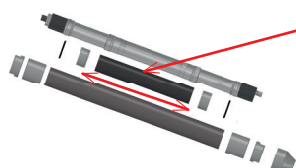


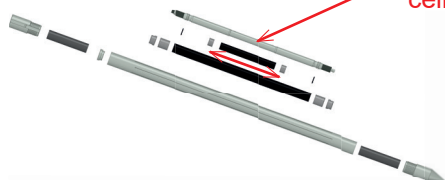
Typical probes

- Historical 60 mm probe (D60)



L = central
cell length

- 44 mm probe in a slotted tube



L = central
cell length

Choice of probe

- 60 mm probe (D60) in priority
- 44 mm probe + slotted tube (SST or LST) to be used in the following cases:
 - Borehole walls instability despite casing and bentonite
 - Repeated probe burstings

Dimensions of 44 mm probes in a slotted tube

- Short central cell (L = 21 cm): SST
- Long central cell (L = 37 cm): LST

Liquid for the central cell

- Summer: pure water (without antifreeze)
- Winter: antifreeze 1/3 + pure water 2/3

	PRESSURE LOSS CALIBRATION		VOLUME LOSS CALIBRATION	
OBJECTIVES	Assessment of the probe self-resistance		Assessment of the equipment self-expansion with pressure (< 6 cm3/10 bar) Assessment of contact volume of the probe inside the calibration cylinder	
PRELIMINARY OPERATIONS	Probe pre-inflation to the maximum expansion volume (three times)			
FREQUENCY	Each bursting – each connecting lines change – once a week minimum			
MEMBRANE	Pressure < 25 bar	Pressure ≥ 25 bar	Pressure < 25 bar	Pressure ≥ 25 bar
STEPS (bar)	D60: 0.2	SN60: 0.2	Apply pressures equal to 1, 3 and 5	
		SST or LST: 0.4	puis de 2.5 en 2.5 bars	then 5
END OF THE TESTS	D60 or LST: 600 cm³		25 bar	50 bar
	SST: 400 cm³			

PROBE TYPE	TARGETED MAXIMUM APPLIED PRESSURE	PROBE MEMBRANE	GROUND TYPE	PROBE SELF RESISTANCE (BAR)
SN60	p < 6 bar	Rubber cover, 1.5 mm Metal cover (steel strips)	Soft fine soil	0.8 - 1.1
	6 bar ≤ p < 25 bar	Rubber cover 4 mm	Clay, silt, sand	1.8 - 2.1
	p ≥ 25 bar	High pressure canvas cover 4mm	Coarse soil, mudstone, rock	2.1 - 2.5
SST or LST	9 bar ≤ p < 25 bar	Rubber cover 4 mm	Buoyant ground, mudstone	2.8 - 3.5
	p ≥ 25 bar	High pressure canvas cover 4 mm	Buoyant ground, gravels, weathered rock	2.8 - 3.5

DIFFERENTIAL PRESSURE P_{diff} BETWEEN CENTRAL CELL AND GUARD CELLS

Test depth (m)	Central cell pressure = guard cells pressure + 1.5 bar at the probe level (bar)
0 (pressure and volume loss calibrations)	1.5
5	1
10	0.5
15	0
20	-0.5 / inverting P _{diff} valve
25	-1

Calibration of pressure-volume unit

- Mandatory annual calibration of the whole equipment
- Calibration date to check before use

Connecting lines: coaxial or parallel

Use the shorter connection lines compared to the deepest pressuremeter test

DOWNLOAD PDF



The **ARSCOP National Project** (New Approaches to Soil Recognition and Design of Geotechnical Works with the Pressure Meter) is managed by the Institut pour la Recherche Appliquée et l'Expérimentation en génie civil (IREX) and supported by the Ministère de la Transition écologique, de la Biodiversité, de la Forêt, de la Mer et de la Pêche

arscop.fr

Pressuremeter sounding

- Minimum horizontal spacing between two pressuremeter boreholes: 2 m
- Minimum vertical spacing between 2 Ménard pressuremeter tests in the same borehole: 0.75 m

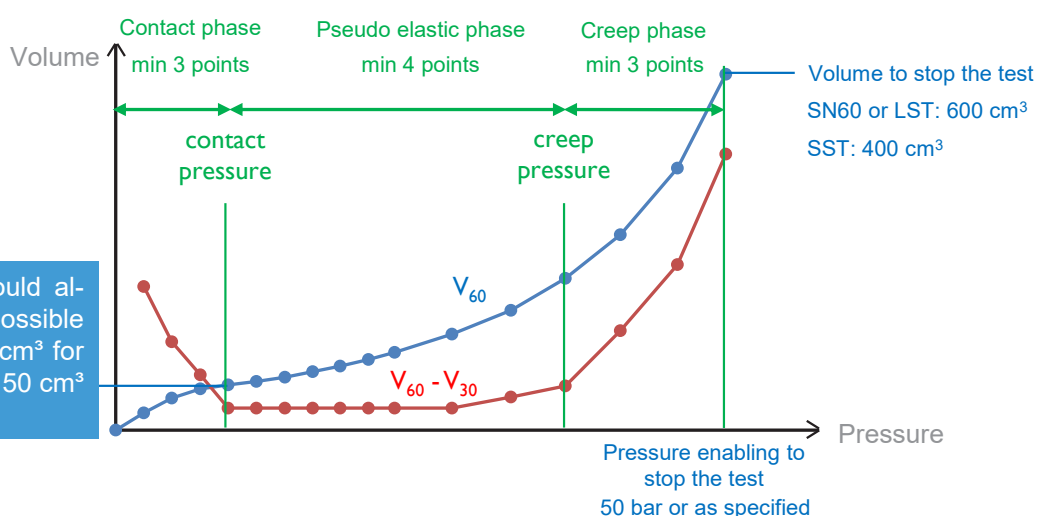


Remember to record measurements while drilling

Guide for the drilling technique choice ⁽¹⁾

***	Recommended	Prior destructive borehole, diameter 60 to 66 mm VA < 90 m/h (1.50 m/min) QI < 15 l/min PI < 5 bar - bentonite if necessary				Slotted tube with predrilling with 51 mm diameter, or direct pushing or hammering	VA	Penetration rate
**	Permitted						VR	Rotational Speed
*	Possible						QI	Drilling fluid inflow
-	Not allowed						PI	Flushing medium pressure
Ground type		Open hole drilling” VR < 120 r/min	Helicoïdal or hand auger VR < 80 r/min	Rotary percussive drilling VR < 120 t/min	Self-drilled slotted tube VR < 120 r/ min		Maximum drilling length forage between each test series (m)	
Soft clay and sludge		**	**	-	-	Driven D60 probe	1	
Soft to firm clays		***	***	*	*	-	3	
Stiff clays		***	***	**	**	-	5	
Silts: — above water table		**	***	**	**	-	5	
Silts: — below water table		**	*	*	**	*	3	
Loose sands – above water table		**	**	*	**	-	3	
Loose sands – below water table		**	*	*	**	*	1	
Medium dense to dense sands		***	***	**	***	*	5	
Gravels		**	-	***	***	**	5	
Non homogeneous cohesive soils (e.g. boulder clay)		***	*	***	**	*	5	
Non homogeneous loose soils (other soils not specified above (e.g. tills, man made soils)		**	*	***	**	**	5	
Weathered and weak rock		***	*	***	**	*	5 m (or length ensuring duration after drilling < 4 h)	
Medium hard and hard rocks		***	-	***	**	-		

(1) Drilling by rotary coring not included here but can be used according to (EN) ISO 22476-4



The drilling technique should allow obtaining the lowest possible contact volume (max 200 cm³ for SN60 or LST probes and 150 cm³ pour SST)

Key-points of the loading programme

- Minimum 10 pressure steps
- Pressure steps change duration shorter than 20 s
- Pressure steps maintained during 60 s
- Effective applied pressure = +/- 0,25 bar / target pressure
- Change in pressure steps maximum twice, before the pressuremeter creep pressure.