

Kit Pull-Out STD

Hydraulic system for extraction tests

Compliant with UNI EN 12504:3



The **Pull-Out STD Kit** is a complete and reliable solution to perform incredibly reliable structural investigations.

The Pull-Out extraction test is classified among the **semi-destructive investigation methods** and consists in the measurement of the force necessary to extract a plug (pre-inserted or post-inserted) with controlled expansion in a special hole made specifically in the concrete as established by the reference standard (**UNI EN12504: 3**). In this way it is possible to make an estimate of the strength of the concrete directly on site and the evaluation of the mechanical characteristics of the material. The system can be adapted for carrying out pull tests on threaded bars, anchors and anchors of various kinds.

The mechanical properties of concrete can be determined on site by measuring the force needed to pull a metal anchor pre or post inserted. The test is performed using a manual hydraulic pump unit with a pressure gauge that drives a hydraulic jack connected to the anchor.

The value of the force produced by the test is used later to determine parameters of concrete strength by calibration curves and/or correlating the test with other methods of non-destructive investigation.



Technical features:

- N.1 single-stage lever pump, working pressure 0-700bar, 1.4 cc / pumped, tank useful 0.5 liters (*);
- N.1 NVT02B high precision 0-700bar digital pressure gauge with peak indication min / max pressure, storage of values and selectable units of measurement (psi, MPa, kPa, bar, mbar), accuracy 0,20% F.S. (*);
- N.1 Digital Dial Gauge fitting with ½ "GAS connection;
- N.1 Perforated s / effect cylinder, spring return, 10ton capacity, 50mm stroke (**);
- N.1 Aluminum reaction spacer L = 150 mm complete with support ring in stainless steel. Dimensions compliant with UNI EN 12504-3;
- N.1 Pulling pin with M20 x 2.5 mm female complete with auto washer leveling;
- N.1 High resistance flexible hose L = 2m, complete with 3/8 "NPT screw quick couplings and protective caps.

Possibility of adapting the instrument for tests on anchors of various sizes (verification on scaffolding anchors) and on threaded bars.

(*) Compatible with Flat Jack Kit, Pull-Off 500, Plate Load Test Kit, Tensile Load Test Kit, Push System

(**) Compatible with Pull-Off 500 Kit, Plate Load Test Kit

Accessories:

The Pull-Out STD system includes the following components and accessories

- N.1 Manual pump with reduced delivery (*);
- N.1 NVT02B high precision 0-700bar digital pressure gauge with peak pressure indication, complete with calibration report (Ref. Accredia) (*);
- N.1 Perforated cylinder, s / effect, 10ton, 50mm stroke, complete with force / pressure ratio (**);
- N.1 Reaction spacer;
- N.1 Pull pin with self-leveling head;
- N.1 R8 high resistance flexible hose L=2m;
- Carrying case with trolley;
- Technical documentation and assembly diagram.

(*) Compatible with Flat Jack Kit, Pull-Off 500 Kit, Plate Load Test Kit, Push System.

(**) Compatible with Pull-Off 500 Kit, Plate Load Test Kit.

Insert UNI25

Mechanical “reusable” controlled expansion insert conforming to UNI EN 12504-3 standard for Pull-Out tests on concrete



The **Pull-Out extraction method**, classified as a semidestructive method, allows to directly **measure the strength of concrete in a structure**. The aim of the test is to evaluate the compressive strength through the value of the force required to extract a metal rod. The extraction is carried out by means of a perforated hydraulic jack to which a contrast ring of proportional size to the size of the plug is fixed to the base (as prescribed by the reference standard UNI EN12504-3 “Tests on concrete in reinforcements – Determination of the extraction force”).

The UNI EN12504-3 standard provides for the execution of the Pull- Out extraction test according to well-defined parameters in terms of depth of the hole (25 mm) and flaring of the end part of the plug (25 mm) for the use of a plug post-inserted with controlled expansion.

The UNI25 insert represents an **innovative solution** since, while respecting the specifications imposed by the reference standard, it is **durable and reusable** over time, with the only possible replacement of the expansion washer.

This feature would allow operators to quickly amortize the cost of the insert, making it much cheaper than other solutions on the market.

The insert is mounted on a special perforated cylinder equipped with a pump and pressure gauge (pressure gauge or pressure transducer).

The UNI25 insert consists of 3 parts: the **body**, the **pin** and the special controlled expansion **washer**.

To make the insert use procedure **compliant with the UNI EN12504-3** standard, it must necessarily be supplied together with the drilling and countersinking system.



Tecnichal features:

UNI25 is an innovative solution born from the collaboration between Novatest and the Laboratory of Geotechnics of the University of Enna “Kore” led in the experimentation by Eng. Giuseppe Carmelo Vadalà.

The UNI 25 dowel **complies** with the geometric dimensional characteristics prescribed by UNI EN 12504-3 “TESTS ON CONCRETE IN STRUCTURES - Part 3: Determination of the pull-out force” recalled by NTC 2018 in point 11. “Checking the strength of concrete in place”.

The head of the ‘post inserted’ insert, which is to be replaced at each test, expands in a controlled manner since it does not depend, with the same force, on the stiffness of the material in which the dowel is inserted. Expansion of the head does not occur by contact with the material in which it is inserted because expansion of the head occurs within the circular countersink having a diameter of 25mm+/-0.1 mm.

Breakage occurs by extraction and does not create any torque, this results in similar failure mechanisms and high constancy of results. The experimentation on samples, conducted at UNIKORE in Enna, produced a correlation coefficient $y=1.1387x$ with a coefficient of determination $R^2=0.9996$ indicating precisely the stability of the results.

UNI25 complies with point 10 of Circular No. 633/stc “Criteria for the issuance of authorization to laboratories for tests and inspections on building materials on existing structures and constructions referred to in Art. 59, paragraph 2, of Presidential Decree No. 380/2001” regarding the Handling of Samples and Materials Subjected to Tests, in fact, the insert head itself is to be replaced with each test.

UNI25, where UNI stands for UNIQUE, as it is **durable** and **reusable**, excluding the expandable head.

PATENT: Pending

Accessories:

The UNI25 insert includes the following accessories:

Starter kit

- Central body UNI25 insert;
- No.3 UNI25 calibrated expansion springs;
- Diamond tip countersinker (compatible with standard drill, tool not included in the kit);
- Drilling guide.

Basic kit

- Central body UNI25 insert;
- No.3 UNI25 calibrated expansion springs.

Expansion springs kit

- Each pack contains no.10 UNI25 Expansion Springs.

Please Note: The UNI25 insert can always be recovered and reused, while the expansion spring must be replaced after each use.

