ANALOGUE PULL TEST

MANUAL

PULL TEST KIT TP100

WHAT, HOW AND WHY

With the TP100 tensile test kit, a vertical and horizontal tensile test can be performed quickly and accurately at a specific location in a simple but effective manner. With a maximum vertical tensile load of 100kN and a horizontal tensile load of 60kN, the larger FIRSTBASE pile diameters such as the V76, V89, V114 and V140 can be rated for load capacity. The bearing capacity is measured on the basis of shaft friction between the screw foundation and the relevant soil conditions.

Dimensions (lxbxh):	530 x 400 x 380mm
Weight:	22,2KG
Load capacity vertical:	100kN
Load capacity horizontal:	60kN

Goal: To determine the maximum load bearing capacity of a ground screw foundation in vertical and horizontal direction, tailored to a specific soil condition.
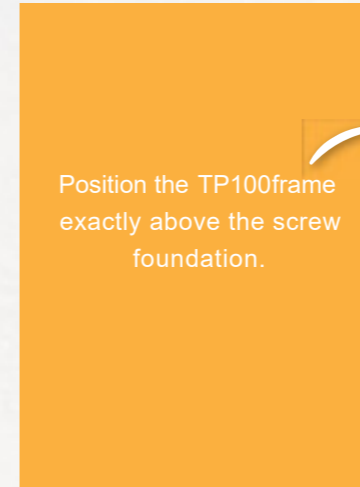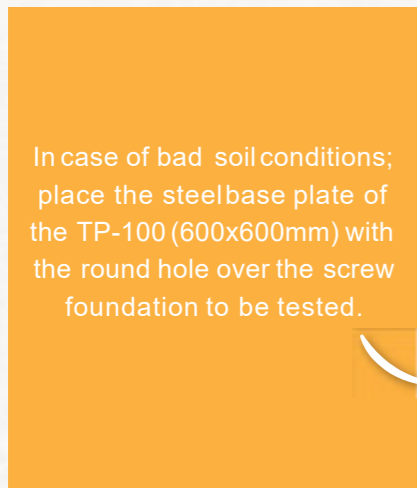
VERTICAL TENSILE TEST SET-UP

ROADMAP

SET UP VERTICAL TENSILE TEST

Install 2 ground screw foundations with a centre-to-centre distance of 1300mm. Make sure the flange plate protrudes about 2cm above ground level.

In case of bad soil conditions; place the steel base plate of the TP-100 (600x600mm) with the round hole over the screw foundation to be tested.

Position the TP100 frame exactly above the screw foundation.
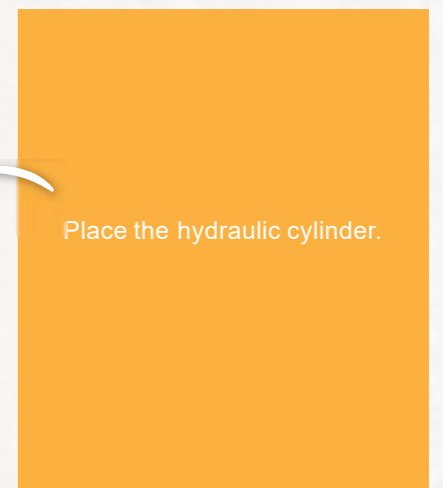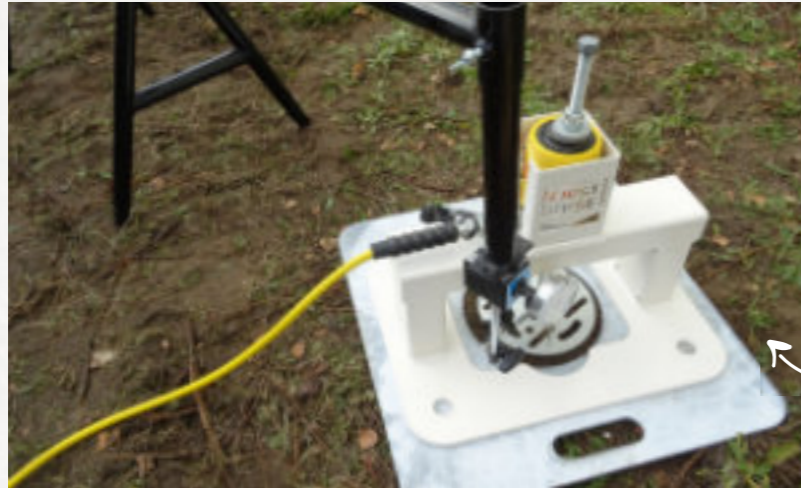

Place the hydraulic cylinder.

Fit the hose to the hydraulic cylinder and hand pump.

Position a threaded rod M16 for the V76 ground screws and an M24 for the V89 / V114 / V140 ground screws.

Fix the threaded rod in the centre nut of the flange using a screw machine. Make sure that the wire end is slightly tightened.

Assemble the analogue displacement meter and tripod.

Mount the analogue displacement meter on the tripod and position the displacement meter exactly above the ground screw foundation.

Make sure the clock is aligned to zero millimetre displacement as accurately as possible. The analogue displacement meter can be accurately adjusted to a hundredth of a millimetre by means of a small turning screw.
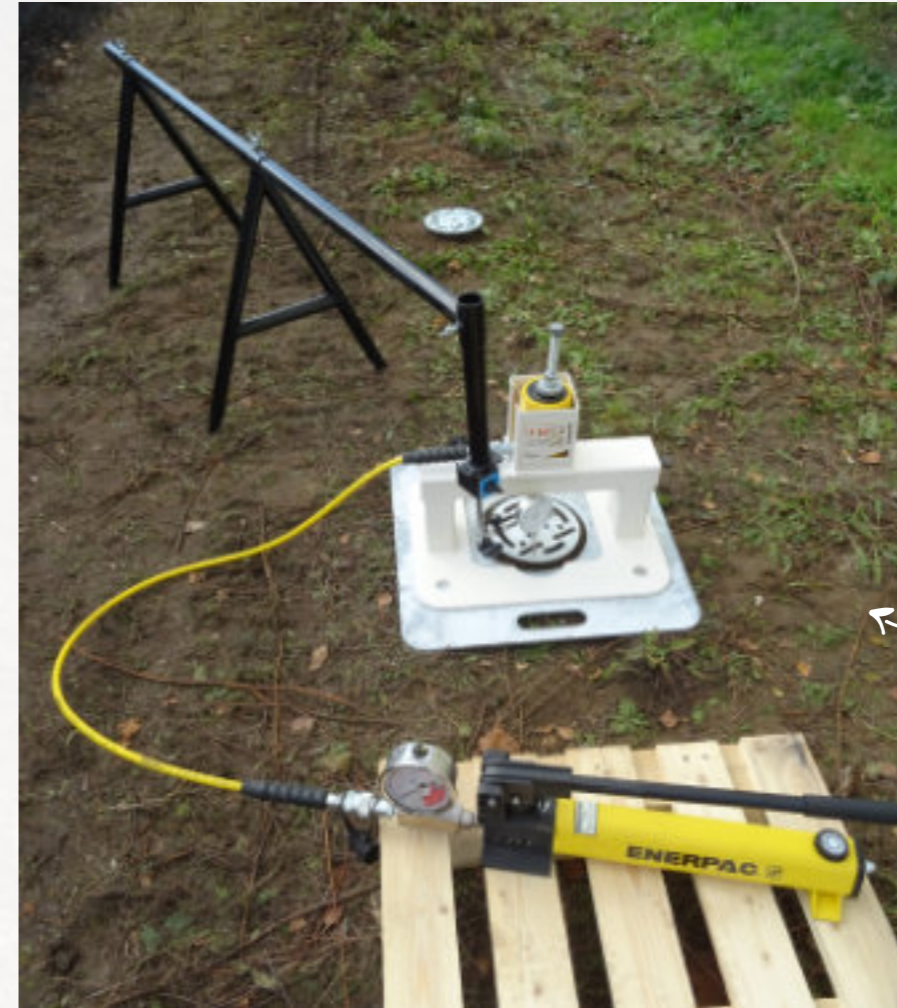
Total overview of the setup

EXECUTION OF VERTICAL TENSILE TEST

In time blocks of 60 seconds, a screw foundation is subjected to an on and off vertical tensile load in steps of 10, 15 or 20 kN. The resulting tensile load is increased by the same step size for each step. During this load increase, the displacement is closely monitored and noted. At a displacement greater than 10% of the diameter (for example 7.6 mm for a V76 and 8.9 mm for a V89), the screw foundation has theoretically failed. The test has been completed.

Note:

After unloading the screw foundation, it is necessary to tighten the threaded end.
We have to take into account the maximum deflection of 50mm of the hydraulic cylinder. This visible displacement is caused by pressing the footplate / frame into the ground + the displacement of the screw foundation vertically upwards.

BOLTS

Example time block + note form at a step size of 15.00 kN

Force (kN):	Displacement (mm):
15,00	
0,00	
30,00	
0,00	
45,00	
0,00	
60,00	
0,00	
75,00	
0,00	
90,00	
0,00	
105,00	

Example
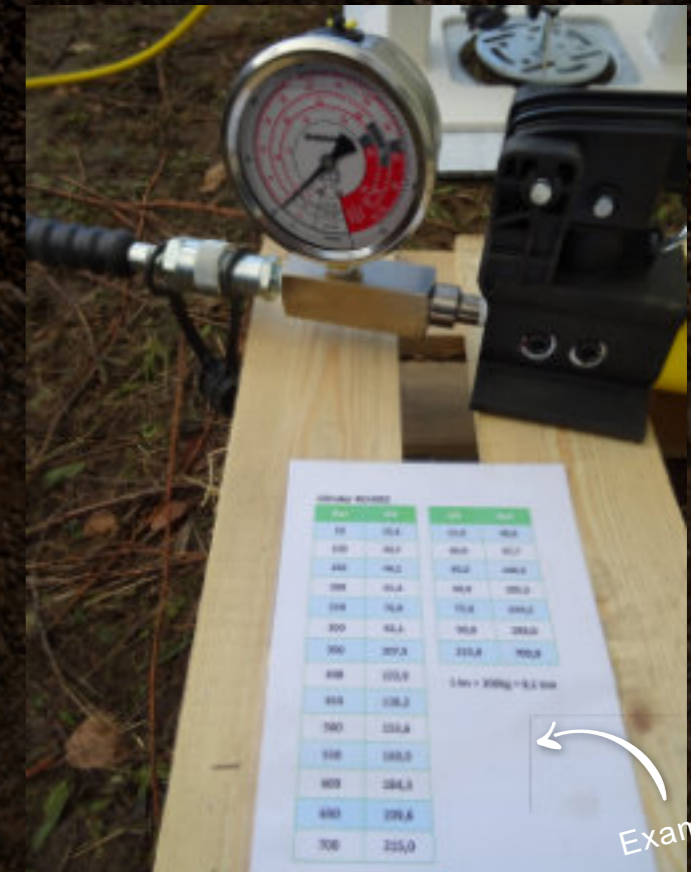
The step size is initially based on 15kN for vertical. After performing the first test, it can be assessed to what extent this step size needs to be further refined.

ADDITIONAL INFORMATION
REGARDING THE USE OF ENERPAC:

After the hand pump has been connected to the cylinder via the hydraulic hose, make sure that the black screw cap of the oil reservoir is turned from "Close" to "Vent". This must be set to ventilation, otherwise the pump will create a vacuum.

Then unlock the lever by pressing a clip under the handle.

Now you can pump and increase the power.

Then make sure that the black adjusting screw (on the side) is tightened clockwise when loading a screw foundation.

Relief can be done by turning the adjusting screw counterclockwise 'loose'.

After completing the test, turn the cap of the oil reservoir from "Vent" to "Close". Otherwise the oil will leak out during transport.

After frequent use and loss, the oil reservoir will have to be topped up with special Enerpac oil.

YOU'RE READY WITH THE VERTICAL TENSILE TEST

# HORIZONTAL TENSILE TEST SET-UP

## ROADMAP

SET UP HORIZONTAL TENSILE TEST

Position the TP-100 pull test frame against the (already vertically tested) screw foundation by means of the round recess.

Place the TP-100 Horizontal Adapter against the side of the test frame, with the protruding head plates downwards. Ensure that the assembly is aligned towards the horizontal screw foundation to be tested.
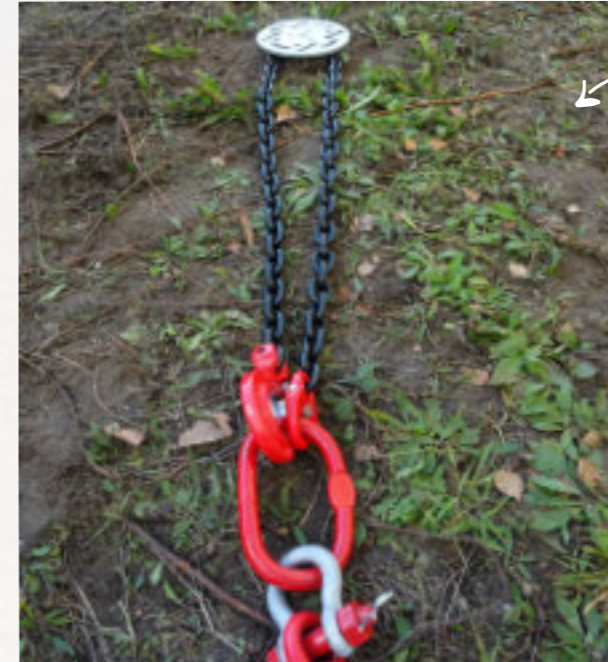
Mount the chain to the ground screw to be tested.
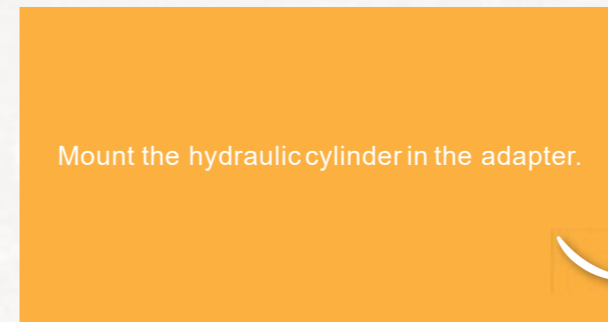
Mount the hydraulic cylinder in the adapter.

Connect the hand pump to the cylinder using the hydraulic hoses.

Insert a threaded rod M16x 1000mm through the hydraulic cylinder + adapter and connect it to the steel chain.

The threaded end is tightened under pretension by means of a spanner. Make sure the chain is tight.

Assemble the analogue displacement meter and tripod.

Mount the analogue displacement meter on the tripod and position the displacement meter exactly above the ground screw foundation in a horizontal direction.

horizontal
pull direction

By mounting a bracket on the flange plate, a vertical support surface
can be created for the analogue displacement meter.

Make sure the clock is aligned to zero millimeter displacement as accurately as possible.
The analogue displacement meter can be accurately adjusted to a hundredth of a millimeter
by means of a small turning screw.

**Total
overview of
the setup**

EXECUTION OF HORIZONTAL TENSILE TEST

In time blocks of 60 seconds, a ground screw foundation is subjected in steps of 1,2 or 3 kN to an on-and- off horizontal tensile load. The resulting tensile load is increased by the same step size for each step. During this load increase, the displacement is closely monitored and noted. At a displacement greater than 10% of the diameter (for example 7.6 mm for a V76 and 8.9 mm for a V89) the screw foundation has theoretically failed. The test has been completed.
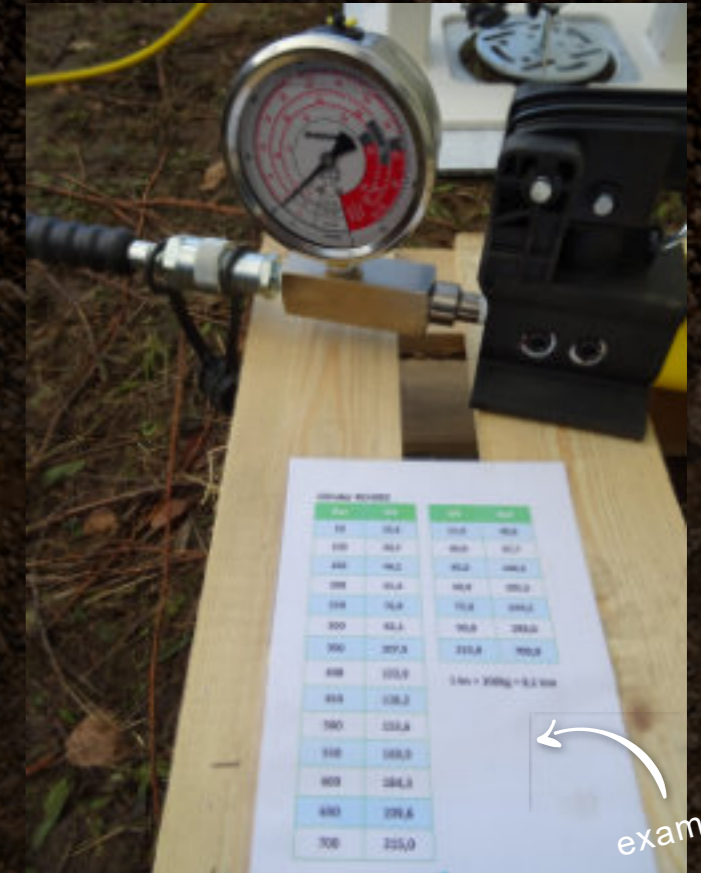
Note:

After unloading a screw foundation, it is necessary to tighten the threaded end.
We have to take into account the maximum deflection of 50mm of the hydraulic cylinder.

example

entry schedule at a step size of 2.00kN

Force (kN):	Displacement (mm):
2,00	
0,00	
4,00	
0,00	
6,00	
0,00	
8,00	
0,00	
10,00	
0,00	
12,00	
0,00	
14,00	

example

The step size is initially based on 2kN for horizontal. After performing the first test, it can be assessed to what extent this step size needs to be further refined.

SPECIALISTS
FOR PROFESSIONALS

GROUNDSCREWPROCO.UK

info@groundscrewpro.co.uk

need help?
contact us