

OPERATING INSTRUCTIONS

14.08 FIELD INSPECTION VANE BORER

INTRODUCTION

The Heavy Field Inspection Vane Borer is designed as a portable equipment which is relatively easily carried.

The vane borer consists of:

The lower part, slip-coupling H-701, part No. 21503 allows the rods to be turned 180° before rotating the vane.

The instrument, H-700, part No. 21501 is torque key with a maximum pointer, which will remain at the maximum torque measured. The dial has two scale readings, both in kPa. (The instrument should not be used at very small torques, less than 10 kPa. When using the standard vane H-704 (75.8x151.6 mm), the shear strength is read off the inner scale. When the smaller vane H-703 (60x120 mm) is used, the reading is read off the outer scale. Please note that the vane tester should not be used for higher shear strengths than respectively 80 and 160 kPa (with the standard, respectively small vane), otherwise the slip coupling can be overloaded and damaged. The manufacturer of the instrument guarantees this correct within $\pm 3\%$ of full scale.

Drive head, part No. 10900.

Adaptor, H-702, part No. 21502 which is an item which will fit the instrument and the drive head.

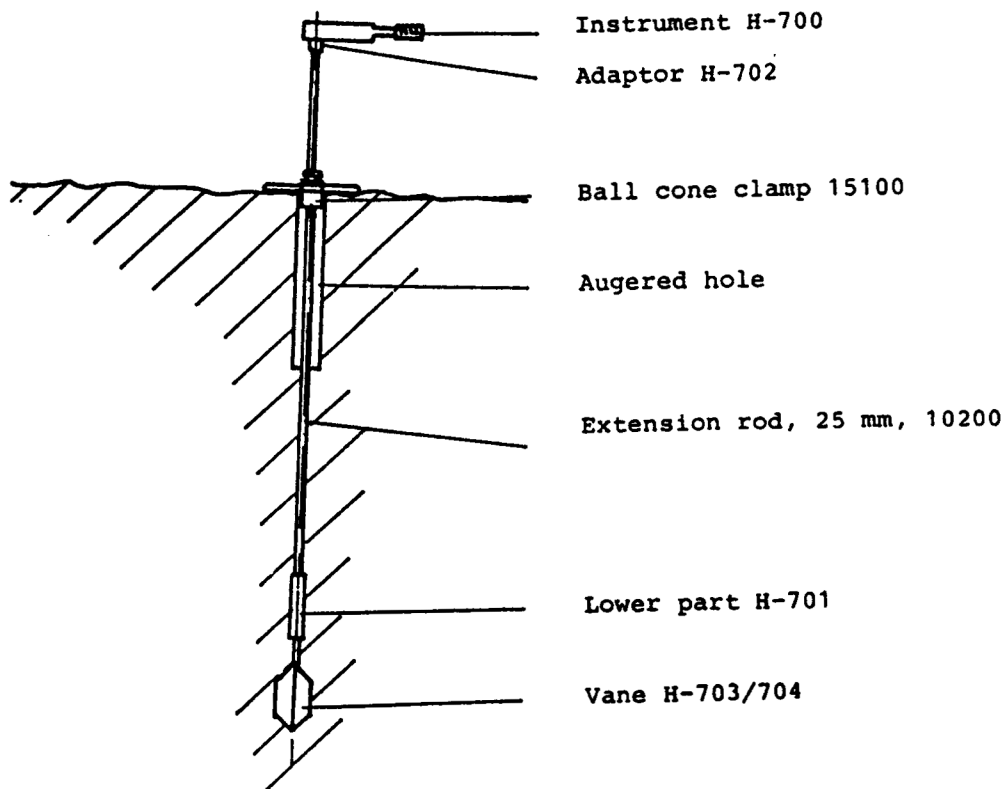
The vane borer is designed to fit other equipment delivered by and is extended by
means of standard 25 mm rods with connection piece M18x1.5.

TEST PROCEDURE

If a hard surface crust is encountered, it may be necessary to auger through this so that the vane will not be damaged by excessive ramming down of the equipment.

It is advantageous to have a ball cone clamp (part No. 15100) at the surface of the augered hole (as shown in the figure below) in order to provide a guide for the extension rods.

The ball cone clamp also ensured that the vane borer is maintained at the correct level when taking disturbed readings in sensitive clay.



Before commencing penetration the extension rods must be turned 180° anticlockwise.

The vane borer can be driven down to the desired depth by mounting a drive head to the top of the extension rods, or if the soil conditions are soft, the vane borer may be pressed down with a pipe wrench.

When reaching the desired depth the instrument (H-700) with adaptor attached (H-702), is placed onto the drive head. Should the drive head be deformed during hammering it must be substituted by an undamaged one, and it is therefore recommended that a spare drive head is available, i.e. one for driving and one for taking readings.

The vane borer should not be driven through very hard layers. If a large stone is encountered it is possible that the vane will fracture. Should this happen the remaining threaded portion must be drilled through and removed by a special extractor (left-hand threaded).

The measurement of shear strength is carried out in four stages for each depth. First the extension rod friction is measured by turning the instrument slowly clockwise through a little less than 180°. It is important to record this reading. The rods are then rotated still further clockwise until the slip coupling engages. The measurement of shear strength is taken by slowly turning the extension rods clockwise until shear is obtained. The red pointer will show the maximum obtained reading. On subtracting the rod friction from the maximum reading a value of shear strength will be obtained at the vane. The vane is then turned 20 times clockwise in order to disturb the clay by means of a wrench, preferably not the instrument. The rods should then be turned 2 revolutions anticlockwise before measuring the rod friction in disturbed clay.

If the soil is sensitive, f.in. quick clay, it may prove difficult to feel when the slip coupling engages. When taking readings of disturbed shear strength under these conditions, the shear strength value may be so small that it is best to record the total rod friction instead.

In quick clay it will be necessary to adjust the initial position of the vane by pressing the vane down 10-20 cm under the disturbed zone, and rotate the rods anticlockwise until the initial position of the slip coupling is felt. The vane is then pressed further down to the next depth where readings are to be taken.

If readings are to be taken in a plastic clay, it is recommended that the test hole be completed during a working day. If the vane borer is left in the hole overnight, the clay will adhere to the extension rods and the vane borer and lead to incorrect interpretation on resuming work the next day.

MAINTENANCE

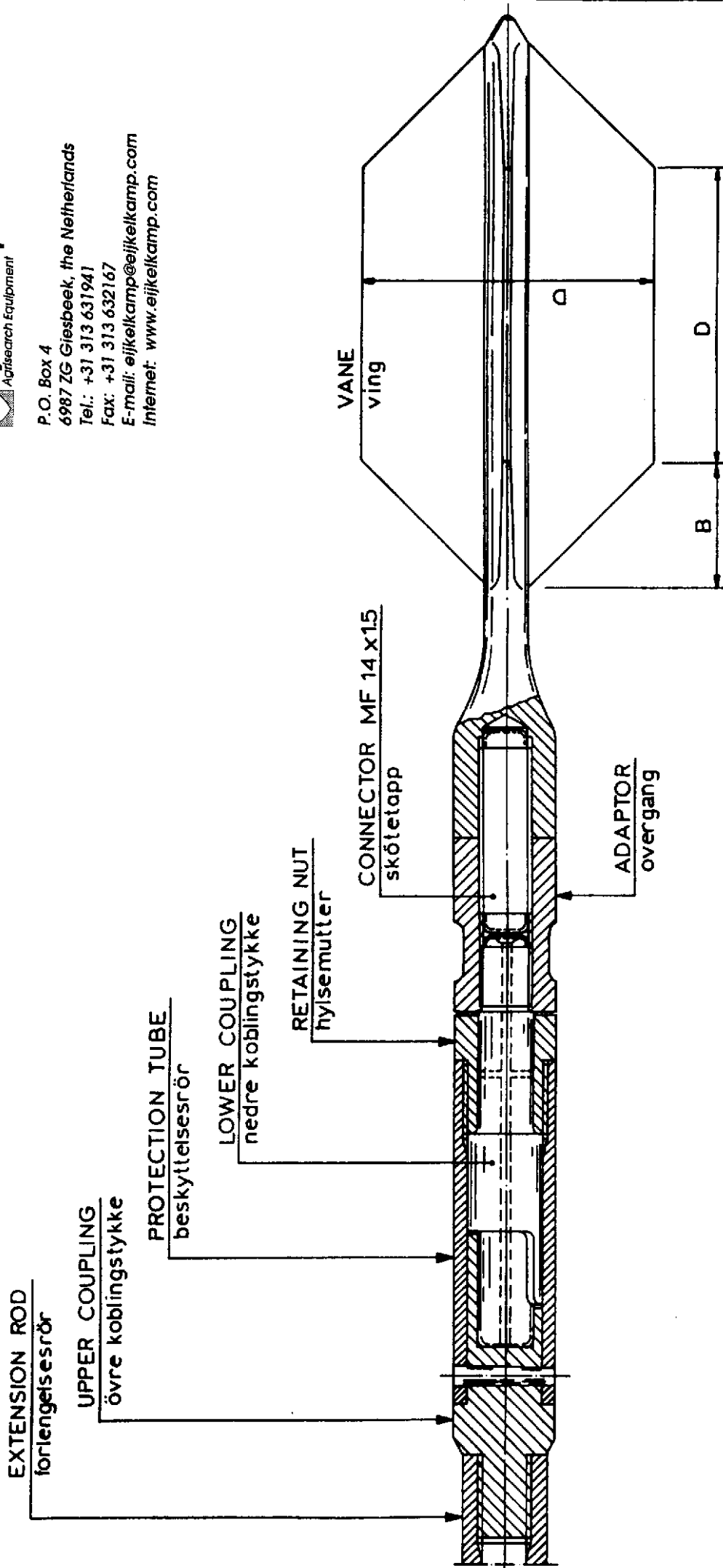
Each time the slip coupling has been retracted from the soil, it should be checked that it has not been jammed by soil and that the vane has not been deformed.

It is possible to press grease into the slip coupling from the top so as to press out soil that may have entered through the bottom. If the friction of the coupling is large, the slip coupling should be taken apart and cleaned.

The body should then be taken apart every day and thoroughly cleaned. After it has been put together again, grease should be pressed in from the top through the grease nipple by means of a grease pump. Grease should be pumped into the instrument until it appears at the underside.

The design of the vane borer requires that it is kept in proper condition.

Enclosures: Drawing



CAT. NR.	RANGE kPa	D mm	B mm
H-704	10-80	75.8	31.9
H-703	20-160	60	24