

Installation of the BAT Mk III Filter Tip

- Preparation
- Installation
- Accessories



BAT Geosystems AB
Box 1060
186 26 Vallentuna
SWEDEN
Tel +46851170600
Fax +46851173361

BAT Geosystems AB
Hällebergsvägen 5
443 60 Stenkullen
SWEDEN
Tel +46317890600
Fax +46851173361

www.bat-gms.com
info@bat-gms.com

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Warranty details

BAT Geosystems AB (BAT) warrants all new BAT products against defects in materials and workmanship for a period of 12 months from the date of invoice. During the warranty period, we will repair or, at our option, replace at no charge a product that proves to be defective provided that it is returned, shipping cost prepaid, to BAT.

BAT's liability and obligations in connection with any defects in materials and workmanship are expressly limited to repair or replacement, and the sole and exclusive remedy in the event of such defects shall be repair or replacement. BAT's obligations under this warranty are conditional upon it receiving prompt written notice of claimed defects within the warranty period and it's obligations are expressly limited to repair or replacement.

This warranty does not apply to products or parts thereof which have been altered or repaired outside of the BAT factory, or products damaged by improper installation or application, or subjected to misuse, abuse neglect or accident.

BAT Geosystems AB will not be liable for any incidental or consequential damage or expense incurred by the user due to partial or incomplete inoperability of it's products for any reason whatsoever or due to inaccurate information generated by its products.

All warranty service will be completed as soon possible. If delays are unavoidable customers will be contacted immediately.

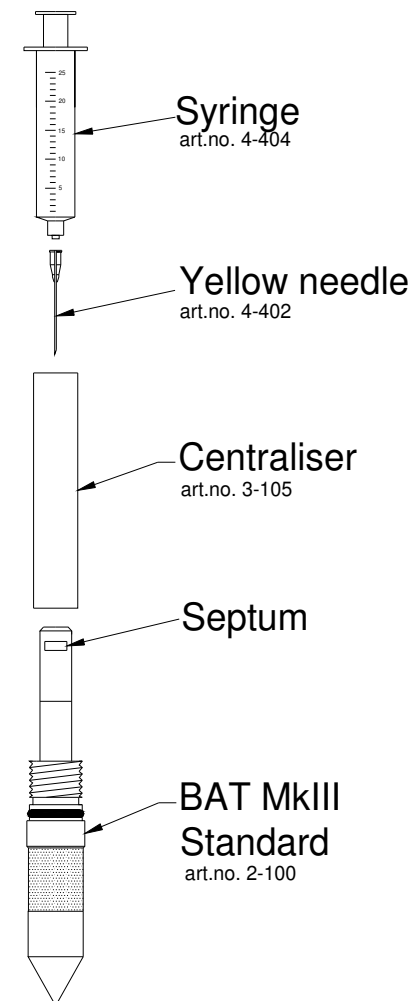
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!! For instructions on BAT MKIII Vadose, see Appendix 1&2 !!

- Fit a yellow needle to a 20 ml syringe.
- Fit the centraliser to the filter tip.
- Lower the filter tip into a bucket containing deaired water until that the filter is below the water surface.
- Connect the syringe via the centraliser and penetrate the rubber septum with the needle.
- Use the syringe to draw water through the filter tip. Draw a total volume of 40 ml water trough the filter tip, i.e. equal to two syringe volumes.
- Finally, when pulling out the needle, you shall maintain a suction in the syringe to expell any trapped air at the top of the filter tip.
- Let the filter tip remain submerged until time for installation.

NOTE! The BAT MKIII filter tip must **not** be boiled to get saturated!

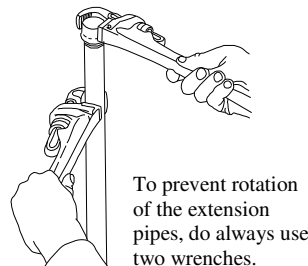
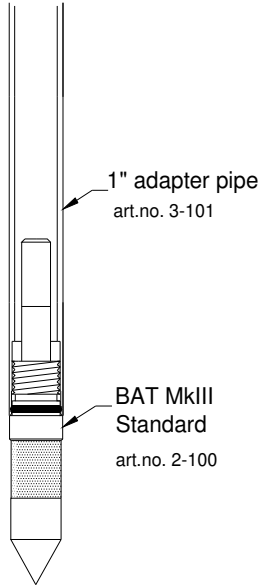
The BAT MKIII Std can tolerate an installation force up to 25kN in fine grained soils.



!! For instructions on BAT MKIII Vadose, see Appendix 1&2 !!

Depending on the type of soil, you can use different methods for installation of the BAT MkIII Filter Tip. The most common method for Swedish soil conditions is simply “push in”-installation using an ordinary drill rig. In harder soils predrilling may be required.

- Clean the inside of the adapter pipe and the 1” extension gas pipes. It is recommended to use galvanized pipes.
- Pre-drill through the harder top soil layers.
- It is recommended to fill the pre-drilled hole with water.
- Screw the filter tip into the 1”-adapter pipe. Hand tighten, no tools are needed! Let the filter tip remain submerged while doing this.
- If using a rig for the installation, place the bucket under the chuck of the rig. Attach an extension pipe to the chuck and screw it together with the adapter pipe always keeping the filter tip submerged. After this, quickly, remove the bucket and commence the installation. Do not rotate the pipe during installation which may damage the filter.
- Use 1-inch extension pipes and remember to apply some kind of thread sealing agent to prevent leakage of water into the pipe. This may for example cause problem winter-time in colder climates.
- Note the installation depth. Add 3cm to the total length of installed pipe (the distance between end of pipe and the filter tips intake).
A special measure tape (#3-106) can be used for an accurate measurement of the installation depth, see Page 4. If using the measure tape, no length compensation is needed.
- Seal the top end of pipe by using a lockable cap (#3-211), see Page 4. For “stand-alone” logging mode a special protective housing (#3-207) has been designed for protection of the sensor cable and the battery unit, see Page 4.



Installation Force

In case the BAT Filter Tip is installed using ordinary 1”-gas pipes, the allowable installation force is normally limited by the strength of the pipe couplings.

The BAT MKIII Std Tip can sustain a static installation force of 25 kN in fine grained soils.

The BAT MKIII HD Tip can tolerate a static installation force of 80 kN in fine grained soils. This filter tip can also be installed by using light dynamic equipment.

Dissipation of pore pressures, caused by disturbance during installation

When the BAT Filter Tip is pushed into the soil, excess pore pressures will be generated due to the disturbance of the soil.

In soft clays, normally high excess pore pressures are generated by the installation of the filter tip. On the contrary, in silts and fine sands it can happen that the installation of the filter tip generates a negative pore pressure response, due to dilatancy effects in these types of soil.

The time needed for dissipation of these disturbance effects varies with the type soil. In soft, high plastic clays it may take up to 5 to 7 days until the original pore pressure situation is restored. In silts and sands, on the other hand, the dissipation of the disturbance effects from the installation of the BAT Filter Tip goes much quicker.

The process of dissipation of excess pore pressures can be monitored by the BAT Pore Pressure sensor. In addition this type of monitoring provides valuable information about the character of the soil, surrounding the filter tip.

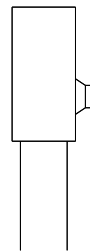
Accessories



Measure tape to determine installation depth of the BAT Filter Tip.
(art.no. 3-106)



Protective housing for the sensor cable and battery unit.
(art.no. 3-207)



1"-pipe

Protective cap
(art.no. 3-211)



BAT MkIII Vadose Filter Tip (2-102).

ASSEMBLY

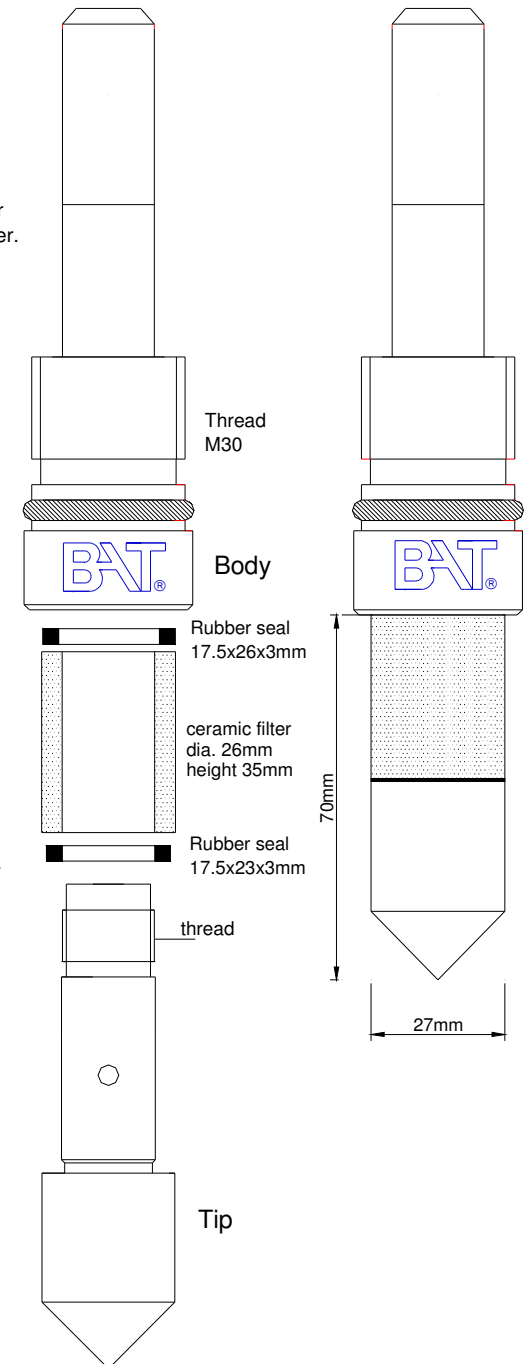
1) Assemble the Rubber seals and the Ceramic Filter onto the axle of the Tip.
NB. Seals: (i) 17.5x26x3mm at the top of filter and (ii) 17.5x23x3mm at the bottom of the filter.

Put a few drops of water on the rubber seals to reduce friction.

2) Screw the Tip into the inner inner thread of the. Body. DO NOT use any tools, finger-tight is enough (NB. Fairly strong fingers are needed)! Over-tightening may damage the filter.

WATER SATURATION OF FILTER TIP

- 1) Lower the Filter Tip into a bucket, containing clean de-aired water.
- 2) Fit a yellow needle to a 20 ml syringe.
- 3) Connect the syringe via the centralizer and penetrate the rubber septa (see instruction on Page 1.)
- 4) Use the syringe for drawing water through the Ceramic Filter and the Filter Tip.
- 5) Draw a total volume of approx. 15ml through the Filter Tip.
- 6) IMPORTANT! Finish the water saturation procedure by SLOWLY PULLING OUT the needle, while SIMULTANEOUSLY MAINTAINING THE SUCTION in the syringe.
- 7) Maintain the Filter Tip submerged in water until installation in soil.



Installation of BAT MkIII Vadose Filter Tip (2-102).

PRE-AUGERING

1) The installation of the BAT Vadose Filter Tip requires pre-augering of a hole to the full installation depth.

The augered hole shall have a diameter slightly smaller than the diameter (26mm) of the BAT Vadose Filter Tip.

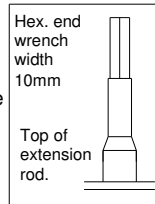
2) The BAT Vadose Filter Tip is supplied together with two augers having the following dimensions:

dia.	22	25	mm
length	300	300	mm

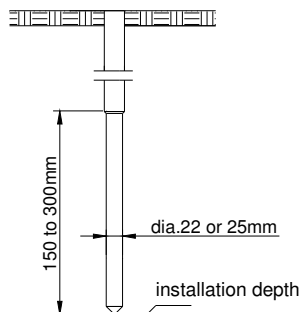
Extension rods (dia. 19mm) to the augers are supplied, having the lengths of 700mm and 1100mm.

Depending on the soil type, the 22mm auger (soft soil) or the 25mm auger (stiff soil) is used for pre-augering for the BAT Vadose Filter Tip.

The top of the extension rod has a hexagonal fitting with a "wrench-width" of 10 mm. Depending on the soil type it might be possible to use a strong electric drill for the pre-augering.

Pre-augering.

N.B. Pre-auger successively 0.3m depths in each turn. Measure and note the depth of pre-augering.



INSTALLATION OF BAT FILTER TIP

1) Fill the pre-augered hole with water to reduce the friction along the 1-inch adapter pipe (#3-107)

2) Connect the BAT Vadose Filter Tip to the 1-inch adapter pipe. N.B. Hand tighten only - no tools are needed.

Make sure that the O-ring at the shoulder of the Filter Tip fully seals inside the 1-inch pipe. Mark the pre-augered depth on the adapter/extension pipe (distance to be measured from the tip of the Filter Tip).

3) Push the 1-inch pipe gently down to the pre-augered depth.

Two pipe wrenches and the weight of two men would normally be enough for pushing down the adapter pipe to the pre-augered depth.

Tamp the soil at the surface around the 1-inch pipe to prevent surface water from running down around the 1-inch pipe.

4) Connect the BAT IS Sensor to the Filter Tip directly after installation to check the function the Filter Tip.

5) Wait for stabilization of the pore pressure. The stabilization process can be monitored by logging the pore pressure. Depending on the soil type the time needed for stabilization will normally be in the interval of approx. 1 - 24h.

6) When conducting permeability testing it is recommended to fill the adapter/extension pipe with clean water to reduce influence of eventual temperature fluctuations.

7) Seal the pipe with a cap for prevention against vandalism.

