

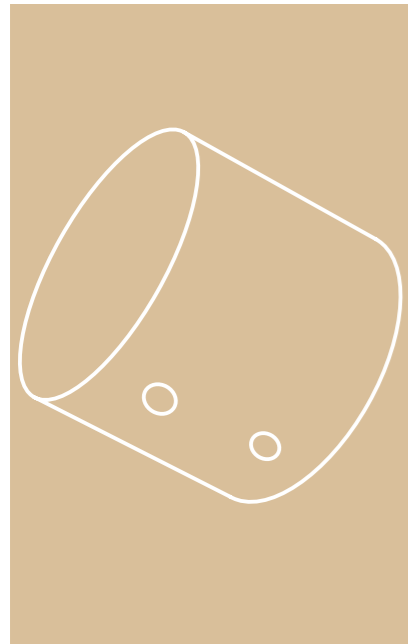


SOIL DRILLING AND SAMPLING

Soil drilling and sampling permits an insight into the structure of the soil. The horizontalisation of the soil, which already provides information on internal soil processes such as substance relocation, can be determined directly by visual means. Using soil samples the physical and chemical soil parameters to determine properties such as pore volume or hydraulic conductivity can be obtained in laboratory tests. A large number of different drilling devices and soil sample rings have been developed to cater to the different soils and the specific requirements placed on the samples. Corresponding accessories make the hard work of sampling easier and improve the quality of the samples.

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SOIL SAMPLE RINGS

Soil sample rings are used to take soil samples which are as undisturbed as possible for laboratory research such as to determine the pore volume, the hydraulic or pneumatic conductivity or water content. The hollow rings made of stainless steel have a cutting edge on one side. With this cutting edge facing down, they are pressed or hammered into the ground. The soil volume in the inside of the soil sample ring is removed with the soil sample ring and remains in it until investigated in the laboratory. The soil sample ring itself as well as lid on the top and bottom sides enclose the sample completely. This enables it to be transported practically and without disturbances. The soil samples with soil sample ring are removed quickly, easily and the samples obtained in this manner are essentially undisturbed. A further advantage is that a uniform volume is always taken from the soil with the same type of soil sample ring.

Undisturbed sampling with sample ring

Based on the patented UGT sampling method for large soil monoliths, UGT GmbH has developed this sampling device for soil samples with a sample ring size of 120 mm diameter and 120 mm height. Equivalent to the excavation technology for large soil monoliths the soil is pre-cut to minimise the forces impacting on the soil. The sample ring is firmly positioned in a stainless steel cutting sleeve studded with cutters. This cutting sleeve is driven by an electrical motor via a planetary gear so that the sample ring inside remains perfectly still while the cutting sleeve rotates to pre-cut the soil sample. The sample ring can then take in the detached soil sample accurately to shape.

The cutter unit and drive are mounted on a portable tripod which is vertically aligned and fixed in the ground at the sampling point. The large pneumatic tyres on the tripod permit a high degree of mobility in the field and therefore simple access to the sample points. An external power supply is required to operate the electrical motor. Appropriate generating units can be procured from UGT if required. Both stainless steel and plexiglass sample rings with the corresponding size can be used with this sampling device. Plexiglass sample rings enable subsequent computer tomographic examination and provide a visual impression



of the soil. For plexiglass cylinders a stainless steel cutting ring is put on to support the cutting effect.

Advantages

- Minimal influence of bedding
- Sample excavation irrespective of soil condition

Technical data

- Dimensions of overall assembly: 120 x 100 x 120 cm
- Weight of overall assembly: 38 kg
- Sample height/diameter (inner): 120 mm / 110 mm
- Sample volume: ~ 1140 cm³

Taking undisturbed samples from sample ring samples

With this sampling device, undisturbed samples with $\varnothing = 30$ mm can be excavated from 120 mm sample rings for higher resolution soil examinations in the lab. Amongst others, this enables examinations of the mesopores and the root distribution. Up to three 30 mm samples can be obtained simultaneously from one layer of the sample ring. The Plexiglass sample rings are placed in stainless steel cutting sleeves which pre-cut the soil before it is taken in the sample rings. The position of the cutting sleeves on their support is ad-

justable. Therefore the sampling point can be freely chosen on the surface of the 120 mm sample ring. The cutting sleeves are manually pressed in using a crank handle. In the cutting process, the sample is pressed out of the large sample ring from below by a die and pressed into the small sample rings. Thus the soil outside the small sample ring can expand and distortions caused by pressure on the small samples are prevented.



Technical data

- Dimensions/weight of overall assembly: 30 x 30 x 60 cm / 12 kg
- Sample height/diameter (inner): 30 mm / 30 mm
- Sample volume: 21 cm³

Advantages

- Undisturbed soil structure
- Examinations in the μm range possible

Hammering head for soil sample rings

The hammering head is an attachment used to hammer soil sample rings into harder soils with a hammer. The impact is distributed evenly over the complete edge of the soil sample ring. The hitting edge is also somewhat deeper and there are pressure compensation bore holes in the base plate of the hammering head. This per-

mits disturbances to the soil sample taken to be minimised. The hammering head is available for UGT soil sample rings with a volume of 100 cm³ and 250 cm³. A polyamide impact hammer is also available.



Soil sampler

Using the soil sampler, soil sample rings can be pressed into soft or medium hard soils without a hammer. It consists of a handle piece which is connected tightly with a ring holder using a bayonet connection. The soil samples may be taken both vertically from the soil surface and horizontally to a soil profile.



The soil sampler is suitable for UGT soil sample rings with a volume of 100 cm³ and 250 cm³.

Soil sample rings removal set

**Soil sample ring set, model A,
for soft soils to a depth of up to 2 m**

The sample sets with the suffix A are used to fill the soil sample rings in soft soil above the ground water table. The samples can be taken on the surface, in drilled holes or in profile pits. The open ring holder in this set is fitted with a bayonet connection and is driven into the soil manually.

The set among other items contains: an open ring holder, an

Edelmann and a Riverside auger, a handle and extension rods, an aluminium case with soil sample rings, various accessories and a carry bag.

The sample sets with the suffix A can be obtained for soil sample rings with a diameter of 53 and 60 mm.

**Soil sample ring set, model C,
for all soils to a depth of up to 2 m and soil sample ring set, model E**

The sample sets with suffix C and E, for very hard soils, can be used to take samples in virtually all soils. The samples can be taken on the surface, in drilled holes or in profile pits both above and below the ground water table. The closed ring holder in this set is fitted with a conical thread connection which means that the ring holder may also be hammered into the soil with an impact absorbing hammer. The set among other items contains: a closed ring holder, a handle with beating head, an Edelmann and a Riverside auger, extension rods, a hammering head with a guide cylinder, an aluminium case with soil sample rings and various accessories.

The sample sets with the suffix C can be obtained for soil sample rings with a diameter of 53, 60 and 84 mm. The most used diameter (standard) is 53 mm (E only available in \varnothing 53 mm). Soil sample rings are stainless steel rings made of seamless tubes, smooth inside and out. The bottom of the ring has a cutting edge. The dimensions, and thus the volume content of soil sample rings are exactly known which makes them highly suitable for laboratory research.

Soil sample rings

Soil sample ring 100 cm³

The soil sample ring with an inner volume of 100 cm³ has an internal diameter of 57 mm and is 40.5 mm high. The cutting edge on the lower side makes it easier to push the ring into the soil and reduces the disturbing effects.

Soil sample ring 250 cm³

Using these soil sample rings undisturbed samples may be obtained with a volume of 250 cm³ which are suitable for laboratory research. The inner diameter is 72 mm, and the height is 61 mm. A cutting edge on the bottom side facilitates pressing into the soil and reduces the disturbing effects. It is made of rust free stainless steel, is tough and durable.

Soil sample ring 1357 cm³

These sample rings allow an extremely large sampling volume. The inner diameter of the sample is 110 mm, while outer diameter and sample height are each 120 mm. They are suitable for use with sampling equipment for the excavation of undisturbed

Soil sample ring 21 cm³

These miniature sample rings have been designed specifically for sampling larger sample rings and should be used with the sampling equipment for undisturbed sample ring testing from UGT GmbH. They are made of plexiglass, and the height and inner diameter of the sample ring each measure 30 mm.

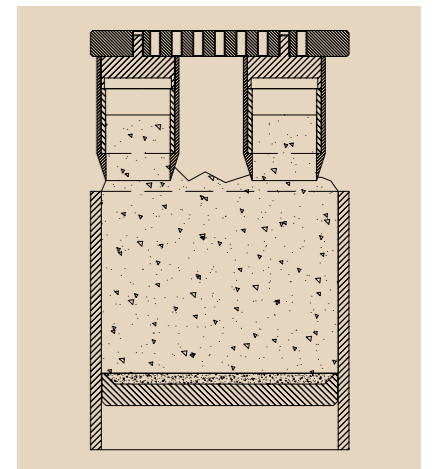
It is made of rust free stainless steel, is tough and durable. The soil sample rings are not numbered as standard. At customer request a continuous or customised numbering can be attached.

These soil sample rings are closed or come with two side holes so that they may be inserted directly into the ku-pF apparatus in order to determine the unsaturated hydraulic conductivity as dependent on water content.

The soil sample rings are not numbered as standard. At customer request a continuous or customised numbering can be attached.

samples with a sample ring from UGT GmbH and are available in V2A stainless steel or plexiglass. When using plexiglass sample rings with the sampling equipment, a stainless steel cutting ring is put on the rings to support the cutting effect. Matching lids are also available.

Matching lids are also available.





HAND AUGER EQUIPMENT

Hand auger equipment is available in different sets and also as individually compiled components and are made of a specially hardened high quality steel. Deeper drillings may be made by extensions with a bayonet connection or with a conical screw thread. A drilling depth of around 8 to 10 m may be achieved using hand auger equipment. The maximum drilling depth will depend on several factors including soil structure and properties of the material to be drilled.

Almost every soil type places special requirements on the model of the auger to be used. This is why several models have been developed during the course of a year which have been ideally designed for the specific requirements.

Hand auger types

- Edelman auger (in different versions for clay, sand and coarse sand)
- Riverside auger (hard, stiff soils mixed with fine gravel)
- Stony soil augers (for soils with a high gravel content)
- Spiral augers (to drill through hard horizons/layers, e.g. local stone)
- Stone catchers (to remove loose stones from the auger hole)
- Augers for soft soil
- Piston samplers (for less cohesive, wet soil layers beneath the ground water)



Connections

Bayonet connection

The advantages of the bayonet connection are rapid assembly and low weight. One disadvantage that only leads to problems for certain tasks is that the connection is without play. The bayonet connection is used as the standard connection.



Conical thread connection

The connection consists of an inner and outer thread and the parts to be connected. If the connection is tightened a strong join is made.



Ergonomic auger set

The ergonomic hand auger set for heterogenous soils is used to carry out manual drilling and sampling in a great variety of different soils in an ergonomically sound

manner. It is particularly suitable for general soil investigation (description of the layering, geology, mineralogy) and for environmental research.



Auger set for heterogenous soils

Drilling and sampling in homogeneous soils (soils with a uniform soil profile) can in almost all cases be executed with one type of auger. For drillings in heterogenous soils, several different auger types will be applied. With the standard set it is possible to execute manual drilling to a depth of 5 m without great physical effort. The standard set comprises different auger types, diameter 7 cm so that this set can be used successfully with all drillings in layered soil profiles. The set can be used for drilling above the water table in all soils, and below the water table in cohesive soils. The piston sampler is used for looser soils also below the ground water table.

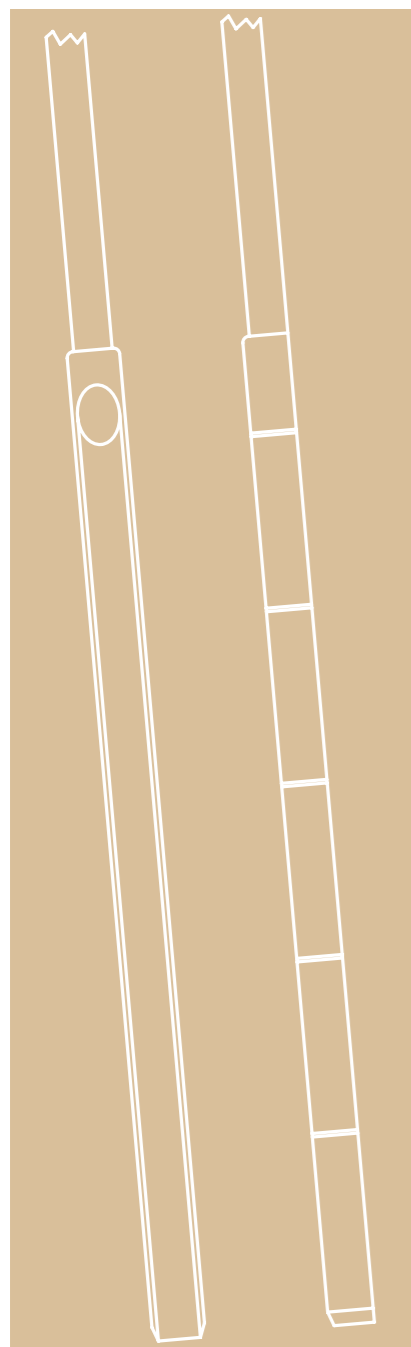
The auger set (with bayonet connection) comprises the following items among others: four types of Edelmann augers (clay, combination, sand, and coarse sand), a riverside auger, a stony soil auger, a spiral auger, a piston sampler and a gouge auger.



The set also includes the following:

Extensions, line search probe, submersible bell with tape measure, a pull and push piece, care material and a field map. This is all provided in an aluminium transport case.

This set is available both with bayonet connections or with conical screw thread connection!



GOUGE AUGERS

Hand operated equipment can be used for soil research up to a depth of 5 to 10 m. A number of augers are described in this section. Their common denominator is that they are all fitted with an almost half cylindrical operational part with parallel cutting edges running vertically, justifying the name gouge auger. The operational part may vary in length as well as diameter. The most suitable length depends on the penetration resistance, the substance of the soil and required drilling depth. The longer the operational part, the more vulnerable the auger is to torsion. The selection of the most suitable diameter will depend on the composition and the structure of the soil and on the purpose of the research. In general a smaller diameter is used in soils with a fine and/or dense structure than in soils with a loose structure (e.g. young swampy soils).

Advantages

The advantages of gouge augers compared to other hand auger equipment are as follows:

- A large profile overview per sample taken, due to the very long effective auger body.
- A large drilling area per hole so that large drilling depths can be quickly reached.

Areas of use

Due to the fact that the samples show very little disturbance, these gouge augers are frequently used for investigations for the following purposes:

- Mapping
- Soil suitability investigations
- Training
- Root investigations
- Fertiliser investigations
- Clay classification
- Palaeontological investigations

Groove auger

The groove auger is used to take soil samples and investigate the soil horizons. Under consideration of the different soil properties we offer this auger in two different versions.

The groove auger for heavy soil is particularly strong and torsion resistant. The core volume consists of a groove with a diameter of 12 mm which is laterally milled into the solid rod made of steel with special alloy.

The length of the groove is 1000 mm. The groove auger for light soils consists of a special steel tube with a diameter of 30 mm and wall thickness of 4 mm which is open at the sides. The groove of 1000 mm length has a diameter of 22 mm in this version.

The shaft can be extended up to 4 m using 1 m screw on pieces.

Advantages

- Favourably priced
- Tough
- Simple to use



Universal gouge auger - PÜRCKHAUER

Universal gauge augers particularly suitable for very hard and stony soils. A set with a gouge auger of the type PÜRCKHAUER with hammer and mechanical withdrawal system as well as accessories packaged in a strong carry case.



Bi-partite gouge augers

The bi-partite gouge augers can be extended by coupling an extension rod. In this way, drillings may be made very quickly and greater depths can be reached. A set with conical thread con-

nection for the sampling from harder soils with gouged augers, Edelmann augers, extension rods, impact absorbing hammer, push/pull handles, various accessories and a strong carrying bag.



Göttinger gouge auger

The Göttinger gouge augers have been developed for taking soil samples up to 90 cm depth, and are primarily designed for soil sample removal with N-min tests. The sampling is done by hand without the use of tools such as hammers or hooks.

The drill groove is manufactured from specially hardened steel adapted to the strong load, so that it is as thin as possible while still being robust and elastic. The sophisticated milled profile of the drill groove and the system of

three drills matched in diameter minimizes the frictional force for pressing into and pulling out of the soil.

This permits sampling using less force compared to conventional sampling equipment.

The Göttinger gouge auger set consist of three drilling rods (0-30 cm, 30-60 cm and 60-90 cm).



Gouge auger set for stepwise sampling

The set consists of three bi-partite gouge augers with different diameters. By first taking a sample with the gouge with the largest diameter and subsequently the gouges having smaller diameters, cross contamination among the samples is avoided. The gouge augers can be pushed into the soil or

hammered (with an impact absorbing hammer).

Because of the short operational length and the diminishing diameters, the set is very suitable for profile research (nitro research) in soils with a somewhat higher penetration resistance.



Lifter S-9000 / S-9002

The tough lifter makes it easier to lift hand operated drilling equipment with a cross borehole in the head. The tough and compact ap-

paratus uses a ball clamp made of steel. It weighs 4.5 kg or 7.6 kg and facilitates a lift load of up to 500 kg and 1000 kg respectively.

Technical data

	S-9000	S-9002
• Lifter:		
• Lift load [kg]:	500	1000
• Throughput [mm]:	-	22
• Total weight [kg]:	4.5	7.6



Root sampler

The root sampler has been specially designed for forest soils. The sampler itself consists of two half shells with a smooth cutting ring and a clamp flange which guarantees a tight connection of the two halves during drilling. To insert the sampler into the soil and to retrieve it easily, a head with cross borehole is screwed on for the insertion of a lever or lifter. During drilling the sampler as a full tube is particularly stable and the facility to open up one side of the tube provides easy access to the drilled core.

tube with a window permitting a view of the profile of the sampled core.

The standard version of the root sampler is made of rust free V2A steel, is 600 mm long and has a diameter of 80 mm. At customer request, the geometric dimensions can be altered and adapted to the specific uses.

Advantages

- Suitable for forest soils rich in roots
- Very tough
- Large sample core volume
- Large access to sample core

Set consisting of:

- 1 drill head made of two half shells
- 1 impact head with lever



A favourably priced alternative is offered by the one piece root sampler. This consists of a hollow

Soil column cylinders

The soil column cylinder has been developed to take undisturbed soil samples. This allows for a fast insight in the structure of the soil profile, the rooting potential, etc. Applying this system it is possible to take undisturbed samples with a length of 100 cm and a diameter of 93 mm, without digging a profile pit.

less steel soil column cylinder, a hand auger, an extraction system and 10 sample gutters.

Advantages

- Big sample length and diameter
- undisturbed soil column
- Large window for sub sampling or soil identification
- Mobile yet very powerfull



Moor probe (according to ILLNER)

The moor probe according to ILLNER has been designed for the taking of semi-homogenous samples during soil investigations in bog, soft sediments, peat land and also sampling in powdery and grainy substances. This sampler is used particularly in environmental research but also to investigate filter beds or palaeontological research and pollen analyses. It consists of an auger head made of stainless steel followed by a semi-cylindrical sampling vessel. The sampling vessel has a cutting edge and is concluded by an angular metal around the auger axis. The metal sheet protrudes a little on one side and similarly has a cutting edge so as to be able to take samples which have been mixed as little as possible.

The metal plate remains in this position due to its own resistance and therefore completely closes the sampling vessel. This can now be pulled from the soil and the sample withdrawn.

The length of the sampling vessel is 500 mm, producing a sample volume of approx 0.5 l with an inner diameter of 60 mm. The overall length of the moor probe is 1000 mm. Either a turn handle or extensions can be attached directly to this. Grips and extensions with spring connectors are provided for fast assembly/dismantling. The standard set contains 10 extension pieces each of 1 m in length.

On request, sets may also be compiled with the customised number of extensions.



Advantages

- To obtain samples from flowing, powdery and fine grained substrates

Set consisting of:

- 1 auger head for the moor probe
- 1 handle
- 10 extensions at 1 m each

Sediment core sampler, type Beeker

The Beeker sampler is designed for taking undisturbed samples from submerged soils. The samples are taken in a transparent tube. The original stratification of the sampled material is maintained. This enables a clear profile description to be made.

bucket and brush. The standard set is suitable for use in water up to a maximum depth of 5 metres. In some cases, deeper sampling is possible using additional extension rods.

The Sediment core sampler, type Beeker consists of: one transparent tube of 1 or 1.5 metres, piston and piston rod and battery powered pressure and vacuum pumps with extension hose, furthermore hammer and extension rods, non-stretch cord, sample

Advantages

- Takes samples fast and certain
- Not necessary to assemble and disassemble apparatus with every new sample



Soil sample ring

230150	Soil sample ring 100 cm ³	Ø 60 mm
230052	Soil sample ring 250 cm ³	Ø 72 mm
230056	Soil sample ring 1357 cm ³ V2A stainless steel	Ø 120 mm
230059	Soil sample ring 1357 cm ³ acrylic	Ø 120 mm
230065	Soil sample ring 21 cm ³	Ø 30 mm

Soil sample ring-removal-set

235000	Soil sample ring removal set Model A for soft soils	
235001	Soil sample ring removal set Model A for soft soils	Ø 60 mm
235002	Soil sample ring removal set Model C for all soils	Ø 53 mm
235003	Soil sample ring removal set Model C for all soils	Ø 60 mm
235004	Soil sample ring removal set Model C for all soils	Ø 84 mm
235005	Soil sample ring removal set Model E for hard soils	Ø 53 mm

Hammering head for soil sample rings

230060	Hammering head for soil sample rings	Ø 60 mm
230061	Hammering head for soil sample rings	Ø 72 mm

Ergonomic auger set

230040	Ergonomic auger set with bayonet connection	
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Soil sampler

235100	Soil sampler 100 cm ³	
235200	Soil sampler 250 cm ³	

Auger set for heterogenous soils

230038	with bayonet connection	
230039	with conical screw thread connection	

Groove auger

231100	for heavy soils	
231200	for light soils	

Universal gouge auger - PÜRCKHAUER

230042	Universal gouge auger - PÜRCKHAUER	
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Bi-partite gouge augers

230043	with conical screw thread connection	
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Göttinger gouge auger

232310	Set of Göttinger gouge augers, consisting of: 1 gouge auger for each of the three sampling depths (0-30cm), (30-60cm) and (60-90cm)	
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Gouge auger set for stepwise sampling

230041	with conical screw thread connection	
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Lifter

230029	S-9000	
230030	S-9002	

Root sampler

234100	Root sampler bi-partite	
234200	Root sampler one part	

Soil column cylinder auger

235010	Soil column cylinder auger, type Stiboka
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Moor probe (according to ILLNER)

230200	Moor probe (according to ILLNER)
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Sediment core sampler, type Beeker

235006	Sediment core sampler, type Beeker
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ORDERING DETAILS

Description	Usable for
Lifter S-9000 For the easier lifting of samples from the soil	• Hand augers with cross bore-hole in the hammer head
Lifter S-9002 For the easier lifting of samples from the soil	• Hand augers with cross bore-hole in the hammer head and probe rods with a max. diameter of 22 mm
Screw-on hammer head Ø 40 mm with cross bore hole for steel lever	• Groove auger
Steel lever Ø 16 mm Chromed, with PVC handle	• Groove auger
Chromed extension pieces For auger shaft 1000 mm	• Groove auger
Polyamide hammer 4 kg	
Polyamide hammer 5 kg	
Simplex hammer 3 kg	
Simplex hammer 5 kg	
Simplex hammer 7 kg	

ORDERING DETAILS