

CYCLIC TRIAXLAB AUTOMATED SYSTEM

STANDARDS: ASTM D7181 | ASTM D2850 | ASTM D3999 | ASTM D4767 | ASTM D5311 | BS 1377:7 | BS 1377:8 | AASHTO T307-9



MAIN FEATURES

- Automatic execution of static and dynamic triaxial tests including effective stress and stress path.
- 4 axis control and 16 channel control Data Acquisition System.
- Servo feedback controlled precision pressure (Pressurematic) generation system.
- Digital Servo-Pneumatic Control to provide accurate loading wave shapes up to 70 Hz.
- Real time charting.
- Compact and versatile for improving productivity and cost effectiveness.
- Pre-programmed user friendly “Method files” through the TestLab Software.
- Possibility to upload user-defined wave-shapes (e.g. earthquakes time series) through Replay Editor.
- Fully configurable to suit a large range of testing applications including maximum shear modulus calculation through bender elements option.
- Programmable Dashboard display showing real-time system status and test result.



DTS-9 Cyclic TriaxLab Automated System

Matest Cyclic TriaxLab automated with its innovative features represents the most ideal solution for modern laboratories that need to investigate the effects of vibration and dynamic loading for soil and unbound granular materials.

Typical applications include:

- Civil engineering including seismic and blasting analysis
- Environmental engineering
- Construction and architectural design
- Advanced research on soils

Based on the 4 axis control and 16 channel control and Data Acquisition CDAS, Matest Cyclic TriaxLab has provision for:

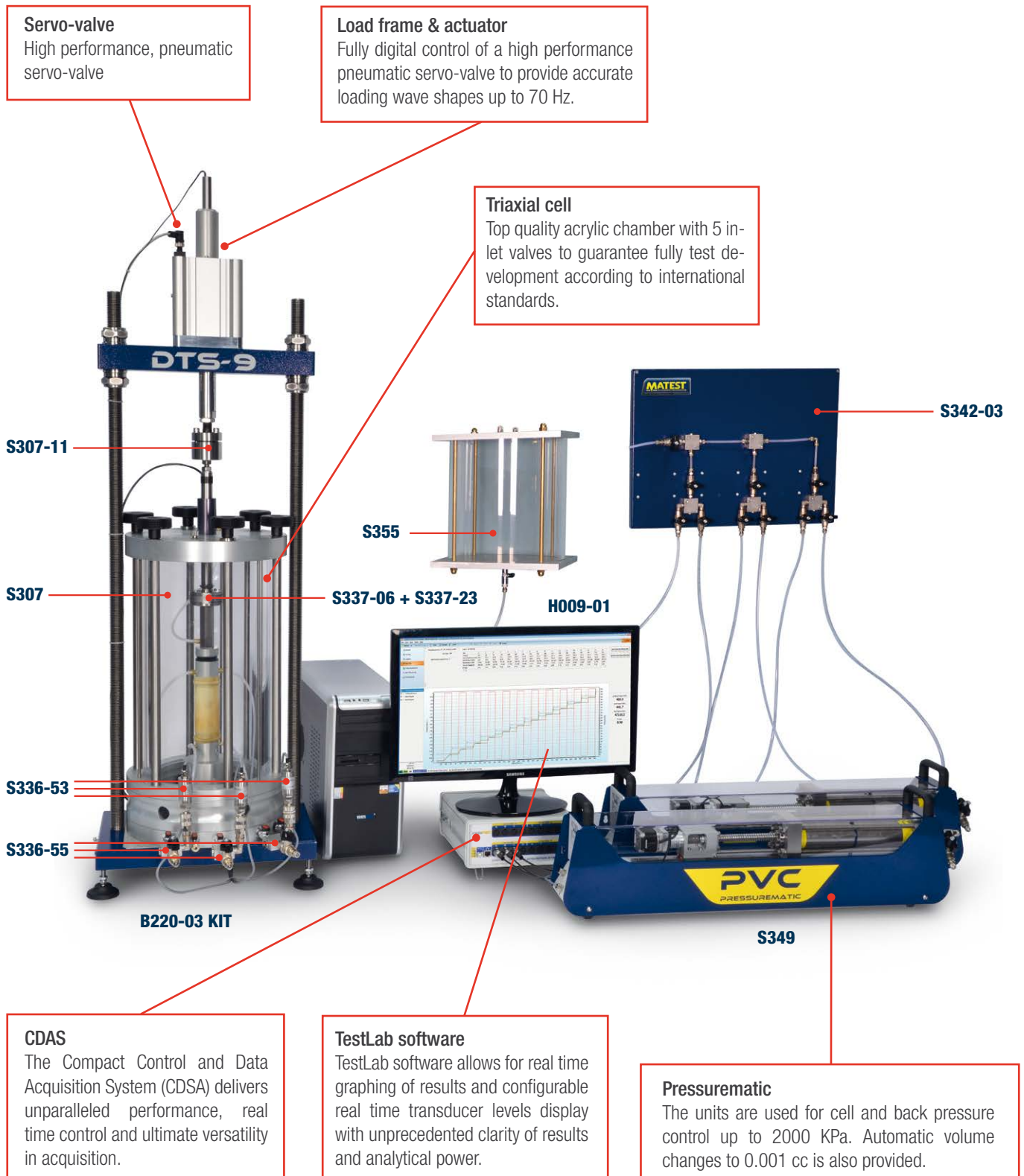
- Vertical load tension/compression up to 9 kN
- Vertical displacement up to 50 mm
- Cell pressure up to 2000 KPa
- Back pressure up to 2000 KPa

The Cyclic TriaxLab automated system is subdivided into 3 major groups similarly to the TriaxLab Automated System:

- **Fully digital controlled load frame** and fit for purpose Triaxial cell with accessories
- **Control system** based on the CDAS
- **Data Acquisition System** comprising:
 - 1 submersible load cell for axial force
 - 3 pressure transducers for cell pressure, back pressure and pore pressure
 - 2 Pressurematic for pressure/volume change

To suit the specific customer's requirements the MATEST Cyclic TriaxLab Automated System basic configuration can be modified by adding or removing the hardware elements which are controlled and monitored under a closed-loop integrated system with the CDAS and TestLab Software.

Pre-programmed "Method files" offer the operator the unique opportunity to run a range of tests without the need for specific computer programming. The possibility to customize the Method files is also given to the operator granting ultimate flexibility and versatility.



Servo-valve

High performance, pneumatic servo-valve

Load frame & actuator

Fully digital control of a high performance pneumatic servo-valve to provide accurate loading wave shapes up to 70 Hz.

Triaxial cell

Top quality acrylic chamber with 5 inlet valves to guarantee fully test development according to international standards.

CDAS

The Compact Control and Data Acquisition System (CDSA) delivers unparalleled performance, real time control and ultimate versatility in acquisition.

TestLab software

TestLab software allows for real time graphing of results and configurable real time transducer levels display with unprecedented clarity of results and analytical power.

Pressurematic

The units are used for cell and back pressure control up to 2000 KPa. Automatic volume changes to 0.001 cc is also provided.

CYCLIC TRIAXLAB AUTOMATED SYSTEM ORDERING INFO:

HARDWARE - SOFTWARE

B220-04 KIT DTS9 WITH MANUAL CROSSHEAD

The machine includes:

B220-14

20 kN load frame with manual crosshead
9 kN servo-pneumatic actuator with its LVDT,
50mm stroke, 70 Hz frequency.

Power supply: 90-264V 50-60Hz 1ph 240W

Dimensions: 1262(h)x400(d)x470(w)

Weight: 80 kg load frame

S303

16 Channel Control and Data Acquisition
System (CDAS) and TestLab software.

For technical specifications, see p. 564

B270-12

Air reservoir assembly with membrane dryer.
It requires pressurized air, minimum 7 bar
(not included).

S307

TRIAXIAL CELL MAX Ø 150X300 MM

Technical specifications:

- Max specimen mm Ø 150x300
- Max cell pressure 2200 kPa
- Overall dimensions mm Ø 338x648
- Weight 40 kg approx.

Accessories listed at p. 546

Note: Triaxial cell for cyclic tests
max. 100x200 mm available on request.



S307 with accessories

MEASURE OF AXIAL FORCE

S337-06 SUBMERSIBLE LOAD CELL 10 KN WITH SIGNAL CONDITIONER

■ Rated output 2 mV/V nominal

■ Accuracy 0.1%

Note: For different requirements load
cells capacity and transducers stroke or
submersible load cells, see p. 548

ACCESSORIES FOR TRIAXIAL CELL

S337-23 Loading ram for the submersible
load cell

S307-05 Transducers holder ring

S307-10 Vacuum generator

S307-19 Vacuum adaptor

S307-11 Alignment coupler assembly

S307-12 Spherical exclusion

S307-13 Base pedestal spacer

OPTIONAL ACCESSORIES

BENDER ELEMENTS KIT for the evaluation of
the stiffness of a soil starting from the meas-
urement of the maximum shear modulus
(Gmax). The Kit includes:

S307-08 Picoscope

S307-07 T-4001 waveforms transformer

S307-01 Universal puck for bender
elements top

S307-02 Universal puck for bender
elements bottom

S307-22 | 32 | 42 | 52

Base pedestal for bender element
Ø 38 | 50 | 70 | 100 mm

S307-23 | 33 | 43 | 53

Top platen for bender element
Ø 38 | 50 | 70 | 100 mm

S307-24 | 34 | 44 | 54

Pair of porous disc
Ø 38 | 50 | 70 | 100 mm



Bender elements KIT

DEAIRED WATER SYSTEM

S355 DE-AIRING TANK 20 LITRES CAPACITY

It produces de-aired water when connected
to the vacuum pump. It is a Perspex tank with
an inlet water valve and an outlet air valve.
Tank capacity: 20 litres.

Dimensions: 320x320x520 mm

Weight: 15 kg approx.

ACCESSORIES

V205

VACUUM PUMP

To produce vacuum up to of 0.1 mbar
(see p. 597)

V205-10 - V205-12

VACUUM REGULATOR

It is supplied with vacuum gauge, control
valve, suction filter and moisture trap.

V230-03

Rubber tube. Suitable for vacuum, 3 m

MEASURE OF PORE PRESSURE SYSTEM AND VOLUME CHANGE

S349 PRESSUREMATIC PVC FOR AUTOMATIC PRESSURE AND VOLUME CONTROL

Output pressure: 3500 kPa

Volume capacity: 250 cc

For Technical Specifications, see p. 565

NEEDED ACCESSORIES

S336-53 Pressure transducer 2000 kPa
with signal conditioner.

S336-55 De-airing block for pressure
transducer

S349-10 Solenoid valve

OPTIONAL ACCESSORIES

S342-03 3 ways water distribution panel

TESTLAB SOFTWARE ➤ NEW

Developed with ultimate flexibility in mind, TestLab test and control software caters to all levels of operator experience. By using pre-programmed **Method files**, an inexperienced operator can run a range of international test methods without the need for any programming. Moreover, a test **Wizard**, available with popular tests, can guide the operator step by step based on a “recipe book” approach. Most importantly, the experienced engineer and/or researcher need not be constrained by the functions and analysis in the method files provided. The operator may clone, modify and/or generate his/her own method file to suit their specific requirements. The Excel based data analysis offers the operator the flexibility to implement alternative analysis and customize reporting facilities. TestLab allows for real time graphing of results and configurable real time transducer levels display with unprecedented clarity of results and analytical power. These features make the TestLab software the optimized solution for the new Matest Triaxlab Automated and Cyclic Systems. It is provided with CDAS mod. S303 see p. 564.

MAIN FEATURES

- Pre-programmed Method files based on international test methods for complete control of triaxial testing for saturation, consolidation and shearing phases.
- Integrated data results post processing feature with MS Excel.
- Standard and user customizable test reporting.
- Real time graphing of results and configurable real time transducer.
- Flexible and user-friendly with unprecedented clarity of results and analytical power.
- Automatic B value measurement.
- Automatic backpressure solenoid valve control.



TESTLAB, A NEW APPROACH

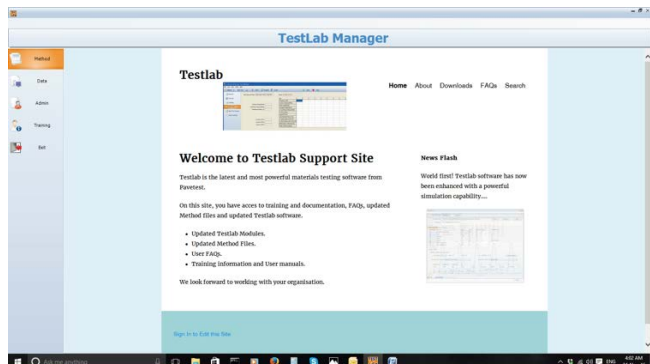
TestLab is an open architecture user programmable software application. Our engineers have taken the time to review all the relevant international test standards and used TestLab “Test Designer” to program method files according to these standards. Basically, any of these tests can be designed, cloned and/or modified by the user within TestLab. The user is no longer restricted to the test applications provided at time of purchase the possibilities are only limited by the skill and imagination of the user.

TESTLAB MANAGER

The TestLab materials testing software is designed to interface with the CDAS and a wide range of Pavetest machines including Automatic TriaxLab system. A TestLab Manager interface allows users to easily and efficiently locate the necessary method files to load and execute.

The method files for soil testing include: saturation, consolidation, CU compression test, CD compression test, UU compression test in accordance with:

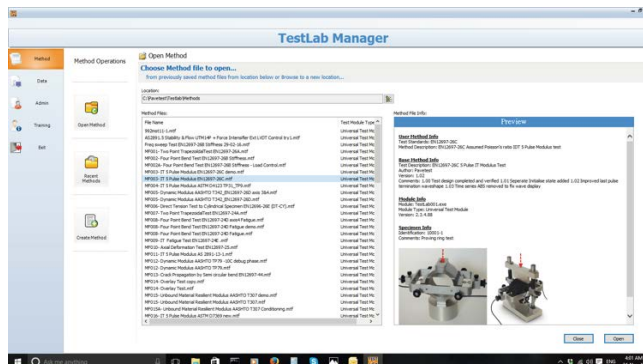
- ASTM 04767, ASTM D7181, BS 1377: part 8
- ASTM D2850, BS 1377: part 7



TestLab Manager

TEST METHOD SELECTION

The operator can run pre-programmed Method files, in accordance to the requested Standards, or configure an application test and then save that configuration to a customised Method file. This includes the real-time transducer and calibration allocations, comprising all the stresses, strain and volume changes for automatic triaxial testing; control parameters for the Pressurematic; solenoid valves and triaxial frames; terminal conditions as for instance end of stroke or maximum capacity limits, test pause features for the Pressurematic live control, additional options to hold the stress and strain applied to the specimen.



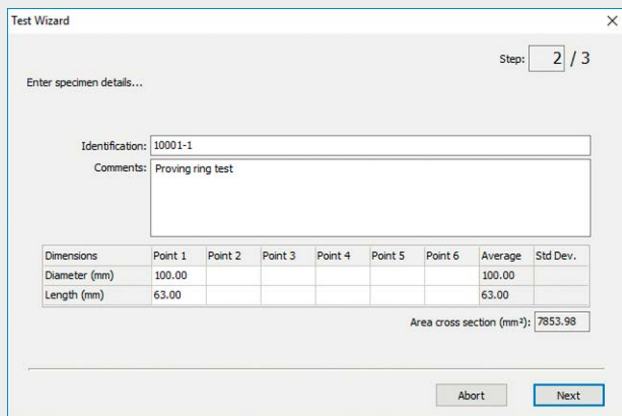
Selection of Method Files

TESTLAB, USER FRIENDLY INTERFACE FOR SOIL TESTING NEW

TEST WIZARD

The wizard section provides a prompted menu approach to running a test. The user is driven to enter information throughout a series of easy steps. Examples of input information for consolidated drained compression test include:

- Specimen Information: axial gauge length (mm), Consolidated Height (mm), Consolidated Area (mm²), Membrane Modulus (MPa), Membrane thickness (mm), Filter Paper K_{fp} (kN/mm), Filter Paper Perimeter P_{fp} (mm), Axial Strain Limit (%), Break Detect (% drop)
- Loading sequences settings: confining pressure (kPa), Road Seal Diameter (mm), back pressure valve, Loading rate (%/min)
- Test data: Axial Load (kN), Axial Deformation (mm), Total and Effective Stress (kPa), Back and Pore Pressure (kPa), Volume Change (cc) and Axial Strain (%)
- Real time tuning (PID control increments) and chart controls (Corrected Deviator Stress, Axial Stress, Radial Stress, Induced Pore Pressure, Effective Radial Stress)

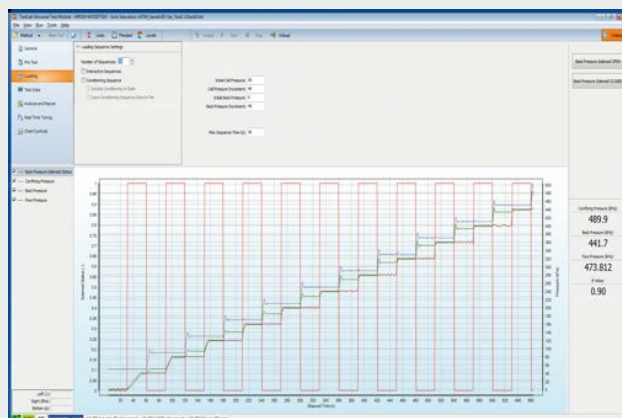


User guided Test wizard

TESTLAB UNIVERSAL TEST

The Test Data section displays run-time information, such as the loading time, cycle count, transducer readings (force, displacement, pressure), stress calculations.

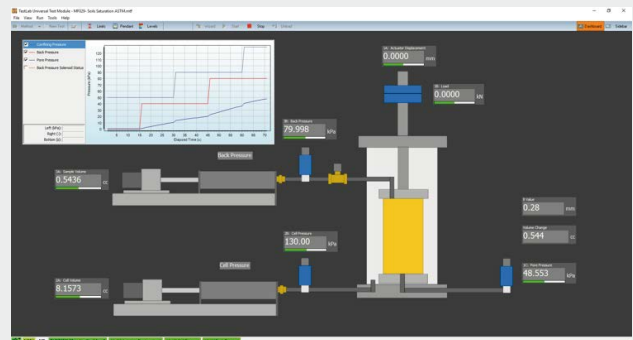
Volume changes, B valve, consolidation parameters (t100), stress path, optional K₀ and permeability coefficients.



ASTM D4767, D7181-11 Automatic Saturation

REAL TIME DASHBOARD DISPLAY

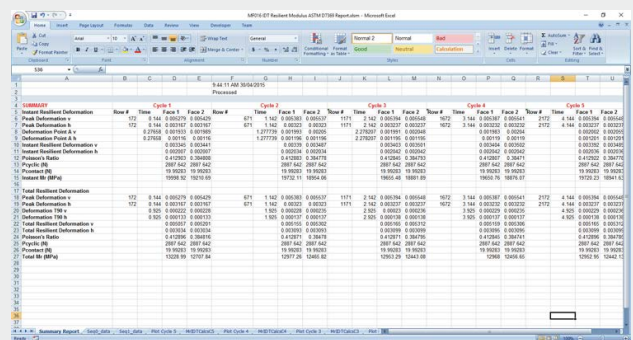
For the automatic and cyclic triaxial tests, Pavetest provides the user with an alternative, simpler and more intuitive representation of the current status of both machine and test method. This dashboard display feature of TestLab shows real time transducer levels, computed data and charted data before, during and after the test has completed.



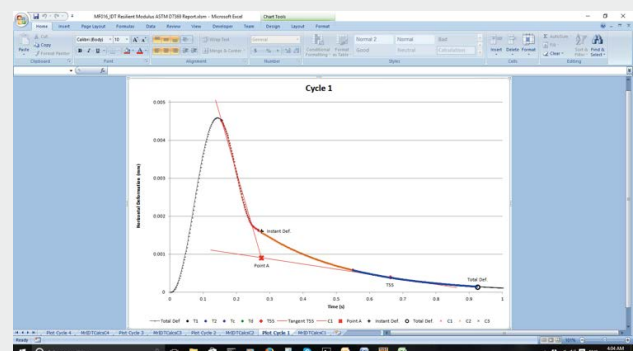
Typical dashboard screen

POST PROCESSING

All TestLab Method file tests provide the facility to send the data directly to an Excel workbook including test input and results data. This facility provides a means of efficiently post processing raw data results and customizing reports from within Excel and optionally displaying summary result in TestLab.



Post processing summary results



Excel post processing report

CYCLIC TRIAXLAB AUTOMATED SYSTEM: suggested typical configuration

Apparatus Section	Item Code	Item Description	Quantity	
Stretcher, actuator and controller	B220-04-KIT	Loading frame	1	
		Triple axis control & data acquisition system (CDAS)	1	
		9 kN Servo-Pneumatic actuator assembly, 50 mm stroke, LVDT \pm 50 mm calibrated over \pm 37.5 mm	1	
Triaxial cells with accessories	S307	Triaxial cell for specimens up to 150x300 mm	1	
	S337-06	Submersible load cell calibrated to -5/+5 kn	1	
	S337-23	Loading ram for the submersible load cell (for S307)	1	
	S337-05	Transducers holder ring	1	
	S307-10	Vacuum generator	1	
	S307-19	Vacuum adaptor	1	
	S307-11	Alignment coupler assembly	1	
	S307-12	Spherical extension	1	
	S307-13	Base pedestal spacer	1	
	S337-51	Calibration process for load cell	1	
	Water pressure system, measure of pressure and measure of volume	S342-03	3 Ways distribution panel w/out regulators	1
S349		Pressurematic PVC	2	
S349-10		Solenoid valve	1	
S336-53		Pressure transducer 2000 kpa with ILC	3	
S336-55		De-airing block	3	
S355		De-airing tank	1	
S355-01		Filter group (water trap)	1	
V205		Vacuum pump 1 stage air: 4.5 m ³ /h	1	
S337-51		Calibration process for pressure transducers	3	
V205-10		Vacuum regulator	1	
V205-12		Condensed water trap	1	
V230-03		Rubber tubing for vacuum, 3 meters	1	
Bendel elements kit		S307-08	Picoscope	1
		S307-07	T-4001 waveforms transformer	1
	S307-01	Universal puck for bender elements top	1	
	S307-02	Universal puck for bender elements bottom	1	
	S307-22/32/42/52	Base pedestal for bender element \varnothing 38/50/70/100 mm	1	
	S307-23/33/43/53	Top platen for bender element \varnothing 38/50/70/100 mm	1	
	S307-24/34/44/54	Pair of porous disc \varnothing 38/50/70/100 mm	1	
Accessories for specimen preparation, \varnothing 38 mm \varnothing 50 mm \varnothing 70 mm \varnothing 100 mm \varnothing 150 mm	S307-20/30/40/50/60	Vacuum plate 38/50/70/100/150 mm specimen	1	
	S307-21/31/41/51/61	Vacuum top platen 38/50/70/100/150 mm specimen	1	
	S310, S310-01/02/03/04	Rubber membrane \varnothing 38/50/70/100/150 mm (10 pcs)	1	
	S311, S311-01/02/03/04	Sealing ring \varnothing 38/50/70/100/150 mm (10 pcs)	1	
	S312, S312-01/02/03/05	Membrane stretcher \varnothing 38/50/70/100/150 mm	1	
	S313, S313-01/02/03/04	Split former \varnothing 38/50/70/100/150 mm	1	
	S313-10/11/12/13/14	Two -part split mould \varnothing 38/50/70/100/150 mm	1	
	S315-10/11/12/13/14	Plinth \varnothing 38/50/70/100/150 mm for cell mod. s307	1	
	S316, S316-01/02/03/04	Porous disc \varnothing 38/50/70/100/150 mm (2 pcs)	1	
	S317, S317-01/02/03/04	Plein disc \varnothing 38/50/70/100/150 mm (2 pcs)	1	
	S318, S318-01/02/03/04	"O" Ring tool for plinth \varnothing 38/50/70/100/150 mm	1	
	S319, S319-01/02/03/04	Filter paper drain \varnothing 38/50/70/100/150 mm (50 pcs)	1	
	S320, S320-01/02/03/04	Filter paper for base \varnothing 38/50/70/100/150 mm (100 pcs)	1	
	S122-13/14/15/16	Hollow punch \varnothing 38/50/70/100 mm - triaxial	1	
	S123-13/14/15/16	Tamper \varnothing 38/50/70/100 mm - triaxial	1	
	Other elements	S325	Nylon tube 4 mm \varnothing (20 mt)	1
S326		Terminal for connection tube (10 pcs)	1	
S327		Flaring tool	1	
S328		Vaseline oil, 1000 ml	1	
S329		Water-repellent grease (1000 g)	1	
S330		Grease pump	1	
S332-04		Spares and wearable 1 cell automatic	1	