

OPERATING INSTRUCTIONS

04.04 GOUGE AUGER SET FOR STEPWISE SAMPLING

On these operating instructions



If the text follows a mark (as shown on the left), this means that an important instruction follows.



If the text follows a mark (as shown on the left), this means that an important warning follows relating to danger to the user or damage to the apparatus.

Description

The standard gouge auger set for stepwise sampling consists of three bi-partite gouge augers, an impact absorbing hammer and accessories, packed in a sturdy carrying bag. The augers consist of a bottom part with a cutting edge and a short handle with beating head. The whole is fitted with conical threaded connections.

Gouge augers have an almost half-cylindrical cutting head with parallel cutting edges running from top to bottom. All three gouge augers in this set have a different diameter: 20, 30 and 40 mm. The augers all have an operational length of 25 cm and their respective overall lengths are 115, 85 and 55 cm.

All bottom parts standard are fitted with a short handle with beating head. The handle is fitted with rubber handles for more grip.

The augers are made of high grade steel which prevents torsion (twisting) of the auger body if used properly. For the benefit of environmental research neither of the auger body is lacquered.

The impact absorbing hammer has no rebound as it is filled with lead pellets which move in the direction of the blow as soon as an object is hit. Because of the impact-proof nylon caps the gouge auger is not damaged.

Method

Stepwise sampling takes place by first taking a sample using the auger with the largest diameter

(0 - 30 cm below the surface). Subsequently a second sample is taken (at a depth of 30 - 60 cm) and finally the narrowest auger is used to take a sample (at a depth of 60 - 90 cm). It is permitted to apply beating power to hammer the gouge auger into the soil.

By the decreasing diameters the gouge augers only meet the friction of the layer the sample is taken from. In addition cross contamination (soil particles) from overlaying layers in the next sample is prevented which increases the reliability of the results.



Use of the gouge augers

1. Connect the bottom part with the auger body to the handle.
2. Push or hammer the gouge auger into the soil.
 - ❑ Without beating power: The gouge auger is pushed vertically in an upright position (without revolving the auger) into the soil. In one single push a sample can be taken with a maximum length of 30 cm (see illustration).
 - ❑ Using beating power: Place the gouge auger vertically on the soil or in the bore hole and stabilise it using one hand on the grip. Next beat the beating head using the impact absorbing hammer. Application of this hammer allows for dosed force preventing the sample from getting unstuck from the gouge auger.



If beating power is required, always use the impact absorbing hammer. This is safer and prevents damage to the auger. Never use a metal hammer. This may damage the auger and may cause injury resulting from the rebounding of the hammer.

3. After insertion the gouge auger must be revolved in order to cut loose the sample volume.



Revolving the full gouge auger simplifies pulling it up and prevents loss of sample. Revolve the auger completely around its axis without pushing it further down.

4. Gently pull the full auger while turning it slowly. The twisting motion prevents loss of sample as it relieves the possible suction (under pressure) under the auger.



Retrieve the auger while keeping your back straight and lifting from the knees in order to avoid back injury.

5. The cylindrical soil column is cut off along the cutting edges of the auger body with a bent spatula. The remaining sample is almost undisturbed.

6. The gouge auger is emptied by pushing the sample outward using a spatula (spherical side upwards). Use the narrow spatula for the narrowest auger.



Use the bent spatula for emptying the gouge auger. Make sure to keep your fingers away from the cutting edges. The cutting edges of the gouge are very sharp and may cause injury if not applied properly.

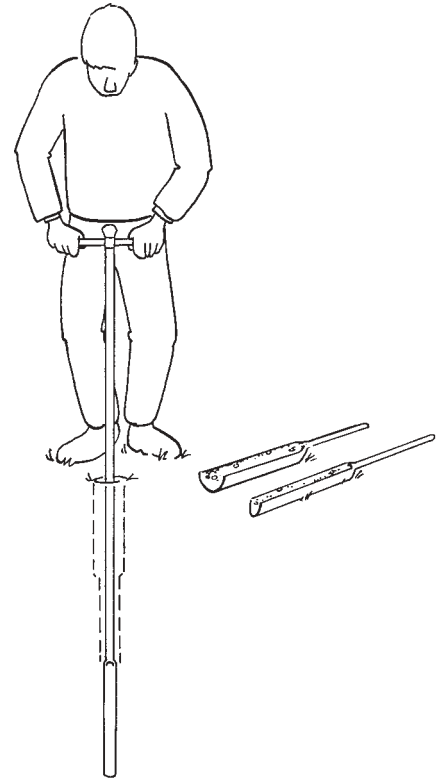
Notes:

- ❑ If the gouge auger is subject to a lot of vertical resistance then the horizontal resistance will be high as well. The risk of torsion of the cutting edge during the revolving is thus increased. Solve this problem by revolving the gouge auger every now and again before pushing it further down.



Never force the gouge auger. Such action may cause serious damage.

- ❑ In order to be able to take sample deeper pre-augering may be required or an other type of auger must be applied, for instance an Edelman auger or a different type of gouge auger. Using extension rods it may be possible to take a sample at a different depth.



Applications

Because of their short operational length, the reduction of diameters and the possibility to use beating power, the gouge auger set for stepwise sampling is suitable for sampling almost all soils (except rocky soils)

The stepwise sampling method is particularly applied in case of:

- Profile research in agricultural soils in particular in arable soils.
- Nitrate determination.
- Fertilisation research.

The sample length of 30 cm approximately agrees with the ploughing depth. The depth of 90 cm which can be reached is approximately the depth up to which nutrients in the soil influence the crop.

Problems and solutions

- Pushing the auger down requires a greater physical effort as the gouge auger meets substantial resistance. Solve this problem by revolving the gouge auger every now and again before pushing it further down or by taking a shorter sample.
- Loss of sample occurs during insertion. This can occur because the sample is cut loose (by revolving) from the soil too often while pushing the auger down, so it loses cohesion. A change of soil type to a less cohesive type of soil may also cause this effect.
- The connection between handle and bottom part is running stiff. Keep the threaded connection clean after use.
- Corrosion of the parts stored in the carrier bag. Only store dry equipment in the bag as the bag has no ventilation. The rust will largely disappear again in use.

Maintenance

- Keep the material clean during and after use by rinsing the contamination with water. Use a stainless steel brush for cleaning the threaded connections.
- Clean the augers after use with tap water and allow them to dry. Store the dry equipment in the carrier bag.
- The cutting edges require no sharpening. They become sharper in use. Rust normally is not harmful as it disappears in use.

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