
Drilling Requirements for PMT

Applicable with TEXAM, TRIMOD and GAM-II Pressuremeters

June 2006

Drilling Requirements

2 CONDITIONS REQUIRED TO OBTAIN A QUALITY BOREHOLE :

---» DIAMETER OF BOREHOLE:

$$1.03 D_2 < D_3 < 1.10 D_2$$

Where D_2 : diameter of the deflated probe

D_3 : diameter of the initial borehole

Use drilling bits between 2 7/8" to 3 1/8" for an N size hole. Ideally, keep different sizes on the site to adjust to types of soils.

---» MINIMUM DISTURBANCE OF THE WALL OF THE BOREHOLE

This is possible by following indications below

Drilling Requirements

Use of rotary drilling with axial injection (towards hole bottom) of mud is applicable in most cases.

- *Popular method : 3-in hollow auger for first portion of the borehole + use of rotary bit in the testing zone only*
- *Ideally: Three-wing bit for clays and fine sands, and Roller bit for gravelly soils*
- *Diameter of rods must be one or two sizes smaller than diameter of bit to allow good flow up of cuttings*
- *Do not ram the bit up and down as this will result in an oversized hole*

Please note that standard 3-in probe comes with an AW box rod adaptor (with straight threads, not tapered)

Drilling Requirements

DRILLING PROCEDURES

- Injection pressure < 500 kPa with borehole full of mud
- Bit rotation < 60 rpm
- Flow < 15 liters per minute
- Bit pressure < 200 kPa (100 kg in a 76 mm borehole)
- Typical advance rate 15 to 25 cm/minute

Drilling Requirements

Type of soil / rock	Recommended methods of drilling <small>* Refers to method of choice</small>	Drill tool with bottom discharge <small>* Refers to tool of choice</small>
Soft clays	- Rotary with water *	- Roller bit * - Drag bit
Medium clays	- Rotary with mud * - Rotary dry - Push In	- Roller bit* - Auger - Shelby tapered outer edge. Does not tolerate gravel. Two successive samples. Slow removal to avoid major suction
Stiff clays	- Rotary with mud *	- Roller bit *

Drilling Requirements

Type of soil / rock

Recommended methods of drilling

* Refers to method of choice

Drill tool with bottom discharge

* Refers to tool of choice

Alluviums above water table

- Rotary dry

- Bucket Auger *
- Helicoidal Auger

Alluviums below water table

- Rotary with mud

- Roller Bit*

Drilling Requirements

Type of soil / rock	Recommended methods of drilling * Refers to method of choice	Drill tool with bottom discharge * Refers to tool of choice
Loose sands above water table	<ul style="list-style-type: none"> - Rotary dry - Rotary with mud * 	<ul style="list-style-type: none"> - Bucket Auger - Roller bit *
Loose sands below water table	<ul style="list-style-type: none"> - Rotary with mud * 	
Medium dense sands above and below water table	<ul style="list-style-type: none"> - Rotary with mud - Rotary dry (rare cases) 	<ul style="list-style-type: none"> - Roller bit * - Bucket (dry shallow hole or mud filled)
Medium dense with large gravel	<ul style="list-style-type: none"> - Rotary plus driven 	<ul style="list-style-type: none"> - Roller bit pilot hole followed by slotted casing. Bridge voids. *
Fine grained homogeneous	<ul style="list-style-type: none"> - Rotary dry 	<ul style="list-style-type: none"> - Bucket (dry shallow hole or mud filled)
Dense sands	<ul style="list-style-type: none"> - Rotary with mud 	<ul style="list-style-type: none"> - Roller bit * - Drag bit
Dense sands with large gravel	<ul style="list-style-type: none"> - Rotary plus driven 	<ul style="list-style-type: none"> - Roller bit with or without driven pilot Hole and slotted pipe. *

Drilling Requirements

Type of soil / rock	Recommended methods of drilling <small>* Refers to method of choice</small>	Drill tool with bottom discharge <small>* Refers to tool of choice</small>
Cemented sands with large gravel	- Rotary with mud	- Roller Bit - Core drilled
Glacial tills	- Rotary with mud - Rotary dry	- Tricone roller bit with rod guide or cored - Core drilled
Weathered rock	- Rotary	- Tricone roller bit with mud or water
Rock ($E < 5 \text{ gPa}$)	- Rotary with water	- Core drilled *