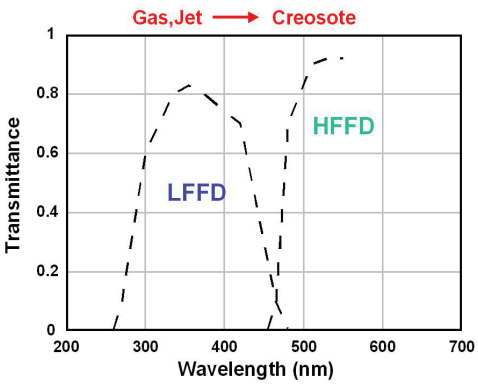
In-Situ Fuel Fluorescence Detector

Site Characterization
Vertek's In-Situ Fuel Fluorescence Detector (FFD) measures fluorescence produced by aromatic hydrocarbons when excited by ultraviolet (UV) light. This tool is designed to screen and define subsurface plumes and provide discrete depths for soil and groundwater sampling. Vertek's FFD significantly reduces the time required to detect and characterize hydrocarbon fuels and volatile organic compounds (VOCs). The FFD probe system generates minimal investigation-derived waste, reducing containment and disposal costs.

VTK Compatibility
The FFD module is designed to be attached to the VTK line of digital cones to conduct geotechnical and environmental site investigations simultaneously. The module may also be advanced as a stand-alone in-situ detector when strictly environmental results are required.

High Sensitivity Option
Using photo multiplier tubes and traditional UV mercury lamps, the High Sensitivity Probe identifies low levels of contamination more readily.

FFD Filters Cover Fuel Range



FFD Features:

- Depth measurements with 1mm accuracy.
- Excites aromatic hydrocarbon contamination above and below the ground water table.
- Licensed and patented sapphire window technology for long window life and high transmissivity of UV light.
- Dual filtered detectors sense the full range of light to heavy fuel types (aromatic hydrocarbons).
- Output into software package of choice for 3D cross-sectional hydrocarbon contamination layer profile.

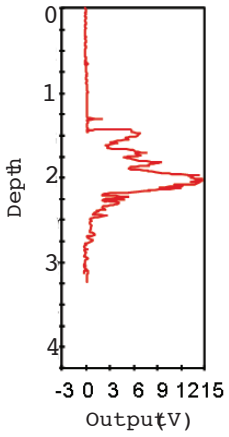
In-Situ Fuel Fluorescence Detector

Continuous Measurement
Vertek's FFD provides a continuous, real-time output of fluorescence through the entire sounding. This information can be viewed graphically in realtime with Vertek's Data Acquisition System (DAS) as the probe is advanced, providing a more complete characterization of the plume's extent than traditional discrete sampling techniques

Aromatic Hydrocarbon	Molecular Weight (g/	Fluorecence Range	Fluorecence Color
Toluene	92	270-310	Faint Purple
Naphthalene	128	310-370	Blue
Anthracene	178	370-470	Blue-Green
Benzo(a)pyrene	252	400-500	Green
Perylene	252	440-530	Green
Tetracene	228	470-580	Green-Yellow

Specifications

UV Light Source:	10Hz Pulsed LED
Excitation Wavelength:	254nm
Housing:	Hardened Steel with Durable Coating
Optical Window:	Replaceable Sapphire
Detection Limit: (Fuel & Soil Dependent)	<100ppm (TPII) in Sandy Soil
Power:	12VDC, 0.2A, 2.4W
Dual Detector Outputs:	Light (LFFD) & Heavy Fuels (HFFD)
Optional Filter Wave lengths:	Per Customer Specification



Typical FFD results from soundings conducted across a hydrocarbon plume.

Data is available instantly in real-time graphical display.

Our products are made, calibrated and serviced in the USA.

Vertek - a Division of ARA
250 Beanville Road
Randolph, VT 05060

Ph. 802.728.4588
Fax 802.728.9871

www.vertekcpt.com
Email: sales@vertekcpt.com