



**ROYAL Eijkelkamp**  
Meet the difference

## Soil & Water Highlights



*Meet the difference*









## Solutions for soil and water research

For over 110 years Royal Eijkelkamp makes a difference worldwide by developing, producing and delivering solutions for soil and water projects. We are involved in soil and water related projects within the themes: Land Degradation, Food Security, Urbanisation, Pollution, Land Development and Natural Resources.

In this brochure we highlight some essential products for soil and sediment sampling, ground water sampling and field measurements. The similarity between the products listed here is that they have all been included in our product range for decades and have proven their worth. The highlights listed in this brochure are manufactured by our own craftsmen in Giesbeek, the Netherlands, and therefore meet your and our high quality and sustainability requirements.

**In addition to the Eijkelkamp's soil sampling and research equipment mentioned in this brochure, we also offer:**

- Augering & Soil sampling equipment
- Laboratory equipment
- Sensors & Monitoring
- (Ground-) water samplers
- Sediment samplers
- Manure technology
- Field measuring equipment
- Consumables

Visit [royaleijkelkamp.com](https://royaleijkelkamp.com) or contact [sales@eijkelkamp.com](mailto:sales@eijkelkamp.com) for more information.



## Augering & Soil sampling equipment

### Hand auger equipment

Hand auger equipment is most suitable for soil research. As almost any type of soil sets its own demands where it requires an auger to be applied, over the course of the years many models have been developed. Years of experience and many contacts with soil researchers at home and abroad made it possible to achieve the optimum design for various types.

By applying handles and extension rods with a bayonet- or a conical threaded connection (c.sc.) augering to greater depths is made simple. With hand auger equipment a depth of 8-10 meters can realistically be achieved. The maximum boring depth strongly depends on various factors such as: depth of the groundwater, the soil profile, the characteristics of the material the auger has to pass through.

### Auger types



#### Edelman auger clay type

Clay soils are very cohesive. Therefore the blades of the clay auger can be narrow, having the advantage that they meet with little resistance.



#### Edelman auger sand type

Sandy soils are not cohesive. To keep the sample inside the auger, this type has broad blades.



#### Edelman auger coarse sand type

Coarse sand soils and extremely dry sand soils have little or no cohesion at all. The blades of this auger are extended with extra wings, thus forming an almost closed auger.



#### Edelman auger combination type

The combination auger type gets a reasonably good hold of sandy material while clayey material can be fairly easily removed from the auger body.



## Augers



### Riverside auger

This design is most suitable for augerings in hard, stiff soils, mixed with fine gravel. The very sharp extremities of the auger bits point at a downwards angle. This design makes the auger go through the soil easily.



### Stony soil auger

This auger is used for soils with a large gravel content. The auger body for stony soils consists of a heavy steel strip, vaulted all along, which is bent double by forging. The pointed cutting section of the strip are bent outward, thus creating a hole significantly wider than the average body diameter. The stony soil auger is used when the Riverside auger is not yielding adequate results in coarse gravel soils.



### Soft soil auger

The soft soil auger is a special type of Edelman auger. It has an extended auger body (sensitive to torsion) and is only suitable for sampling very soft (clay) soils. The extendable auger parts can be supplied with a bayonet or screw thread connection.

## Benefits

- High tensile strength forged auger bodies
- Perfect auger body shapes for optimal drilling
- Non toxic steel for all types of analyses
- Rapid connectible extension rods



### Stone catcher

The stone catcher is used to remove loose stones from the auger hole.



### Spiral auger

The spiral auger operates similar to a corkscrew and does not cut off the soil. The auger is usually applied when hard layers need to be penetrated.





## Hand auger sets

Most augers are available as one-piece and two-piece (extendable) version. For your convenience several standard sets are available. Hand auger equipment is supplied in five different types of complete standard sets: ergonomic auger set with special ergonomic T-handle, basic hand auger set with bayonet connections, basic hand auger set with conical screw thread connections (c.sc.), geological prospecting kit in carrying bag (backpack) and a hand-operated bailer boring auger set.



### Ergonomical auger set (0111SE)

The ergonomic hand auger set for heterogeneous soils is used to carry out manual drilling and sampling in an array of different soils in an ergonomically sound way. It is particularly suitable for general soil investigation (description of the layering, geology, archaeology) as well as taking samples for activities such as environmental research. It can carry out drillings to a depth of 5 m, depending on the depth of the groundwater, the build-up of the soil and the nature of the material to be drilled into.



### Auger set for heterogeneous soils (0111SO)

For augerings in heterogeneous soils (soils with a layered soil profile), several different auger types will be applied. This led to the composition of an auger set for heterogeneous soils. With the standard set it is possible to execute manual augering to a depth of 5 m, with little effort. The standard auger set comprises different auger types, diameter 7 cm, so that this set can be used successfully with augerings in layered soil profiles. The set can be used for augerings above the water table in all soils, and below the water table in cohesive soils.







### Auger set for heterogeneous soils (0111SZ)

This auger set for heterogeneous soils is similar to the set above, but with a connection based on the male and female threads on the parts to be coupled: the conical screw thread connection.



### Prospecting kit for geological surveys (0116)

The kit can be used for augerings in heterogeneous soils (agricultural and environmental soil research), to improve the mobility it comprises of fewer auger types. Therefore it can be transported in a backpack. With this standard kit it is possible to execute manual augerings to a depth of 7 m, with little effort. The set is also used to drill shotholes by hand in areas with difficult access. Each seismic field crew should have a set available for scouting and drilling purposes. The backpack ensures quick mobilisation and quicker tracking in the bush.



### Hand-operated bailer boring auger set for heterogeneous soils (0112SA)

The standard bailer boring auger set is suitable for augerings to a depth of around 7 meters. In addition to exploratory soil augering and sampling - this set is most suitable for - inserting monitoring well pipes for groundwater level measurements and for sampling. This compact set easily transported and is simple to use in the field. It can be used by one person. The bailer, an essential part of the set, is a stainless steel tube with a stainless steel or synthetic valve on the lower part. By moving the bailer rapidly up and down loose material will collect in the bailer. In principle, this takes place below the tube where space is available. This allows the casing tubes to be pushed deeper into the ground. The casing tube platforms are used in combination with the tube clamp, in this way bailing and driving in the casing tubes can be done in a more ergonomic way.



## Gouge augers

Gouge augers are a special group of core samplers that are used for samplings to a depth of 5 to 10 meters. In contrary to other manufacturers the gouge augers of Royal Eijkelpkamp are not made out of tube material, but out of forged high grade steel, hardened and formed in an almost half cylindrical shape with parallel cutting edges running vertically. The tools are available in different lengths and diameters, extendable and non-extendable. The most suitable length and diameter depends on the

penetration resistance, the substance of the soil and the required boring depth. Gouge augers are supplied in various types and sizes. Which one to use depends on the goal of the research, the soil type and conditions. The single, one-piece (non-extendable) soil core sampler sets for sampling to a depth of 1 meter or two-piece (extendable) soil core sampler sets with bayonet or conical screw thread connection (c.sc.) for sampling up to a depth of 5 meter.

### One-piece gouge auger set (0401SA)

A set for sampling more or less soft soil layers with two gouge augers with different lengths but the same diameter, packed in a strong carrying bag.



### One-piece gouge auger set, hard soils (0401SB)

For sampling of tougher layers a set is available with a gouge auger of a heavier design, an impact absorbing hammer and accessories plus a carrying bag.



### One-piece gouge auger set Pürckhauer (0401SC)

A set for sampling very hard soils and soils containing gravel. The Pürckhauer type gouge auger has a tapered outside profile. The special hammer and mechanical extraction system enable an easy extraction. The set is supplied with accessories and a strong carrying bag.



## Root samplers

The root samplers are available in a one-piece and two-piece (extendable) version. The one-piece version is used in soils with low penetration resistance and takes 15 cm long samples till a depth of 1 m. The sample is pushed out by a rod with extruder plate. The extendable root auger can also be applied to take samples in heavier soils using an impact absorbing hammer, sample length is also 15 cm and the depth that can be reached is approximately 2 m. The extendable root auger is fitted with a sample extruder unit which forces the sample from the cylinder of the auger.

### Advantages

- Minimal ground disturbance in built-up areas.
- Almost completely undisturbed soil sampling.
- Because of the robust, heavy construction also suitable for heavier soils.
- The samples taken are equal concerning surface and contents.
- Less disturbance (and faster operation) by comparison to digging a profile pit.





### Two-piece gouge auger set, bayonet (0402SA)

A set with a bayonet connection, an Edelman auger and gouge augers with various lengths and diameters, extension rods, handle, accessories and a strong carrying bag for transport in the field. The set is suitable for sampling a maximum depth of 5 m.



### Two-piece gouge auger set, c.sc. (0402SB)

Similar to the set mentioned above, but with the conical screw thread connection. The set is suitable for sampling a maximum depth of 5 m.

### Two-piece gouge auger set, c.sc. (0402SC)

A set with conical screw thread connection for sampling more solid layers of soil with gouge auger, Edelman auger, extension rods, hammer with nylon heads (impact absorbing design), push-/pull handles, various accessories and a strong carrying bag for transport in the field.

### Gouge auger set for stepwise sampling (0404)

The set consists of three two-piece gouge augers with different diameters. By first taking a sample with the gouge with the largest diameter and subsequently with 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 most suitable for profile research (nitrate research) in soils with a somewhat higher penetration resistance.



### Gouge auger set for top layers (0406)

Another special set is the gouge auger set for top layers. A correctly dosed fertilization is a condition for high yield and good quality. From economic and ecological perspectives it is therefore necessary to check the state of the soil. After analysis of the samples taken with this set it is possible to determine a fertilization program. Because of their operational length and small diameter the included gouge augers are most suitable for sampling of the top layers of arable land, in particular for a nitrate- or a fertilization research, etc.



#### Advantages

- Non toxic high tensile strength steel
- Large diameter for nice samples from soft soil
- Small diameters for medium to soft soils
- Perfect for rapid soil profiling



## Undisturbed samplers core samplers

**A successful laboratory analysis starts in the field. The result of an analysis is as good as the representativeness of the soil sample used. The sampling procedure is fundamentally determined by the analyses that need to be executed on this sample. Sometimes a fast profile description is important, sometimes an accurate chemical analysis or the volume percentage of humidity in a sample needs to be determined accurately.**

Undisturbed samples can also be taken in a synthetic liner applying a stainless steel core sampler with sample tube and cutting head. By using sample liners it is easy to remove the undisturbed sample from the sampler tube. The sample, still in the liner, is stored in a container which can be sealed, for transport to the laboratory.

### **Samples are suitable for:**

- Soil fertility determinations
- Judgement of soil structure
- Volume weight determinations
- Determination of granular composition
- Soil technical measurements
- Field education

Various types of liner samplers are available for surface or deeper sampling, varying in diameter and length. We only highlight a few sets.

### **Liner sampler sets (0415SA & 0415SB)**

There are two sets of liner samplers available:

- 0415SA for more or less soft soils
- 0415SB for use in hard soils.

By using liners in the sampler, it is easy to remove the sample which is almost undisturbed. The sample, still in the liner can be stored in a container which can be sealed for transport to the laboratory. The sets contain, among other things: a hand auger for pre- and clean boring of the auger hole, the core sampler with the sampler tubes and soil sample containers and maintenance equipment.



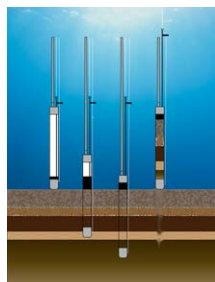
### **Soil coring kit for chemical soil research (0416)**

The set is used for undisturbed sampling in thin-walled stainless steel tubes for the determination of very volatile components such as benzene, toluene, xylene & chlorinated hydrocarbons volatiles. The sampling tubes preferably are pushed into the soil; possibly a steel hammer with nylon heads can be used. With the special coring kit, volatilization and oxidation of components in soil samples can be prevented as much as possible. The sample tubes can be easily sealed to prevent loss of volatiles during transport. The sample has a volume of 226 ml. The set therefore also is suitable for the determination of volume percentages of humidity in samples from undisturbed soil. After decontamination the equipment can be used again.





## Sediment sampling



Sediment is in fact soil, but it is often weak in composition because it is saturated with water and the soil particles usually consist of the fine fractions with organic matter. Sediment is often described in the mode of how it occurs. Three terms are often used for this: aqueous sludge, stab-proof sludge and solid sludge. The sediment is located somewhere below the bottom and under the water column. This requires the use of specific tools. Various types of liner samplers are available for surface or deeper sampling, varying in diameter and length. We only highlight a few sets.

### Sediment core sampler type Beeker

The sediment core sampler type Beeker for high accuracy sampling of very soft to medium hard sediment layers (supplied in two different sets). The sediment core sampler type Beeker has for years been the best solution for taking undisturbed samples from submerged soil. The samples are taken in a transparent tube. The original stratification of the sampled material is maintained. This enables a clear profile description.

#### Advantages

- No loss of sample in any case
- Cutting head can be closed with air pressure
- Piston assures identical core sample length
- Can be hammered to sample all sediments
- For sample lengths up till 150 cm
- Transparent: Easiest profile description
- Contaminant free stainless steel body
- Set B allows for 10 cm sub sample transfer

**Note:** the sampler cannot be used in unsaturated sediments.



### Van Veen grabs

The stainless steel Van Veen grabs are used for taking disturbed samples from the bottom of lakes, rivers, etc. Various designs can be supplied. The smaller designs are manually controlled. The mode of operation of all Van Veen grabs is the same. At the surface the jaws are pushed open and kept in that position by a hook. Both jaws are fitted with holes to allow air to escape during the sinking. As soon as the jaws touch the bottom, the hook loosens its grip, so that, when hoisting the rope again the jaws will shut tight because of the leverage by the rods. It is recommended to take at least 6 samples from every location and to base your conclusion on the total of the samples.

### Multisampler

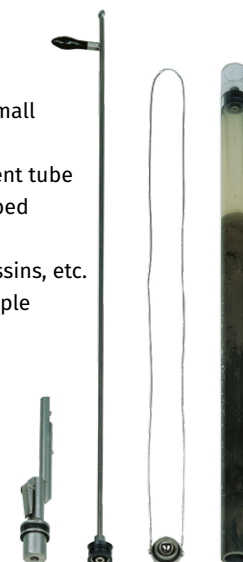
The Multisampler is used to take undisturbed core samples (1 m) of relatively soft sediments at shallow depths. Using the Multisampler it is possible to take anaerobe samples in a wide variety of wet materials, solid as well as fluid. Using the piston rod (usually extended by means of a wire-line) it is possible to move the piston in the sampling tube while this tube is held stationary. In this way the original stratification of the sampled material is maintained.

#### Advantages

- For sediment sampling with a small budget
- Professional tool with transparent tube
- Open cutting head for undisturbed samples
- Ball valve to sample sewers, bassins, etc.
- Piston assures perfect core sample length

#### Remarks

- No hammering possible
- Loss of sample in watery or coarse sediments
- Cannot be used in unsaturated sediments



#### Advantages

- Fast indication of sediment type
- Four sizes to suit any need
- Inert stainless steel construction
- Anyone can do the job



## Groundwater sampling

Groundwater is sampled to determine the chemical composition directly in the field or in the laboratory. The pumps are used to sample in monitoring wells or open water.

### Peristaltic pump 12 VDC Advanced (1235SB)

This peristaltic pump suitable for field use is battery-powered and microprocessor controlled. The microprocessor provides adjustable constant speed, overload protection and various external control functions. A built-in maintenance-free 12 Volt lithium-ion battery (10 Ah) makes it possible to use the pump for two to five hours at a time (depending on the load). The housing is the highest degree splash-proof (IP 66) and can function safely and without problems in the field.



#### Advantages

- Contemporary design
- Digitally controlled peristaltic pump
- Stable pump speed with a constant flow rate between 50ml-2000 ml/minute
- Battery indicator
- Suction head up to 6-9 meters
- Designed for long and frequent use
- To be used with the prescribed silicone tubes
- Basic tool for all groundwater research
- Display of rotations per minute and battery percentage
- Ideal for purging and sampling with the low-flow sampling method of groundwater monitoring wells



### Submersible pump MP 1

The MP 1 is a 2" environmental pump used for water monitoring. You can collect groundwater samples for analysis from depths down to 90 m to establish the precise type and degree of contamination. The MP 1 submersible pump is specially designed for purging and sampling of monitoring wells with a diameter of at least 50 mm or bigger. The pump motor is controlled by an adjustable frequency converter. Due to the variable setting of the frequency, the capacity of the pump can be adjusted from 0 to 2 m<sup>3</sup>/hour. This results in a steady flow of anaerobe water. The high capacity of this pump allows for quick purging of the measuring point. By setting a low pumping capacity the same pump can be used for sampling. Built-in safeguards protect the MP 1 and the converter against overload. The actual frequency can be read from a display.

#### Advantages

- High top capacity for purging, smooth flow for sampling
- Compact and easy to install; mobile
- Resistant against corrosive fluids
- Pumped medium only in contact with stainless steel and Teflon
- Anaerobe sampling
- Simple cleaning procedures







## Quality monitoring wells

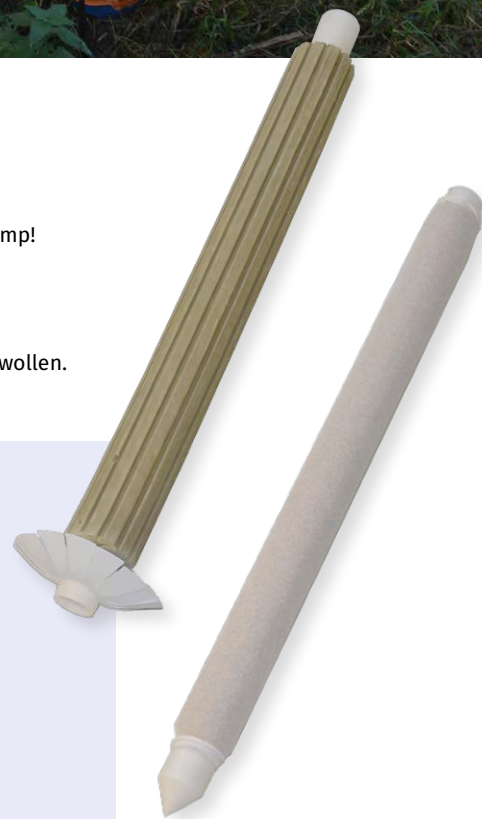
Fast and accurate installation of a monitoring well with prepacked filter sand and bentonite collar? The solution: a quality monitoring well from Royal Eijkelkamp!

### The quality filter consists of three elements:

1. Plain pipe with (fixed) bentonite collar with high swelling capacity.
2. Sand catcher to prevent sand from flowing past the filter before the collar is swollen.
3. Ready-to-use filter pipe with prepacked filter sand fixed by filter gauze.

### Advantages

- Easy and fast installation: save time and money!
- Reliable hydrological sealing of sealable layers, swelling capacity (63 mm version) Ø 180 mm (7 inch).
- Prevents spreading of contamination in polluted area research
- Complies with KIWA standards for environmental soil research
- International and widely used sizes of monitoring well
- Bentonite guaranteed in the right place
- Clean way of working
- Loose filter pipe, filter gauze or filter sand no longer required
- Perfect centring of the filter pipe
- With 63 mm version easy access for MP1 sampling pump and other sampling pumps





## Field measuring equipment

For planning and execution of environmental research, agricultural-, civil-, and rural engineering projects, etc. it is often required that the area concerned is carefully studied and surveyed. Because of the importance of this soil physical research it is necessary that reliable equipment is used. Royal Eijkelkamp included a great number of general field instruments in its package.

### Hand penetrometer Eijkelkamp

The hand penetrometers, used to determine the resistance to penetration of a soil, are supplied in 2 sets and can be used for probing to a depth between 1 and 3 m. Both sets contain various cones, probing- and extension rods, a measuring instrument with pressure gauge, tool set, cone check, calibration certificate and instruction manual. The measuring range of the pressure gauge is 10000 kN/m<sup>2</sup> (=10000 kPa). The scale range runs from 0 up to 1.0 kPa. The accuracy is +/- 8% in the advised measuring range. The resistance measured by the cone can be read from the pressure gauge. The maximum resistance recorded during measurement is indicated by the red dragging pointer.



#### Advantages

- Compact and complete.
- Easy to operate.
- Little maintenance.

### Penetrograph

The penetrograph is a device for determination and registration of the penetration resistance of the soil to a depth of 80 cm. The standard set is equipped with various penetration cones, recorder pens, probe rods and recording charts. The entire set, including spare parts, instructions, cone check and the tools are packed in a transport case. The measuring range is up to 5000 kN/m<sup>2</sup> (= 5 MPa). The penetrograph is self-recording. The principle of the measurement is based on the compression of a calibrated spring, while at the same time the chart is moved in proportion to the depth by the drive pulley.

#### Advantages

- Writes obtained forces with depth on chart
- Shows disturbing (compacted) layers
- Weather proof charts
- One-push measurement



### Penetrologger

The penetrologger measures the resistance to penetration of the soil and saves the measuring results digitally. The penetrologger is ergonomically designed, lightweight and easy to use. It can be used to measure to a depth of 80 cm. The penetrologger values are expressed in MegaPascals (MPa) and Newtons (N) as a function of depth. It also evaluates the Cone Index (CI). The penetrologger comprises an accurate internal GPS-system to determine the exact measuring point.

Optionally, a soil moisture sensor can be connected to make a one point measurement and record the soil moisture percentage at the measuring point. The soil moisture data is stored together with the coordinates and the measured resistance to penetration.

#### Advantages

- Robust design
- Precise and fast internal GPS
- Moisture percentage per measurement
- Display of Vehicle Cone Index
- Memory for 1500 measurements
- Definition of numerous different projects
- Velocity indicator stimulates correct pushing
- Field and office programmable/read-out



## Sand ruler

A sand ruler is a disc made of transparent material with standard (specimen) samples. It is an excellent indicative aid in determining the particle size distribution. Of the sample to be tested a representative part is rubbed dry with the fingers in the palm of the hand.

The sample is then placed in the hollow area in the center of the ruler. The average grain size is now judged by comparing the average grain size of the sample with the specimen in the ruler. The sand ruler is available with different fractions.



**The measure of infiltration of water into the soil is an important indication concerning: the efficiency of irrigation and drainage, optimizing the availability of water for plants, improving the yield of crops and minimizing erosion.**

## Double ring infiltrometer

The double ring infiltrometer is a simple instrument that is used to determine the rate of infiltration of water into the soil. The rate of infiltration is determined as the amount of water per surface area and time unit, that penetrates the soil. The standard set includes a number of sets of stainless steel rings with different diameters. Several measurements can be executed simultaneously, yielding a very reliable and accurate result. As vertically infiltrated water runs away to the sides, the outer ring of the infiltrometer serves as a separation. The measurements exclusively take place in the inner ring through which the water runs virtually vertical. The ring infiltrometer may be used for determining the rate of infiltration and capacity for irrigation and drainage projects, studying drainage, determining the intensity of artificial precipitation and the effect of treatment of the soil.

### Advantages

- Ideal for infiltration measurement of top soils
- Perfect for flood/furrow irrigation advice
- Triple rings for a representative average
- Everlasting stainless steel rings



## RBC flumes

The RBC flume has been specially designed for use in smaller water ways or earthen channels (irrigation channels, in- outlets, furrow, ditches, etc.). The RBC flume is a simple and reliable instrument for the measurement of the quantity of irrigation water that flows towards a field. The standard program contains flumes with various measuring ranges, varying from 0.1-8.7 l/sec to 2.0-145 l/sec. On special order larger measuring ranges are possible as well. Using standard formulas the flow through quantity (the discharge) is calculated. Instead of reading the stilling well it is possible to install a pressure transducer connected to a datalogger.

### Advantages

- Easy installation.
- User friendly.
- Light stainless steel construction.
- Measuring results can be read easily.
- Four standard sizes to cope all research needs
- Information regarding discharge velocity available fast
- Can be combined with sensitive datalogger





### **More products**

Only a very small part of Eijkelkamp's soil sampling and research equipment is included in this brochure

**Visit our website [royaleijkelkamp.com](http://royaleijkelkamp.com) for more information on:**

- Augering & Soil sampling equipment
- Laboratory equipment
- Sensors & Monitoring
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