



MATERIALS & SERVICES

for soil investigation, drilling and laboratory



APAGEO

Matériel de Géotechnique - Geotechnical Equipment

2010-2011 CATALOGUE

25 YEARS OF EXPERTISE

APAGEO has travelled a long road since its founding in 1984, a road full of challenges and adventures. Our singular mission remains the same as on day one: **to serve the geotechnics and drilling industries in France and worldwide.**

We have since worked diligently to develop the next generation of solutions, invested towards maximising value for investment and developed to provide for our company's long-term viability. The men and women striving over the years to grow our company and preserve its values have accomplished the amazing feat of making APAGEO an industry leader whilst also forging our solid reputation. We certainly share our dynamic outlook with our partner suppliers, whom we involve in our decision-making processes; but above all it is you, our valued clients, to whom we owe our longevity thanks to your enduring confidence in us.

We have started the new year with a new catalogue that is more concise and user-friendly. Use it as a tool to help you make the best decisions for your worksites and crews. In it you will find all the products and services you have come to appreciate along with our newest offerings.

I take this opportunity also to extend my thanks to two key individuals: Michel Gambin, APAGEO's scientific advisor, whose name is familiar to many, for his reliability and loyalty and the quality of his expertise; and Jean-Paul Robert for his tireless efforts to develop distant markets and share his knowledge and experience.

My thanks to you both and to all.



Jean-Pierre Arsonnet
Chief Executive Officer

Founded in 1984, APAGEO manufactures and markets a comprehensive range of geotechnical and drilling equipment to meet your full requirements. Our teams of experts with their extensive knowledge are available at any time to support your projects.

DESIGN:

Design and Methods Department



PRODUCTION:

Equipment and Tools Production Plant



PRESSUREMETERS AND ELECTRONICS:

Development of in situ measuring equipment



SERVICES:

After-Sales Service and training



APAGEO: OUR VALUES AND COMMITMENTS

APAGEO ON THE WORLD STAGE

APAGEO AND QUALITY

In our effort to achieve **continuous quality improvements**, we leverage our full expertise and seek to develop it further on a daily basis with:



- Our unique heritage – the expertise of **Louis Ménard**, an international reference in geotechnics
- Our **Design and Methods Department**, which ensures the highest quality of our products and contributes to all phases from prototype creation through product design
- Our **patented** products, **registered trademarks** and full compliance with **EC standards**.



APAGEO AND CUSTOMER SERVICE

Supporting our clients with their projects is important and allows us to ensure optimal operation and use of our products.

For this reason, APAGEO offers **training on use of its equipment** and **on-site assistance** at any time of year in France or abroad.

APAGEO AND SUPPLY STOCKS

Being **responsive** is one of our main objectives.

To ensure fastest fulfilment of client requirements, APAGEO operates a **warehouse** with a storage area of **615 m2** and capacity to hold more than **5000 reference products**.



APAGEO has been deploying its expertise internationally for a number of years. We are currently active in more than 80 countries in Africa, Asia, Oceania, Europe and the Americas.



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 Overburden drilling - S.T.A.R. equipment

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 Tungsten carbide bits and reaming shells
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 Diamond bits
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 Non destructive testing

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Our Design and Methods Department is responsible for designing and defining the company's various products. Ready to adapt to client requirements using its creativity and field knowledge, it **devises technical solutions** and **assures the highest quality** of all parts whilst identifying the most suitable materials for their manufacture.

Its primary activities consequently include **planning production**, finalising the technical specifications of each machine, **ensuring conformity** of the end products to client requirements,

organising the various phases of the operations process and **ensuring timely delivery** to clients.

Continually seeking **innovation**, it carries out client-specific projects using the most powerful tools currently available such as SolidWorks for 3D CAD and Cosmos for the calculation component.

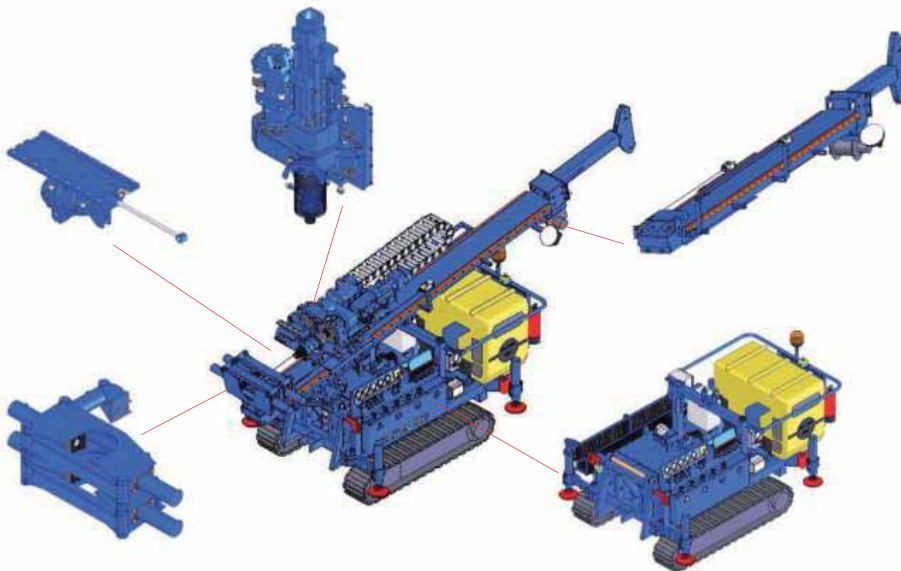
The Design and Methods Department plays a key role in developing APAGEO'S equipment by **maximising the performance of our current line** whilst also **conceiving new solutions** with a view to offering our clients products that meet their requirements as effectively as possible.

P.10 DRILLING RIGS APAFOR®

APAFOR® 100
APAFOR® 220
APAFOR® 330 and APAFOR® 340
APAFOR® 440 and APAFOR® 450
APAFOR® 450 RS
APAFOR® 550
APAFOR® 560
APAFOR® and more

P.18 DRILLING DATA LOGGER EXPLOFOR® 3 WITH GEOBOX®

P.20 INJECTION PUMPS AND MIXERS



APAFOR® 100



Technical specifications (for any modification, contact us)

Ref: D10 800000

Performances

Blowing speed:
25 blows/min

Hammer weight:
63,5 kg

Falling height:
75 cm



General Information

- Heavy dynamic penetrometer, NF P 94-115 and EN ISO 22476-2 standards
- Penetration test type B (DPSH) and SPT
- The rig can be operated by one person only

Standard specifications

- 10 HP HATZ diesel engine
- Electric blow counter integrated on the control panel
- Hydraulic extraction system 7 tons with pedal
- Boxes for rods, tools and cones

Option

- Rotation head for auger drilling with 63mm auger guide on the penetrometer
- Winch with cable and shackle (capacity=470 kg)
- Mechanically welded steel frame to support the penetrometer system when exchanged with the rotation head

APAFOR® 220

Technical specifications (for any modification, contact us)

Ref: U2 7100702 (standard)
Ref: U2 7100703 (trailer)



General information

- Very compact rig for difficult site access
- Very attractive power-weight ratio
- Drilling for pressuremeter tests at lowest cost
- Drilling with auger and Down The Hole hammer drilling
- Small diameter coring at shallow depth

Standard specifications

- 26 HP Caterpillar diesel engine
- Mast length 2.75 m – useful stroke 1.98 m
- 4 mechanical stabilisation feet
- Emergency stops on the control panel and remote control
- Mounted on a variable width rubber track manually operated from 700 to 1060 mm
- Standard rotary head
- Auger guide
- Remote moving control (wireless possible)
- Proportional hydraulic controls

Weight

- 1100 Kg (without option)



Performances

Rotation speed:
0 to 100 rpm

Max. Torque:
100 daN.m

Rotary head translation speed:
22 m/min

Pull-up force:
1600 daN

Mast lengths	Useful stroke
	Auger guide or rod clamp 4T
1.95 m	1.18 m
2.45 m	1.68 m
2.75 m	1.98 m

Options

- Hydraulic rod clamp 40 kN force
- Thermal engine injection pump mounted on independent skid
- Fitting of a heavy dynamic penetrometer (DPSH, SPT and hammering works)
- Capstan for semi automatic heavy penetrometer or SPT
- Speed rotation engine for coring
- Percussion hammer
- Trailer for transportation
- Available mounted on a trailer without rubber track
- Prefitting for drilling data logger (light or full)
- Hydraulic manipulation winch
- Hydraulic stabilisation feet

APAFOR® 330 & 340

Technical specifications (for any modification, contact us)

Ref: U3 7100101 (330)
Ref: U3 7100103 (340)
Ref: U3 7100100 (340 trailer)

Performances

Rotation speed:
0 to 86 rpm

Max. Torque:
190 daN.m

Rotary head translation speed:
22 m/min

Pull-up force:
1600 daN

Mast lengths	Useful stroke
	Auger guide or rod clamp 4T
1.95 m	1.18 m
2.45 m	1.68 m
2.75 m	1.98 m



General information

- Very compact rig for difficult site access
- Very attractive power-weight ratio
- Drilling for pressuremeter tests
- Micro piling (auger or Down The Hole hammer)
- Coring at medium depth

Standard specifications

- 32 HP HATZ soundproofed diesel engine (APAFOR 330)
- 41 HP DEUTZ diesel engine (APAFOR 340 and 340 trailer)
- Mast length 2.75 m – useful stroke 1.98 m
- Mechanically welded steel frame mounted on a hydraulic variable width rubber track from 700 to 1060 mm
- 4 mechanical stabilisation feet
- Proportional hydraulic controls on control panel
- Emergency stops on the control panel and remote control
- Auger guide
- Remote moving control (wireless possible)
- Standard rotary head

Weight

- 1400 Kg (without option)

Options

- Hydraulic rod clamp 40 kN force
- Thermal engine injection pump mounted on independent skid
 - Fitting of a heavy dynamic penetrometer (DPSH, SPT and hammering works)
 - Capstan for semi automatic heavy penetrometer
 - Speed rotation engine for coring
 - Trailer for transportation
 - Hydraulic manipulation winch
 - Percussion hammer
 - Prefitting for drilling data logger (light or full)
 - Hydraulic stabilisation feet

APAFOR 340
AVAILABLE ON TRAILER
VERSION



APAFOR® 440 & 450

Technical specifications (for any modification, contact us)

Ref: U3 8710101 (440)
Ref: U4 5710101 (450)



General information

- Powerful and versatile drilling rigs, able to perform coring, rotary or rotary-percussion drilling operation thanks to its top hammer, the ideal equipment for soil investigation
- Large speed and torque range thanks to their variable volumetric displacement hydraulic motor and proportional distributors

Standard specifications

- 41 HP DEUTZ diesel engine (APAFOR 440)
- 48 HP HATZ soundproofed diesel engine (APAFOR 450)
- Floating shaft equipped with a swivel having two threads : male 2"3/8 IF and female R38
- Rotary percussive head with proportional hydraulic control, top hammer
- Mast length 3.65 m – useful stroke 2.25 m, inclination +/-15%
- Light prefitting for drilling data logger
- Prefitting for an hydraulic injection pump
- Rod clamp 80 kN force
- 4 hydraulic jacks
- Mechanically welded steel frame mounted on a hydraulic rubber track 140cm width
- Remote moving control (wireless possible)
- Rods rack

Weight

- 2 600 kg (without option)

Options

- Hydraulic sliding of drilling head (except for frame with variable width)
- Hydraulic Piston Injection pump
- Hydraulic injection pump (GAMA 80)
- Rock drilling mast advance system
- Hydraulic manipulation winch
- Wireline winch
- Hydraulic variable rubber track (from 0.72 m to 1.02 m)
- Capstan for SPT

- Rods unscrewing hydraulic wrench
- Road trailer four wheeled for transportation
- Rotation speed sensor (VIR®)
- Full prefitting for drilling data logger
- Removable receptacle for rods (length 1.8m)
- Other rotary heads, see p.17



Performances

(other performances available please see page 17)

Rotation speed:
0 to 700 rpm

Variable torque:
0 to 220 daN.m

Pull-up force:
4000 daN

Hydraulic hammer :
180 joules – 1300 bpm

Mast lengths	Useful stroke		
	Rotary-percussion head		Rotary head
	Rod clamp 8T	Rod clamp 8T	Double rod clamp 8T
3.45 m	2.03 m	2.03 m	-
3.65 m	2.25 m	2.25 m	2.25 m

APAFOR® 450 RS



Technical specifications (for any modification, contact us)

Ref: U45 700002



General information

- Versatile rig, track mounted for difficult site access.
- Very attractive power-weight ratio
- Continuous flight auger, rotary and Down-the-hole hammer drilling, coring
- Fully self-sufficient thanks to its serial injection pump fitting

Standard specifications

- 48 HP Hatz soundproofed diesel engine
- Mechanically welded steel frame mounted on a rubber track 1,4 m width
- Safety devices : Emergency stop on the control panel
- Floating shaft with pin thread 2"3/8 IF (other threads available)
- Pull-up force : 1800 daN.m
- Handling with hydraulic controls
- 4 hydraulic jacks for stabilisation
- Mast length : 3.56 m useful stroke 2.31 m
- Hydraulic rod clamp 8 tonnes
- Swift injection swivel at the top of the rotation head
- Dimensions : L 3.060 x W 1.400 x H 3.730 m (drilling position)

Weight

- 2 750 kg (without option)

Options

- Hydraulic injection pump
- Hydraulic sliding of drilling head
- Manipulation winch
- Light prefitting for drilling data logger

Performances double torque

Rotation speed:
0 to 87 rpm (auger configuration)
0 to 435 rpm (coring configuration)

Double Torque:
280 daN.m (auger configuration)
56 daN.m (coring configuration)

APAFOR® 550

Technical specifications (for any modification, contact us)

Ref: U3 8710100



General information

- Powerful and versatile drilling rigs, able to perform coring, rotary or rotary-percussion drilling operation thanks to its top hammer, the ideal equipment for soil investigation
- Large speed and torque range thanks to their variable volumetric displacement hydraulic motor and proportional distributors

Standard specifications

- 53 HP DEUTZ air and oil cooling diesel engine
- Floating shaft equipped with a swivel having two threads: male 2"3/8 IF and female R38
- Rotary-percussion head with proportional hydraulic control, top hammer
- Mast length 3.85 m – useful stroke 2.25 m, inclination +/-15%
- Light prefitting for drilling data logger
- Prefitting for an injection pump
- Rod clamp 80 kN force
- 4 hydraulic jacks
- Mechanically welded steel frame mounted on a hydraulic rubber track 140cm width
- Rod rack
- Remote moving control (wireless possible)

Weight

- 2800 Kg (without option)

Options

- Hydraulic sliding of drilling head
- Hydraulic injection pump
- Hydraulic manipulation winch
- Wireline winch
- Capstan for SPT
- Double rod clamp
- Rotation speed sensor (VIR®)

Performances

(other performances available please see page 17)

Rotation speed:
0 to 500 rpm

Variable torque:
0 to 280 daN.m

Pull-up force:
4000 daN

Hydraulic hammer:
180 joules – 1300 bpm

	Useful stroke			
	Rotary-percussion head		Rotary head	
Mast lengths	Rod clamp 8T	Double rod clamp 8T	Rod clamp 8T	Double rod clamp 8T
3.65 m	2.25 m	-	2.25 m	2.25 m
3.85 m	2.25 m	2.25 m	2.25 m	2.25 m
4.11 m	2.71 m	2.71 m	2.71 m	2.71 m
4.41 m	3.05 m	3.02 m	3.05 m	3.05 m

- Full prefitting for drilling data logger
- Road trailer four wheeled for transportation
- Removable receptacle for rods
- Rock drilling mast advance system
- Other rotary head, contact us

APAFOR® 560

Technical specifications (for any modification, contact us)

Ref: U5 6700000



General information

- Powerful and versatile drilling rigs, able to perform coring, rotary or rotary-percussion drilling operation thanks to its top hammer, the ideal equipment for soil investigation
- Large speed and torque range thanks to their variable volumetric displacement hydraulic motor and proportional distributors

Standard specifications

- 60 HP CATERPILLAR diesel engine
- Floating shaft equipped with a swivel having two threads: male 2"3/8 IF and female R38
- Rotary-percussion head with proportional hydraulic control, top hammer
- Mast length 3.85 m – useful stroke 2.25 m, inclination +/-15%
- Light prefitting for drilling data logger
- Prefitting for an injection pump
- Rod clamp 80 kN force
- 4 hydraulic jacks
- Mechanically welded steel frame mounted on a hydraulic rubber track 140cm width
- Road trailer coupling
- Remote moving control (wireless possible)
- Rod rack

Weight

- 2 900 kg (without option)

Options

- Hydraulic injection pump (SIGMA 100)
- Hydraulic sliding of drilling head
- Hydraulic manipulation winch
- Wireline winch
- Capstan for SPT
- Double rod clamp
- Rotation speed sensor (VIR®)
- Full prefitting for drilling data logger
- Rock drilling mast advance system
- Road trailer
- Removable receptacle for rods
- Other rotary head, contact us

Performances

(other performances available please see page 17)

Rotation speed:
0 to 510 rpm

Variable torque:
0 to 310 daN.m

Pull-up force:
4000 daN

Hydraulic hammer:
180 joules – 1300 bpm

Mast lengths	Useful stroke			
	Rotary-percussion head		Rotary head	
	Rod clamp 8T	Double rod clamp 8T	Rod clamp 8T	Double rod clamp 8T
3.65 m	2.25 m	-	2.25 m	2.25 m
3.85 m	2.25 m	2.25 m	2.25 m	2.25 m
4.11 m	2.71 m	2.71 m	2.71 m	2.71 m
4.41 m	3.05 m	3.02 m	3.05 m	3.05 m



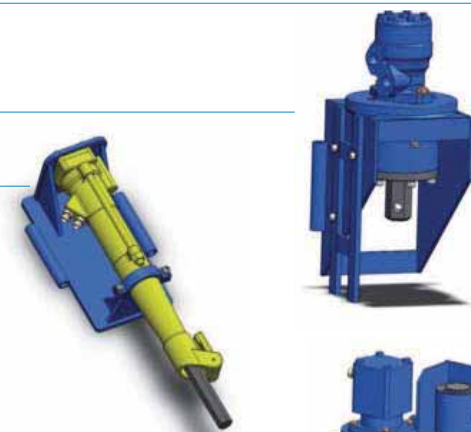
APAFOR® and its variants

Additional rotary heads for more performances

Available for APAFOR® 220 / 330 / 340

Fast coring head:
Rotation speed: 0 to 500 rpm
Variable torque: 0 to 32 daN.m

Hammering head/device:
80 - 100 joules
1650 bpm



Available for APAFOR® 440 / 450 / 550 / 560

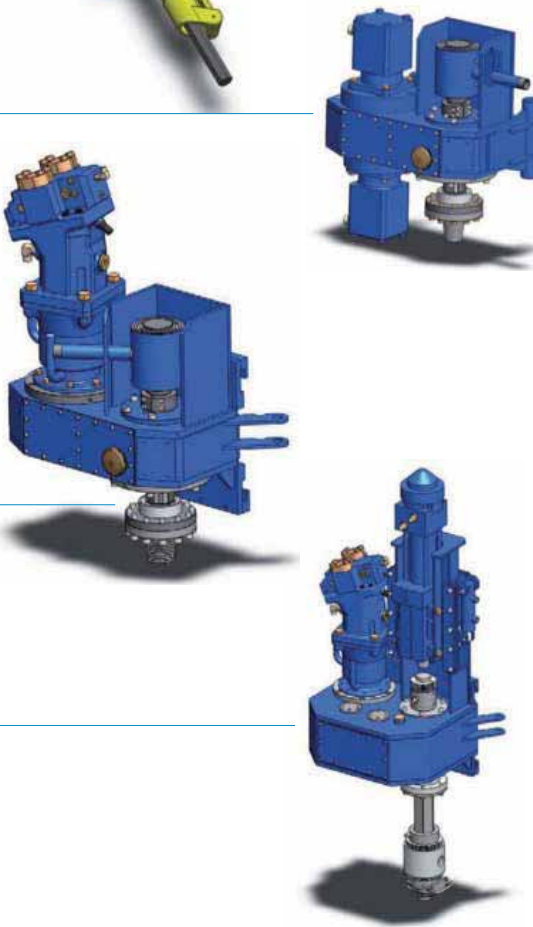
Micro piling rotation head (APAFOR® 450)
Rotation speed: 0 to 210 rpm
Variable torque: 0 to 310 daN.m

Simple rotation head (APAFOR® 440 / 450)
Rotation speed: 0 to 93 rpm
Variable torque: 0 to 350 daN.m

Special rotation head for coring (APAFOR® 440 / 450)
Rotation speed: 0 to 1080 rpm
Variable torque: 0 to 145 daN.m

Special rotation head for coring (APAFOR® 550 / 560)
Rotation speed: 0 to 780 rpm
Variable torque: 0 to 185 daN.m

Special rotation head with high torque (APAFOR® 550 / 560)
Rotation speed: 0 to 56 rpm
Max torque: 560 daN.m



RotoSTAF® rotation head
Configured for simultaneous bidirectional rotation and with percussion for the implementation of the Self Bored tube system for pressuremeter test (STAF® method)

EXPLOFOR®3 DRILLING DATA RECORDER



General presentation

The new version of EXPLOFOR® has arrived. EXPLOFOR®3 records drilling parameters through the central unit, GeoBOX® : less equipment to handle, a unique tool to centralize and visualize data.

EXPLOFOR®, designed, developed and produced by APAGEO, enables the recording of drilling parameters during the drilling process with a view to collecting real time information on the soil profile. These data can also be used to choose adapted soil testing investigations (PRESSUREMETER, SPT, etc.) to the soil at hand.

APAFOR® - APAGEO's range of drilling rigs - are equipped in series with quick hydraulic couplings and electrical wires for connecting EXPLOFOR® system (APAFOR® 400 series or higher).



IMPLEMENTATION

GeoBOX® records via WIFI the data while drilling, through a tiny black box connected to your drilling rig. Data can be visualized on screen with an adjustable depth scale and sent to the departed printer at the end of drilling. p. 58

EXPLOFOR®3 records the following parameters:

- Advance rate (depth and penetration speed)
- Rotating torque of the rotary head
- Pushing force (thrust) on drilling bits
- Injection pressure of drilling fluid
- Optional: VIR® - a rotation speed sensor (APAFOR® 400 or higher), VIBRASOL® - reflective energy holding pressure, flow



Data from EXPLOFOR®3 can be processed directly using our geotechnical data processing software, GeoVision®. p. 62-63

EXPLOFOR®3 is equipped with the following:

- GeoBOX®, Ultra Mobile PC extremely rugged, IP54, high storage capacity, with printer and adaptor, in hardy waterproof case.
- A new generation of remote unit for EXPLOFOR®3 allows direct reading of the borehole depth, with more flexibility to the main control. (start, stop, restart). It can be positioned on the control panel of the drilling rig for easy operation of EXPLOFOR® 3 during drilling.
- New depth encoder: penetration rate/depth sensor, compact and light, it is equipped with an electromagnetic rewinding brake to avoid damages.
- Junction box that will be mounted on the drilling rig for centralized connection of EXPLOFOR® sensors and communication with GeoBOX® via WIFI.
- 3 pressure sensors.
- USB storage key.

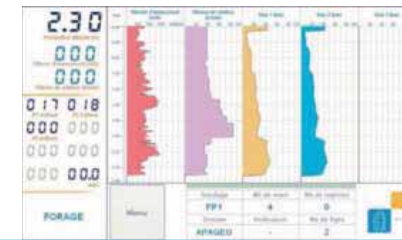
EXPLOFOR®3 is 100% compatible with your existing EXPLOFOR® sensors and depth encoder.

DESCRIPTION	Reference
EXPLOFOR®3 complete (with pressure sensors and depth encoder)	N7 5900600
Speed and depth sensor (encoder)	N4 5910002
Pressure sensor 200 bars (torque and pressure on bit)	N1 5900400
Pressure sensor 70 bars (for injection pressure)	N1 5900389
Paper roll	N4 5900001
Power cable	N9 5900433
Junction box (sensors connection)	N7 5900601
Remote drilling unit and display	N7 5900602

- Spare parts for Explofor® first and second generation, please consult us

EXPLOFOR®3 DRILLING DATA RECORDER

Options



VIR®: Rotation speed sensor

APAGEO has developed a rotation speed sensor suitable for use on all APAFOR® 400 and higher geotechnical rigs. This system is made up of a display unit positioned near the control panel of the rig and a sensor inserted directly into the rig's rotating head, offering maintenance-free operation while eliminating all outside disturbances. This system can be used independently from the recorder EXPLOFOR®3.



VIBRASOL®: Reflective energy

To complement the monitoring of pressure and the advance rate, APAGEO presents VIBRASOL®, a new system for measuring reflective energy based on the depth of the drilling bit in the soil and the vibrations and impacts to which it is subjected.



Additional options available:

- Onboard GPS for localisation of sounding position
- Extra pressure sensors (10, 20, 70, 100 or 200 bars)
- Installation kit for hydraulic drilling rig (hydraulic couplings, support plate for encoder)
- GeoBOX® accessories p. 58

OPTIONS	Reference
V.I.R.®	N4 5960000
Vibrasol®	N4 5970000
Onboard GPS EXPLOFOR®3	N4 5900037
Installation kit for drilling rig	N1 5900420

INJECTION PUMPS AND MIXERS

TRIPLEX INJECTION PUMPS WITH THERMAL ENGINE

Triplex injection pumps with thermal engine

Designation	Max Pressure	Max Flow	Reference
Injection valve pump 5,5 HP engine – V75	30 bars	58 l/min	C3 0101604
Injection valve pump 9 HP engine – V105	30 bars	85 l/min	C3 0101605
Balls pump 9 HP engine – Gama 80	40 bars	76 l/min	C3 0101601
Balls pump 9 HP engine – Sigma 100	40 bars	100 l/min	C3 0101607

Triplex injection pumps with hydraulic engines

Designation	Max Pressure	Max Flow	Reference
Injection valve pump – HY - V75	30 bars	68 l/min	C0 0101601
Injection valve pump – HY - V105	30 bars	105 l/min	C2 0301500
Injection valve pump – HY - V160	30 bars	160 l/min	C2 0301600
Balls pump – HY - Gama 80	40 bars	80 l/min	C2 0101601
Balls pump – HY - Sigma 100	40 bars	100 l/min	C2 0101604

NOTE: pumps are delivered with a 3 meters suction pipe and a strainer.



INJECTION PUMPS AND MIXERS

PISTON PUMPS FOR CLEAR WATER, MUD AND CEMENT GROUT

Pneumatic versions

Designation	Max Pressure	Max Flow	Reference
P-PN-25-2900	25 bars	49 l/min	C1 0101603
P-PN-40-2900	40 bars	49 l/min	C1 0101602
P-PN-15-4700	15 bars	79 l/min	C1 0101601

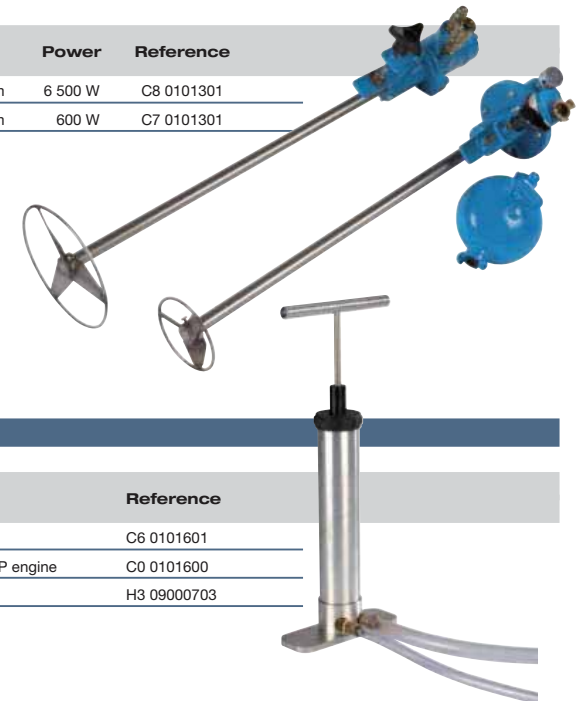
Hydraulic versions

Designation	Max Pressure	Max Flow	Reference
P-HY-40-6500	40 bars	108 l/min	C2 0101602
P-HY 25	25 bars	60 l/min	C2 0101600



MIXERS FOR DRILLING MUD AND CEMENT GROUT

Designation	Speed	Power	Reference
Hydraulic - Consumption 30 l/min at 50 bars	0 – 1 200 rpm	6 500 W	C8 0101301
Pneumatic- Consumption 480 l/min at 7 bars	0 – 3 000 rpm	600 W	C7 0101301



ACCESSORIES

Designation	Reference
Hand pump – injected volume = 600 ml / return	C6 0101601
Hydraulic central unit with 2 circuits (pump and mixer) 11 HP engine	C0 0101600
Oil feeder for pneumatic equipment	H3 09000703

MÉNARD PRESSUREMETER PRESSUREMETER TEST ACCORDING TO THE EN ISO 22476-4 AND ASTM D-4719-00 STANDARDS



enard matériels

Control Unit (CU), tubing and three-cell probe to perform in situ pressuremeter tests.

P.23 MÉNARD PRESSUREMETER AND GEOSPAD® UNIT

General presentation

P.27 MÉNARD PRESSUREMETER

Complete kits
Accessories (probes, tubing, slotted tube, extension tube...)
Spare parts (pressure gauge, control valve...)

P.48 STAF® SYSTEM A SELF-BORED TUBE SYSTEM FOR PRESSUREMETER TEST

P.52 MINI PRESSUREMETER

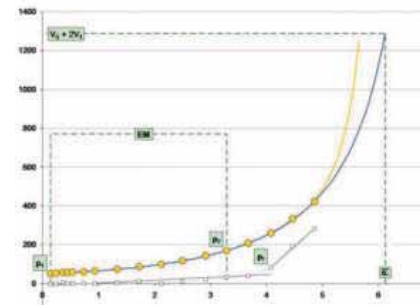
P.53 OTHER IN SITU METHOD

Lugeotest® - Lugeon permeability test
Phicometer - in situ shear tester
Light Dynamic Penetrometer
Benkelman Beam (p.60)

P.58 GEOBOX® CENTRAL UNIT FOR SOIL INVESTIGATION

P.59 GEOPAC® AUTO CONTROL PRESSUREMETER WITH GEOBOX®

P.62 GEOVISION® SOFTWARE GEOTECHNICAL DATA PROCESSING SOFTWARE



EQUIPMENT

1. Control Unit

The CU is equipped to precisely regulate the pressure of the probe to apply controlled loads to the soil and then to measure volume increases over pressure. Positioned in an aluminium box standing on a tripod, it includes a 800 cm³ volumeter with sight tube, a main pressure regulator, a differential pressure regulator and pressure gauges for 0-25 and 0-60 bars (0-100 bar gauge) for monitoring the pressure applied to the measuring and guard cells. A nitrogen cylinder provides the pressure source.

2. Plastic tubing

This coaxial or twin tubing, flexible and highly resistant with small dilatation, connects the control unit to the probe.

3. Three-cell probe

This component includes a central measuring cell, filled with water. Its volume changes are read on the Control Unit volumeter. The probe is totally protected by a rubber cover (different types depending on nature of soil) which is inflated by the gas to form the two guard cells, one on either side of the central cell. The pressure applied to the three cells is balanced to ensure true cylindrical deformation along the measuring cell.

TEST PROCEDURE

The borehole is drilled so as to minimize wall disturbance and maintain a cavity diameter compatible with the probe size (63 or 76 mm). The probe is lowered into the borehole to the required test depth and the pressure is applied by equal increments using the Control Unit.

In gravelly or sloughy soils with risk of collapse of the borehole wall, the probe may be inserted into a specially designed slotted tube which can be directly hammered or vibrodriven into the soil or inserted at the time of drilling. Used without acquisition, the pressuremeter meets the requirements of the EN ISO 22476-4 standard part A.



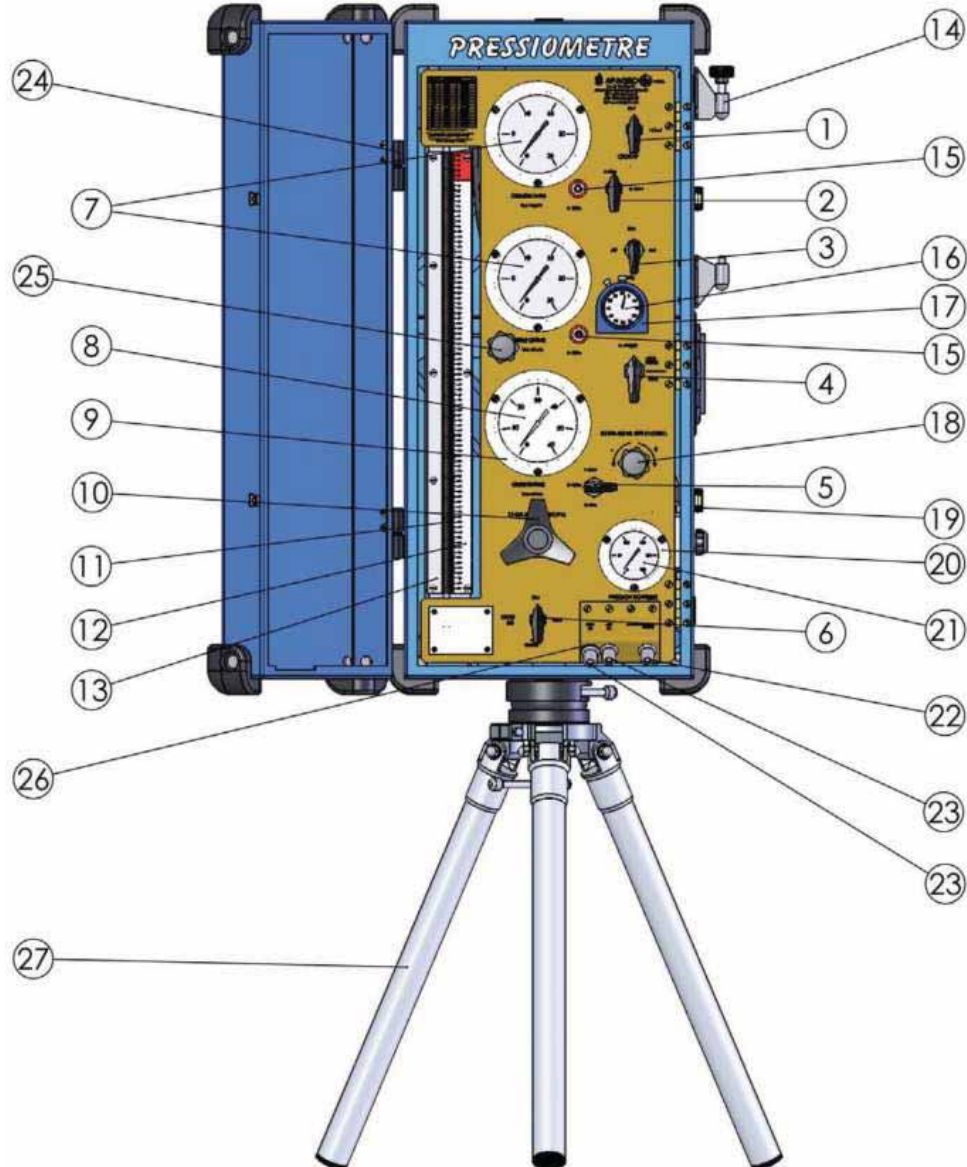
TEST TREATMENT

The test data can be entered manually into the GeoVision® software. P. 82-83

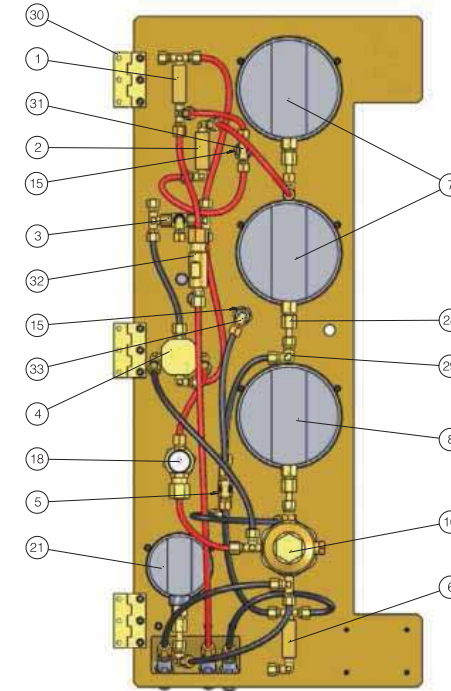
CONTROL UNIT TECHNICAL SPECIFICATIONS

- Dimensions: 86 x 43 x 26 cm
- Mass: 24.5 kg (tripod 3.5 kg)
- Aluminium box with protection cover
- Transport handle
- Tripod and level allowing adjustment of verticality on all sites

MÉNARD PRESSUREMETER



MÉNARD PRESSUREMETER



Index	Description	Reference	Index	Description	Reference
1	Gas circuit stop valve (complete)	A1 1902206	17	Protection case for timer	A1 8900303
2	25/100 bar gas selection valve (complete)	A1 1902207	18	Pressure lag regulator	A1 8320301
3	Bleed valve for both gas and water (complete)	A1 1902208	19	Fixation for lid type 3	A2 8200101
4	Inversion valve 0-10m	A1 1902209	20	Ø 60 gauge ring	A1 8500302
5	25/100/60 bar water selection valve (complete)	A1 1902210	21	0-250 bar gauge bottle pressure (vertical outlet)	A1 8501324
6	Water circuit stop valve (complete)	A1 1902211	22	Quick female socket for Nitrogen bottle inlet	A1 8701801
7	0-25 bar gauge (vertical outlet)	A1 8501310	23	Quick female socket for tubings outlet (water and gas)	A1 8701804
8	0-60 bar gauge central cell (vertical outlet)	A1 8501312	24	Nylon hinge for lid type 3	A1 8200106
9	Ø 100 gauge ring	A1 8500301	25	Plastic handle for front panel and pressure lag regulator	A1 9322202
10	Main pressure regulator	A1 9310403	26	Stainless steel washer for water socket	A1 8201900
11	Sight tube complete (new model)	A1 8902203	27	Tripod stand with leveling adjustment*	A1 8200103
11	Sight tube complete (old model)	A1 8902201	28	Gauge brass coupling	A1 8500501
12	800cc volume reading ruler	A1 9801802	29	Ø 6x6 + brass elbow coupling	A1 1700603
13	Polycarbonate cover plate for sight tube	A1 9801603	30	Brass hinge for panel	A1 8200304
14	Fixation hinge for Geospad Unit	A1 8200102	31	Ø 6x1/8 " brass tee coupling centered	A1 1700610
15	Quick female socket for extra gauge	A1 8701802	32	Filter cartridge complete	A1 8901602
16	Minute timer	A1 8900301	33	Ø 6x1/8 " brass elbow	A1 1700602

*Also exists without leveling device.

GEOSPAD®

DATA ACQUISITION SYSTEM FOR PRESSUREMETER ACCORDING TO EN ISO 22476-4 AND ASTM D-4719-00 STANDARDS



The GEOSPAD® controls the conduct of pressuremeter tests and automatically records the test conditions and results.

The GeoSPAD® is a rugged, reliable field device featuring all the latest technological offerings including touch screen, thermal printer, data recording on a high-capacity flash memory card, 30-day internal memory to provide for reliable backup of test results and a multilingual (English, French, German, Spanish, Portuguese, Italian) menu. It can be used with most Ménard pressuremeters, which maintain their full performance range whether or not used with the GeoSPAD®.

Description	Reference
GEOSPAD®	N1 5900500

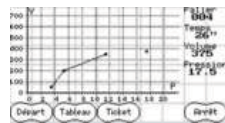


DESCRIPTION

The GEOSPAD® allows the operator to program the timing between pressure increments so that the recording of the test can be proceeded without operator intervention. The unit displays the theoretical differential pressure according to depth making it easy to set before proceeding with testing.

According to the EN ISO 22476-4 and NF P 94-110-1 standards, readings are taken at exactly 1, 15, 30 and 60 seconds with high accuracy – to within 1 cm³ for volume and 1 kPa for pressure (readings at 10 kPa).

During testing, the GEOSPAD® displays the rough data curve, providing an instant overview of test results.



The pressure of the central cell and differential pressure, volume, $\Delta V_{60/30}$ and $\Delta V_{60/60}$, level number and time are also displayed during testing.

The GEOSPAD® prints all test curves and data directly and then saves them on the flash memory card for subsequent processing on a PC using the GeoVision® software.

All test results are stored in internal memory for 30 days and can be transferred at any time to a memory card.

Cyclic (load and re-load) or very deep tests are also available on request using a software interface designed for these specialised procedures.



TEST TREATMENT

Transfer of data to memory card and industrial processing of results using GeoVision® software. p. 62-63

GEOSPAD TECHNICAL SPECIFICATIONS

- Tripod and level allowing adjustment of verticality on all sites
- Waterproof box, ruggedly built and compact (33 x 27 x 20 cm)
- Weight : 4 kg
- Temperature range -20 to + 70 °C
- Power source 10 to 35 V
- LCD display with built-in keyboard
- Memory card recorder (30 days memory capacity)

OPTIONS

- Cyclic (load and re-load), or very deep tests
- Additional memory card
- Power cable

PRESSUREMETER PACKAGES

PRESSUREMETER PACKAGE

Designation	Reference	Quantity suggested
Pressure and volume Control Unit 0x25 - 0x60 - 0x100 bars	A1 8100302	1
Pressure and volume Control Unit with GeoSPAD pre fittings	A1 8100312	-
ø60mm twin probe, complete with rubber cover**	A1 1406006	1
ø60mm twin probe, complete with HP canvas cover	A1 1406010	1
ø60mm probe protection shoe	A1 1496008	1
ø60mm probe to ø22mm rod connection***	A1 1456002	1
ø22mm extension rod 1,00m length - hollow ***	F5 02002202	15
Twin connecting tubings - 33m length****	A1 8602015	2
Quick connection for twin tubings	A1 8701811	4
Nitrogen cylinder	A1 1900202	1
Complete Regulator for cylinder (with connecting tubing to CU)	A1 8310400	1
Calibration steel cylinder ø66mm I.D. for ø60 probe and ø63 slotted casing	J2 900006301	1
Metal carrying box	QO 005	1

* Mounting of the 100 bars option, possible on a 0-60 bars pressuremeter

** Coaxial probes available p. 34 Probes Ø 74 available p. 36

*** Precise if other rod diameter needed

**** Other lengths and coaxial tubing available p. 37-39

SPARE PARTS PACKAGE

Designation	Reference	Quantity suggested
Rubber cover, ø60mm probe	A1 1416002	5
HP canvas cover, ø60mm probe	A1 1416008	5
Metal cover, ø60mm probe (steel strips)	A1 1416006	5
Membrane, ø60mm probe	A1 1496006	30
O-ring, ø60mm probe	A1 1496004	2
Cover ring, ø60mm probe	A1 1426003	2
Membrane ring, ø60mm probe	A1 1426004	2
Setting up probe stand, ø60mm	A1 1496010	1
Probe thread grease	A1 1902001	1
Cover mounting grease	M2 0901618	1
19mm wide tape roll	A1 1901804	1
50mm wide tape roll	A1 1901805	1
Strap wrench	A1 1900302	1
ø60mm polyurethane ring extractor	A1 1496001	1
Band clip for ø60 metal cover (steel strip)	A1 1496002	2
Reparation kit for twin tubings	A1 1700618	2
Connection kit for twin tubings	A1 1700619	2
Probe drain tap	A1 1456012	2
ø6x1/8" brass nipple for twin probe	A1 1700605	4
Set of maintenance tools for pressuremeter	A1 1900300	1

*Other type available p. 35

Ø63MM MÉNARD SLOTTED TUBE WITH Ø44MM PROBE

Based on 15 meters

Designation	Reference	Quantity suggested
1 ø63mm Menard slotted tube right thread*	J2 101006301	1
2 Cone for ø63mm Menard slotted tube	J4 060006301	2
3 Retaining plate for ø63mm Menard slotted tube	J4 0906309	1
4 Shock absorber for ø55/63mm Menard slotted tube	J4 0906305	2
5 ø63mm Menard slotted connection to drilling head	Depend on thread	1
6 Hollow washer for ø63mm Menard slotted tube	J4 0906306	1
7 ø44mm coaxial probe, complete with HP canvas cover**	A1 1404414	1
ø63mm Menard extension tube, 1,5m length right thread*	J1 101006302	10
HP canvas cover, ø44mm probe	A1 1414412	5
Membrane (short), ø44mm probe, 210mm central cell length	A1 1494405	5
membrane ring, ø44mm probe	A1 1424404	2
O-ring, ø44mm probe	A1 9901004	2
Cover ring, ø44mm probe	A1 1424402	2

Used for sand, gravel, pebble. The implementation of the tubing required a hammering system or vibrofonçage and extraction system. Sometimes, a pilot drilling with a smaller diameter is necessary before the implementation of the tubing in very compact ground.

* variation: Ø55 and 75, see next page

** also exists in twin 



Ø55MM MÉNARD SLOTTED TUBE WITH Ø44MM PROBE

Based on 15 meters

Designation	Reference	Quantity suggested
1 ø55mm Menard slotted tube right thread*	J2 102005502	1
2 Cone for ø55mm Menard slotted tube	J4 060005501	2
3 Retaining plate for ø55mm Menard slotted tube	J4 0905504	1
4 Shock absorber, ø55/63mm Menard slotted tube	J4 0906305	2
5 ø55mm Menard slit connection to drilling head	Depending of the thread	1
6 Hollow washer for ø55mm Menard slotted tube	J4 0905503	1
7 ø44mm coaxial probe, complete with HP canvas cover**	A1 1404414	1
ø55mm Menard extension tube, 1,0m length right thread	J1 101005501	15

Ø75MM MÉNARD SLOTTED TUBE WITH Ø60MM PROBE

Based on 15 meters

Designation	Reference	Quantity suggested
ø75mm Menard slotted tube right thread	J2 101007501	1
Cone for ø75mm Menard slotted tube	J4 060007501	2
Shock absorber for ø75mm Menard slotted tube	J4 090007501	2
ø75mm Menard slit connection to drilling head	Depend on thread	1
ø60mm twin probe, complete with HP canvas cover**	A1 1406010	1
ø75mm Menard extension tube, 1,0m length right thread	J1 101007501	15
ø75mm nipple	J4 070007501	15
HP canvas cover, ø60mm probe	A1 1416008	5
Membrane, ø60mm probe	A1 1496006	5
Membrane ring, ø60mm probe	A1 1426004	2
O-ring, ø60mm probe	A1 1496004	2
Cover ring, ø60mm probe	A1 1426003	2

*Also exists in left thread

**Exists in twin and coaxial 

PACKAGE FOR HAND DRILLING

Based on 10 meters

Designation	Reference	Quantity suggested
ø63mm hand auger x ø22mm rods thread	F5 01006302	1
ø22mm probe extension rod, hollow, 1 meter length	F5 02002202	10
Hand auger handle, for ø22mm rods	F5 09002201	1
Handling wrench for ø 22mm rods	F5 09000302	2
OPTION :		
Lifting device for 22mm rods	D4 1901201	1
INJECTION OPTION :		
Hand injection pump	C6 0101601	1
Hand auger handle, ø22mm rods thread, with injection	F5 09002202	1

* [p. 66](#) Other diameters available.

** These rods can be used for probe implementation.

Other types available (23 square, 20x27 thread)



PACKAGE FOR DRILLING WITH CONTINUOUS FLIGHT AUGER Ø 63 MM

Based on 15 meters

Designation	Reference	Quantity suggested
Continuous flight auger ø63x 1,50 meter length (hexagon 21mm)	F1 01006303	10
Pin for hexagon 21mm	F1 04002101	15
ø63 tungsten cutting bit	F1 02006301	5
ø63 auger security holder	F1 04006302	1
ø63 auger fishing device	F1 04006301	1
OPTION :		
Cardan joint hex41 box x hex21 box	F1 06025003	1
Hex 21 pin x ø22 box connection (for ø22 probe extension rod)	F1 05002105	1

*Other diameter available



PACKAGE FOR DRILLING WITH ROTARY INJECTION BIT

Designation	Reference	Quantity suggested
ø42mm. drilling rod 1,50 meter length	K1 010004203	10
ø42mm nipple	K1 020004201	12
Tricone bit 2"1/2 (63,5mm) x N ROD thread (pin)	I1 040025001	1
ø42mm rods x N ROD connection (box-box)	E3 031004202	1
3-way drag bit 2"1/2 (63,5mm) x A ROD thread (pin)	ID 01025001	2
ø42mm rods x A ROD connection (box-box)	E3 031004201	1
OPTION :		
Injection head hex29 x ø42mm (box-box)		

* Other diameters available

** Other threads available

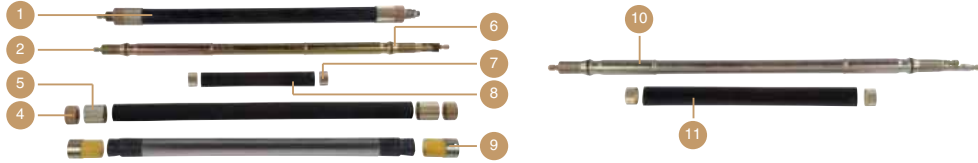


PACKAGE FOR ROTARY PERCUSSION DRILLING

Designation	Reference	Quantity suggested
Drilling rod R32 - 1.22m long (ø32 mm – pin-pin)	H1 02003206	13
Nipple for R32 rod (box-box)	H1 02003211	15
Cross bit ø64mm x Fem R32	H1 01106404	2
Button bit ø64mm x Fem R32	H1 01206401	2
Wrench for R32 rods	H1 09003201	2

* Exists in metric profile

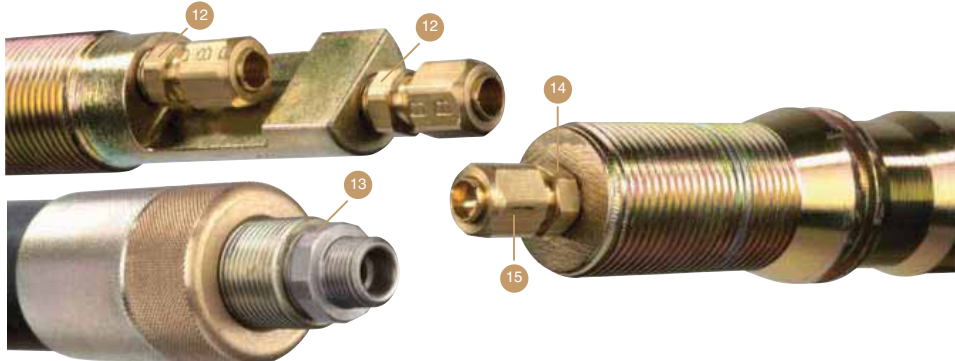




044MM PROBE « AX MÉNARD » TYPE

Mark	Designation	Reference
1	044mm NS coaxial probe, complete with rubber cover*	A1 1404416
	044mm NS coaxial probe, complete with HP canvas cover	A1 1404414
	044mm NS coaxial probe, complete with steel canvas cover	A1 1404411
	044mm NS twin probe, complete with rubber cover	A1 1404422
	044mm NS twin probe, complete with HP canvas cover	A1 1404420
	044mm NS twin probe, complete with steel canvas cover	A1 1404419
	044mm NS probe protection shoe	A1 1494408
2	044mm NS probe steel body twin/coaxial	-
3	044mm probe cover (several type available)	See next page
4	044mm probe nut	A1 1494402
5	Cover ring, 044 mm probe	A1 1424402
6	O-ring, 044mm probe	A1 9901004
7	membrane ring, 044mm probe	A1 1424404
8	Membrane NS (short), for 210mm central cell length, 044 mm probe	A1 1494405
9	Polyurethane cover ring for metal cover, 044mm probe	A1 1424406
10	044mm (standard) probe steel body twin/coaxial	-
11	Membrane STD (long), for 370mm central cell length, 044 mm probe	A1 1494406
12	06x1/8" brass nipple for twin probes	A1 1700605
13	010x1/2" stainless steel nipple, 044mm coaxial probe	A1 1700615
14	Probe drain tap	A1 1456012
15	Drain nut, alone	A1 1497005

*NS = New Standard (short central cell). "STD=Standard Menard" probe (long central cell).

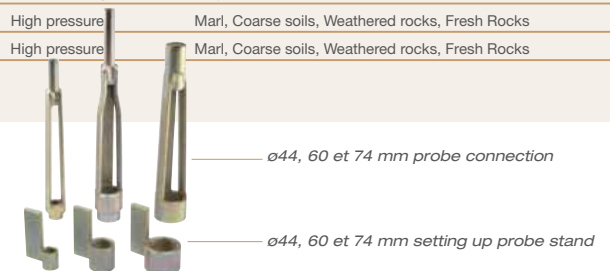


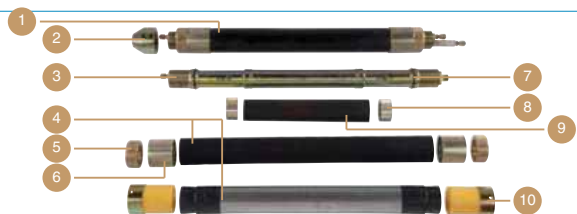
SPARE PARTS 044MM PROBE

Designation	Reference
Metal cover, 044 mm probe	A1 1414407
03 mm rubber cover, 044 mm probe	A1 1414405
04 mm rubber cover, 044 mm probe	A1 1414406
Standard canvas cover, 044 mm probe	A1 1414408
HP canvas cover, 044 mm probe	A1 1414412
Super HP canvas cover, 044 mm probe	A1 1414413
Steel canvas cover, 044 mm probe	A1 1414411
Cover ring, 044 mm probe	A1 1424402
Polyurethane ring, for metal cover, 044 mm probe	A1 1424406
044mm probe nut	A1 1494403
O-ring, 044mm probe	A1 9901004
Membrane NS (short), for 210mm central cell length, 044 mm probe	A1 1494405
Membrane STD (long), for 370mm central cell length, 044 mm Menard standard probe	A1 1494406
Membrane ring, 044mm probe	A1 1424404
044mm probe to 022mm rod connection (see picture below)	A1 1454402
044mm probe to 020/27 rod connection	A1 1454401
Setting up probe stand, 044mm	A1 1494409
Ring extractor device, 044mm probe	A1 1494400
Polyurethane ring extractor, 044mm probe	A1 1494401
063mm casing shoe, tungsten carbide	J4 080006301

COVER CHOICE ADVICES

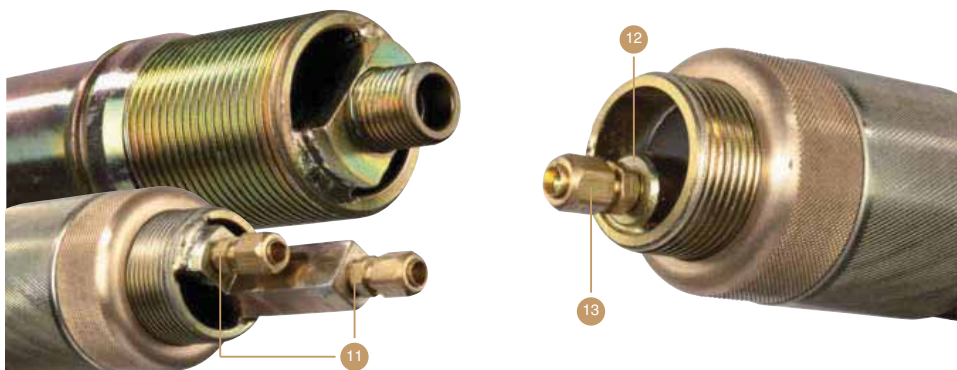
Cover type	Pressure Range	Soil type
Metal cover, 044 mm probe	Medium pressure	Gravel, Flinty clays, chalk Mud, soft clays, Silts, Loose sands, Pasty Chalk
3 mm rubber cover, 044 mm probe	Low pressure	Mud, soft clays, Silts, Loose sands, Pasty Chalk
4 mm rubber cover, 044 mm probe	Low pressure	Soft clays, Silts, Loose sands, Pasty Chalk + grain
Standard canvas cover, 044 mm probe	Medium pressure	Clay, Silt, Sand
HP canvas cover, 044 mm probe	Medium to high pressure	Clay, Silt, Sand + Marl, Coarse soils
Super HP canvas cover, 044 mm probe	High pressure	Marl, Coarse soils, Weathered rocks, Fresh Rocks
Steel canvas cover, 044 mm probe	High pressure	Marl, Coarse soils, Weathered rocks, Fresh Rocks





Ø60MM PROBE « BX MÉNARD » TYPE

Mark	Designation	Reference
1		A1 1406008
	ø60mm twin probe, complete with rubber cover	A1 1406006
	ø60mm twin probe, complete with HP canvas cover	A1 1406010
	ø60mm twin probe, complete with steel canvas cover	A1 1406007
	ø60mm coaxial probe, complete with rubber cover	A1 1406003
	ø60mm coaxial probe, complete with HP canvas cover	A1 1406002
	ø60mm coaxial probe, complete with steel canvas cover	A1 1406011
	ø60mm coaxial probe, complete with steel canvas cover	A1 1406005
2	ø60mm probe protection shoe	A1 1496008
3	ø60mm probe steel body twin/coaxial	-
4	ø60mm probe cover (several types available)	See next page
5	ø60mm probe nut	A1 1496003
6	Cover ring, ø60 mm probe	A1 1426003
7	O-ring, ø60mm probe	A1 1496004
8	Membrane ring, ø60mm probe	A1 1426004
9	Membrane, 210mm central cell length, ø60 mm probe	A1 1496006
10	Polyurethane cover ring for metal cover, ø60mm probe	A1 1426006
11	ø6x1/8" brass nipple for twin probe	A1 1700605
12	Probe drain tap	A1 1456012
13	Drain nut alone	A1 1497005



Ø60MM PROBE, SPARE PARTS

Designation	Reference
Metal cover (8 strips), ø60 mm probe	A1 1416003
Metal cover, ø60 mm probe	A1 1416006
ø3mm rubber cover, ø60 mm probe	A1 1416002
ø4mm rubber cover, ø60 mm probe	A1 1416005
Standard canvas cover, ø60 mm probe	A1 1416007
HP canvas cover, ø60 mm probe	A1 1416008
Super HP canvas cover, ø60 mm probe	A1 1416009
Steel canvas cover, ø60 mm probe	A1 1416010
Cover ring, ø60 mm probe	A1 1426003
Polyurethane ring, for metal cover, ø60 mm probe	A1 1426006
ø60mm probe nut	A1 1496003
O-ring, ø60mm probe	A1 1496004
Membrane, 210mm central cell length, ø60 mm probe	A1 1496006
Membrane ring, ø60mm probe	A1 1426004
ø60 mm probe protection shoe	A1 1496008
ø60mm probe to ø22mm rod connection(see picture page 33)	A1 1456002
ø60mm probe to ø42mm rod connection	A1 1456005
ø60mm probe to ø50mm rod connection	A1 1456007
ø60mm probe to Arod (pin) connection	A1 1456008
ø60mm probe to R32 rod connection	A1 1456011
ø60mm probe to R38 rod connection	A1 1456013
Setting up probe stand, ø60mm probe (see picture page 33)	A1 1496010
Probe thread grease	A1 1902001
Cover mounting grease	M2 0901618
Strap wrench	A1 1900302
Spare strap	A1 1901901
19mm wide tape roll	A1 1901804
50mm wide tape roll	A1 1901805
Ring extractor device, ø60mm probe	A1 1496000
Polyurethane ring extractor, ø60mm probe	A1 1496001
Band clip for ø60 metal cover (steel strip)	A1 1496002
Probe drain tap	A1 1456012
Drain nut alone	A1 1497005
ø6x1/8" brass nipple for twin probe	A1 1700605

Ø74MM PROBE « NX MÉNARD » TYPE

Mark	Designation	Reference
1	Ø74mm twin probe, complete with metal cover	A1 1407005
	Ø74mm twin probe, complete with rubber cover	A1 1407003
	Ø74mm twin probe, complete with steel canvas cover	A1 1407006
	Ø74mm coaxial probe, complete with metal cover	A1 1406999
	Ø74mm coaxial probe, complete with rubber cover	A1 1407401
	Ø74mm coaxial probe, complete with steel canvas cover	A1 1406998
	Ø74mm probe protection shoe	A1 1497009
	Ø74mm probe steel body twin/coaxial	-
2	Ø74mm probe cover (several type available)	-
3	Ø74mm probe nut	A1 1497006
4	Thick cover ring for rubber cover, Ø74 mm probe	A1 1427001
5	Thin cover ring for steel canvas cover, Ø74 mm probe	A1 1427005
6	Polyurethane cover ring for metal cover, Ø74mm probe	A1 1427003
7	O-ring for polyurethane cover ring, Ø74mm probe	A1 1497007
8	O-ring for steel cover ring, Ø74mm probe	A1 1497012
9	Membrane ring, Ø74mm probe	A1 1427002
10	Membrane, 210mm central cell length, Ø74mm probe	A1 1497008

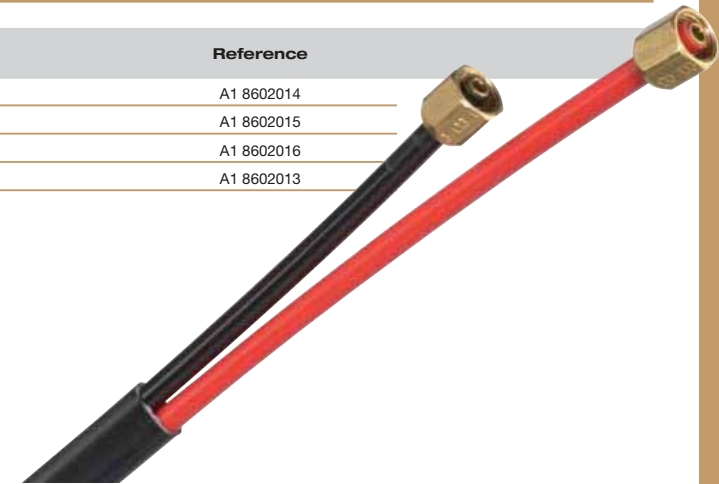


Ø74MM PROBE, SPARE PARTS

Designation	Reference
Metal cover, Ø74 mm probe	A1 1417002
Rubber cover, Ø74 mm probe	A1 1417001
Steel canvas cover, Ø74 mm probe	A1 1417004
Thick cover ring for rubber cover, Ø74 mm probe	A1 1427001
Thin cover ring for steel canvas cover, Ø74 mm probe	A1 1427005
Polyurethane ring, Ø74mm probe	A1 1427003
Ø74mm probe nut	A1 1497006
O-ring for polyurethane ring, Ø74mm probe	A1 1497007
O-ring for steel ring, Ø74mm probe	A1 1497012
Membrane, 210mm central cell length, Ø74mm probe	A1 1497008
Membrane ring, Ø74mm probe	A1 1427002
Ø74mm probe protection shoe	A1 1497009
Ø74mm probe to Ø22mm rod connection (see picture page 33)	A1 1457001
Ø74mm probe to Ø42mm rod connection	A1 1457013
Ø74mm probe to Ø50mm rod connection	A1 1457015
Setting up stand, Ø74mm probe (see picture page 33)	A1 1497010
Polyurethane ring extractor, Ø74mm probe	A1 1497002

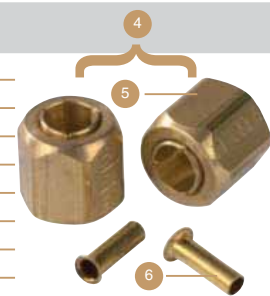
TUBING

Description	Reference
High pressure Twin tubing – 25 m length	A1 8602014
High pressure Twin tubing – 33 m length	A1 8602015
High pressure Twin tubing – 50 m length	A1 8602016
High pressure Twin tubing – 100 m length	A1 8602013



ACCESSOIRES

Mark	Description	Reference
1	Male coupling for twin tubing	A1 8701811
2	Ø6mm x 1/8" brass nipple	A1 1700605
3	Rubber protection cap for tubing coupler	A3 1901603
4	Repairing kit for twin tubing	A1 1700618
5	Ø6mm nut with ferrule	A1 1700607
6	Straight insert 3mm diameter	A1 1900602
7	Connection kit for 2 twin tubings	A1 1700619
8	Ø6 x 6mm brass nipple	A1 1700606

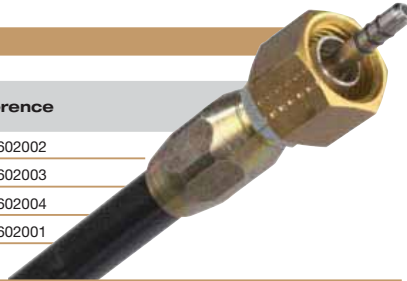


PRESSUREMETER

COAXIAL TUBING
HIGH PRESSURE ACCESSORIES

TUBING

Description	Reference
High pressure coaxial tubing 100 bars TECALAN 25 m	A1 8602002
High pressure coaxial tubing 100 bars TECALAN 33 m	A1 8602003
High pressure coaxial tubing 100 bars TECALAN 50 m	A1 8602004
High pressure coaxial tubing 100 bars TECALAN 100 m	A1 8602001



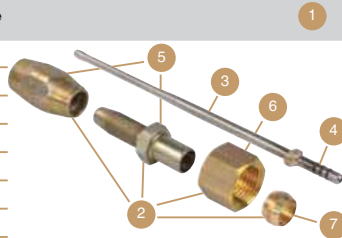
COAXIAL COUPLING

Mark	Description	Reference
1	Complete coaxial quick coupling - tubing to monitoring unit	A1 8701601
2	Male plug for coaxial tubing with 6 mm tube	A1 8701809
3	Male plug for coaxial tubing	A1 8701808



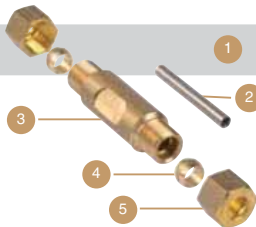
TECALAN REPAIRING KIT (COMPLETE)

Mark	Description	Reference
1	Repairing kit for coaxial tubing	A1 9901500
2	4 parts coupling for coaxial tubing (marks 5+6+7)	A1 9901499
3	Connector 4x3	A1 1601803
4	O-ring for insert coupling 4x3 / 4x4	A1 9901003
5	2 parts TECALAN coupling	A1 8601801
6	ø10 mm nut	A1 9900501
7	ø10 mm ferrule High Pressure	A1 9901501



COUPLING KIT FOR 2 TECALANS

Mark	Description	Reference
1	Coupling kit	A1 1601807
2	Inox inner tube	A1 1602001
3	Coupling main part	A1 1601806
4	ø10 mm ferrule (x2) high pressure	A1 9901501
5	ø10 mm nut (x2)	A1 9900501

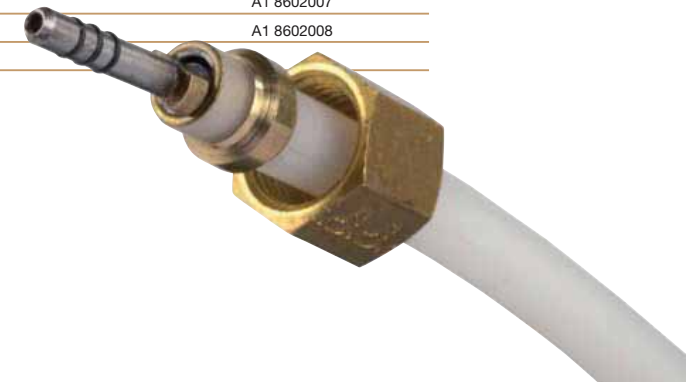


PRESSUREMETER

COAXIAL TUBING
LOW PRESSURE ACCESSORIES

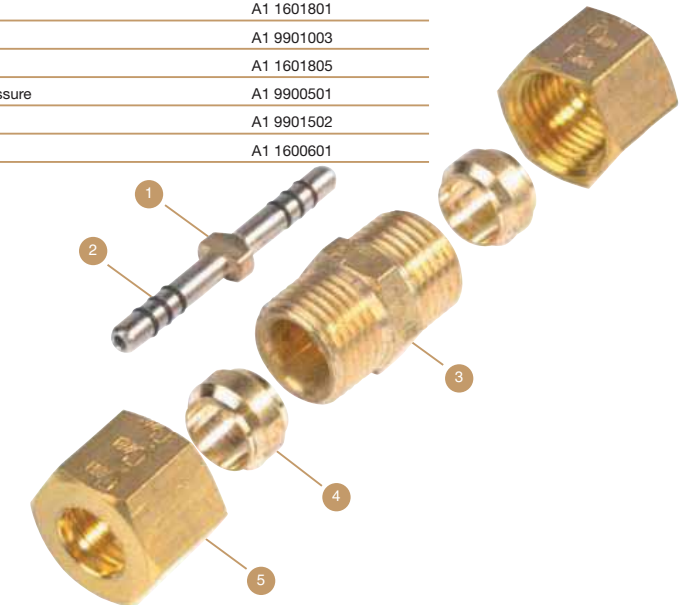
TUBING

Description	Reference
Coaxial tubing RISLAN 25 m	A1 8602006
Coaxial tubing RISLAN 33 m	A1 8602007
Coaxial tubing RISLAN 50 m	A1 8602008
Coaxial tubing RISLAN 100 m	



COUPLING FOR 2 RISLANS

Mark	Description	Reference
1	Connector 4x4	A1 1601801
2	O-ring for insert coupling	A1 9901003
3	Straight connector 10 mm	A1 1601805
4	ø10 mm ferrule (x2) low pressure	A1 9900501
5	ø10 mm nut (x2)	A1 9901502
	Straight insert 7.5 mm	A1 1600601



SLOTTED CASINGS

Description	Reference
Slotted casing 55 mm, right thread	J2 102005502
Slotted casing 55 mm, left thread	J2 102005504
Reinforced slotted casing 55 mm, right thread	J2 201005501
Reinforced slotted casing 55 mm, left thread	J2 212005501
Slotted casing 63 mm, right thread	J2 101006301
Slotted casing 63 mm, left thread	J2 102006301
Reinforced slotted casing 63 mm, right thread	J2 201006301
Reinforced slotted casing 63 mm, left thread	J2 202006302
Slotted casing 75 mm, right thread	J2 101007501
Slotted casing 75 mm, left thread	J2 102007501

All our slotted tubes have 3/10 slot. They respect the effective standards (NFP 94-110-1 and EN ISO 22476-4) and are conform to the developer's requirements (Louis Ménard).

SHORT CONES

Description	Reference
Cone for slotted casing 55, right thread	J4 060005501
Cone for slotted casing 55, left thread	J4 060005503
Cone for slotted casing 63, right thread	J4 060006301
Cone for slotted casing 63, left thread	J4 060006303
Cone for slotted casing 75, right thread	J4 060007501
Cone for slotted casing 75, left thread	J4 060007502



SHOCK ABSORBER, RETAINING PLATE AND HOLLOW WASHER

Description	Reference
Shock absorber for 55 and 63 mm slotted casings (unit)	J4 0906305
Shock absorber for 75 mm slotted casing (unit)	J4 090007501
Retaining plate for 55 mm slotted casing	J4 0905504
Hollow washer for 55 mm slotted casing	J4 0905503
Retaining plate for 63 mm slotted casing	J4 0906309
Hollow washer for 63 mm slotted casing	J4 0906306

Reinforced slotted casings, also available.

SPLIT COUPLINGS FOR HAMMERING CASING OR MÉNARD SLOTTED CASING

Description	Reference
Coupling for slotted casing 55 mm Right thread x F 42	J3 311005502
Coupling for slotted casing 55 mm Right thread x F 50	J3 111005512
Coupling for slotted casing 55 mm Left thread x F R32	J3 312005501
Coupling for slotted casing 55 mm Left thread x F R38	J3 312005503
Coupling for reinforced slotted casing 55 mm Right thread x F 42	J3 411005506
Coupling for reinforced slotted casing 55 mm Left thread x F R32	J3 412005501
Coupling for reinforced slotted casing 55 mm Left thread x F R38	J3 312005504
Coupling for slotted casing 63 mm Right thread x F 42	J3 311006304
Coupling for slotted casing 63 mm Right thread x F 50	J3 311006307
Coupling for slotted casing 63 mm Right thread x F 60	J3 311000308
Coupling for slotted casing 63 mm Left thread x F R32	J3 312006303
Coupling for slotted casing 63 mm Left thread x F R38	J3 312006305
Coupling for reinforced slotted casing 63 mm Right thread x F R38 left	J3 411006300
Coupling for reinforced slotted casing 63 mm Left thread x F R32	J3 412006301
Coupling for reinforced slotted casing 63 mm Left thread x F R38	J3 312007500
Coupling for slotted casing 75 mm Right thread x F BW	J3 311007500
Coupling for slotted casing 75 mm Right thread x F 50	J3 311007501
Coupling for slotted casing 75 mm Right thread x F T63 Ménard	J3 311007502
Coupling for slotted casing 75 mm Left thread x F R32	J3 312007501
Coupling for slotted casing 75 mm Left thread x F R38	J3 312007502

Other threads, please consult us.

44 MÉNARD CASINGS

Description	Length	Reference
44 Ménard casing – right thread	1,00 m	K1 01004403
44 Ménard casing – right thread	1,20 m	*
44 Ménard casing – right thread	1,50 m	K1 010004404
44 reinforced Ménard casing – right thread	1,00 m	K1 010004401
44 reinforced Ménard casing – right thread	1,20 m	*
44 reinforced Ménard casing – right thread	1,50 m	K1 010004402
44 reinforced nipple – right thread		K1 020004401

55 MÉNARD CASINGS

Description	Length	Reference
55 Ménard casing – right thread	1,00 m	J1 101005501
55 Ménard casing – right thread	1,20 m	J1 201005501
55 Ménard casing – right thread	1,50 m	*
55 Ménard casing – left thread	1,00 m	*
55 Ménard casing – left thread	1,20 m	*
55 Ménard casing – left side	1,50 m	*
55 reinforced Ménard casing – right thread	1,00 m	J1 101005503
55 reinforced Ménard casing – right thread	1,20 m	*
55 reinforced Ménard casing – right thread	1,50 m	*
55 reinforced nipple – right thread		J4 070005502
55 reinforced Ménard casing – left thread	1,00 m	J1 102005501
55 reinforced Ménard casing – left thread	1,20 m	*
55 reinforced Ménard casing – left thread	1,50 m	J1 202005501
55 reinforced nipple – left thread		J4 070005501

63 MÉNARD CASINGS

Description	Length	Reference
63 Ménard casing – right thread	1,00 m	*
63 Ménard casing – right thread	1,20 m	J1 101006301
63 Ménard casing – right thread	1,50 m	J1 101006302
63 Ménard casing – left thread	1,00 m	J1 102006303
63 Ménard casing – left thread	1,20 m	J1 102006301
63 Ménard casing – left thread	1,50 m	J1 102006302
63 reinforced Ménard casing – right thread	1,00 m	*
63 reinforced Ménard casing – right thread	1,20 m	J1 201006301
63 reinforced Ménard casing – right thread	1,50 m	J1 201006302
63 reinforced Ménard casing – left thread	1,00 m	*
63 reinforced Ménard casing – left thread	1,20 m	*
63 reinforced Ménard casing – left thread	1,50 m	J2 202006301

*Please, consult us.

75 MÉNARD CASINGS

Description	Length	Reference
75 Ménard casing – right thread	1,50 m	J1 101007501
75 Ménard casing – left thread	1,50 m	J1 102007501
75 nipple – right thread		J4 070007501
75 nipple – left thread		J4 070007502

85 MÉNARD CASINGS

Description	Length	Reference
85 Ménard casing – right thread	1,00 m	J1 101008502
85 Ménard casing – right thread	1,20 m	J1 101008503
85 Ménard casing – right thread	1,50 m	J1 101008504
85 Ménard casing – left thread	1,00 m	*
85 Ménard casing – left thread	1,20 m	J1 102008502
85 Ménard casing – left thread	1,50 m	J1 102008503

CASING SHOES AND BITS

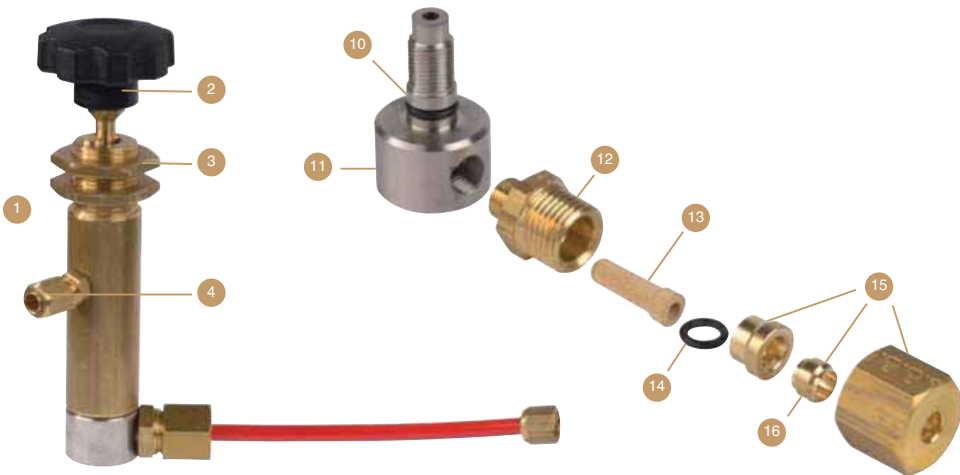
Description	Reference
55 casing shoe – right thread	J4 080005503
55 casing shoe – left thread	J4 080005504
63 casing shoe – right thread	J4 080006303
63 casing shoe – left thread	J4 080006307
63 Tungsten bit – right thread	J4 080006301
63 Tungsten bit – left thread	J4 080006302
85 casing shoe – right thread	J4 080008503
85 casing shoe – left thread	J4 080008505
85 Tungsten bit – right thread	J4 080008501
85 Tungsten bit – left thread	J4 080008502

*Please, consult us.



PRESSURE LAG REGULATOR

Mark	Description	Reference
1	Pressure lag regulator with tubing	A1 8320301
2	Plastic handle for front panel	A1 9322202
3	Fixation Nut	A1 8320501
4	ø6x1/8" brass nipple	A1 1700605
5	O'ring for valve 2.6x1.9	A1 9321003
6	Shutter for pressure lag regulator	A1 8320302
7	4 bars pressure (0.4 MPa) spring for lag regulator – up to 50 meters test	A1 8321801
	7 bars pressure (0.7 MPa) spring for lag regulator – up to 80 meters test	A1 8321803
	10 bars pressure (1 MPa) spring for lag regulator – up to 110 meters test	A1 8321802
	15 bars pressure (1.5 MPa) spring for lag regulator – up to 160 meters test	A1 8321804
8	O'ring for screw pressure lag regulator	A1 9321001
9	Pressure lag regulator screw	A1 8322201
10	O'ring for stainless steel seat	A1 9321002
11	Stainless steel seat	A1 8321901
12	ø1/8"x10 Straight coupling for pressure lag regulator	A1 8322220
13	Filter for pressure lag regulator	A1 8320601
14	O'ring for pressuremeter filter	A1 9901002
15	Reducer for filter cartridge	A1 8901610
16	ø6 mm brass Ferrule	A3 1901501



FILTER CARTRIDGE

Mark	Description	Reference
1	Complete filter cartridge for pressuremeter, with tubing	A1 8901602
2	ø6x1/8" brass nipple	A1 1700605
3	Filter cartridge	A1 8901601
4	Protective filter for control knobs	A1 9900601
5	O'ring for pressuremeter filter	A1 9901002
6	Reducer for filter cartridge	A1 8901610
7	ø6 mm brass Ferrule	A3 1901501



MAIN REGULATOR

Mark	Description	Reference
1	Main regulator 100 B (complete)*	A1 9310403
2	Plastic handle for piston type regulator	A1 9322203
3	ø6x1/4" brass tee coupling	A1 1700609
4	Shutter for main regulator	A1 9320301
	Main regulator seal 15/100th 100 bars	A1 9321602
	Main regulator seal 10/100th 60 bars	A1 9321601
	100 bars piston type regulator	A1 9310400
	100 bars spring for main regulator	A1 9321802
	10 bars spring for main regulator	A1 9321801
	25 bars spring for main regulator A1 9321803	
	40 bars spring for main regulator	A1 9321804
	80 bars spring for main regulator	A1 9321805

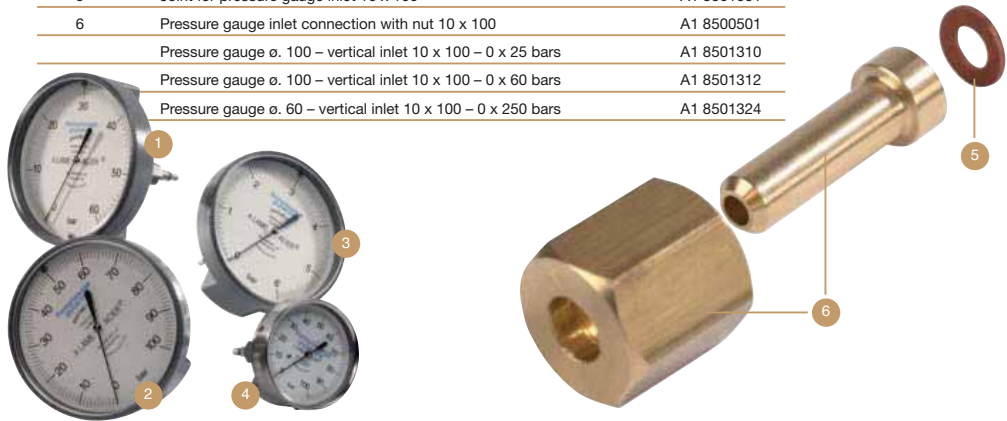
*Available in 80 bars for Pressure Control Unit 60 bars, please consult us.



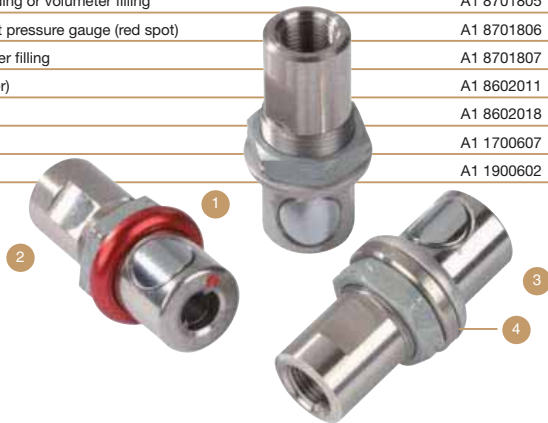
PRESSUREMETER

SPARE PARTS

Mark	Description	Reference
1	Additional pressure gauge – 0 x 60 bars – ø100mm	A1 8501005
2	Additional pressure gauge – 0 x 100 bars – ø100mm	A1 8501002
3	Additional pressure gauge – 0 x 6 bars – ø100mm	A1 8501004
4	Additional pressure gauge – 0 x 100 bars – ø60mm	A1 8501003
5	Joint for pressure gauge inlet 10 x 100	A1 8501001
6	Pressure gauge inlet connection with nut 10 x 100	A1 8500501
	Pressure gauge ø. 100 – vertical inlet 10 x 100 – 0 x 25 bars	A1 8501310
	Pressure gauge ø. 100 – vertical inlet 10 x 100 – 0 x 60 bars	A1 8501312
	Pressure gauge ø. 60 – vertical inlet 10 x 100 – 0 x 250 bars	A1 8501324



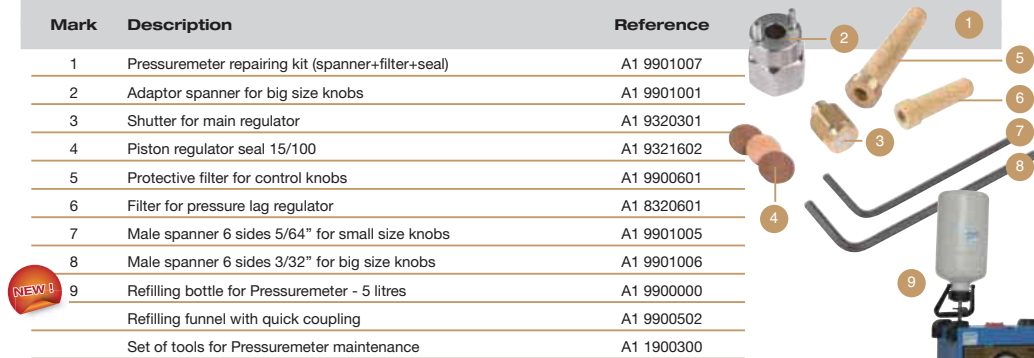
Mark	Description	Reference
1	Quick female socket for gas feeding	A1 8701801
2	Quick coupling (box) for rear inlet pressure gauge (red spot)	A1 8701802
3	Quick coupling (box) for gas and water outlet	A1 8701804
4	Stainless steel washer for water socket	A1 8201900
	Quick female coupling for volumeter filling	A1 8701803
	Quick male coupling for gas feeding or volumeter filling	A1 8701805
	Quick male coupling for rear inlet pressure gauge (red spot)	A1 8701806
	Quick male coupling for volumeter filling	A1 8701807
	Inner black tubing 3 x 6 (by meter)	A1 8602011
	Inner red tubing 3 x 6 (by meter)	A1 8602018
	ø6 mm nut with ferrule	A1 1700607
	ø3 Straight insert	A1 1900602



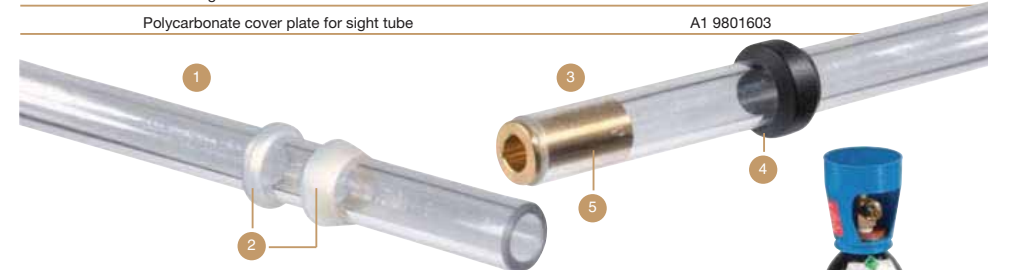
PRESSUREMETER

SPARE PARTS

Mark	Description	Reference
1	Pressuremeter repairing kit (spanner+filter+seal)	A1 9901007
2	Adaptor spanner for big size knobs	A1 9901001
3	Shutter for main regulator	A1 9320301
4	Piston regulator seal 15/100	A1 9321602
5	Protective filter for control knobs	A1 9900601
6	Filter for pressure lag regulator	A1 8320601
7	Male spanner 6 sides 5/64" for small size knobs	A1 9901005
8	Male spanner 6 sides 3/32" for big size knobs	A1 9901006
9	Refilling bottle for Pressuremeter - 5 litres	A1 9900000
	Refilling funnel with quick coupling	A1 9900502
	Set of tools for Pressuremeter maintenance	A1 1900300



Mark	Description	Reference
1	Polycarbonate sight tube (complete) – new model	A1 8902203
2	Nylon ferrule for new type of sight tube	A1 8801500
3	Polycarbonate sight tube (complete) – former model	A1 8902201
4	Nylon ferrule for of sight tube (former type)	A1 8801501
5	Straight insert for sight tube (former type)	A1 8800601
	Elbow for polycarbonate sight tube new model	A1 9801800
	Bolt for sight tube new model	A1 9800501
	Elbow for polycarbonate sight tube former model	A1 9801801
	Bolt for sight tube former model	A1 9900501
	Polycarbonate cover plate for sight tube	A1 9801603



Mark	Description	Reference
1	Nitrogen cylinder (1m³)	A1 1900203
2	MAV type high pressure regulator for nitrogen cylinder with tubing	A1 8310400
3	Pressure gauge for MAV HP 400 bars ø50 mm	A1 9311305
4	Pressure gauge for MAV LP 160 bars ø50 mm	A1 9311303
5	Tubing from gas cylinder to monitoring box	A1 9311803
	Piston regulator seal for MAV 20/100 130 bars	A1 9311601



The STAF® Self-Bored Tube System is a pressuremeter boring method developed to conform to the STDTM (Slotted Tube technique with inside Disintegrating Tool and Mud circulation) specifications from the NF P 94-110-1 and EN ISO 22476-4 standards. This equipment is particularly recommended for driving the slotted tube in non-homogeneous or overburden layers.

DESCRIPTION

This drilling method may be carried out with any type of drilling rig fitted with hydraulic rotary percussion equipment (VibroSTAF® method) or a special rotation head configured for simultaneous bidirectional rotation (RotoSTAF® method). Previously considered as a delicate task, positioning of a slotted tube can now be performed at the same time as drilling without the need to remould the borehole walls.



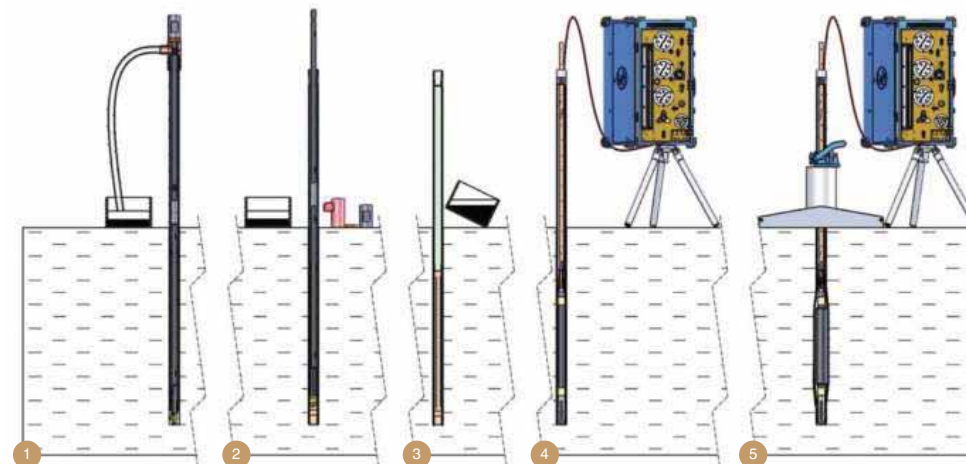
A FULL STAF® EQUIPMENT INCLUDES :

- a string of pipes with the slotted tube, its driving head and slurry circulation discharge pipe
- a drilling set including drilling rods, couplings, bit holder and STAF® bits, either buttons or cross types
- a probe with a set of rods
- a rod pulling device

STAF® is a patented technic and a registered trademark of Geomatech.



STAF IMPLEMENTATION AND PRESSUREMETER TESTS



- 1 Rotary percussion drilling is performed using the STAF® tool during which the slotted tube is also positioned according to the STDTM (Slotted Tube technique with inside Disintegrating Tool and Mud circulation) specification for pressuremeter testing. Slurry spills out into a sediment tank where the borehole logging takes place.
- 2 The STAF® tool and its string of rods are pulled back up without compromising the borehole walls.
- 3 The borehole stays lined, the slotted tube is ready to accept the pressuremeter probe and the clean slurry is ready to be recirculated after settling in the sediment tank.
- 4 Using the locking device for the probe, the driller inserts the pressuremeter probe into the borehole as far as the slotted tube which is now in position. The probe is located exactly at the centre level of the steel strips forming the slotted tube. Pressuremeter testing can now start. The coaxial or twin lines are protected by the string of STAF® tubes from any squeezing or pinching.
- 5 Pressuremeter tests are carried out, starting from the deepest elevation using a specially designed pulling device for ø63 tubing. Pressuremeter readings are recorded using the GEOSPAD® data logger fitted to the pressuremeter control unit according to the NF P 94-110-1 and EN ISO 22476-4 standards. P. 62-63

The data are then processed using GeoVision® software.

A detailed description of pressuremeter testing using the STAF® technique can be found in a paper published in **Vol. 1 of the Proceedings of the ISP5 International Symposium, Paris, Aug. 2005: Pressuremeter tests inside a self-bored slotted tube**, G. Arsonnet, J.-P. Baud, M. Gambin.

This paper may also be downloaded at apageo.com.

STAF® CASING

Description	Reference
Guide for STAF® casing	H6 0010035
Anvil spacer for STAF®	H6 0010040
Slurry circulation discharge pipe	H6 0010030
Upsetting tubing	H6 0010031
Driving head	H6 0010020
Casing Lg 1,22 m	H6 0010010
Casing Lg 0.3 m	H6 0010005
Slotted tube	H6 0010000
Starting casing tube lg 0.3 m	H6 0010015
Coupling box R38 x pin STAF® slotted casing	H6 0010100
Coupling box R38 x pin STAF® casing	H6 0010110
Manipulation loop for STAF® casing	H6 0010170
STAF® casing spanner	H6 0010175
Coupling pin STAF® casing x box 2"3/8 with flats	H6 0010180

STAF® BITS

Description	Reference
Coupling box R38 x R32box modified	H6 0010080
Rod R38 x lg 0.3 m	H1 02003802
Rod R32 x lg 1.5 m for STAF® (x1)	H6 0010073
Rod R32 x lg 1.22 m for STAF®	H6 0010075
R32 nipple for STAF®	H6 0010076
Pilot bit holder for STAF® equipment	H6 0010060
Pilot U-pin for STAF® equipment	H6 0010070
STAF® cross bit ø66mm	H6 0010050
STAF® button bit ø66mm	H6 0010055
R32 rod spanner	H1 09003201
R32 rod spanner long handle	H1 09003802
R38 rod spanner	H1 09003803
ø65 rod spanner for STAF® equipment	H6 0010140
R32 manipulation ring	M5 0900010



IMPLEMENTATION OF THE PRESSUREMETER PROBE

Description	Reference
Coupling pin 22 x box R38	H6 0010060
Rod ø9 x 22mm – length 1.22 m for STAF® equipment	H6 0010130
Coupling for 44mm probe x 22 mm rod box	A1 1454402
ø44 mm probe centering coupling for STAF®	H6 0010120
Wrench for ø22 mm rods	F5 09000302
ø22 rod manipulation ring	M5 0900011



EXTRACTION SYSTEM

Description	Reference
Hydraulic Jack 15 T capacity for casing extraction	H6 0010160
Set of hose for hydraulic jack	H6 0010165
Foot clamp – big model	M3 0100000
Clamp for STAF® casing	M3 0200016
Pull up washer for STAF® system	H6 0010145
Base plate for the hydraulic jack	H6 0010150

STAF® is a patented technique and a registered trademark of Geomatech.

MINI PRESSUREMETER

MÉNARD PRESSUREMETER TEST
ACCORDING TO THE NF P 94-110-1
AND EN ISO 22476-4 STANDARDS

DESCRIPTION

The Mini Pressuremeter is dedicated to small diameter hand borings (with a hand auger*), in medium formation, up to 10 meters depth. Light and easy to carry, it fits especially to difficult access on site. The direct probe hammering allows performing without the need to remould the borehole walls**. Thanks to its small diameter, the intervals between 2 tests can be reduced and thus improve the test result at low depth.



MAIN EQUIPMENT

Description	Reference	Quantity suggested
Pressure Volume Control 0 x 6 – 0 x 25 bars for monocell probe	A3 1900301	1
Monocell ø32 mm probe	A3 1901901	2
Driving cone ø32 mm probe	A3 1901601	1
Probe coupling ø32 mm x F ø22 mm	A3 1901801	1
25 m long tubing	A7 8900100	2
Nitrogen cylinder 1m3	A1 1900202	1
High pressure regulator at gas cylinder	A1 8310400	1
Male socket – blue mark	A2 8701802	1
Vaccum pump	A3 1901602	1
Tripod	A2 8202001	1
Axle for Tripod	A2 8202003	1

SPARE PARTS

Description	Reference	Quantity suggested
Wrench for ø22 mm rod	F5 09000302	2
Extension rod ø22 mm x 1 m long	F5 02002202	5
ø32 mm cover with 4 steel strips	A3 1900702	5
Vulkolan ring for ø32 mm metal cover	A3 1900202	2
Probe drain device	A1 1456012	1
ø6 x 1/8" brass nipple	A1 1700605	1
ø32 mm probe O-ring	A3 1901001	2
19 mm wide tape roll	A1 1901804	1
ø6 mm nut with ferrule	A1 1700607	10
ø3 mm straight insert	A1 1900602	10

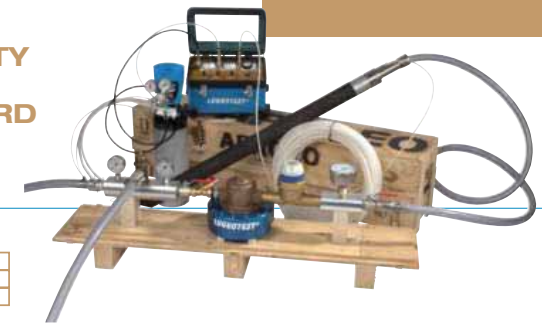
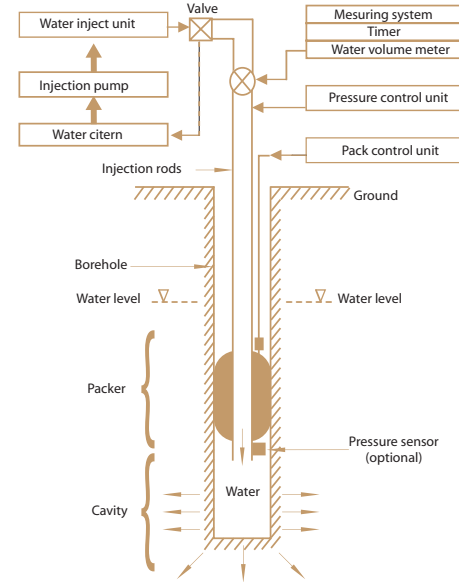
*Hand auger [p. 66](#)

**Hammering of the probe with the light dynamic penetrometer using Ø 22 hollow rods, anvil and slotted hammering head for passing the tubing. [p. 56](#)



LUGEOTEST®

IN SITU SOIL PERMEABILITY
TESTING ACCORDING TO
THE NF P 94-131 STANDARD



DESCRIPTION

The Lugeon water test is an in situ test of formation permeability applicable to fractured rock, masonry and cohesive soil with mechanical resistance corresponding to the water pressure applied during testing. It is used primarily to assess water flow potential in the soil and to detect anomalies and fissures.



Description	Reference
Complete Lugeotest®	A6 9900501



EQUIPMENT

According to the French NF P 94-131 standard, the equipment assembly is made up of a control box dedicated to inflating the packer and controlling the pressure regulator plus a complete injection unit equipped with an injection regulator, a water volume meter and an injection pressure measuring system.

To perform the test, the following materials are sold separately:

- [p. 20](#) • A Triplex pump with a 100 l/minute flow at pressure of 11 bars
- [p. 47](#) • Nitrogen cylinder
- [p. 81](#) • Drilling rods
- [p. 117](#) • Packer and a water level indicator

PHICOMETER

IN SITU SHEARING TEST ACCORDING TO THE NF P 94-120 STANDARD

The Phicometer is a device for in situ measurement of the mechanical characteristics ϕ and C of soil using a linear shearing test. Its advantages include the possibility of performing tests on heterogeneous soil which cannot be sampled or is difficult to sample; and the low cost of this fast test method.

DESCRIPTION

The test involves placing slotted casing shaped with horizontal annular teeth in a 63 mm diameter borehole, then applying radial pressure to let the teeth penetrate the surrounding soil. Stress σ is consequently applied to the circumscribed surface S such that $S = \pi \cdot d \cdot L$ where:

- d = outside diameter of the teeth
- L = shearing cell length.

Pull-up is then applied at a controlled rate from the ground surface. The mobilisable limit force T under stress σ produces the corresponding shearing stress $\tau = T/S$.

A several pair of values are measured in this manner to determine the internal friction angle and the cohesion of the soil which are designated by the symbols ϕ and c .



IMPLEMENTATION

The test is performed in a previously drilled borehole with a 63 mm diameter. The borehole has to be drilled with minimum disturbance of the soil using the same methods as those recommended for pressuremeter tests.

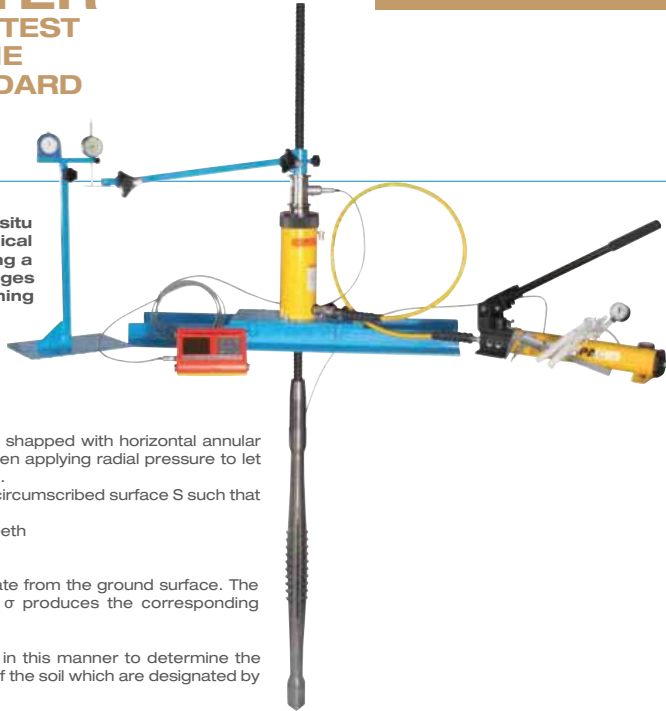
Testing follows a specific procedure in which the probe is typically inserted into the previously drilled borehole using optional tubing and mud in sloughy soil.

Description	Reference
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Complete PHICOMETER (Without CU)	A7 8101601
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SPARE PARTS (NON EXHAUSTIVE LIST)

Shearing slotted tube	A7 8902004
ø32mm complete probe for phicometer	A7 1401904
ø32mm standard rubber cover	A7 1400702
Hollow jack	A7 8902201
Electronic measuring unit including a dial gauge and a timer	A7 84900301
Wooden storage box for accessories	A7 8900300



PHICOMETER

IN SITU SHEARING TEST ACCORDING TO THE NF P 94-120 STANDARD

THE EQUIPMENT INCLUDES THREE MAIN PARTS:

1. The shearing probe is composed by a monocellular inflatable probe introduced inside a shearing slotted tube



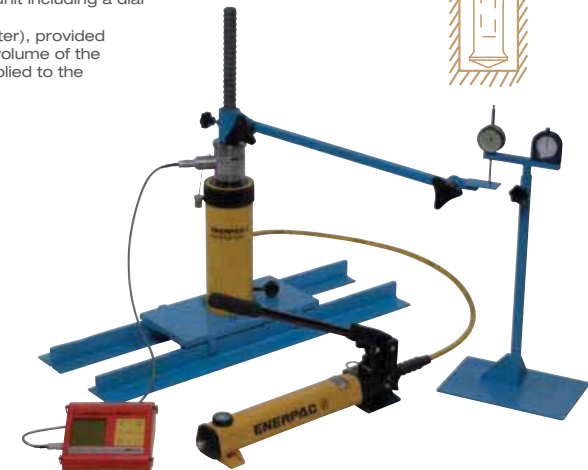
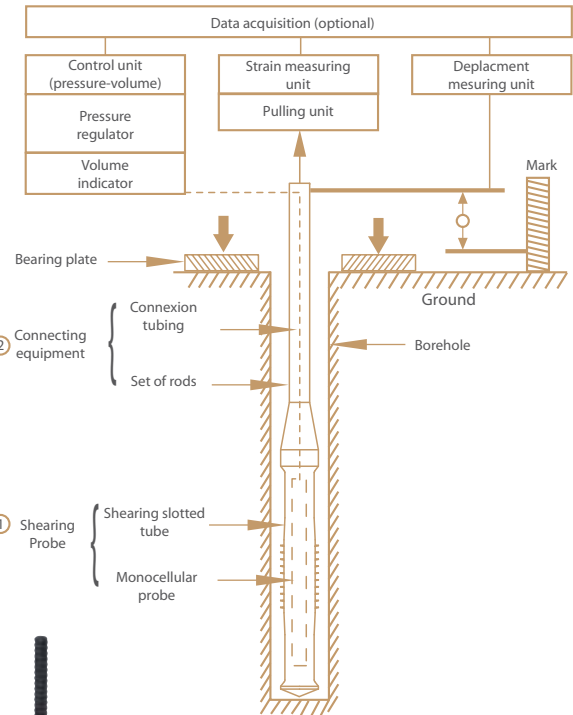
2. The interconnection equipment includes:

- R32 rotary percussive rods (provided separately)
- a plastic tubing, connecting the inflatable probe to the surface equipment

3. The surface equipment includes:

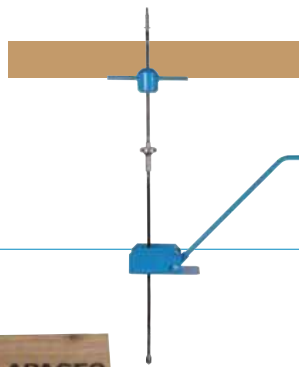
- a bearing plate
- a hollow jack applying the pulling force
- a dynamometric gauge for measuring the pulling force T
- a locking system
- wagon drill rods set with various lengths
- a displacement measuring unit including a dial gauge and a timer
- a Control Unit (Pressuremeter), provided separately, measuring the volume of the probe and the pressure applied to the shearing probe

③ Surface equipment



LIGHT DYNAMIC PENETROMETER

DYNAMIC PENETRATION TEST ACCORDING TO THE EN ISO 22476-2 STANDARD

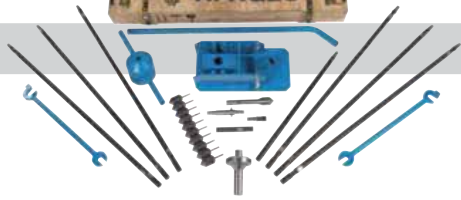


GEOBOX®

CENTRAL UNIT FOR SOIL INVESTIGATION

DESCRIPTION

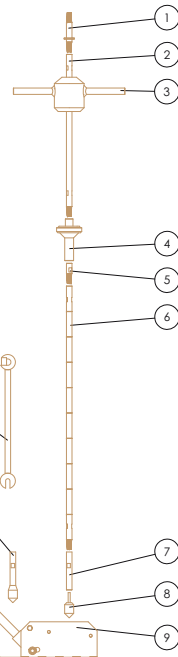
Hammering system for the control of trench or platform compaction (lost cone 10cm²) or implementation of ø32 mm probe for mini pressuremeter



Description	Reference
Light dynamic penetrometer	D4 8101601

LIGHT DYNAMIC PENETROMETER, MANUAL HAMMERING

Description	Reference	Qty
1 Non slotted pulling connector for ø22 rod	D4 1902004	1
2 Guide rod ø22 – lg 0,6 m	D4 1902005	1
3 Hammer 10 kg	D4 1901301	1
4 Non slotted anvil for ø 22 rod	D4 1900503	1
5 Non slotted hammering head for ø 22 rod	D4 1902002	1
6 Hammering rod ø22 x lg 1,0 m – marked every 10 cm	F5 02002201	6
7 Lost cone holder 10 cm ²	D4 1901801	1
8 Lost cone 10 cm ² with pin	D4 1901603	10
8 Or hollow lost cone 10 cm ²	D4 1901604	10
9 Complete lever device for ø22 rods extraction	D4 1901201	1
10 Screwing and hoisting wrench for ø22 rod	F5 09000302	2
11 Fixed cone 10 cm ² - ø22 rod thread	D4 1901602	1
Storage box for rods	D4 1903000	1
Storage box for hammering system	D4 1903001	1



VARIATION FOR MINI PRESSUREMETER USE

1 Slotted pulling connector for ø22 rod	D4 1902003	1
4 Slotted anvil for ø22 rod	D4 1900502	1
5 Slotted hammering head for ø22 rod	D4 1902001	1
6 ø22 hollow rod x lg 1,0 m	F5 02002202	6



GEOBOX®

CENTRAL UNIT
FOR SOIL INVESTIGATION



GeoBOX®

An equipment of new generation is born: GeoBOX®, a central unit for soil investigation monitoring and data acquisition.

DESCRIPTION

GeoBOX® is a central unit monitoring all your work for soil investigation. GeoBOX® is an ultra-mobile PC that integrates a unique software intelligence developed by Apageo. GeoBOX® offers several applications for soil investigation that can be downloaded according to your needs:

- Pressuremeter test (test piloting and acquisition) with GeoPAC®
- Pressuremeter data acquisition with GeoSPAD®2 and genuine Ménard pressuremeter
- Drilling data acquisition with Explofor®3
- DPSH-B test acquisition (available mid 2010)
- Permeability test with the Lugeotest (available soon)
- Shear test with the Phicometer (available soon)

MATERIAL

Especially adapted to outdoor conditions, GeoBOX® is extremely rugged and ultra-portable with a 5.6" LCD screen. Designed for outdoor uses (IP54, military std) it can endure falling height of 1.2 meters. GeoBOX® conveys automatically through WIFI with all the surrounding equipments (printer, GeoPAC®, Explofor®3, GeoSPAD®2 etc...).

Data extracted with GeoBOX® can be either saved on a USB storage key or sent to the office via GPRS (option).



Data can be treated on our software GeoVision®.

THE MATERIAL INCLUDES :

A central unit GeoBOX®, delivered with its VAC adaptor.

A thermal printer, hardy and industrial, delivered with adaptor and 3 rolls of paper (110mm width)

A 1Go USB storage key

A hardy case (dimension 432 x 290 x 155 mm), with inside foam designed to receive the material.



GEO PAC®

AUTO-CONTROLLED PRESSUREMETER
PRESSUREMETER TEST ACCORDING
TO THE EN ISO 22476-4
AND ASTM D-4719-00 STANDARDS



DESCRIPTION

Apageo has developed a new way to perform pressuremeter test according to the EN ISO 22476-4 standard. GeoPAC® is a smart equipment that manages all the different steps of the test. It is driven by its **UMPC (Ultra Mobile PC)**. GeoBOX®: it orders the execution of the test through wifi, letting to GeoPAC® the reactivity and smartness to implement the test. Thanks to GeoBOX®, data can be stored on USB key on the site or sent via a GPRS system to the head office. GeoPAC® makes the whole process **easier to conduct** for the operator, **reinforces the reliability** of the results, and **reduces the time of preparation**.

GeoPAC

IMPLEMENTATION

The operator enters the different parameters of the test in GeoBOX® (borehole number, depth of the test, pressure of 1st pressure stage etc...). As soon as the probe is lowered into the borehole to the required test depth, GeoBOX® can launch the test execution. From now, GeoPAC® controls all the sequences of the whole process: standard test, pressure loss, volume loss, probes bleeding. Pressure increments and pressure lag settings are also automated. During the entire process, GeoBOX® offers a monitoring of the pending test on its screen (progression, real time view of the results, line graph etc...). At any time, the operator can decide to stop the test from GeoBOX®. When the test is over, data are saved on GeoBOX® (no time limit, max. 500 tests). Results can be printed directly on GeoBOX® printer, saved on a USB key to be treated by the software GeoVision®. Data can be sent to the office via a GPRS system (option).

TECHNICAL SPECIFICATIONS

GeoPAC® is 100% compatible with all Ménard pressuremeter accessories (probe, tubing, nitrogen bottle etc...).

Dimensions: 1170 x 374 x 338 mm
Weight : 49kg
2 wheels for easy move
Volumer capacity: approx. 1200cm³
Max. gas pressure: 70 bars
Power supply: 9 – 18VDC



BENKELMAN BEAM

1/PLATE TEST ACCORDING TO THE NF P 94 117-1 STANDARD
 2/FLEXIBLE PAVEMENT DEFLECTION TESTING
 ACCORDING TO THE NF P 98-200-8 STANDARD

DESCRIPTION

The Benkelman Beam measures the deformation of a material under stress. This equipment is used for the two following test:

- The plate test measures the static deformation EV1/EV2 (roads) and Westergard deformation (platforms). The Benkelman beam measures the formation level bearing capacity by applying a load on the plate to the material with the loading device.
- Standard Benkelman Beam tests measure pavement deflection in response to a static load. Measurement is made by placing the tip of the beam between the dual tires of a loaded truck and measuring the pavement surface rebound as the truck is moved away.

MATERIAL

For the deflection test, the beam is used alone. For the plate test, a loading device and aluminum plate are necessary.

BENKELMAN BEAM

High-end model

The Benkelman beam consists of a balance arm (in two parts) mounted on ball-bearing axis, a frame supported on the ground by three feet on height-adjustable ball-joints, with a digital comparator 10 mm to 0.01. The whole equipment is protected by a high resistance epoxy paint and delivered in a flight case.

- Beam weight: 11.5kg
- Overall length: 3m60
- Beam in storage: 29kg
- L x W x H: 200 x 300 x 300 mm

Eco model

- Beam weight: 8.5kg

ALUMINUM PLATE Ø600 MM

With reinforced ribbed, side slit and handles for transportation.



BENKELMAN BEAM

1/PLATE TEST ACCORDING TO THE NF P 94 117-1 STANDARD
 2/FLEXIBLE PAVEMENT DEFLECTION TESTING
 ACCORDING TO THE NF P 98-200-8 STANDARD

MANUAL LOADING APPLIANCES

Hydraulic model

(Exists also with electrical pumps, see below)

- Hydraulic jack, force 100 kN
- 203 mm Stroke with centering plate and pivot joint
- Hand pump with analogue manometer 90 kN and 3.0 m flexible hose
- Wooden transport carrying case
- Aluminum wedge



NEW!

Mechanical model

- Reinforced mechanical jack, force 200 kN
- Dynamometer for control, graduation from 0 to 100 kN with loading stage
- Pivot joint
- Wooden transport carrying case

BENKELMAN BEAM

Description	Reference
High end Benkelman beam in flight case	O2 203121720
Eco Benkelman beam in box	O2 203121702
Aluminum plate, diameter 600 mm	O2 203121707
Manual hydraulic loading appliance	O2 203121760
Electrical hydraulic loading appliance	O2 203121770
Manual mechanical loading appliance	O2 203121710
OPTION	
Adjustable wedge	O2 203121715



Manual mechanical loading appliance



NEW!

GeoVision® enables the extraction, processing and viewing of all data coming from APAGEO's data loggers including pressuremeter data (SPAD® and GeoSPAD®) and drilling data (EXPLOFOR®).

The GeoVision® license is available in 3 versions:

- **GeoVision® - P**, for pressuremeter data, generating pressuremeter test reports and diagraphies
- **GeoVision® - F**, for drilling data
- **GeoVision®**, full version (P + F)

GENERAL SPECIFICATIONS:

- Data acquisition through **PCMCIA and flash memory cards** used on APAGEO's data loggers (SPAD®, GEOSPAD® or EXPLOFOR®)
- **Manual data input** for all data types (image, text or numeric), entry of site investigation notes and results (dynamic penetrometer, water tests, pictures, etc.)
- Data exploitation and generation of **pressuremeter reports** according to the **NF P 94-110-1** and **EN ISO 22476-4**
- **Customisation of the diagraphy process**
- Definition of a **reference database** to facilitate data sharing and regular saving of data
- Compatible with all recent versions of Windows
- Available in English, French, Italian, Spanish and German

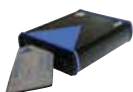
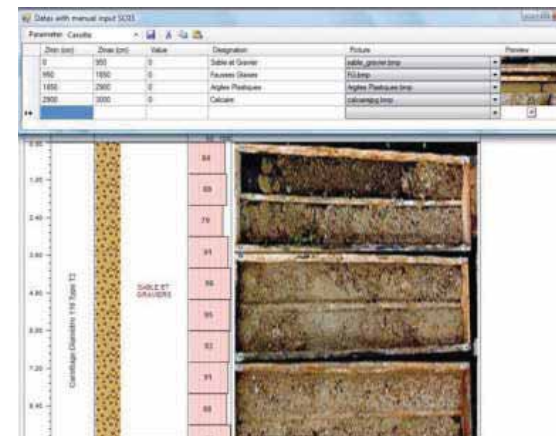


GEOVISION® - MANUAL DATA INPUT

The manual data input module is available with both versions of the software. It enables logging of all site-related information including notes, images and representative values of geotechnical measures.

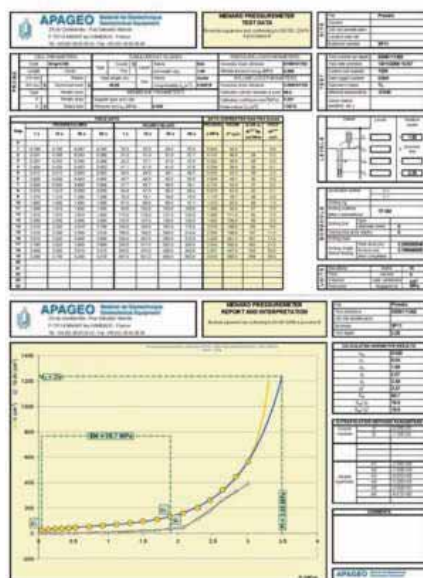
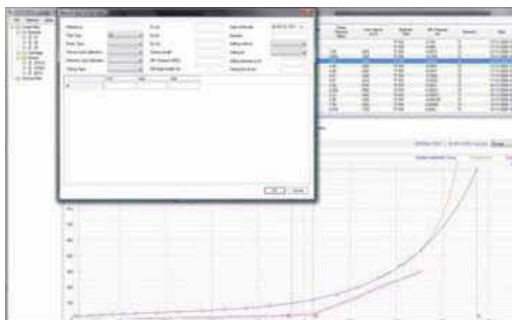
GeoVision® is pre-configured with a database of lithological legends to be used or modified as required.

Manual data input takes place using an interface similar to Microsoft Excel.



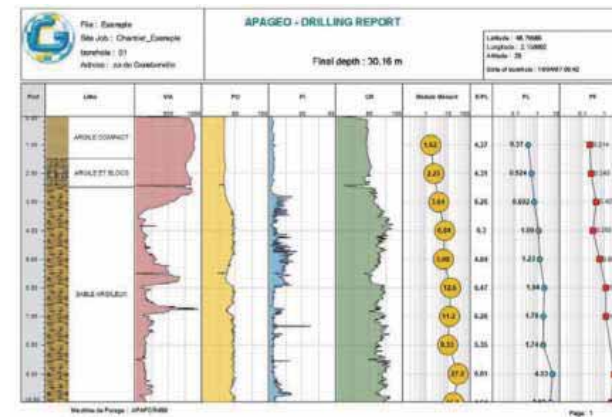
In addition to the software, APAGEO is pleased to provide a universal reader, compatible with Windows 98 and later, to all clients in possession of an older data logger (SPAD® or EXPLOFOR®).

The **pressuremeter data** module imports, analyses, defines and generates test results to meet industrial requirements. It also features the double hyperbole method as prescribed by the proposed international standard as well as adjustment of the pseudo-elastic phase for maximum precision of test results.



GEOVISION® - REPORT GENERATION

Reports can be printed on any kind of printer or generated in PDF format for e-mailing. The layout of drilling reports can be personalised. Headings created can be saved and applied to different reports. Charts can also be customised easily and intuitively.



P.66

DRILLING EQUIPMENT AUGERS AND BITS

p 66

Hand augers
Continuous flight augers
Auger bits
Hollow Stem Augers
Injection augers and bits - "JET AUGER" type

ROTARY-PERCUSSION DRILLING

p 75

Rods and bits for top hammer rotary-percussion [R32 - R38]
Down The Hole hammers and bits
Overburden drilling - STAREX equipment
Overburden drilling - S.T.A.R. equipment

ROTATION DRILLING

p 81

Drilling rods - Penetrometer rods - Couplings
Rotation bits (tricones, drag bits, special bits)

P.88

CORING EQUIPMENT

CORE BARRELS AND BITS

p 88

Single core barrels B - T
Double core barrels T2 - T6 - TRIPLEX T6S and K2
Tungsten carbide bits and reaming shells
Wireline core barrel
Diamond bits
Hammering sampler - SPT

CASINGS AND ACCESSORIES

p 109

Casings (metric, LS, W series, ...).
Accessories for Q casing - foot clamp

In 1989, APAGEO took over the company SEGELM - one of the leading French manufacturers for coring equipment. From this time, APAGEO has fully integrated this know-how and expertise and is now established as a renowned coring equipment manufacturer.

In 2010, thanks to modern production tools, APAGEO remains a performing actor providing high quality products to meet the very demanding industry of mining and soil investigations.




HAND AUGER

Ø 35 to 150 mm


HAND AUGER

Ø (mm) auger	Thread - Reference			
	22 conical	20/27	Square rod 23	Square rod 32
35	F5 01003501	-	-	-
46	F5 01004602	-	-	-
63	F5 01006302	F5 01006303	F5 01006301	-
80	F5 01008002	F5 01008003	-	-
100	F5 01010002	F5 01010003	-	-
125	-	-	-	F5 01012502
150	-	-	-	F5 01015001



HANDLE FOR HAND AUGER


Rod type	Reference
22 Rod	F5 09002201
22 injection Rod	F5 09002202
20/27 Rod	F5 09002001
23 Square rod	F5 09002301
32 Square rod	F5 09003201



EXTENSION ROD FOR HAND AUGER

Can be used for the implementation of pressurimeter probe

1 m extension rod	Reference
Ø22 conical M/F (marked every 10 cm)*	F5 02002201
Ø22 conical M/F (marked every 10 cm)* hollow	F5 02002202
20/27 with nipple	F5 02002001
30 x 23 square rod	F5 02002301
40 x 33 square rod	F5 02003201
Screwing and hoisting wrench for 22mm rods	F5 09000302



CONTINUOUS FLIGHT AUGERS

AUGER FOR PRESSUREMETER DRILLINGS

Right rotation

Ø 63 mm Auger	Hex (mm)	Core (mm)	Reference
1,00 m length	21	25	F1 01006304
1,50 m length	21	25	F1 01006303

Left rotation

Ø 63 mm Auger	Hex (mm)	Core (mm)	Reference
1,00 m length	21	25	F1 01006305
1,50 m length	21	25	F1 01006306

CONTINUOUS FLIGHT AUGER Ø 63 MM TO Ø 254 MM

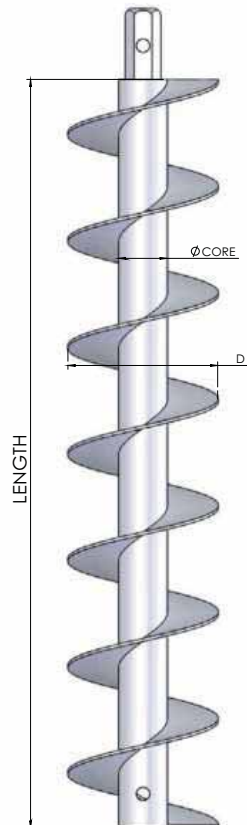
Ø auger (mm)	Ø bit and hole	Core (mm)	Hex (mm)	Reference 1,00 m length	Reference 1,50 m length
63	63	32	21	F1 01006307	F1 01006308
75	76	32	21	F1 01007500	F1 01007501
80	89	43	29	F1 01008001	F1 01008003
100	114	43	29	F1 01010003	F1 01010004
114	127	43	29	F1 01011401	F1 01011402
114	127	60	41	F1 01011404	F1 01011403
140	152	43	29	F1 01014001	F1 01014002
140	152	60	41	F1 01014006	F1 01014007
152	178	60	41	F1 01015202	F1 01015203
178	203	60	41	F1 01017811	F1 01017808
178	203	76	51	F1 01017812	F1 01017809
225	254	76	41	F1 01022504	F1 01022501
225	254	76	51	F1 01022505	F1 01022502
254	305	76	41	F1 01025400	F1 01025401
254	305	76	51	F1 01025404	F1 01025402

Other lengths available, please consult us.

Our augers are steel hardened

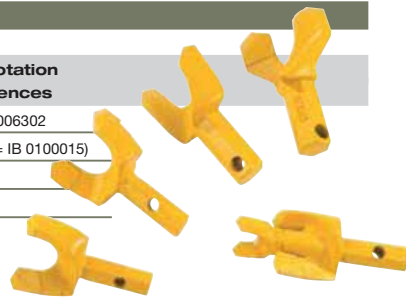
U-PIN

Hex	Reference
Hex 21	F1 04002101
Hex 29	F1 04002901
Hex 41	F1 04004101
Hex 51	F1 04005101



2 WINGS BIT

Ø (mm)	Hex (mm)	Right rotation references	Left rotation references
63	21	F1 02006301	F1 02006302
63	21	F1 02006310 (with pilot)	-> (Ref. Pilot = IB 0100015)
76	21	F1 02007601	
89	29	F1 02008901	



FINGER BIT

Ø (mm)	29 Hex	41 Hex	51 Hex
114	F1 02012700	*	*
127	F1 02012701	F1 02012702	*
152	F1 02015203	F1 02015204	*
178	*	F1 02017801	*
203	*	F1 02020301	F1 02020302
254	*	F1 02025401	F1 02025402
305	*	F1 02030501	F1 02030502
Finger with carbide insert		F1 02090002	
Finger with head single type		F1 02090004	
Finger with head double type		F1 02090003	
Simple finger head		Small size	F1 02090005
Double finger head		Small size	F1 02090006
Double finger head		Large size	F1 02090011



*Please, consult us

DP ROCK BIT

Ø (mm)	Hex (mm)	Reference
114	29	F1 02090018
152	29	F1 02090014
152	41	F1 02090016
203	41	F1 02090021
203	51	F1 02090022
254	41	F1 02090024
254	51	F1 02090023
Small size inserts		F1 02090019
Large size inserts		F1 02090017



BULLDOG BIT

Ø (mm)	Hex (mm)	Reference
114	29	F1 02111401
114	41	F1 02111402
152	29	F1 02115200
152	41	F1 02115201
TC inserts		F1 02190001



BULLET BIT

Ø (mm)	Hex (mm)	Reference
152	41	F1 02090207
203	41	F1 02090208
254	41	F1 02090209
254	51	F1 02090210
305	41	F1 02090211
305	51	F1 02090212



FISHTAIL BIT

Ø (mm)	Reference	Ø (mm)	Reference
64	F1 03006401	152	F1 03015201
76	F1 03007601	178	F1 03017801
89	F1 03008901	203	F1 03020301
114	F1 03011401	254	F1 03025401
127	F1 03012701	305	F1 03030501

SHANK FOR FISHTAIL BIT

Fishtail Ø (mm)	Hex (mm)	Reference
51 - 64 - 76	21	F1 03002101
51 - 64 - 76	29	F1 03002901
89 - 114	29	F1 03002902
89 - 114	41	F1 03004101
127 à 152	29	F1 03002903
127 à 305	41	F1 03004102
127 à 305	51	F1 03004103



AUGER FISHING DEVICE

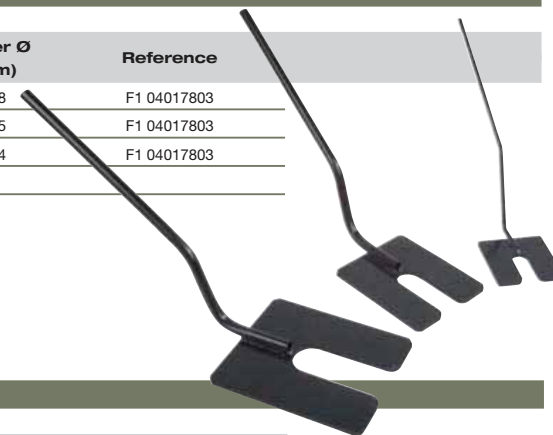
Auger Ø (mm)	Right rotation reference	Left rotation reference
63	F1 04006301	F1 04006303
80/100/114	F1 04008001	*
140/152	F1 04014001	*

*Please, consult us



AUGER HOLDER

Auger Ø (mm)	Reference	Auger Ø (mm)	Reference
63	F1 04006302	178	F1 04017803
80/100/114	F1 04008002	225	F1 04017803
140/152	F1 04014002	254	F1 04017803



U-PIN

Hex (mm)	Reference
Hex 21	F1 04002101
Hex 29	F1 04002901
Hex 41	F1 04004101
Hex 51	F1 04005101

CARDAN JOINT 400 daN.m

F x F	Hex 41
2" 3/8 R	F1 0604005
2" 3/8 IF	F1 06040010
41 hex	F1 06040004
29 hex	F1 06040003
21 hex	F1 06040002
<i>Other couplings (R51, R66), please contact us</i>	
Pointed hammer for U Pins	F1 09006301



PRINCIPLE

The hollow-stem auger (HSA) system is used to drill and case a borehole simultaneously in gravelly or heterogeneous soil such as sand or gravel.

The principle of this method is to use a string of rods with a pilot bit inside the auger string. The hollow-stem auger can also be positioned using lost tools instead of internal rods.

Soil should not enter the auger regardless of the method used.

This is an ideal method for piezometer installation, well monitoring, geotechnics, micro-piles, tubing for SPT tests and pressuremeter tests.

In a standard configuration (auger+rod), when the desired depth is reached, the inner rods are removed to free the inside of the auger. Coring or sampling is subsequently possible beyond this depth.

We offer a range of four standard dimensions identified by their inside and outside diameters:

- (ø inside x ø outside)
- 66 x 140 mm
- 82 x 175 mm
- 111 x 194 mm
- 159 x 254 mm

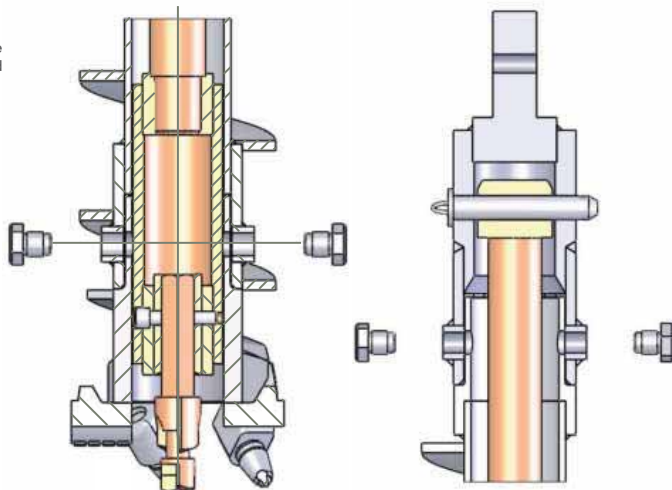
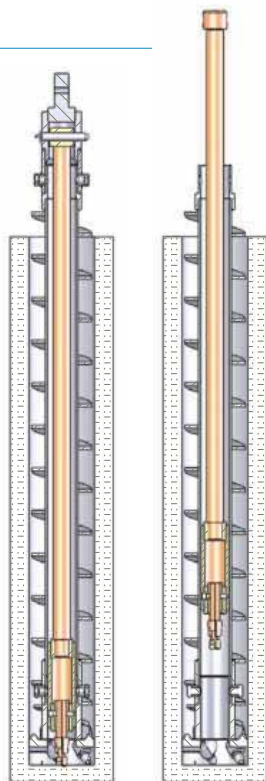
DESCRIPTION

The top of the equipment consists of a dual head leading both the auger string and the inner rod string. The augers are fixed to the driving head with nuts and bolts, whilst the top rod is fixed to the head using an adapter secured with a locking pin.

The augers and inner rods are added in 1.5 m lengths (or others lengths on request) until the target drilling depth is reached. The rods are threaded and screwed, whilst the augers are secured using nuts and bolts.

The first (bottom) rod is equipped with a plug adapter connecting the rod to the pilot bit. The bottom auger is fitted with a tungsten carbide cutter head bit including both self-sharpening bullets for chipping action and blades for cleaning.

When the inner rods are removed, the stem of the auger is completely emptied to its full inner diameter.



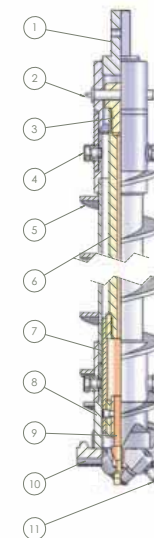
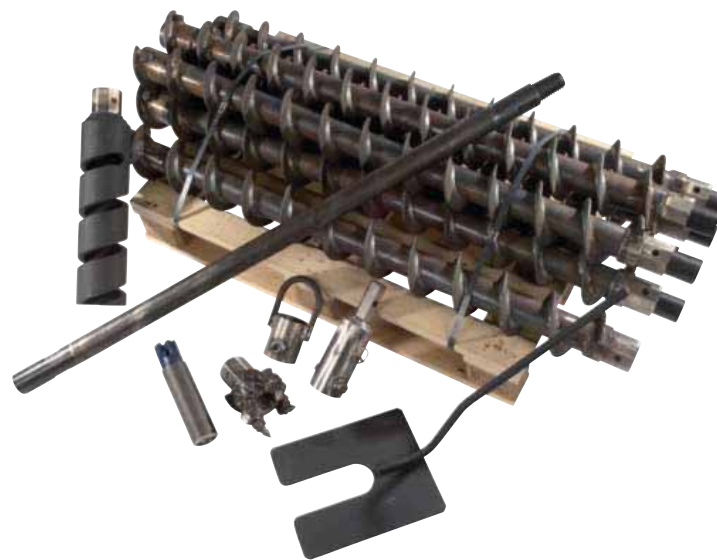
COMPOSITION OF THE SYSTEM

Designation	Dimensions in mm (Ø inside x Ø outside)			
	Ø 66 x 140	Ø 82 x 175	Ø 111 x 194	Ø 159 x 254
1 Driving head	F6 06614001	F6 08217501	F6 11119401	F6 15925401
2 Rod bolt	*	*	*	*
3 Rod x head adapter	F6 06614004	F6 08217504	F6 11119404	F6 15925404
4 Auger locking bolt	F6 06614010	F6 08217510	F6 11119410	F6 15925410
5 Hollow auger 1,5 m long	F6 06614002	F6 08217502	F6 11119402	F6 15925402
6 Rod Ø60 x 1.5m	K2 010006005	K2 010006005	K2 010006005	
6 Rod Ø76 x 2"3/8 Reg x 1.5m				K2 010237505
7 Plug adapter for pilot bit	F6 06614005	F6 08217505	F6 11119405	F6 15925405
8 Heavy duty cutter head bit	F6 06614003	F6 08217503	F6 11119403	F6 15925403
9 Pilot bit	Drag bit ø63,5 mm ID 01025001	Drag bit ø76 mm I5 010030001	Drag bit ø108 mm I5 010042501	Drag bit ø156 mm I5 010061251
10 Plug adapter for pilot bit	*	*	*	*
11 Finger bit	*	*	*	*
Left in hole bit (Option)	F6 06614007	F6 08217507	F6 11119407	F6 15925407

ACCESSORIES

Hoisting plug	F6 06614009	F6 08217509	F6 11119409	F6 15925409
Auger holder	F6 06614008	F6 08217508	F6 11119408	F6 15925408
Auger retriever	F6 06614011	F6 08217511	F6 11119411	F6 15925412

*Please, consult us.



INJECTION AUGERS

« JET AUGER » TYPE

INJECTION AUGER

Ø (mm)	Length 1.5 m Thread type	Reference
63	E	F2 01006302
102	AWJ	F2 01010003
114	60	F2 01011401
140	2"3/8 Reg	F2 01014001
178	2"3/8 Reg	F2 01017802
225	2"3/8 Reg	F2 01022504

Other diameters and lengths : please, consult us

2 WINGS BIT FOR INJECTION AUGER

Ø auger (mm)	Ø bit (mm)	Thread	Reference
63	63	E	F2 02006302

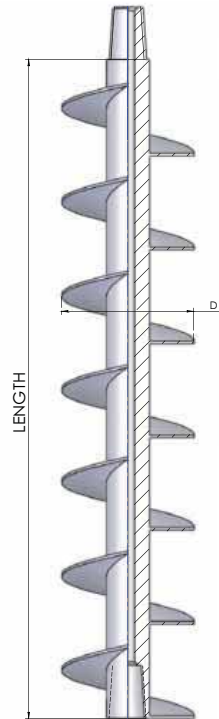
Other diameters : please, consult us

DP ROCK BIT

Ø auger (mm)	Ø bit (mm)	Thread	Reference
102	114	AWJ	F1 02090100
114	127	60	F1 02090103
140	152	2"3/8 Reg	F1 02090105
178	203	2"3/8 Reg	F1 02090110
225	254	2"3/8 Reg	F1 02090115
Small size inserts			F1 02090019
Large size inserts			F1 02090017

Other bits for injection augers : please, consult us

P.21 For cement grout injection, please consult our piston pumps.



RODS AND NIPPLES FOR TOP HAMMER ROTARY-PERCUSSION

APAGEO offers a full range of rods, bits, shanks, adaptors and couplings for top hammer rotary percussion. We have a large storage of material to meet your needs.

Other threads can be manufactured: ask us for rods and bits in R22, R25, T38, T45 and T51.

RODS

Rod length	Reference R 32 rod	Reference R 38 rod
0.60 m	H1 02003204	H1 02003810
0.91 m	H1 02003205	H1 02003803
1.22 m	H1 02003206	H1 02003804
1.52 m	H1 02003207	H1 02003801
1.83 m	H1 02003208	H1 02003805
2.43 m	H1 02003209	H1 02003806
3.05 m	H1 02003210	H1 02003807
Nipple	H1 02003211	H1 02003808
Wrench	H1 09003201	H1 09003803
Fishing tool bell type	M7 0100020	M7 01000032

Rod M x F on demand

ADAPTOR AND COUPLING

	R38 Fem	R38 Male
R32 Fem	H1 05003203	H1 05003803
R32 Male	H1 05003207	H1 05003807

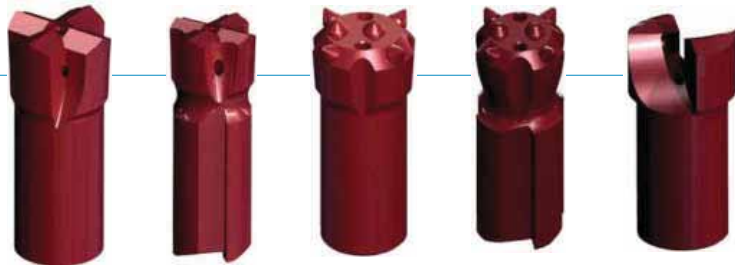


SPECIAL RODS AND SHANK

Designation	Reference
R38 M x M Rod guide- ø60 mm - lg 910 mm (Stabilisor for pressuremeter tests)	H1 02004001
R38 F x F wing guide sleeve ø60 mm - lg 190 mm	H4 01000770
Shank for APAFOR 48 / 51 - R38	U4 7400503
Shank BBC 100 - R32 - side inj.	H1 03003213
Shank BBC 120 - R32 - central inj.	H1 03003810
Shank for Sed 350	U0 1900502



ROTARY-PERCUSSION BITS



Thread	Ø (mm)	Cross bits	Retric cross bits	Button bits	Retric button bits	Rotary 2 wings bits
R 32	43	-	-	H1 01204401	-	-
or	45	H1 01104501	-	H1 01204501	-	-
1"1/4	48	H1 01104801	-	H1 01204801	-	-
	51	H1 01105100	H1 01105101	H1 01205101	H1 01205102	-
	57	H1 01105701	-	H1 01205701	H1 01205704	-
	60	H1 01106002	H1 01106001	H1 01206001	H1 01206002	-
	64	H1 01106404	H1 01106402	H1 01206401	H1 01206404	H1 01006301
	66	H1 01106601	H1 01106602	H1 01206601	H1 01206604	H1 01006601
	68	H1 01106801	H1 0116805	H1 01206803	H1 01206802	-
	70	H1 01107101	H1 0117104	H1 01207001	H1 01207005	-
	76	H1 01107601	H1 01107602	H1 01207601	H1 01207602	-
	89	H1 01108901	H1 01108902	H1 01208901	H1 01208902	-
	102	H1 01110203	H1 01110200	H1 01210201	H1 01210204	-
	115	H1 01111500	-	-	-	-
	127	-	-	H1 01212703	H1 01212704	-
R 38	57	H1 01105702	-	H1 01205703	-	-
or	64	H1 01106403	H1 01106405	H1 01206402	H1 01206403	H1 01006303
1"1/2	66	H1 01106603	H1 01106604	H1 01206602	H1 01206603	H1 01006602
	68	H1 01106802	H1 01106804	H1 01206800	H1 01206801	-
	70	H1 01107102	H1 01107103	H1 01207002	H1 01207003	-
	76	H1 01107603	H1 01107604	H1 01207603	H1 01207604	H1 01007601
	89	H1 01108903	H1 01108904	H1 01208903	H1 01208904	-
	102	H1 01110201	H1 01110202	H1 01210202	H1 01210203	-
	115	H1 01111501	H1 01111502	H1 01211501	H1 01211502	-
	127	H1 01112701	-	H1 01212701	H1 01212702	-
	152	-	-	H1 01215201	-	-

Please contact us for bits in R25, BT 38 (1"1/2), BT 45 (1"3/4), BT 51 (2").



DOWN THE HOLE HAMMERS AND BITS



APAGEO offers a full range of DTH hammers, as well as bits.

Technical specifications below will help you to choose the right equipment for boring.

For each hammer, we recommend specific bit diameter, but we can also provide larger ones.

Hammer	1"	2"	3"	4"	5"	6"	8"
Reference	H3 01001305	H3 01001306	H3 01120005	H3 01120010	H3 01120020	H3 01130006	H3 01130008
Shank type	BR1	BR2	DHD3.5	COP44/DHD340	COP54/DHD350	SD6	SD8
Thread	RD 40 Fem	RD 50 Fem	2"3/8Reg	2"3/8Reg	3"1/2 Reg	3"1/2Reg	4"1/2Reg
Length(mm)	724	828	930	1030	1170	1264	1458
Outer Ø (mm)	50	62	81	99	125	142	180
Weight (kg)	8	13	24.50	39.2	71.5	97.5	194
Bit Ø (mm)	60-66	70-76-80	90-105	105-135	135-155	155-205	195-330
Air pressure (bar)	7 to 20	7 to 17	5-25	5-25	5-25	5-25	5-25
Air consumption (m3/min)	1,1 to 5,6	2 to 6,8	5-12.5	6-15	8.7-23.40	10.6-28.5	11.4-29.7
Rotary speed (rpm)	20 to 30	20 to 30	20-30	25-40	20-30	15-25	15-20

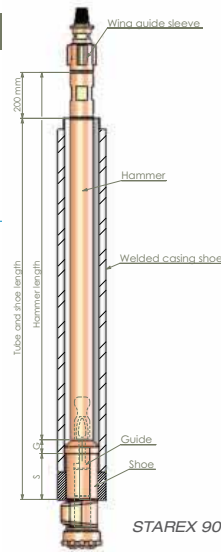
Shank bit Ø (mm)	1"	2"	3"	4"	5"	6"	8"
64	H3 02206401						
66	H3 02206601						
70		H3 02207001					
76		H3 02007601					
80		H3 02009501					
90			H3 012200090				
95			H3 02219501				
105			H3 01210501	H3 01220105			
115				H3 01220100			
127				H3 02012701			
140				H3 01220140	H3 01220200		
152				H3 02015201	H3 012215201	H3 01230504	
165					H3 012216500	H3 01230502	
178						H3 01230509	
190						H3 01230505	
203						H3 01230508	
216						H3 012 30506	
240							H3 01224001
254							H3 01230507

Other bits (other diameters and shank) are also available, please contact us.

The STAREX® is an overburden drilling system enabling simultaneous drilling and casing in different types of formations.

This system is made up of a guide, a reamer and a pilot bit. It is used to drill a hole slightly larger than the external diameter of the casing. This enables the casing tube to follow the pilot bit down the hole without rotation.

The Starex® series 76 and 90 casings are designed for simultaneous drilling and casing operated with top hammer. In the case of a DTH hammer-operated drilling, series 90 to 240 are to be used. On reaching the target depth, reverse rotation is applied which allows the eccentric reamer to turn in, thus reduced to its smallest diameter. It is then possible to pull up the drill string and leave the casing in place in the soil. Drilling can also continue in the available diameter at the foot of the casing.

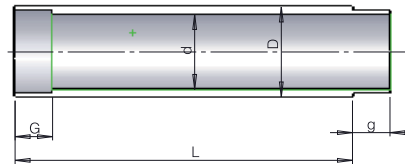


STAREX® CASINGS DIMENSIONS

Starex casing types	OD (mm)	Wall Thickness (mm)	ID (mm)	Thread	G	g
TH 76	88.9	5.5	77.8	Right	60/70	60/70
TH 90	114.3	6.35	101.5	TH Right / DTH Left	60/70	
DTH 90	114.3	6.35	101.5	Left	60/70	60/70
DTH 115	139.7	6.35	127	Left	60/70	60/70
DTH 140	173	8	157	Left	60/70	60/70
DTH 165	193.7	6.6	180.5	Left	60/70	60/70
DTH 190	219	7	205	Left	70	70
DTH 240	285	12	261	Left	120	120

Shoe welded casing length definition:
Length (LTS) = S + G + LM - 200 mm

S = Shoe total length (depending on model used)
G = Guide skirt length (manufacturer specifications)
LM = Hammer length (manufacturer specifications)



STAREX® TECHNICAL SPECIFICATIONS

Starex types	Ø pilot (mm)	Ø reamer (mm)	Connection thread	DTH hammer*	Suitable drill rods
TH 76	70	96	R38 female	-	Rod R38
TH 90	90	123	R38 female	-	Rod R38
DTH 90	90	123	DHD 3.5	3" - DHD 3.5	76/89
DTH 115	115	152	COP 44/ DHD 340	4" - COP 44 / DHD 340	89
DTH 140	140	181	DHD 350	5" - DHD 350	114
DTH 165	165	209	SD6	6" - SD6	114
DTH 190	190	237	SD6	6" - SD6	114
DTH 240	240	306,5	SD8	8" - SD8	114

*Adaptable on all our STAREX® tools



A complete STAREX® equipment is composed of:

- A discharge head allowing cuttings to flush out (Except TH Starex® 90)
- A welded casing shoe at the beginning. (available in length 1m, 2m or 3 meters, depending of the model)
- Casings with right hand thread for the TH method in ø76 and 90 mm and left hand thread for the DTH method, generally, ø90 to 240 mm (available in 1m, 1,5m, 2m et 3m)
- A wing guide sleeve (option) stabilizing the drill string.
- A STAREX® composed of a guide, a reamer and a pilot bit.
- A suitable DTH (for the DTH method)
- A drill string with suitable type and diameter (depending on the method chosen)
- An uncasing head to retrieve casings
- Eventually a coupling adaptor

STAREX® 76 AND 90 TOP HAMMER

Casing and bit	OD 88,9 / ID 77,8	OD 114,3 / ID 101,5
Casing 1,22 m length	H4 010007610	H4 0100905
Welded casing shoe	H4 01000767	H4 0100906
Spare shoe		H4 0100907
Driving head FxF R38	H4 01000769	-
Discharge head	H4 01000765	-
Adaptation sleeve head	H4 010007611	-
Wing guide sleeve	H4 01000770	H4 01000771
Brace	H4 01000764	-
Set of 3 washers	H4 01000768	-
Uncasing head	H4 01000766	H4 0100904
Compleat bit (guide, reamer, pilot bit)	H4 0100076	H4 010090
Guide	H4 01000761	H4 0100901
Reamer	H4 01000762	H4 0100902
Pilot bit	H4 01000763	H4 0100903

Other casing lengths, please consult us

p. 75 For drillpipes, please see rotary percussion drillpipes R38.

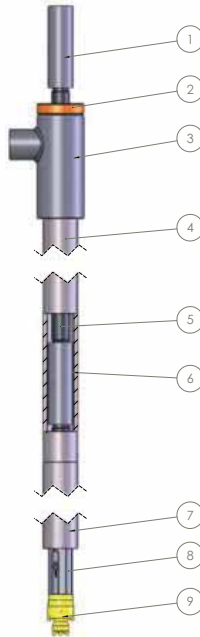
STAREX® 90 TO 240 DOWN THE HOLE HAMMER

Casing and bit	Starex 90 OD 114,3 ID 101,5	Starex 115 OD 139,7 ID 127,0	Starex 140 OD 173,0 ID 157,0	Starex 165 OD 193,7 ID 180,5	Starex 190 OD 219,0 ID 205,0	Starex 240 OD 285,0 ID 261,0
Casing 1m length	H4 01009008	H4 01001156	H4 01001406	H4 01001656	H4 01001906	H4 01002406
Welded casing shoe 1 m length	H4 01000905	H4 01001155	H4 01001405	H4 01001655	H4 01001905	H4 01002405
Spare shoe	H4 01000904	H4 01001154	H4 01001404	H4 01001654	H4 01001904	H4 01002404
Discharge head	H4 010009010	H4 01001157	H4 010014012	H4 010016512	H4 010019012	H4 010024012
Uncasing head	H4 010009011	H4 01001158	H4 010014013	H4 010016513	H4 010019013	H4 010024013
Complete bit (guide, reamer, pilot bit)	H4 0100090	H4 0100115	H4 0100140	H4 0100165	H4 0100190	H4 0100240
Guide	H4 01000901	H4 01001151	H4 01001401	H4 01001651	H4 01001901	H4 01002402
Reamer	H4 01000903	H4 01001152	H4 01001402	H4 01001652	H4 01001902	H4 01002401
Pilot bit	H4 01000902	H4 01001153	H4 01001403	H4 01001653	H4 01001903	H4 01002403
Kit with balls and pins	H4 0100908	H4 0100909	H4 0100910	H4 0100911	H4 0100912	H4 0100913

Other casing lengths, please consult us

p. 81 For drillpipes, please see friction welded drillpipes

Designation	Casing diameter : Ø in x Ø out (boring Ø) in mm		
	Ø 67 x 74 (86)	Ø 76.2 x 88.9 (101)	Ø 104 x 113 (125)
1 Driving nipple	H5 0067109	H5 0076109	H5 0100109
2 Driving ring	H5 0067101	H5 0076101	H5 0100101
3 Casing driving head	H5 0067102	H5 0076102	H5 0100102
4 Casing lg 1.22m	H5 0067105	H5 0076105	H5 0100105
5 R32 rod lg 1.22m	H1 02003206	-	-
5 R38 rod lg 1.22m	-	H1 02003804	H1 02003804
6 R32 nipple	H1 02003211	-	-
6 R38 nipple	-	H1 02003808	H1 02003808
7 Starting casing	H5 0067104	H5 0076104	H5 0100104
8 Bit adaptor	H5 0067106	H5 0076106	H5 0100106
9 STAR eccentric bit	H5 0067107	H5 0076107	H5 0100107
Driving head	H5 0067103	H5 0076103	H5 0100103
Lifting head	H5 0067108	H5 0076108	H5 0100108
R32 rod spanner	H1 09003201	-	-
R38 rod spanner	H1 09003803	-	H1 09003803



ROTARY INJECTION DRILLPIPES

Ø (mm)	Length - Reference					Nipple M x M	Ø (mm) nipple
	0,75 m	1,00 m	1,50 m	2,00 m	3,00 m		
E* (ø32 x 16)	-	K1 010000507	K1 010000506	K1 010000505	-	K1 020000502	32 x 9
42 (ø42 x 32)	K1 010004205	K1 010004202	K1 010004203	-	K1 010004204	K1 020004201	42 x 22
44 M (ø44 x 34)	-	K1 010004403	K1 010004404	-	-	-	-
44 Renf (ø44,5 x 34)	-	K1 010004401	K1 010004402	-	-	K1 020004401	44 x 25
50* (ø50 x 37)	K1 010005005	K1 010005002	K1 010005003	K1 01005006	K1 010005004	K1 020005001	50 x 22

*with unscrewing flats

**FRICTION WELDED DRILLPIPES
WITH 4 FLATS - WALL THICKNESS 6.35 MM**

Ø (mm)	Length - Reference					Thread
	0,75 m	1,00 m	1,50 m	2,00 m	3,00 m	
60 (ø60,3 x 47,6)	K2 010006003	K2 010006004	K2 010006005	K2 010006006	K2 010006007	60
PR ø 76	K2 010237503	K2 010237504	K2 010237505	K2 010237506	K2 010237507	2" 3/8 API REG
PR ø 89	K2 010237509	K2 010237510	K2 010237511	K2 010237512	K2 010237513	2" 3/8 API REG
PR ø 114	K2 010350002	K2 010350003	K2 010350004	K2 010350005	K2 010350006	3" 1/2 API REG

Please consult us for any other length.

Thickness 4,0 or 8,8 mm also available.

**HAUSHERR TYPE DRILLPIPES
LG 3,00 M WITH SLOT - WALL THICKNESS 8,8 MM**

Ø (mm)	Reference	Thread
76	K2 020076300	Hausherr / 2"3/8
88,9	K2 020088300	2"3/8 API REG
114	K2 020114300	3"1/2 API REG



ACCESSORIES FOR DRILLPIPES

HOISTING PLUG - FISHING BELL AND TAP

Rod type	Lifting swivel	Fishing tap	Fishing bell
E	M5 0100001	M6 0100001	M7 0100001
42	M5 0100011	M6 0100003	M7 0100002
44 Ménard	M5 0100011	M6 0100003	M7 0100002
44 reinforced 44,5	M5 0100011	M6 0100003	M7 0100002
50	M5 0100012	M6 0100004	M7 0100003
60	M5 0100013	M6 0100005	M7 0100004
PR 76 - 2"3/8 Reg	M5 0100045	M6 0100199	M7 0100022
PR 89 - 2"3/8 Reg	M5 0100045	M6 0100200	M7 0100023

WATER SWIVEL

Bottom thread	42		50		60		2"3/8 Reg	
Top adaptor								
Hex 29	U0 7702002	U0 7702008						
Hex 41	U0 7702007	U0 7702003	U0 7702004			U0 7702001		
2"3/8 Reg	U0 7702010	U0 7702011	U0 7702012			U0 7702013		

RODS AND CONES FOR DYNAMIC PENETROMETER





APAGEO offers a wide range of rods and cones (fixed or lost cones) for dynamic penetrometer tests, as well as hammering of windowless sampler.

Rod Ø (mm)	Lg 0,5 m	Lg 1,0 m	Nipple	Driving head
22 - full and treated rod	-	F5 02002201	-	D4 1902002
32 - DPSH (without nipple)	-	D3 1902002	D3 1900701	D3 1902001
32 - DPSH (with nipple)	-	D3 1902010	-	D3 1902001
42 - PDA	D2 1902000	D2 1902001	-	A9 0900027

Our rods are marked every 10 or 20 cm. Driving rods are also available in BW, BSW, SPT, CPT type ø36, as well as in other lengths. Please consult us.

Cones	Threads	Fixed cone	Lost cone	Lost cone holder
5 cm ²	Rod Ø 22	D4 19016040	-	-
10 cm ²	Rod Ø 22	D4 1901602	D4 1901603	D4 1901801
20 cm ²	DPSH rod - Ø 32	D3 1901605	D4 1901606	D3 1902001
30 cm ²	PDA rod - Ø 42	D2 1901601	D2 1901602	D2 1901604

*Also available with a tail ref D4 1901603

-  p. 56 Light dynamic penetrometer
-  p. 11 Heavy dynamic penetrometer
-  p. 108 Semi-automatic hammering system for SPT/PDB
-  p. 107 Soil sampler



COUPLINGS AND ADAPTATORS



Couplings and adaptors are manufactured in hardened steel, stabilized at 85 to 100 kg/mm².

We have an important storage of reductions, couplings, shank adaptors, and we can manufacture them according to your specific needs : with flats, special lengths, special threads, ball valves, etc.
Couplings listed hereafter are some of the most common ones.

DRILLING COUPLING SLEEVE

Threads	60 Fem	2"3/8 Reg Fem	2"3/8 IF Fem	2"7/8 Reg Fem	3"1/2 Reg Fem	4"1/2 Reg Fem	6"5/8 Reg Fem
N Rod Fem	E2 031006002	E2 041237501	E2 044237518	E2 045287503	E2 043330022	E2 044450013	E2 044662509
50 Fem	E2 033006003	E2 043237502	E2 044237517	E2 045217503	E2 043350009	E2 044450012	E2 044662508
60 Fem	E2 033006001	E2 034006001	E2 044237515	E2 034006002	E2 034006003	E2 034006004	E2 044662507
2"3/8 Reg Fem	E2 034006001	E2 044237503	E2 044237506	E2 044287501	E2 044350001	E2 044450001	E2 044662501
2"3/8 Reg Male	E4 034006001	E3 044237506	E3 044237508	E3 044237503	E3 044237509	E4 054122380	E4 054122379
2"7/8 Reg Fem	E2 034006002	E2 044287501	E2 044287502	E2 044287505	E2 044350004	E2 044450004	E2 044662502
3"1/2 Reg Fem	E2 034006003	E2 044350001	E2 044350003	E2 044350004	E2 044350006	E2 044450005	E2 044662503
4"1/2 Reg Fem	E2 034006004	E2 044450001	E2 044450003	E2 044450004	E2 044450005	E2 044450007	E2 044662505
6"5/8 Reg Fem	E2 044662507	E2 044662501	E2 044662500	E2 044662502	E2 044662503	E2 044662505	E2 044662506
Ball valve							
N Rod Fem	E2 031006003	E2 041237502	-	-	-	-	-
2"3/8 Reg Fem	E2 034006007	E2 044237505	-	E2 044287503	E2 044350002	E2 044450002	-

GEOTECHNICAL COUPLING SLEEVE

Threads	2"3/8 Reg M	60 Male	50 Male	42 Male	N Rod Fem	A Rod Fem	E Fem
2"3/8 Reg Male	E1 044237510	E1 034006001	E1 034006006	E1 034006004	E3 041237500	E3 041237499	E3 041237498
60 Male	E1 034006001	E1 033006001	E1 033006002	E3 055004205	E3 030006001	E3 031005999	E3 031005998
60 Fem	E4 034006001	E3 033006003	E4 033006002	E4 033006004	E2 031006002	E2 031006004	E2 031005997
50 Fem	E3 043237500	E3 033006007	E3 033005001	E3 033004201	E2 013000801	E2 013000401	E2 031005001
42 Fem	E3 043237502	E3 033006006	E4 033004201	E3 033004242	E2 031004202	E2 031004201	E2 031004203

RIGS COUPLING WITH FLATS

Threads	42 Male	50 Male	60 Male	Hex 21 Fem	Hex 29 Fem	Hex 41 Fem	2"3/8 Reg M
2"3/8 Reg Fem	E3 033004200	E4 043237500	E3 034006009	E2 080237503	E2 080237502	E2 080237501	E3 044237516
2"3/8 IF Fem	E3 033004199	E4 043237499	E3 034006006	E2 044237515	E2 044237517	E2 044237516	E3 044237517
2"3/8 Reg Male	E1 034006000	E1 034005999	E1 034005998	E3 080237501	E3 080237503	E3 080237502	E1 044237505
R66 Fem	E3 033004198	E1 033004197	E3 035006004	H1 05006599	H1 05006600	H1 05006601	E1 012006008
Sed 350 (38) F	E4 033006005	U01901802	E3 035006003	--E1 045237506			
R51 Fem	E4 033006006	E3 033004196	E3 035006005	--E1 045237507			
H55 Fem	Left thread x R38 Fem = H1 05003220			Right thread x 2"3/8 Reg M = E3 080237504			

These tricone bits are manufactured in the USA, coming directly from the producer warehouse.

STEEL TOOTH TRICONE BITS

TUNGSTENE CARBIDE INSERT TRICONE BITS

Diameter and thread			Ground hardness / IADC code		Ground hardness / IADC	
Ø inch	Ø mm	Thread	Hard / IADC 321	Medium / IADC 211	Medium / IADC 631	
2"1/2	63.50	N Rod	I1 040025001 (IADC 311)	I1 040025002	I2 050025004 (IADC 733/633)	
2"5/8	66.67		I1 040026255 (IADC 311)	I1 040026251	I2 050021252 (IADC 733/633)	
2"7/8	73.03		-	I1 040028751		
2"15/16	74.61		I1 040029375	I1 040029371	I2 050029371	
3"	76.20		I1 040030005	I1 040030001	I2 050030001	
3"1/8	79.38		I1 04003405	I1 04003401	I2 050031251	
3"1/4	82.55		I1 04003406	I1 04003402	I2 050032001	
3"3/8	85.72		I1 04003407	I1 04003403	I2 050034001	
3"1/2	88.90		I1 040035005	I1 040035001	I2 050033001	
3"3/8	85.72		I1 04003408	I1 04003405	I2 050034002	
3" 1/4	82.55		-	-	I2 050032002	
3"1/2	88.90		I1 040035006	I1 040035002	I2 050033002	
3"5/8	92.08		I1 040036255	I1 040036251	I2 050036251	
3"3/4	95.25		I1 040037505	I1 040037501	I2 050037501	
3"7/8	98.43		2"3/8 R	I1 040038755	I1 040038752	I2 050038751
4"	101.60		I1 040040005	I1 040040001	I2 050041100	
4"1/8	104.78	I1 040041255	I1 040041251	I2 050041202		
4"1/4	107.95	I1 040042505	I1 040042501	I2 050042501		
4"3/8	111.13	I1 040043755	I1 040043751	I2 050043751		
4"1/2	114.30	I1 040045005	I1 040045001	I2 050045001		



STEEL TOOTH TRICONE BITS

TUNGSTENE CARBIDE INSERT TRICONE BITS

Diameter and thread			Ground hardness / IADC code		Ground hardness / code IADC	
Ø inch	Ø mm	Fil.	Hard / IADC 321	Medium / IADC 211	Medium / IADC 631	
4"5/8	117.48	2"7/8 R	I1 040046255	I1 040046251	I2 050046251	
4"3/4	120.65		I1 040047505	I1 040047501	I2 050047501	
4"7/8	123.83		I1 040048755	I1 040048752	I2 050048701	
5"	127.00		I1 040050005	I1 040050001	I2 050050001	
5"1/8	130.18		I1 040051255	I1 040051251	I2 050051201	
5"1/4	133.35		I1 040052505	I1 040052501	I2 050052501	
5"1/2	139.70		I1 040055005	I1 040055001	I2 050055001	
5"5/8	142.88		-	I1 040056251	I2 050056251	
5"3/4	146.05		I1 040057505	I1 040057501	I2 050057501	
5"7/8	149.23		I1 040056255	I1 040056252	I2 050058701	
6"	152.40		I1 040060005	I1 040060001	I2 050060000	
6"1/8	155.58		3"1/2 R	I1 040061255	I1 040061251	I2 050061251
6"1/4	158.75		I1 040062505	I1 040062501	I2 050062501	
6"1/2	165.10		I1 040065005	I1 040065001	I2 050065001	
6"5/8	168.27		I1 040066255	I1 040066251	I2 050066251	
6"3/4	171.45		I1 040067505	I1 040067501	I2 050067501	
7"3/8	187.33	I1 040073755	I1 040073751	I2 050073751		

Other diameters and IADC codes : please, consult us.

Possibility to repack tricones

Varel tricones are also available, please ask us.

On request, we can also supply sealed bearings tricones.



BICONE X A ROD THREAD

Ø	Reference
2"3/8	I4 010029368
2"1/2	I4 010029369
2"5/8	I4 010029370

DRAG BITS



3-WAY DRAG BITS

STEP TYPE

CHEVRON TYPE

Ø inches	Ø mm	A / N ROD	Thread		HARD FORMATION WINGS BIT
			2"3/8	3"1/2	
2"3/8	60.32	-	-	-	ID 01023701 (A)
2"1/2	63.50	-	-	-	ID 01025001 (A)
2"5/8	66.67	-	-	-	ID 01026201 (A)
3"	76.20	I5 010030001 (N)	-	-	I6 010030001
3"1/4	82.50	I5 010032501 (N)	-	-	I6 010032501
3"1/2	88.90	I5 010035001 (N)	I5 010035002	-	-
3"3/4	95.20	-	I5 010037501	-	-
3"7/8	98.43	-	I5 010038751	-	I6 010038751
4"	101.60	-	I5 010040001	-	I6 010040001
4"1/4	107.95	-	I5 010042501	-	I6 010042501
4"3/8	111.16	-	I5 010043751	-	I6 010043751
4"1/2	114.30	-	I5 010045001	-	I6 010045001
4"3/4	120.65	-	I5 010047501	-	I6 010047501
5"	127.00	-	I5 010050001	-	I6 010050001
5"1/8	130.18	-	I5 010051251	-	I6 010051251
5"1/4	133.35	-	I5 010052501	-	-
5"3/8	136.53	-	-	-	I6 010053751
5"1/2	139.70	-	I5 010055001	-	-
5"5/8	142.88	-	I5 010053251	I5 010053252	I6 010053251
5"3/4	146.05	-	I5 010057501	I5 010057502	-
5"7/8	149.23	-	I5 010058751	I5 010058752	I6 010058752
6"	152.40	-	I5 010060001	I5 010060002	I6 010060001
6"1/8	155.58	-	I5 010061251	I5 010061252	I6 010061251
6"1/4	158.75	-	I5 010062501	I5 010062502	I6 010062501
6"1/2	165.10	-	I5 010065001	I5 010065002	I6 010065001
6"3/4	171.45	-	I5 010067501	I5 010067502	I6 010067501

3-WAY DRAG BITS

STEP TYPE

CHEVRON TYPE

Ø inches	Ø mm	A / N ROD	Thread		HARD FORMATION WINGS BIT
			2"3/8	3"1/2	
7"	177.80	-	-	I5 010070001	-
7"1/8	180.97	-	-	I5 010071251	-
7"3/8	187.33	-	-	I5 010073751	-
7"1/2	190.50	-	-	I5 010075001	-
7"5/8	193.68	-	-	I5 010076251	I6 010076251
7"7/8	200.03	-	-	I5 010078751	-
8"	203.20	-	-	I5 010080001	-
8"1/8	206.38	-	-	I5 010081251	-
8"1/2	215.90	-	-	I5 010085001	-
8"3/4	222.25	-	-	I5 010087501	-
10" (1)	254.00	-	-	I5 010100001	-
10"5/8(1)	269.90	-	-	I5 010106251	-
12"1/4(1)	311.10	-	-	I5 010121251	-

Large diameters also available : please consult us

TUNGSTENE AND MINING BITS



4-WAY DRAG BITS

Ø inches	Ø (mm)	Thread	Reference
3"	76.20	N	I4 010030001
3"1/8	79.38	N	I4 010031251
3"1/4	82.50	N	I4 010032501
3"3/8	85.70	N	*
3"1/2	88.90	N	I4 010035001
3"3/4	95.20	N	I4 010037501
3"7/8	98.43	2" 3/8	I4 010038751
4"1/4	107.95	2" 3/8	*
4"1/2	114.30	2" 3/8	I4 010045001
4"3/4	120.65	2" 3/8	I4 010047501

TUNGSTENE BITS, PCD BITS AND MINING TOOLS

Available on request

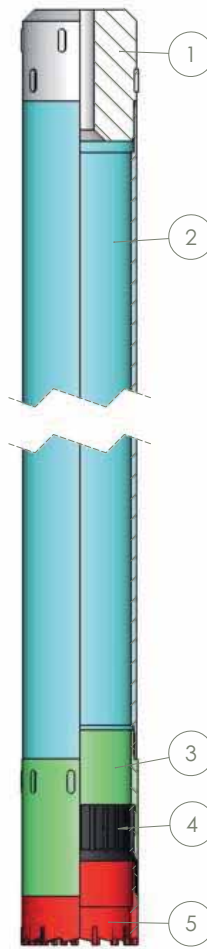


SINGLE TUBE CORE BARREL

B - type

MARK

1	Head coupling
2	Core tube
3	TC reaming shell
4	Core lifter
5	Thread protector



DIMENSIONS AND WEIGHT

Ø	Lg 0.75 m		Lg 1.50 m		Lg 3.00 m		Core bit (mm)		Head thread
	Length (m)	weight (kg)	Length (m)	weight (kg)	Length (m)	weight (kg)	inner Ø	outer Ø	
46	0.91	4.0	1.66	6.7	3.16	12.0	32	46	42
56	0.94	5.3	1.69	8.6	3.19	15.2	42	56	42
66	0.95	6.7	1.70	10.6	3.20	18.4	52	66	50
76	0.97	8.8	1.72	13.6	3.22	23.0	62	76	50 / 60
86	0.98	10.5	1.74	15.9	3.23	26.7	72	86	60
101	0.99	15.0	1.74	23.0	3.24	38.9	87	101	60 / 2*3/8 Reg
116	0.99	19.0	1.74	28.3	3.24	47.0	102	116	60 / 2*3/8 Reg
131	0.99	22.5	1.74	32.9	3.24	53.6	117	131	2*3/8 Reg
146	0.99	26.8	1.74	38.4	3.24	61.5	132	146	2*3/8 Reg

SINGLE TUBE CORE BARREL

B - type

CORE BARREL

Ø	Lg 0.75 m	Lg 1.50 m	Lg 3.00 m
46	WA 0100136	WA 0100147	WA 0100158
56	WA 0100137	WA 0100148	WA 0100159
66	WA 0100138	WA 0100149	WA 0100160
76	WA 0100139	WA 0100150	WA 0100161
86	WA 0100140	WA 0100151	WA 0100162
101	WA 0100141	WA 0100152	WA 0100163
116	WA 0100142	WA 0100153	WA 0100164
131	WA 0100143	WA 0100154	WA 0100165
146	WA 0100144	WA 0100155	WA 0100166

Useful length of the core - please precise the head thread

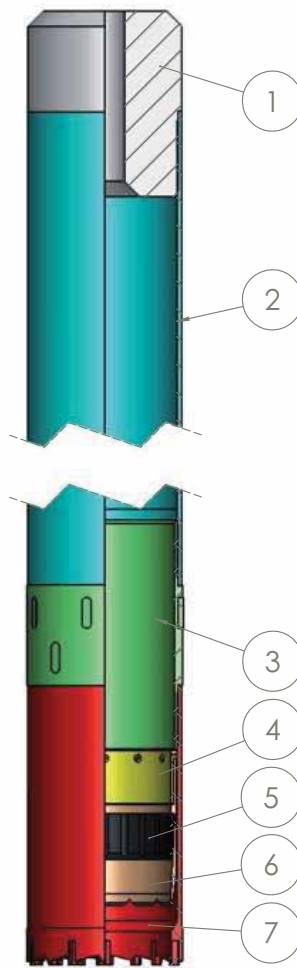
SPARE PARTS

Ø	Head	Tube Lg 0.75 m	Tube Lg 1.50 m	Tube Lg 3.00 m	Reaming shell
46	WA 0200062	WA 0300103	WA 0300114	WA 0300125	WA 0400014
56	WA 0200063	WA 0300104	WA 0300115	WA 0300126	WA 0400015
66	WA 0200064	WA 0300105	WA 0300116	WA 0300127	WA 0400016
76	WA 0200065	WA 0300106	WA 0300117	WA 0300128	WA 0400017
86	WA 0200066	WA 0300107	WA 0300118	WA 0300129	WA 0400018
101	WA 0200067	WA 0300108	WA 0300119	WA 0300130	WA 0400019
116	WA 0200068	WA 0300109	WA 0300120	WA 0300131	WA 0400020
131	WA 0200069	WA 0300110	WA 0300121	WA 0300132	WA 0400021
146	WA 0200070	WA 0300111	WA 0300122	WA 0300133	WA 0400022

Ø	Core lifter	Basket core lifter	Thread protector	Casing head for sediment
46	WA 0500026	WA 0500035	WA 0600091	-
56	WA 0500027	WA 0500036	WA 0600092	-
66	WA 0500028	WA 0500037	WA 0600093	WA 0200082
76	WA 0500029	WA 0500038	WA 0600094	WA 0200083
86	WA 0500030	WA 0500039	WA 0600095	WA 0200084
101	WA 0500031	WA 0500040	WA 0600096	WA 0200085
116	WA 0500032	WA 0500041	WA 0600097	WA 0200086
131	WA 0500033	WA 0500042	WA 0600098	WA 0200087
146	WA 0500034	WA 0500043	WA 0600099	WA 0200088

SINGLE TUBE CORE BARREL

T - type



MARK

1	Head coupling
2	Core tube
3	TC reaming shell
4	Spacer
5	Core lifter
6	Core lifter case
7	Thread protector

DIMENSIONS AND WEIGHT

Ø	Lg 0.75 m		Lg 1.50 m		Lg 3.00 m		Core bit (mm)		Head thread
	Length (m)	weight (kg)	Length (m)	weight (kg)	Length (m)	weight (kg)	inner Ø	outer Ø	
46	0.99	4.1	1.74	6.1	3.24	9.6	32	46	42
56	0.99	5.8	1.74	8.5	2.24	14.0	42	56	42
66	1.02	7.0	1.76	10.2	3.26	16.7	52	66	50
76	1.02	8.6	1.77	12.1	3.27	19.1	62	76	50 / 60
86	1.02	10.2	1.77	14.2	3.27	22.7	72	86	60
101	1.16	15.3	1.91	21.3	3.41	32.3	84	101	60 / 2*3/8

SINGLE TUBE CORE BARREL

T - type

CORE BARREL

Ø	Lg 0.75 m	Lg 1.50 m	Lg 3.00 m
46	WE 0110104	WE 0110112	WE 0110120
56	WE 0110105	WE 0110113	WE 0110121
66	WE 0110106	WE 0110114	WE 0110122
76	WE 0110107	WE 0110115	WE 0110123
86	WE 0110108	WE 0110116	WE 0110124
101	WE 0110109	WE 0110117	WE 0110125

Useful length of the core - please precise the head thread

SPARE PARTS

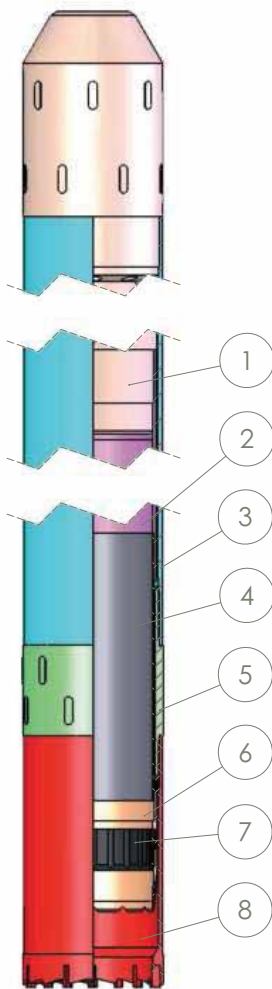
Ø	Head	Outer tube			Reaming shell
		Lg 0.75 m	Lg 1.50 m	Lg 3.00 m	
46	WE 0210064	WE 0310080	WE 0300243	WE 0300251	WE 0400011
56	WE 0210065	WE 0310081	WE 0300244	WE 0300252	WE 0400012
66	WE 0210066	WE 0310082	WE 0300245	WE 0300253	WE 0400013
76	WE 0210067	WE 0310083	WE 0300246	WE 0300254	WE 0400014
86	WE 0210068	WE 0310084	WE 0300247	WE 0300255	WE 0400015
101	WE 0210069	WE 0310085	WE 0300248	WE 0300256	WE 0400016

Ø	Spacer	Core lifter	Basket core lifter	Core lifter case	Thread protector
56	WE 0510073	WE 0500030	WE 0500044	WE 0500039	WE 0600292
66	WE 0510074	WE 0500031	WE 0500045	WE 0500040	WE 0600293
76	WE 0510075	WE 0500032	WE 0500046	WE 0500041	WE 0600294
86	WE 0510076	WE 0500033	WE 0500047	WE 0500042	WE 0600295
101	WE 0510077	WE 0500034	WE 0500048	WE 0500043	WE 0600296



DOUBLE TUBE CORE BARREL

T2 - type



MARK

1	Head assembly
2	Inner tube
3	Outer tube
4	Extension tube
5	TC reaming shell
6	Core lifter case
7	Core lifter
8	Thread protector

DIMENSIONS AND WEIGHT

Ø	Lg 1.50 m		Lg 3.00 m		Core bit (mm)		Head thread
	Length (m)	weight (kg)	Length (m)	weight (kg)	inner Ø	outer Ø	
46	1.77	10.5	3.27	17.0	32	46	42
56	1.77	13.7	3.27	22.2	42	56	42
66	1.85	17.1	3.35	27.6	52	66	50
76	1.89	21.2	3.39	33.2	62	76	50 / 60
86	1.93	24.4	3.43	37.9	72	86	60
101	2.05	49.0	3.55	68.0	84	101	60 / 2"3/8

DOUBLE TUBE CORE BARREL

T2 - type

CORE BARREL

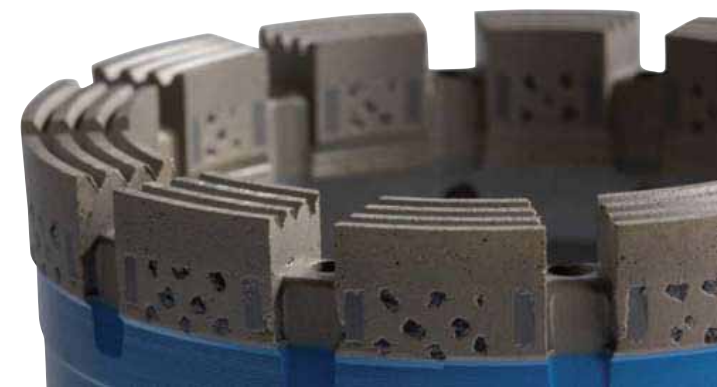
Ø	Lg 0.75 m	Lg 1.50 m	Core extractor
46	WE 0120275	WE 0120283	WE 0900235
56	WE 0120276	WE 0120284	WE 0900236
66	WE 0120277	WE 0120285	WE 0900237
76	WE 0120278	WE 0120286	WE 0900238
86	WE 0120279	WE 0120287	WE 0900239
101	WE 0120280	WE 0120288	WE 0900240

Useful length of the core - please precise the head thread

SPARE PARTS

Ø	Head	Outer tube		Inner tube		Extension tube
		Lg 1.50 m	Lg 3.00 m	Lg 1.50 m	Lg 3.00 m	
46	WE 0220136	WE 0300243	WE 0300251	WE 0320259	WE 0320267	WE 0320047
56	WE 0220137	WE 0300244	WE 0300252	WE 0320260	WE 0320268	WE 0320048
66	WE 0220138	WE 0300245	WE 0300253	WE 0320261	WE 0320269	WE 0320049
76	WE 0220139	WE 0300246	WE 0300254	WE 0320262	WE 0320270	WE 0320050
86	WE 0220140	WE 0300247	WE 0300255	WE 0320263	WE 0320271	WE 0320051
101	WE 0220141	WE 0300248	WE 0300256	WE 0320264	WE 0320272	WE 0320052

Ø	Core lifter case	Core lifter	Basket core lifter	TC reaming shell	Thread protector
46	WE 0500038	WE 0500029	WE 0500036	WE 0400011	WE 0600291
56	WE 0500039	WE 0500030	WE 0500044	WE 0400012	WE 0600292
66	WE 0500040	WE 0500031	WE 0500045	WE 0400013	WE 0600293
76	WE 0500041	WE 0500032	WE 0500046	WE 0400014	WE 0600294
86	WE 0500042	WE 0500033	WE 0500047	WE 0400015	WE 0600295
101	WE 0500043	WE 0500034	WE 0500048	WE 0400016	WE 0600296

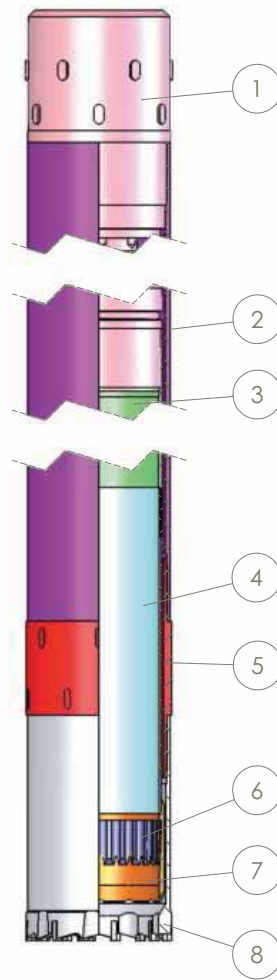


DOUBLE TUBE CORE BARREL

T6 - type

MARK

1	Head assembly
2	Outer tube
3	Inner tube
4	Extension tube
5	TC reaming shell
6	Core lifter
7	Core lifter case
8	Thread protector



DIMENSIONS AND WEIGHT

Ø	Lg 1.50 m		Lg 3.00 m		Core bit (mm)		Head thread
	Length (m)	weight (kg)	Length (m)	weight (kg)	Ø int	Ø ext	
76	2,03	28.0	3,53	47.0	57	76	50 / 60
86	2,04	33.0	3,54	53.0	67	86	60
101	2,14	46.0	3,64	69.0	79	101	60 / 2*3/8
116	2,09	60.0	3,59	85.0	94	116	60 / 2*3/8
131	2,09	70.0	3,59	105.0	108	131	2*3/8 Reg
146	2,09	93.0	3,59	128.0	123	146	2*3/8 Reg

DOUBLE TUBE CORE BARREL

T6 - type

CORE BARREL

Ø	Lg 1.50 m	Lg 3.00 m
76	WF 0100125	WF 0100133
86	WF 0100126	WF 0100134
101	WF 0100127	WF 0100135
116	WF 0100128	WF 0100136
131	WF 0100129	WF 0100137
146	WF 0100130	WF 0100138

Useful length of the core - please precise the head thread



SPARE PARTS

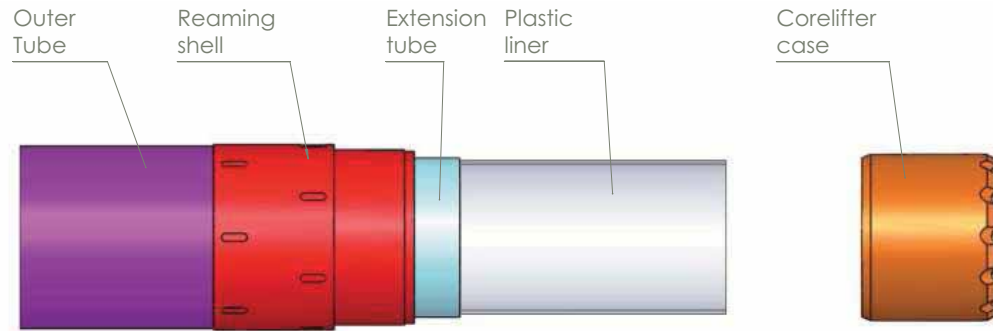
Ø	Head	Outer tube		Inner tube		Extension tube
		Lg 1.50 m	Lg 3.00 m	Lg 1.50 m	Lg 3.00 m	
76	WF 0200068	WF 0300093	WF 0300101	WF 0300109	WF 0300117	WITHOUT
86	WF 0200069	WF 0300094	WF 0300102	WF 0300110	WF 0300118	WITHOUT
101	WF 0200070	WF 0300095	WF 0300103	WF 0300111	WF 0300119	WITHOUT
116	WF 0200071	WF 0300096	WF 0300104	WF 0300112	WF 0300120	WF 0300088
131	WF 0200072	WF 0300097	WF 0300105	WF 0300113	WF 0300121	WF 0300089
146	WF 0200073	WF 0300098	WF 0300106	WF 0300114	WF 0300122	WF 0300090

Ø	TC reaming shell	Core lifter case	Core lifter	Basket core lifter	Thread protector
76	WF 0400011	WF 0500036	WF 0500020	WF 0500042	WF 0600052
86	WF 0400012	WF 0500037	WF 0500021	WF 0500043	WF 0600053
101	WF 0400013	WF 0500038	WF 0500022	WF 0500044	WF 0600054
116	WF 0400014	WF 0500039	WF 0500023	WF 0500045	WF 0600055
131	WF 0400015	WF 0500040	WF 0500024	WF 0500046	WF 0600056
146	WF 0400016	WF 0500041	WF 0500025	WF 0500047	WF 0600057

TRIPLEX CORE BARREL

T6 - type

Using a plastic liner within the T6 double core barrel makes easier the extraction of perfect core. A standard T6 core barrel can easily be changed into a triplex core barrel by switching the core lifter, the core lifter case and the core bit.



TRIPLEX T6

Ø	Core barrel		Core lifter case	Core lifter	Core bit (mm)	
	1.50 m	3.00 m			Ø int	Ø ext
101	WF 0100139	WF 0100145	WF 0500202	WF 0500204	76	101
116	WF 0100140	WF 0100143	WF 0500212	WF 0500225	90	116
131	WF 0100141	WF 0100144	WF 0500222	WF 0500223	104	131
146	WF 0100146	WF 0100142	WF 0503041	WF 0503025	120	146

Ø	Basket core lifter	Plastic liner		Plastic liner dimension (mm)	
		1.50 m	3.00 m	inner Ø	outer Ø
101	WF 0500206	WF 0300240	WF 0300203	77	80
116	WF 0500207	WF 0300230	WF 0300216	91	94
131	WF 0500208	WF 0300242	WF 0300246	106	109
146	WF 0500209	WF 0300243	WF 0300247	121	124

Other Triples core barrel, please consult us.

OTHER CORE BARREL

DOUBLE TUBE CORE BARREL - T6S TYPE

Ø	Lg 1.50 m		Core bit (mm)		Reference
	Length (m)	weight (kg)	inner Ø	outer Ø	
76	2.11	28.0	48	76	WG 0100010
86	2.12	33.0	58	86	WG 0100011
101	2.22	46.0	72	101	WG 0100012
116	2.20	60.0	86	116	WG 0100013
131	2.20	70.0	101	131	WG 0100014
146	2.20	93.0	116	146	WG 0100015

Please, contact us for spare parts.

DOUBLE TUBE CORE BARREL - K2 TYPE

Ø	Lg 1.50 m		Lg 3.00 m		Core bit (mm)		Reference	
	Length (m)	weight (kg)	Length (m)	weight (kg)	inner Ø	outer Ø	1.50 m	3.00 m
76	2.16	32.0	3.66	49.0	48	76	WC 0100261	WC 0100270
86	2.16	40.0	3.66	60.0	58	86	WC 0100262	WC 0100271
96	2.14	50.0	3.64	75.0	67	96	WC 0100263	WC 0100272
101	2.15	55.0	3.65	82.0	72	101	WC 0100264	WC 0100273
116	2.18	69.0	3.68	104.0	86	116	WC 0100265	WC 0100274
131	2.13	87.0	3.63	126.0	98	131	WC 0100266	WC 0100275
146	2.21	104.0	3.71	148.0	115	146	WC 0100267	WC 0100276

Please, contact us for spare parts.



TUNGSTEN CARBIDE BITS (TCI)

TUNGSTEN CARBIDE BITS (TCI)

CORE BITS AND REAMING SHELLS

Type and diameter	TC core bit	Carbotec core bit	TC reaming
B 46	WA 0600002	WA 0600169	WA 0400014
B 56	WA 0600003	WA 0600170	WA 0400015
B 66	WA 0600004	WA 0600171	WA 0400016
B 76	WA 0600005	WA 0600172	WA 0400017
B 86	WA 0600006	WA 0600173	WA 0400018
B 101	WA 0600007	WA 0600174	WA 0400019
B 116	WA 0600008	WA 0600175	WA 0400020
B 131	WA 0600009	WA 0600176	WA 0400021
B 146	WA 0600010	WA 0600177	WA 0400022
TT 46	<i>Please consult us</i>		
TT 56			
T2 46	WE 0600002	WE 0600056	WE 0400011
T2 56	WE 0600003	WE 0600057	WE 0400012
T2 66	WE 0600004	WE 0600058	WE 0400013
T2 76	WE 0600005	WE 0600059	WE 0400014
T2 86	WE 0600006	WE 0600060	WE 0400015
T2 101	WE 0600007	WE 0600061	WE 0400016
T6 76	WF 0600002	WF 0600028	WF 0400011
T6 86	WF 0600003	WF 0600029	WF 0400012
T6 101	WF 0600004	WF 0600030	WF 0400013
T6 116	WF 0600005	WF 0600031	WF 0400014
T6 131	WF 0600006	WF 0600032	WF 0400015
T6 146	WF 0600007	WF 0600033	WF 0400016
T6S 76	WG 0600002	WG 0600028	
T6S 86	WG 0600003	WG 0600029	
T6S 101	WG 0600004	WG 0600030	
T6S 116	WG 0600005	WG 0600031	
T6S 131	WG 0600006	WG 0600032	
T6S 146	WG 0600007	WG 0600033	
TRI 101	WF 0600201	WF 0600205	
TRI 116	WF 0600211	WF 0600215	
TRI 131	WF 0603006	WF 0600220	
TRI 146	WF 0603007	WF 0603010	

CORE BITS AND REAMING SHELLS

Type and diameter	TC core bit	Carbotec core bit	TC reaming
K2 76	WC 0600002	-	WC 0400022
K2 86	WC 0600003	-	WF 0400023
K2 96	WC 0600004	-	WF 0400024
K2 101	WC 0600005	-	WF 0400025
K2 116	WC 0600006	-	WF 0400026
K2 131	WC 0600007	-	WF 0400027
K2 146	WC 0600008	-	WF 0400028
Reference without bottom discharge			
AQ	WK 0600015	WK 0600001	WK 0400067
BQ	WK 0600016	WK 0600002	WK 0400068
NQ	WK 0600017	WK 0600003	WK 0400069
HQ	WK 0600018	WK 0600004	WK 0400070
PQ	WK 0600019	WK 0600005	WK 0400071
SK6L 146	-	WK 0600141	-

Other kinds of TC bits are available on demand, please consult us. (BS, DCDMA, BE, etc...)

See casing shoes and casings p. 109



WIRELINE CORE BARREL



The wireline core barrel has been developed in order to make easier the extraction of core while avoiding manipulating rods. The lift of the core is made through the fall of the overshot in the borehole.

CORE BARREL ASSEMBLY AND WEIGHT

Ø	Lg 1.50 m		Lg 3.00 m		Core bit (mm)	
	Ref.	weight (kg)	Ref.	weight (kg)	inner Ø	outer Ø
A W/L	WK 0100010	15,8	WK 0100000	26,3	27	47,6
B W/L	WK 0100050	24,5	WK 0100199	40,8	36,5	59,5
N W/L	WK 0100111	40,7	WK 0100001	62,4	47,6	74,6
H W/L	WK 0100200	65,9	WK 0100201	97,2	63,5	95,6
P W/L	WK 0300111	104,8	WK 0300110	147,2	85	122

SPARE PARTS

Ø	Head assembly	Core lifter	Core lifter case	Locking coupling	Coupling adaptor	Overshot
A W/L	WK 0100011	WK 0501004	WK 0501000	WK 0100021	WK 0100022	WK 0100202
B W/L	WK 0100051	WK 0501005	WK 0501010	WK 0100061	WK 0100062	WK 0700198
N W/L	WK 0100112	WK 0501002	WK 0501003	WK 0400180	WK 0400181	WK 0700002
H W/L	WK 0100211	WK 0501006	WK 0501009	WK 0100304	WK 0100303	WK 0700200
P W/L	WK 0300112	WK 0501008	WK 0501011	WK 0300120	WK 0300123	WK 0700100

Ø	1,50 m core barrel			3,00 m core barrel		
	inner tube	inner tube assembly	outer tube	inner tube	inner tube assembly	outer tube
A W/L	WK 0100012	WK 0100013	WK 0100020	WK 0100030	WK 0100031	WK 0100040
B W/L	WK 0100052	WK 0100053	WK 0100060	WK 0100070	WK 0100071	WK 0100080
N W/L	WK 0100113	WK 0100114	WK 0100120	WK 0100003	WK 0300017	WK 0100002
H W/L	WK 0100300	WK 0100213	WK 0100310	WK 0100301	WK 0100220	WK 0100006
P W/L	WK 0300132	WK 0300130	WK 0300131	WK 0300140	WK 0300141	WK 0300150

DIAMOND CORE BITS



APAGEO has partnered with Urdiamant to offer a full range of diamond tools.

Urdiamant's products are the result of more than 65 years of expertise and manufactured from the highest-quality raw materials using leading-edge technology and equipment to make fast-penetration core bits with an exceptionally long lifespan.

Our diamond tools are appropriate for all operating conditions regardless of abrasion level or rock type. Maintaining ongoing stock in our warehouse, we are able to respond immediately to your requirements in most cases. Specialised core bits (special shape, specific diamond impregnation, customised, etc.) are also available on request. We are also equipped to manufacture diamond tools on special order according to your plans.

IMPREGNATED DIAMOND CORE BITS (IMPREGNATION DEPTH 8 MM)

These core bits are designed for demanding drilling conditions and all formation types from soft to hard, abrasive to silicified (see matrix classification). The range currently on offer covers all core bit standards (B series, T2, T6, T6S, Triplex, K2, Q series) for all matrices indicated.

REAMING SHELLS

APAGEO offers highly robust diamond reaming shells manufactured using high-quality, natural diamonds embedded in highly resistant matrices. The diamond components are cast in the matrix thereby constituting an integral part of the shell. This maximises performance whilst also preserving diameter through any type of soil.

IMPREGNATED AND SURFACE-SET SHOES

We offer a full range of diamond shoes according to the metric, LS, DCDMA ("W" series), etc., standards. Highly robust and with reinforced inside and outside diameters, they offer outstanding value for their investment. Shoes are available either impregnated (flat or VV profile) or surface-set.

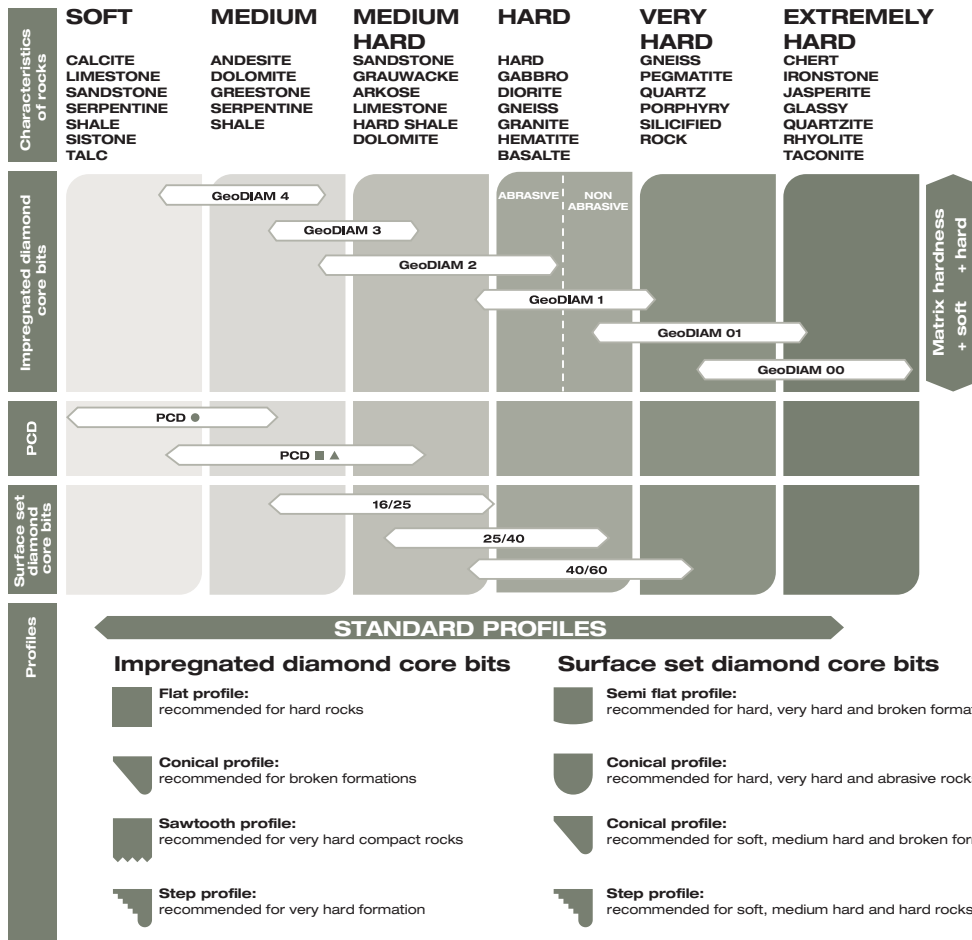
TECHNICAL SUPPORT

With their extensive knowledge, our core drilling experts can advise you on proper use of your core bits and even visit your site to assist with testing.



DIAMOND CORE BITS

DIAMOND CORE BITS SELECTION
ACCORDING TO THE CHARACTERISTICS
OF THE ROCKS



Some different heights of impregnation are available on request.

DIAMOND CORE BITS

CORE BIT OPERATING PARAMETERS

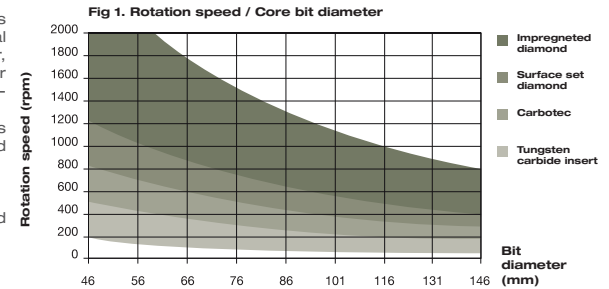
1. Choice of rotation speeds depending on:

- penetration rate;
- core bit diameter;
- drilling depth;
- vibration.

In estimating the appropriate rotation speed it is recommended to follow the concept of peripheral rotation speed: the smaller the core bit diameter, the weaker its circumference, requiring a higher rotation speed in order to maintain adequate peripheral velocity.

For reference, the required peripheral velocity is typically 2 to 5 m/s for impregnated core bits and 1 to 3 m/s for surface-set core bits.

Figure 1 illustrates target ranges for rotation speed based on tool diameter.

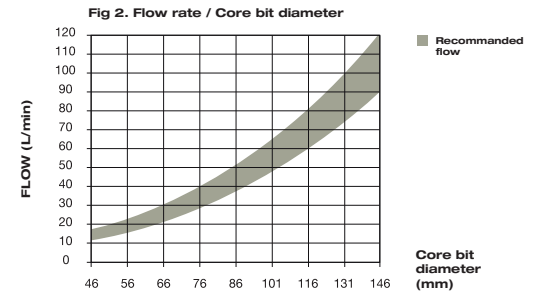


2. Choice of water flow rate:

Flow rate should generally be as high as possible but also depends on the core bit diameter and rock type.

For example, soft or fractured rock requires a higher flow rate. On the other hand, very hard, resistant rock associated with a low penetration rate calls for a lower flow rate to promote rock cutting and reduce polishing risk for the diamonds.

Figure 2 depicts suggested water flow rates for various core bit diameters.

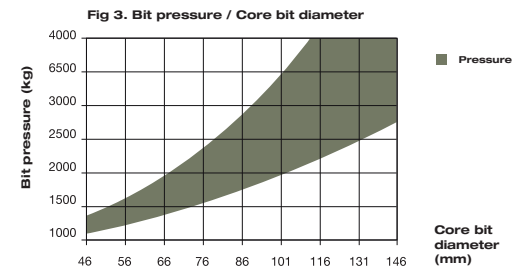


3. Bit pressure:

During drilling, the force applied by the machine and the weight of the rods must also be as weak as possible whilst maintaining a sufficient penetration rate to prevent polishing of the diamonds.

The consequences of excessive pressure include:

- **wearing** of mechanical components in the machine, rods and corer;
- **premature** wearing of the core bit;
- **increased** likelihood of deflection.



DIAMOND CORE BITS

ANALYSIS OF WEAR

DIAMOND CORE BITS



New impregnated bit



Ideal wear

Even wear, complete up to the carbide with the diamonds evenly worn.



Consumed bit

Impregnated bit consumed perfectly.



Diamond over exposed

The matrix wears too fast before the diamonds have worn out. The diamonds pop-out prematurely thus reducing the life of the bit.

Caused by: Drilling pressure too high for speed of rotation, water flow too low, matrix too soft.



Core bit polished or glazed

The bit doesn't cut anymore, diamonds are polished.

Caused by: Drilling pressure too low for the speed of rotation, water flow too high, matrix too hard.

Solution: Sharpen the bit, reduce the rotation speed and increase drilling pressure, reduce water flow, select a softer matrix.



Burnt core bit

Bit is completely melted and destroyed.

Caused by: Lack of water

Solution: Increase the water flow, check the pump is working well, check the rods for leaks in the joints, check the inner tube is not too long.



Cracks in the water ways

Caused by: Too much weight on the bit, Dropped the rods, bit crushed by the foot clamp or rod holder.

Solution: Take some weight off the bit.



Loss of inside diameter

Wear of inside diameter and ringing.

Caused by: Drilling pressure too high, very broken ground, core left in the hole, water flow too low, matrix too soft.

Solution: Sharpen the bit, reduce the rotation speed and increase drilling pressure, reduce water flow, select a softer matrix.



Loss of outside diameter

Cause : vibration, rotation speed too high, water flow too low, fragmented rock present in the borehole.

Solution: increase water flow, reduce rotation speed, check the diameter of reaming shell, add drilling fluid (to reduce vibration)



Inside wear pattern

Caused by: drilling pressure too high for rotation speed, Core left in the hole had to be drilled, very broken ground.

Solution: decrease drilling pressure, increase rotation speed, check the core barrel, add drilling fluids.



Outside wear pattern

Caused by: water flow too low, loss of water by the rods, hole "reamed"

Solution : increase the water flow, check for leaks, check the diameter of shell.

DIAMOND CORE BIT AND REAMING SHELL

Type and diameter	Impregnated core bits GeoDIAM 2	Surface set core bits (GeoDIAM 25/40)	Impregnated reaming shells
B 46	RL 0046452	-	RL 0046900
B 56	RL 0056452	-	RL 0056900
B 66	RL 0066452	-	RL 0066900
B 76	RL 0076452	-	RL 0076900
B 86	RL 0086452	-	RL 0086900
B 101	RL 0101452	RL 0101830	RL 0101900
B 116	RL 0116452	RL 0116800	RL 0116900
B 131	RL 0131452	-	RL 0131900
B 146	RL 0146452	-	RL 0146900
TT 46	WE 1600101	-	RU 0046900
TT 56	RU 0056210	-	RU 0056900
T2 46	RI 0046452	-	RI 0 46900
T2 56	RI 0056452	RI 0056811	RI 0056900
T2 66	RI 0066452	RI 0066811	RI 0066900
T2 76	RI 0076452	RI 0076816	RI 0076900
T2 86	RI 0086452	RI 0086821	RI 0086900
T2 101	RI 0101452	RE 0101221	RI 0101900
T6 76	RJ 0076452	RJ 0076821	RJ 0076900
T6 86	RJ 0086452	RJ 0086821	RJ 0086900
T6 101	RJ 0101452	RJ 0101826	RJ 0101900
T6 116	RJ 0116452	RJ 0116831	RJ 0116900
T6 131	RJ 0131452	RJ 0131836	RJ 0131900
T6 146	RJ 0146452	RJ 0146836	RJ 0146900
T6S 86	RV 0086452	RV 0086836	-
T6S 101	RV 0101452	RV 0101830	-
T6S 116	RV 0116452	RV 0116836	-
T6S 131	RV 0131452	-	-
T6S 146	RV 0146452	-	-
TRI 101	RA 0101452	RA 0101830	RJ 0101900
TRI 116	RA 0116452	RA 0116830	RJ 0116900
TRI 131	RA 0131452	RA 0131830	RJ 0131900
TRI 146	RA 0146452	RA 0146830	RJ 0146900

DIAMOND CORE BITS

DIAMOND CORE BIT AND REAMING SHELL

Type and diameter	Impregnated core bits GeoDIAM 2	Surface set core bits (GeoDIAM 25/40)	Impregnated reaming shells
K2 76	-	-	RW 0076900
K2 86	-	-	RW 0086900
K2 96	RW 0096452	-	RW 0096900
K2 101	RW 0101452	-	RW 0101900
K2 116	RW 0116452	RW 0116830	RW 0116900
K2 131	RW 0131452	RW 0131830	RW 0131900
K2 146	RW 0146452	-	RW 0146900
AQ	RT 0005452	-	RT 0001900
BQ	RT 0004452	-	RT 0002900
NQ	RT 0001452	-	RT 0003900
HQ	RT 0002452	RT 0002830	RT 0004900
PQ	RT 0003452	RT 0003820	RT 0005900

Diamond casing shoes for each type of casing are available.

Please consult us for any other kind of diamond core bits (BS, DCDMA, BE, etc...)

It is also possible to order PCD core bit, please contact us.

HAMMERING CORE BARREL

MARK

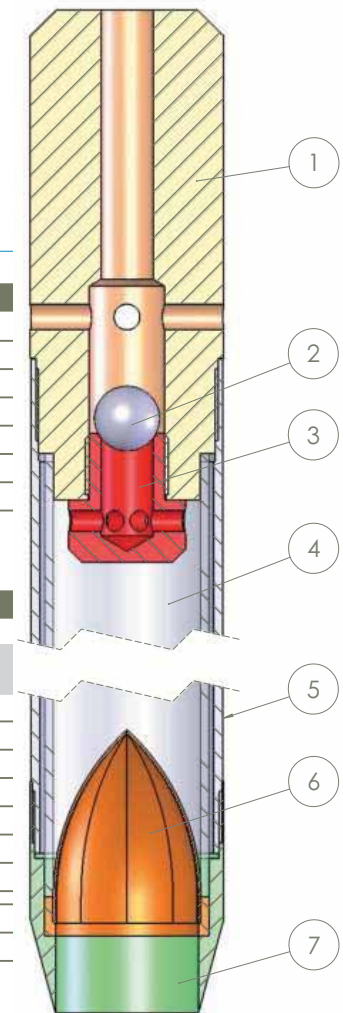
1	Head
2	Ball
3	Ball place
4	Plastic liner
5	Tube
6	Basket
7	Casing

Please, indicate the type of rods used

Ø LINER-TUBE-CASING

Type and diameter	Liner Dim. (mm)	Tube Dim. (mm)	Casing Dim. (mm)
42 x 56	45 x 42	55,6 x 46	56 x 42
56 x 76	63 x 56,6	74 x 67	74,5 x 55
76 x 91	80 x 77	86 x 81	88,8 x 75,3
		Long casing:	84,2 x 75,3
83 x 105	90 x 86,4	99 x 92,5	102 x 85
92 x 111	100 x 94	110 x 101,6	111 x 92
102 x 127	110 x 103,6	125 x 113	127 x 102
APM 86	80 x 77	86 x 81	86 x 75,3
APM 101	92 x 94	100 x 95	100 x 92

Diameters in mm : Ø outer x Ø inner

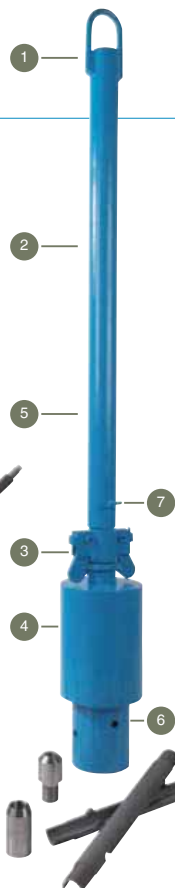


CORE BARREL REFERENCE - RIGHT THREAD

Type	Lg 0.5 m	Core barrel Lg 0.75 m	Lg 1.00 m	Basket	Casing	Head
42 x 56 without basket	WN 0100013	-	-	-	WN 0600006	WN 0200001
42 x 56 with basket	WN 0100017	-	-	WN 0600009	WN 0600007	WN 0200001
56 x 76	WN 0100115	WN 0100116	WN 0100117	WN 0600110	WN 0600109	WN 0200101
76 x 91	WN 0101014	WN 0101015	WN 0101016	WN 0601011	WN 0601009	WN 0201001
83 x 105	WN 0100215	WN 0100216	WN 0100217	WN 0600210	WN 0600209	WN 0200201
92 x 111	WN 0102115	WN 0102116	WN 0102117	WN 0602109	WN 0602108	WN 0202101
102 x 127	WN 0102011	WN 0102012	WN 0102013	WN 0600211	WN 0602008	WN 0202001
APM 86	WAPM 086050	WAPM 086075	WAPM 086100	WN 0601011	WAPM 086400	WAPM 086200
APM 101	WAPM 101050	WAPM 101075	WAPM 101100	WAPM 101600	WAPM 101400	WAPM 101200

For left thread core barrel and other lengths and diameters, please consult us.





Principle:

The hammering system of the SPT (Standard Penetration Test) consists of a weight of 64kg and a pick up and self tripping mechanism that ensure a falling height of 75 cm. The energy is given by the anvil to the rods, and then to the SPT core barrel.

Implementation:

- The guide rod (5) enables the weight (4) to drop with minimal resistance and to strike the anvil (6) squarely. It is fixed to the anvil.
- The outer tube (2) is left by the capstan's string thanks to the hook (1), until the lifting pawls (3) are opened (at the height of 75 cm), thus releasing the weight.
- The weight can be fixed to the guide rod thanks to the safety bolt (7), especially during transportation or while not testing.
- The total length of the hammer is 1.6 m unextended and 2.35 m extended. The total weight of the complete hammer is 105kg.

Description:

1. Lifting hook
2. Outer tube
3. Lifting pawls with springs
4. Drive weight
5. Guide rod
6. Anvil
7. Safety bolt
8. PDB rod

SPECIAL RODS AND CONNECTION THREADS

Description	Reference
Hammering system	A9 0900028
Rod SPT ø54 mm x 1,5 m - M x F (English standard)	A9 0900027
Rod SPT 1,0 m - with nipple	A9 0900012
Core barrel SPT ø54mm (english standard)	A9 0900029
Core barrel SPT NF (ø51mm) - Ball head - Right thread	A9 0100014
Core barrel SPT ball head - Right thread	A9 0200017
Split tube SPT - Right thread	A9 0300020
Basket SPT	A9 0900018
Cone SPT ø54mm on rod or core barrel	A9 0900022

WEIGHTS AND DIMENSIONS OF HEADS, TUBES AND CASING SHOES

Head for tube ø	Weight (kg)	Tube dim.	Length and weight (kg)				Casing shoe for tube	Weight (kg)
			0.5 m	1.0 m	1.5 m	3.0 m		
46	1,56	37 x 44	1.94	3.70	5.46	10.74	46	0.20
56	2,31	47 x 54	2.40	4.60	6.79	13.36	56	0.25
66	3,22	57 x 64	2.88	5.53	8.12	15.98	66	0.30
76	4,27	67 x 74	3.36	6.41	9.47	18.63	76	0.35
86	5,47	77 x 84	3.83	7.32	10.80	21.25	86	0.45
101	7,54	89 x 98	5.70	10.88	16.00	31.62	101	0.70
116	9,95	104 x 113	6.95	13.28	19.60	38.53	116	0.90
131	12,69	119 x 128	7.92	15.12	22.32	43.92	131	1.10
146	15,77	134 x 143	8.88	16.95	25.00	49.25	146	1.35

TUBES AND CASING SHOES REFERENCES

Ø	Length and weight (kg)				TC casing shoe	Carbotec casing shoe	Impregnated casing shoe
	0.5 m	1.0 m	1.5 m	3.0 m			
46	V5 0310067	V5 0310068	V5 0310069	V5 0310071	V5 0810012	V5 0810001	V5 0810265
56	V5 0310073	V5 0310074	V5 0310075	V5 0310077	V5 0810013	V5 0810002	V5 0810266
66	V5 0310079	V5 0310080	V5 0310081	V5 0310083	V5 0810014	V5 0810003	V5 0810267
76	V5 0310085	V5 0310086	V5 0310087	V5 0310089	V5 0810015	V5 0810004	V5 0810268
86	V5 0310091	V5 0310092	V5 0310093	V5 0310095	V5 0810016	V5 0810005	V5 0810269
101	V5 0310097	V5 0310098	V5 0310099	V5 0310101	V5 0810017	V5 0810006	V5 0810270
116	V5 0310103	V5 0310104	V5 0310105	V5 0310107	V5 0810018	V5 0810007	V5 0810271
131	V5 0310109	V5 0310110	V5 0310111	V5 0310113	V5 0810019	V5 0810008	V5 0810272
146	V5 0310115	V5 0310116	V5 0310117	V5 0310119	V5 0810020	V5 0810009	V5 0810273

Other lengths, please consult us

ACCESSORIES REFERENCES

For tube Ø	Driving head*	Casing clamp	Fishing tool	Hoisting plug
46	V5 0210045	V5 0300241	M6 0100003	M5 0100021
56	V5 0210046	V5 0300242	M6 0100004	M5 0100022
66	V5 0210047	V5 0300243	M6 0100005	M5 0100023
76	V5 0210048	V5 0300244	M6 0100006	M5 0100024
86	V5 0210049	V5 0300245	M6 0100007	M5 0100025
101	V5 0210050	V5 0300246	M6 0100008	M5 0100026
116	V5 0210051	V5 0300247	M6 0100009	M5 0100027
131	V5 0210052	V5 0300248	M6 0100010	M5 0100028
146	V5 0210053	V5 0300249	M6 0100011	M5 0100029

*Please indicate the threads required, left and right thread available

CASING TUBES

LS SERIES - F X F
(SLEEVE M X M)

CASING TUBES

D.C.D.M.A
"W" SERIE

WEIGHTS AND DIMENSIONS OF CASINGS, SLEEVES AND CASING SHOES

Tube	Length and weight (kg)				Dimensions (mm)		Sleeve		Casing shoe weight
	0.5 m	1.0 m	1.5 m	3.0 m	Ø inside	Ø outside	Weight (kg)	Ø inside (mm)	
95	5.80	13.50	22.20	44.30	81.0	95.0	3.40	77.0	2.28
114	6.40	14.80	23.00	48.40	101.6	114.3	3.80	98.0	3.40
140	8.80	20.50	32.10	67.10	125.7	139.7	5.50	120.5	4.50
168	10.70	24.90	39.00	81.50	153.6	168.3	6.80	149.0	5.80
194	13.30	30.80	48.30	100.80	178.4	193.7	7.70	174.4	6.90
220	16.10	37.30	58.60	122.30	203.6	219.1	8.70	200.0	7.60

Other lengths, please contact us

WEIGHTS AND DIMENSIONS OF HEADS, TUBES AND CASING SHOES

Tube	Length and weight (kg)			Thread per inch	Dimensions (mm)		Casing shoe weight (kg)
	0.5 m	1.5 m	3.0 m		Ø inside	Ø outside	
AW	3.40	8.60	17.20	4	48.4	57.1	0.40
BW	5.30	15.80	31.80	4	60.3	73.0	0.70
NW	6.50	19.50	39.00	4	76.2	88.9	1.30
HW	8.50	25.40	51.30	4	101.6	114.3	2.20
PW	11.00	30.00	58.00	3	127.0	139.7	3.70
SW	18.00	48.00	93.00	3	152.4	168.2	5.00
UW	25.00	67.00	130.00	2	177.8	193.6	5.70
ZW	30.00	80.00	154.00	2	203.2	219.0	6.00

Other length, please contact us.

TUBES AND CASING SHOES REFERENCES

Tube	Length and weight (kg)				Sleeve
	0.5 m	1.0 m	1.5 m	3.0 m	
95	V6 0300025	V6 0300033	V6 0300041	V6 0300057	V6 0400001
114	V6 0300026	V6 0300034	V6 0300042	V6 0300058	V6 0400002
140	V6 0300027	V6 0300035	V6 0300043	V6 0300059	V6 0400003
168	V6 0300028	V6 0300036	V6 0300044	V6 0300060	V6 0400004
194	V6 0300029	V6 0300037	V6 0300045	V6 0300061	V6 0400005
220	V6 0300030	V6 0300038	V6 0300046	V6 0300062	V6 0400006

TUBES AND CASING SHOES REFERENCES

Tube	Length and weight (kg)			TC casing shoe	Carbotec casing shoe	Impregnated casing shoe
	0.5 m	1.5 m	3.0 m			
AW	V2 0300320	V2 0300321	V2 0300322	V2 0800193	V2 0800228	V2 0800175
BW	V2 0300325	V2 0300326	V2 0300327	V2 0800194	V2 0800229	V2 0800176
NW	V2 0300330	V2 0300331	V2 0300332	V2 0800195	V2 0800230	V2 0800177
HW	V2 0300335	V2 0300336	V2 0300337	V2 0800196	V2 0800231	V2 0800178
PW	V2 0300340	V2 0300341	V2 0300342	V2 0800197	V2 0800232	V2 0800174
SW	V2 0300345	V2 0300346	V2 0300347	V2 0800198	V2 0800233	V2 0800173
UW	V2 0300350	V2 0300351	V2 0300352	V2 0800199	V2 0800234	V2 0800172
ZW	V2 0300355	V2 0300356	V2 0300357	V2 0800200	V2 0800235	V2 0800171

ACCESSORIES REFERENCES

Tube	T C casing shoe	Carbotec casing shoe	Impregnated casing shoe	Casing clamp	Driving head*
95	V6 0800017	V6 0800065	V6 0800073	V2 0300370	V6 0200009
114	V6 0800018	V6 0800066	V6 0800074	V2 0300365	V6 0200010
140	V6 0800019	V6 0800067	V6 0800075	V2 0300366	V6 0200011
168	V6 0800020	V6 0800068	V6 0800076	V2 0300367	V6 0200012
194	V6 0800021	V6 0800069	V6 0800077	V2 0300368	V6 0200013
220	V6 0800022	V6 0800070	V6 0800078	V2 0300369	V6 0200014

*Please indicate the thread required

ACCESSORIES REFERENCES

Tube	Driving head (right)*	Casing clamp	Fishing tool	Hoisting plug
AW	V2 0200260	V2 0300361	M6 0100004	M5 0100035
BW	V2 0200261	V2 0300362	M6 0100006	M5 0100036
NW	V2 0200262	V2 0300364	M6 0100007	M5 0100037
HW	V2 0200263	V2 0300365	M6 0100009	M5 0100038
PW	V2 0200264	V2 0300366	M6 0100010	M5 0100039
SW	V2 0200265	V2 0300367	-	-
UW	V2 0200266	V2 0300368	-	-
ZW	V2 0200267	V2 0300369	-	-

*Please indicate the thread required

OCASING ACCESSORIES

“Q” SERIE FOOT CLAMP

REFERENCES

Tube	Driving head (right)*	Fishing tool	Hoisting plug	TC casing shoe	Carbotec casing shoe	Impregnated casing shoe
AQ	V4 0100095	M6 0100021	M5 0100014	V4 0800081	V4 0800074	-
BQ	V4 0100096	M6 0100022	M5 0100015	V4 0800082	V4 0800075	V4 0800178
NQ	V4 0100097	M6 0100023	M5 0100016	V4 0800083	V4 0800076	V4 0800179
HQ	V4 0100098	M6 0100024	M5 0100017	V4 0800084	V4 0800077	V4 0800180
PQ	V4 0100099	M6 0100025	M5 0100018	V4 0800085	V4 0800078	V4 0800181

FOOT CLAMP - SMALL

Weight (kg) Reference

Clamp only 14.0 M3 0100001

Jaws for manual rod clamp

32	1.14	M3 0200020
42	1.03	M3 0200003
50	0.93	M3 0200004
60	0.79	M3 0200005
63	0.80	M3 0200016
AW	1.00	M3 0200007
BW	0.90	M3 0200008
NW	0.83	M3 0200010

For other diameters, please consult us



FOOT CLAMP - BIG

Weight (kg) Reference

Clamp only 19.50 M3 0100000

Jaws for manual rod clamp

AQ	1.75	M3 0200011
BQ	1.57	M3 0200012
NQ	1.36	M3 0200013
HQ	1.20	M3 0200014

For other diameters, please consult us

AND LABORATORY EQUIPMENT



P.114

ACCESSORIES AND DRILLING PRODUCTS

Drilling mud and grease
Straight pipe and chain wrenches
Water level – Packers

P.118

LABORATORY EQUIPMENT

Granular, soil, cement, concrete and bitumens testings
Drilling mud equipment
Non destructive testing

DRILLING MUD AND GREASE

DRILLING MUD

Description	Conditioning	Reference
Drilling mud		
Stafor P (powder)	Bag of 0,5 kg (powder)	M2 0901609
Stafor P (powder)	Bag of 1,0 kg (powder)	M2 0901501
Stafor L (liquid)	Drum of 25 L (liquid)	M2 0901500
Biodegradable drilling mud		
Stafor 5000 (powder)	Bag of 25 kg	M2 0901600



SEALING PRODUCTS AND OTHERS

Description	Conditioning	Reference
Lubricant DP Lub	Barrel of 25 kg	M2 0901520
Foam DP	Barrel of 20 kg	M2 0901510
Peltonite	Bucket of 25 kg (7 mm balls)	M2 0901601
Bentonite	Bag of 25 kg (C2T)	M2 0901530

GREASE

Description	Conditioning	Reference
Copper grease	Jug of 5 kg	M2 0901611
Graphit grease	Jug of 1 kg	M2 0901612
Graphit grease	Jug of 5 kg	M2 0901613

STRAIGHT PIPE WRENCHES

STRAIGHT PIPE WRENCHES

Type	Length (mm)	Pipe capacity (mm)	Ridgid iron handle		Ridgid aluminium handle	
			Ref	Weight (kg)	Ref	Weight (kg)
6"	150	27	M1 0100603	0,2		
8"	200	34	M1 0100801	0,3		
10"	250	48	M1 0101001	0,8	M1 0101002	0,4
12"	330	60	M1 0101203	1,2	M1 0101204	0,7
14"	350	60	M1 0101403	1,6	M1 0101404	1,1
18"	450	76	M1 0101803	2,6	M1 0101804	1,7
24"	600	89	M1 0102402	4,4	M1 0102403	2,7
36"	900	141	M1 0103603	8,7	M1 0103604	5,0
48"	1200	168	M1 0104801	15,6	M1 0104802	8,4
60"	1500	219	M1 0106001	23,3		

STRAIGHT PIPE WRENCHES - SPARE PARTS

	Hook jaw	Handle	Nut	Spring
6"	M1 0200603	M1 0200601	M1 0300601	M1 0300602
8"	M1 0200802	M1 0200801	M1 0300801	M1 0300802
10"	M1 0201002	M1 0201001	M1 0301001	M1 0301002
12"	M1 0201203	M1 0201201	M1 0301201	M1 0301202
14"	M1 0201403	M1 0201401	M1 0301401	M1 0301402
18"	M1 0201803	M1 0201801	M1 0301801	M1 0301802
24"	M1 0202403	M1 0202401	M1 0302401	M1 0302402
36"	M1 0203603	M1 0203601	M1 0303601	M1 0303602
48"	M1 0204802	M1 0204801	M1 0304801	M1 0304802
60"	M1 0206002	M1 0206001	M1 0306001	M1 0306002



RIDGID CHAIN WRENCHES

Type	Reference	Length (mm)	Pipe capacity (mm)	Weight (kg)	Chain	Jaw
12"	M1 0101202	300	100	0,8	M1 0101201	M1 0201202
14"	M1 0101402	320	125	1,2	M1 0101401	M1 0201402
18"	M1 0101802	435	125	2,7	M1 0101801	M1 0201802
24"	M1 0102401	580	125	3,7	M1 0101801	M1 0202402
36"	M1 0103602	700	185	7,1	M1 0103601	M1 0203602

RIDGID CHAIN WRENCHES - DOUBLE JAW

Type	Reference	Chain length (mm)	Pipe capacity (mm)	Weight (kg)
3229	M1 0003229	445	14 / 89	5,0
3231	M1 0003231	570	27 / 114	8,0
3233	M1 0003233	815	34 / 168	11,0
3235	M1 0003235	1030	48 / 219	15,0
3237	M1 0003237	1410	60 / 324	25,0

VIRAX CHAIN WRENCHES

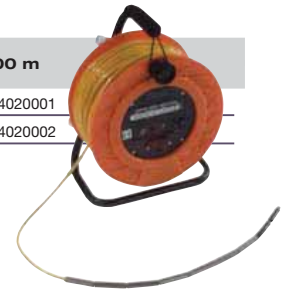
Type	Reference	Chain length (mm)	Pipe capacity (mm)	Weight (kg)	Spare parts Chain
1" - 10610	M1 0100102	275	10 / 34	1,2	M1 0100101
3" - 10611	M1 0100302	470	10 / 90	4,1	M1 0100301
6" - 10613	M1 0100602	690	13 / 165	7,6	M1 0100601



WATER LEVELS

APAGEO proposes water level with acoustic signal and led, flat or round cable.

Length	20m	30 m	50 m	100 m	150 m	200 m
Round cable		M4 04003001	M4 04005001	M4 04010001	M4 04015001	M4 04020001
Flat cable	M4 04002002		M4 04005002	M4 04010002		M4 04020002



BOREHOLES AND WELLS CAMERA

APAGEO proposes boreholes and wells camera with a maximum length of 500 meters. The complete system consist of: reel and camera head, display unit with integrated LCD, USB2 grabber board and microphone, battery charger. Pictures, movies and comments can be saved to any external laptop. The equipment is easy to use, reliable, a compact and light weight instrument for field operations.

PACKERS

Low pressure packer, single or double, for injection with piston pump or permeability test (Lugeon test).

Diameters 42 to 72 mm. Max. inflation pressure = 40 bars p. 21 p. 53

Ø (mm)	Ø Max (mm)	NPT	Single packer sleeve length			Double packer sleeve length		
			0,5 m	1,0 m	1,5 m	0,5 m	1,0 m	1,5 m
42	80	1/2"	B1 9104204	B1 9104205	B1 9104212	B1 9104208	B1 9104207	B1 9104209
54	130	1"	B1 9105404	B1 9105405	B1 9105412	B1 9105402	B1 9105401	B1 9105403
72	160	1 1/4"	B1 9107204	B1 9107206	B1 9107205	B1 9107202	B1 9107201	B1 9107203

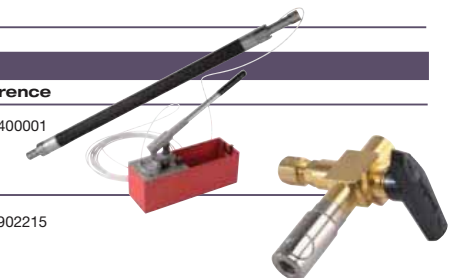
High pressure single packer

Diameters 30 and 42 mm. Max. inflation pressure = 100 bars

Ø (mm)	Ø Max (mm)	NPT	Length	
			0,3 m	0,4 m
30	55	3/8 G	B2 0000200	-
42	85	3/4 G	-	B2 0000001

ACCESSORIES FOR PACKER

	Reference
Hand pump for water inflation - Capacity 60 bars - With manometer + tank	B1 9400001
Pilot valve nitrogen inflation - To be used with the Pressuremeter	A1 1902215



LABORATORY TESTING EQUIPMENT

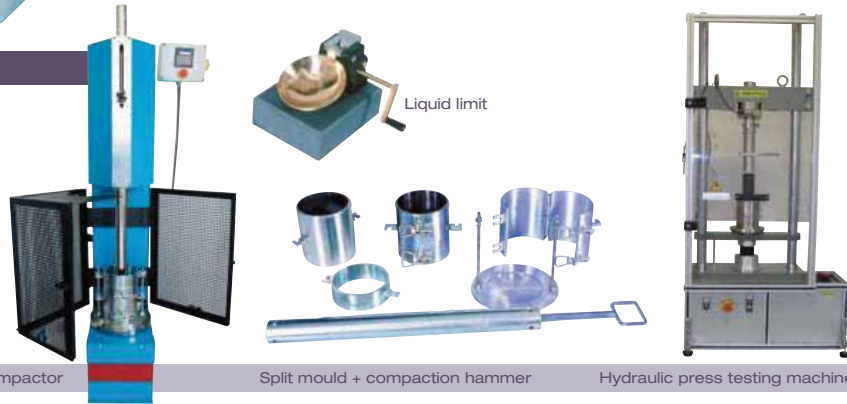
APAGEO offers a complete range of laboratory equipment for soil testing. This is a non exhaustive list, please consult us for any other kind of equipment.

GRANULAR



Sand equivalent test Automatic sieve shaker Methylene blue test

SOIL



Liquid limit

Automatic compactor Split mould + compaction hammer Hydraulic press testing machine

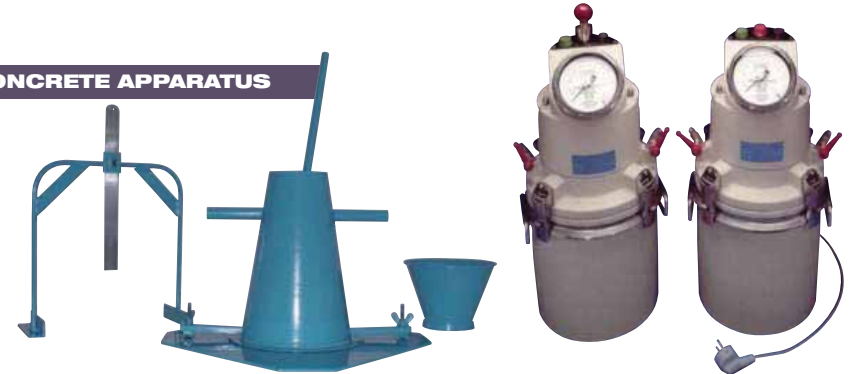
CEMENT AND MORTARS



Three gang mould Mortar mixer Vicat apparatus

LABORATORY TESTING EQUIPMENT

CONCRETE APPARATUS



Abrams cone Concrete aerometer

BITUMINOUS MIXTURE



Ring and ball apparatus Automatic penetrometer Compression test machine – Marshall + Duriez testing

EQUIPMENT FOR DRILLING MUD:

- Mud Libra
- Viscometer
- Etc...

+ ALL THE GENERAL EQUIPMENT

NON DESTRUCTIVE TESTINGS

TDR2

The TDR2 controls the integrity of piles by measuring both the input force to a pile as well as the resulting velocity response. The software IMPRO 2 is used to transfer data, carry out basic analysis of result and produce report. Advanced simulation and impedance profiling modules are also included in this software.



AU 2000

The AU 2000 measures sound propagation time in a material. The AU 2000 displays the received signal immediately it has passed through the material; It calculates the propagation time and the position of the signal's point of arrival; finally it has a facility for storing the results.

NON DESTRUCTIVE TESTINGS

SC XT 2000

The SC XT 2000 is designed for integrity testing of large diameter concrete piles, diaphragm walls, barettes etc... by the ultra sonic cross-hole method. Ultra sonic transducers are used to measure the transit time of sound in concrete.



Sclerometer and many others, please consult us



I. GENERAL POINTS

An order is deemed accepted and effective only upon our notifying the Client within a reasonable time period that we have officially received the order. The Client acknowledges that these conditions constitute the entire agreement between the parties and cancels and supersedes all previous offers or agreements, whether oral or written, and other communications between the parties with respect to the subject of the contract at hand unless otherwise agreed and signed in writing by authorised representative of both parties.

Acceptance of any order deemed firm by our company implies that the purchaser agrees to these general conditions of sale which shall be binding to both parties. Any contract of the Client deviating from our conditions shall be valid only upon written acceptance from an authorised representative of our company. APAGEO reserves the right to reject any amendment or termination of the agreement after launch of the project. In the event of acceptance and subsequent termination involving equipment or materials already made available to the Client, the termination shall not be deemed effective until said equipment or materials have been returned in their original state without being unpacked, installed, started up or otherwise used. The Client shall be responsible for return shipping or delivery fees and for a restocking fee corresponding to 20% of the invoice amount.

II. PRICING AND PAYMENT TERMS

Our prices are quoted excluding VAT and are firm for execution under the conditions specified in the offer and confirmed in the order acknowledgment. Conditions for packing and delivery are set out in the special conditions. Unless specified otherwise, prices are applicable to unpacked goods ex works. With the exception of special provisions governing replacement parts for which payment shall be due in cash on delivery, the Client agrees to comply with the terms of payment indicated in our offer.

In the event that an invoice remains unpaid after this time, the balance due shall be deemed immediately payable regardless of any terms agreed previously including terms involving the issue of drafts. Moreover, the purchaser shall, by right, be liable for a penalty amount, plus VAT, for any late payment. We reserve the right to demand, at our entire discretion and according to the above mentioned terms:

- payment in cash at time of order;
- in the event of late payment, immediate payment of all invoices not yet past due and advance payment of all orders currently being processed; alternatively, APAGEO may cancel said orders by simple registered letter without claim of compensation against us under the above mentioned conditions.

III. TIME FRAMES

Delivery time frames are counted from the date on which the details of an order are confirmed in writing.

These time frames are provided for information purposes only at the time of offer and are to be confirmed by APAGEO in the order acknowledgment. Any delays shall not give the purchaser right to cancel the sale, refuse the merchandise or service or claim any form of damages, penalty or holdback.

IV. DELIVERY AND SHIPPING

All costs and risks of transactions relating to insurance, packing, shipping, customs, unloading and unpacking shall be the responsibility of the Client unless agreed and specified otherwise in our offer.

On delivery, the Client is responsible before taking delivery to note any irregularities on the delivery slip acknowledgment and to take all appropriate recourse against the shipper which shall be solely responsible in this regard.

V. RETENTION OF OWNERSHIP

APAGEO retains ownership of all goods sold until receipt of full payment of principal, interest and any other amounts in arrears concerning said goods. These provisions shall not prevent the transfer to the Client, on delivery, of risks relating to the loss or degradation of the goods sold or any damage they may cause. The Client is to arrange for insurance covering the risks arising at delivery and to notify the insurer of our right of ownership so that we might benefit from any compensation resulting from the loss or degradation of the goods sold. The Client may resell the goods only if all prices have been decided in advance in consultation with us unless agreed otherwise by our authorised representative.

VI. LIMITED LIABILITY

The liability of APAGEO shall be limited strictly to the obligation to repair or replace at no charge any parts or components we have acknowledged as defective to the exclusion of any other compensation on any grounds whatsoever.

The liability of APAGEO is, regardless of the nature of any claim made, whether legal or contractual, limited strictly to the abovementioned obligation, and APAGEO shall not be bound to compensate the Client or any third party (including but not limited to employees and clients) for any direct or indirect damages such as loss of productivity or for costs or other damages resulting from improper use or malfunction of the equipment.

VII. GUARANTEE

Our equipment, with the exception of consumables and replacement parts and subject to use in accordance with normal operating conditions, is guaranteed for a period of 12 months from delivery ex works against defects due to manufacture or design errors recognised by us. Parts replaced or reworked under the terms of this guarantee shall be guaranteed only for the remaining duration of the original guarantee. This guarantee is not applicable:

- if the defective material or design originated with the purchaser or a third party imposed by the Client;
- if the faulty operation resulted from intervention or modifications to the good performed by the Client without our prior written authorisation;
- if the faulty operation resulted from normal wear of the good or from negligence or improper maintenance by the Client, from abnormal use or from failure to follow our operation or maintenance instructions;
- if the faulty operation resulted from force majeure, prohibitions or embargoes affecting import or export and foreign exchange control measures being classified as cases of force majeure for the purposes of execution of the contract;
- if the Client fails to follow any instructions provided by APAGEO concerning the installation and start-up of the equipment.

The liability of APAGEO is limited expressly to the abovementioned conditions to the exclusion of any other recourse including guarantee claims signifying additional liability.

VIII. CONFIDENTIALITY

All estimates, studies, drawings, calculations and documents delivered or otherwise made available to the Client remain the property of APAGEO and consequently may not be used or conveyed to a third party for any purpose whatsoever without our authorisation.

IX. APPLICABLE LAW - COURT OF COMPETENT JURISDICTION

Our sales are governed by French law.

Any dispute concerning our sales or services, including those with multiple respondents, that cannot be resolved amicably shall fall under the exclusive jurisdiction of the Versailles (78) Commercial Court. Any special conditions with respect to bank domiciliation or other conditions shall have no effect, whether overriding, novatory or other. Any dispute arising in relation to an international contract shall be settled according to the guidelines for conciliation and arbitration of the International Chamber of Commerce by one or more arbitrators designated by the parties, the place of arbitration being Paris, France.

A

3-way drag bit (86-87)
4-way drag bit (87)
Apafor® 100 (10)
Apafor® 220 (11)
Apafor® 330 340-340 Remorque (12)
Apafor® 440-450 (13)
Apafor® 450 RS (14)
Apafor® 550 - 560 (15-16)
Auger - continuous flight (67)
Auger - hand (66)
Auger - Hollow Stem (72-73)
Auger - injection (74)
Auger bits (68 to 71)
Auger fishing device (70)
Auger holder (71)
Auscultation of ground pile and building materials (120)
Auto controlled pressuremeter (GeoPac®) (59)

B

Benkelman beam (60-61)
Bentonite and drilling mud (114)
Bicone (bit) (85)
Bit (rotary percussion) (76)

C

Cam (rod clamp) (112)
Camera for boreholes and wells (117)
Cardan joint (71)
Casing - LS (110)
Casing - metric (109)
Casing - Q serie (accessories) (112)
Casing - W serie (DCDMA) (111)
Casing (Ménard Ø 55-63-75-85) (42-43)
Casing shoe (109)
Cones - lost or fixed (82)
Cones for slotted tube Ø55-63 (40)
Core barrel - double tube K (97)
Core barrel - double tube T2 (92-93)
Core barrel - double tube T6 (94-95)
Core barrel - hammering (107)
Core barrel - plastic liner (96 - 107)
Core barrel - single tube (88-89)
Core barrel - single tube T (90-91)
Core barrel - SPT (108)
Core barrel - T6S (97)
Core barrel - thin wall (107)
Core barrel - Triplex (96)
Core barrel - wireline (100)
Coupling and bit holder (83)

D

Diamond bit (101 to 106)
Diamond core bit (101 to 106)
Diamond reaming shell (105-106)
Down the Hole hammer (77)
DP Rock (bit for auger) (68)
Drilling data logger (18-19 & 26)
Drilling rigs (118-119)
Drilling rigs Apafor (9)

F

Finger bit (68-69)
Fishing bell (82)
Fishing tap (82)
Fishtail bit (70)
Foot clamp (112)

G

GeoBox® (58)
GeoPac® (59)
GeoSPAD® (pressuremeter data logger) (26)
Geotechnical rigs (9)
GeoVision® (62-63)
Grease for rod (114)

H-I-J

Heavy dynamic penetrometer (11)
Hollow Stem Auger (72-73)
In situ testing equipment (22)
Jet Auger (injection auger) (74)

L

Laboratory (material) (118-119)
Lifting swivel (82)
Light dynamic penetrometer (56)
Loading test set (61)
LS (Casing and sleeve) (37 to 39)
LS casing reaming shell (110)
Lugeon test (Lugeotest®) (53)

M-N

Matrix (diamond core bit) (102)
Membrane, 44-60-74 probe (32-36)
Ménard Pressuremeter (accessories) (32-33)
Ménard Pressuremeter (CU) (23 to 25)
Ménard Pressuremeter (Software) (62-63)
Ménard Pressuremeter test (23)
Mini Pressuremeter (52)
Mud and cement grout mixer (21)
Nipple (for rod) (81)
Non destructive testing (120)

O-P

Oil feeder (21)
Packer (single or double) (117)
PDA / PDB (rods and cones) (82)
Penetration test (11 - 108)
Permeability test (LUGEON test) (53)
Phicometer test (54 - 55)
Plate test (60)
Pressure & Volume Control Unit (23 to 25)
Pressuremeter accessories (32 - 43)

Pressuremeter probe (32 to 36)
Pressuremeter tools (27 to 29)
Probe cover (32 to 36)
Pump (hand injection) (21)
Pump (injection) (20-21)
Pump (packer inflation) (117)

R

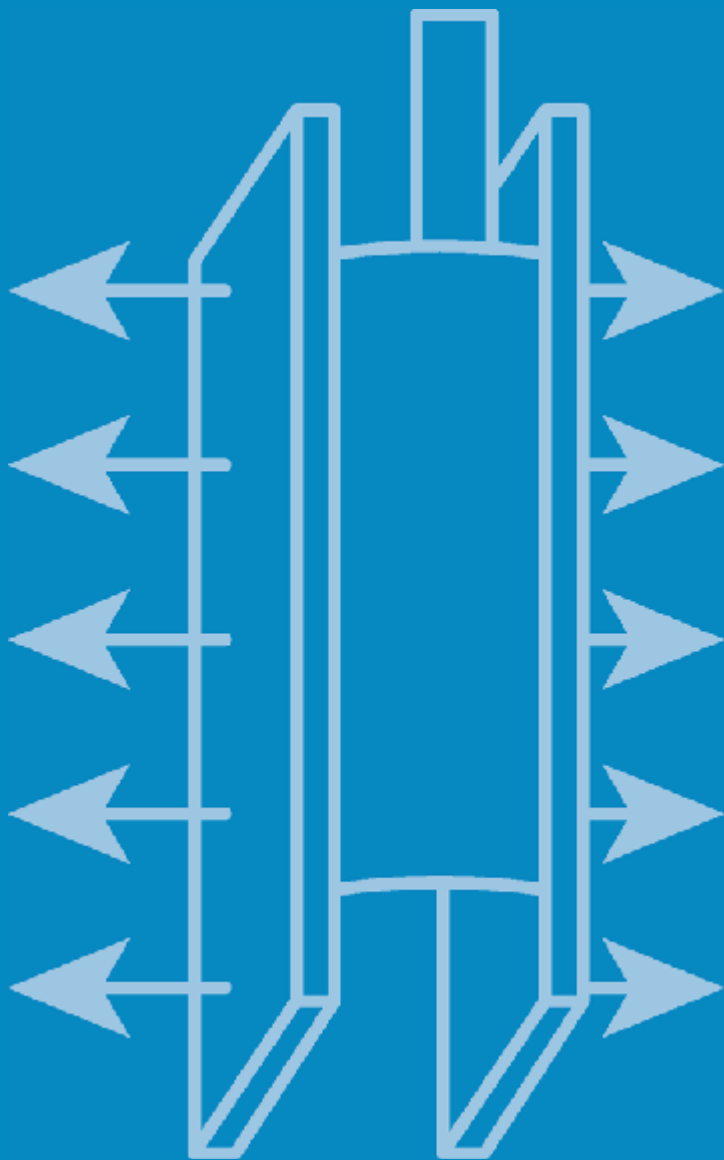
R32-R38 reaming shell (75)
Repairing kit for line (37 to 39)
Rod - hammering PDA/PDB (82)
Rod - rotary drilling (81)
Rod - rotary percussion R32-R38 (75)
Rotary drilling bits (84 to 87)
Rotary percussion (drilling rigs) (14 to 16)
Rotary percussion (rod and bit) (76-77)
Rotary percussion drilling bit (76-77)
Rotation head (26)

S

Selection diamond core bit (102)
Self bored system (all):
STAF®
STAR
STAREX® (TH and DTH Ø76 to 240 (48 to 51 - 80 - 78-79))
Sensor Vibrasol® (19)
Sensor VIR (19)
Shear testing (Phicometer) 54-55)
Slotted casing Ménard Ø55 - 63 and 75 (40-41)
Software GeoVision (121)
SPT (core barrel and hammering system) (108)
SPT (penetrometer for) (108)
STAF® - Self bored tube system (48 to 51)
STAR (top hammer Ø86 à 125) (80)
STAREX® (TH and DTH Ø76 to 240) (78-79)

T-U-V-W

Tricone bits - Steel tooth and TC insert (84-85)
Triplex (core barrel) (96)
Triplex (injection pump) (20-21)
Tubing for pressuremeter probe (37 to 39)
Tungsten carbide bit (Ø63-76-89) (68)
Tungsten carbide core bit (98-99)
Tungsten carbide reaming shell (98-99)
U-pin for auger (67)
Vibrasol®: reflective energy sensor (19)
VIR®: Rotation speed sensor (19)
Water level (117)
Water swivel (82)
Wrenches (chain and straight pipe) (115-116)



APAGEO

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