

Tinius  Olsen

The First Name in Materials Testing



Testing Solutions for the Civil & Construction Industry

**Equipment, Software, Calibration,
Service and After Sales Support**

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3000kN Fully Automatic
Compression Machine



Hydraulic Universal
Testing Machine



Electromechanical
Universal Testing
Machine



HORIZON

250/25kN
Automatic
Compression
Machine














Marshall
Machine



CBR Machine



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Specifications in this catalogue are subject to change without notice

Tinius Olsen



The industrial history of materials testing by machine can be traced to Tinius Olsen, a visionary inventor who built the first universal testing machine.

By 1880, he had proven and patented enough of his revolutionary ideas and designs to create an entire line of testing machines and launch his own company. Over the years, Tinius Olsen introduced and innovated application-specific solutions for materials testing that spanned industrial manufacturing and construction.

After the turn of the century and the innovations of motor vehicles and modern highways, the scope of Tinius Olsen's offerings expanded to include a new product line dedicated to the testing of cement, concrete and road materials.

Nearly 140 years later and many of Tinius Olsen's original designs and technological approaches are still viewed as industry standards and are testament to his knowledge of the sciences, the natural and man-made materials that make up our

world, and of best engineering practices.

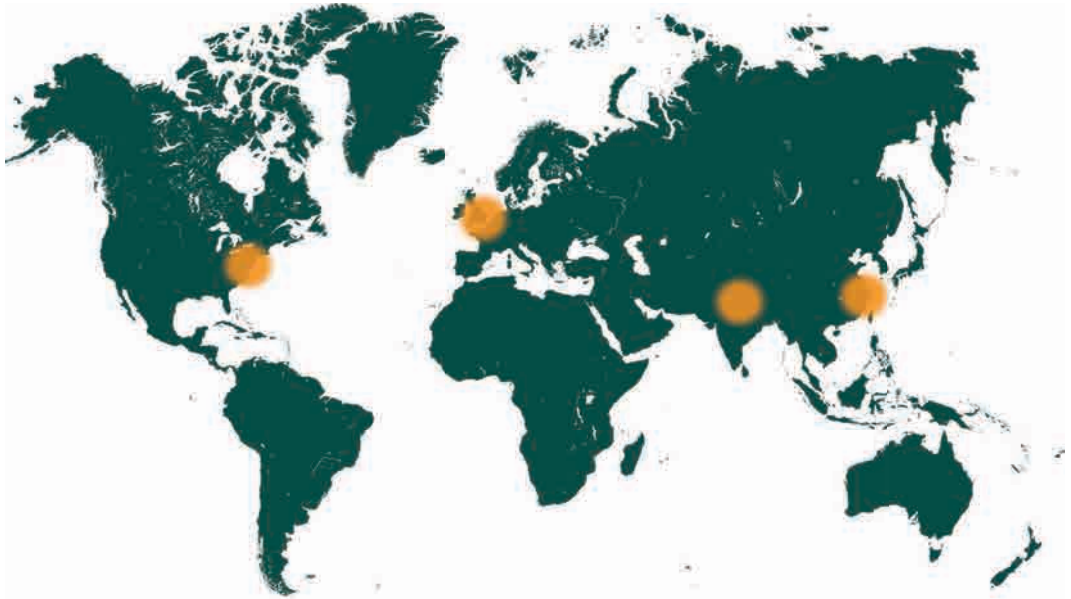
At Tinius Olsen, we are proud of our founder's legacy and continue to seek to build on it with new and creative systems that combine the best of proven materials testing machine technologies with the latest in automation and in digital monitoring, control and analysis software.

We offer equipment for testing high performance metals, the latest engineering grades of plastics, the toughest textiles and the most exotic composites.

Building on some of the early solutions of our founder, we also offer one of the industry's most comprehensive and reliable lines of products and services for testing construction-related materials.

The breadth of machines and testing resources on the following pages are supported by our A2LA and UKAS accredited technical team, who keep our ever-growing global customer base up and running with precisely-calibrated testing machinery.

Our Global Presence



Tinius Olsen proudly owns facilities in US, UK, India and China

- Customer Service Centers
- Training Centers
- Showrooms
- Calibration Facilities

Our global partner for Civil and Construction Industry is PowerCept Technologies. Contact details are:

PowerCept Middle East LLC,
P.O. BOX 123489, Dubai - UAE
www.powercept.com
info@powercept.com

Key highlights of PowerCept are:

- Combining 45 years of regional knowledge and experience in the field of testing and measurement across the

- dynamic markets of the Middle East, Europe, India, SAARC and Asia Pacific
- Specialising in packaged product and support solutions for civil engineering, education & research and manufacturing.
- Providing clients with comprehensive application advice, customer service, calibration, repair and training.
- Ensuring value through close working relationships with regulatory bodies, technology partners and end users.
- Empowering local customers with proven track record of bringing diverse business cultures together with best in class engineering solutions.

Package



Tinius Olsen offers Package Solutions as per BS/ASTM/EN/ISO/AASHTO International Standards for the following:

- Ready Mix Plant
- Pre Cast Factory
- Educational Laboratory
- Accredited Commercial Laboratories for Testing:
 - Rebar
 - Geotextiles
 - Membranes
 - Concrete
 - Aggregate
 - Cement Plant
 - Contractors Laboratory
 - Soil
 - Asphalt
 - Cement
 - General Laboratory Testing

Solutions



All Tinius Olsen Package Solutions include the following:

- Lab layouts and machine placements
- Power requirements
- Manpower requirements
- Comprehensive product training
- Application and technical support
- Calibration support
- Installation & Commissioning
- Pre and post-sales support
- Certification and traceability
- User application training
- After sales and warranty support

Horizon software

Tinius Olsen is proud to introduce the next evolution of its testing software with the Horizon package. As part of the development process, we have taken the best features of our existing software offerings, added a host of report writing and data manipulation capabilities and, in the process, created a new, unparalleled testing platform. This will make easy work of your materials testing programs, whether they're designed for the demanding rigors of R&D or the charting and analysis functions of QC testing.

Horizon software uses the most current Windows environments. These familiar formats make it easy to use and learn, especially because the same familiar functionality is maintained throughout the program.

Key features

- Test method library
- Test Editor
- Tabbed Test and Recall Area
- Multiple Machine Control
- Closed loop control of compression testers
- Output Editor
- Multilingual with translation

Horizon software can accept data from all manner of testing equipment including, but not limited to: compression testers, Marshall tester, Speedy testers and Super L. It can also take manual data entry from equipment such as the slump cone test, Vicat penetration test, Blaine apparatus, sieve grading results and consistometer.

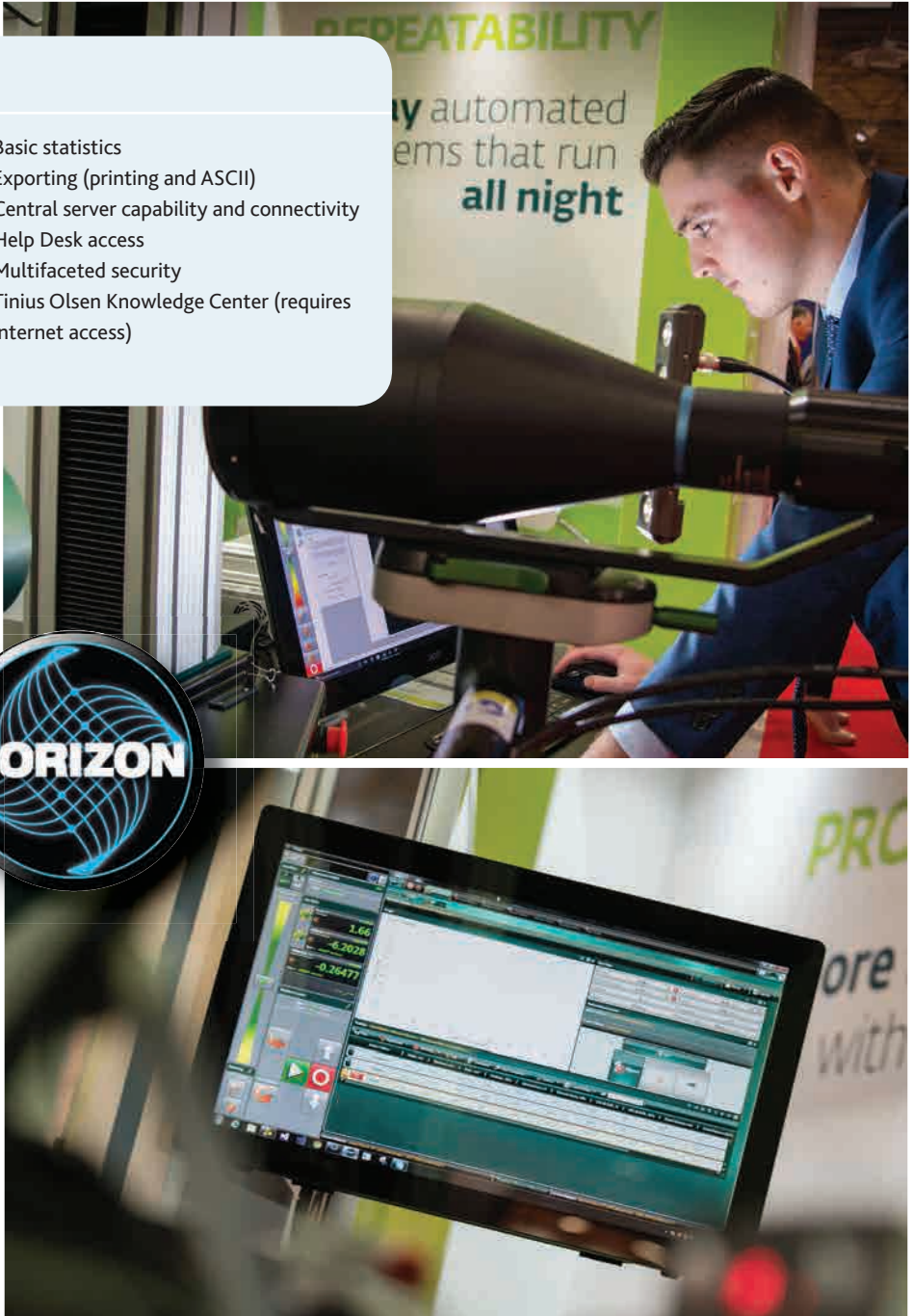
If your testing hardware has PC communication and control capabilities, then Horizon software can also automatically control the tests for you, in accordance with the appropriate testing specifications, gather the test data and calculate the required results. Horizon can then take these results and produce a consolidated testing report that can incorporate your or your customer's logo.

Modular in design, Horizon software can be configured in a number of different ways so that your immediate needs are addressed; further enhancements are readily available as your testing needs change and grow.

Talk to your sales engineer to see how Horizon software can best meet your needs.



- Basic statistics
- Exporting (printing and ASCII)
- Central server capability and connectivity
- Help Desk access
- Multifaceted security
- Tinius Olsen Knowledge Center (requires internet access)



DG Series Semi-Automatic Concrete Compression Testers

The machine shown right is from the DG Series – Model TO317E-DG – with a maximum testing capacity of 450,000lb or 2000kN. This machine is primarily designed for the testing of 4in (100mm) and 6in (150mm) concrete cubes, 100mm and 150mm concrete cylinders.

The Tinius Olsen DG Series of digital compression testers features highly robust frames for exceptional stability when testing concrete cylinders or cubes. These compact testers are made up of three core pieces: the heavy duty load frame, hydraulic pump, and control and display systems.

The large lower bearing block includes a bellows to prevent leaks caused by dust and debris getting into the loading piston. The other advantage of this large bearing block is that it allows for a wide horizontal entrance opening and plenty of ready access for loading and removing specimens.

This series also includes the rapid change platen system with which operators can quickly and easily change accessories, quickly switching between cylinder, block, cube and beam specimen testing.

The hydraulic pumping system is attached to the loadframe and connected to the piston by a high pressure hydraulic hose. The rate of loading and piston return on test completion is controlled automatically by the controller.

While these machines are ideally positioned to test cubes and cylinders, testing can be taken to another level by adding a flexure testing attachment that will work with the pumping unit in the TO317E-DG frame. After installing a simple manual valve system, you are ready to test the flexural strength of concrete beams, up to 100kN (22,000lb) maximum load.

Alternatively, a different attachment for testing the compression of hollow prisms can be attached to the main test frame. This attachment, model TO314-LU-SPL, can test up to three stacks of hollow prisms.

The DG Series features front and rear doors for easy loading of cylinders and also brushing out of broken specimens to the rear. The rear



also features a debris chute that doubles as protection for the hydraulic hose and valve connections.

Further safety features include physical limit switches, electronic limit switches and emergency panic button to ensure that your investment lasts for years of testing.

The DG Series comes with two controller options:

- EDI, a straightforward design using a membrane keypad and an LCD display to let operators select the test parameters simply and efficiently.
- A more advanced system with 10in TFT resistive touchscreen display. Easy to read and operate, it features simple and logical input screens and displays a real-time graph of test load vs time.



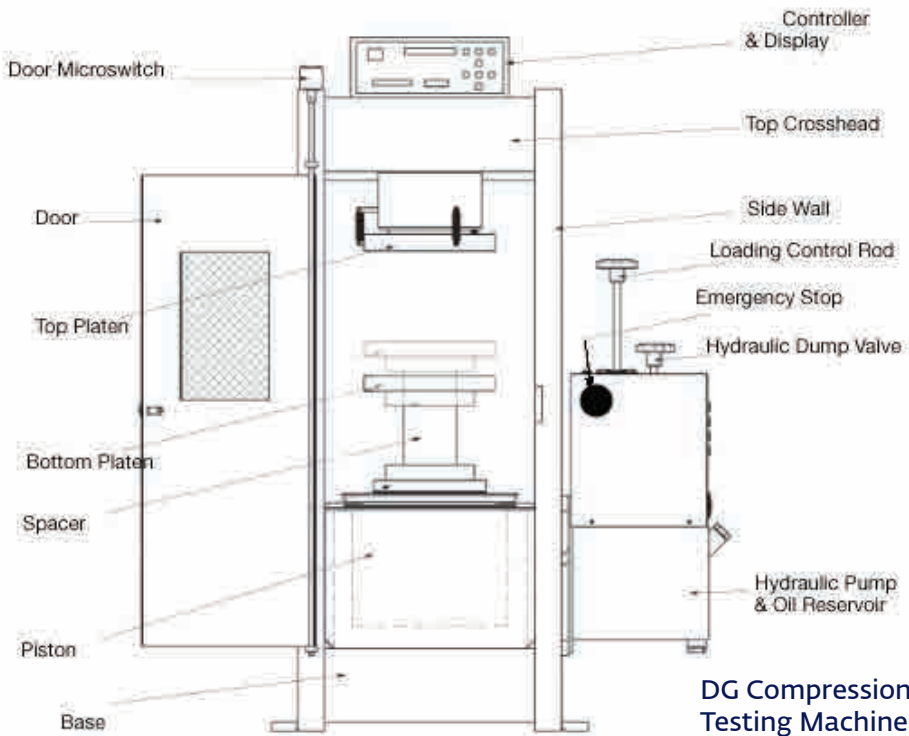
Key features

- Meets or exceeds key ASTM, EN, AASHTO standards.
- Manual pace rate control.
- Automatic stress determination and display.
- Interlocked safety doors with mesh window as standard.
- Overload and over travel safety protection.
- Self aligning platen with fast accessory change capability.
- Menu driven interface.
- Automatic data logging.
- Peak load capture and recording.

SPECIFICATIONS

Model	Capacity	Horizontal clearance	Vertical clearance	Piston stroke	Lower platen diameter
TO-302E	50kN/ 11,000lbf	260mm/ 10.24in	390mm/ 15.35in	50mm/2in	150mm /5.9in
TO-305E	100kN/ 22,000lbf	260mm/ 10.24in	390mm/ 15.35in	50mm/2in	150mm /5.9in
TO-308E	250kN/ 55,000lbf	260mm/ 10.24in	390mm/ 15.35in	50mm/2in	150mm /5.9in
TO-309E	25-250kN	230-260mm	230-390mm	50mm/2in	150mm
TO-311E	500kN/ 110,000lbf	260mm/ 10.24in	390mm/ 15.35in	50mm/2in	222mm /8.75in
TO-314E	1000kN/ 225,000lbf	260mm/ 10.24in	390mm/ 15.35in	50mm/2in	222mm /8.75in
TO-315E	1500kN/ 338,000lbf	305mm/ 12in	370mm/ 14.57in	50mm/2in	222mm /8.75in
TO-317E	2000kN/ 450,000lbf	340mm/ 13.4in	340mm/ 13.4in	50mm/2in	222mm /8.75in
TO-317E-STD	2000kN/ 450,000lbf	340mm/ 13.4in	340mm/ 13.4in	50mm/2in	222mm /8.75in
TO-320E	3000kN/ 675,000lbf	340mm/ 13.4in	340mm/ 13.4in	50mm/2in	222mm /8.75in
TO-320E-DG-CT-5000	5000kN	620mm	610mm	50mm/2in	341mm

Notes: 1. These models conform to all relevant European CE Health and Safety Directives EN 50081-1, 580081-1, 73/23/EEC, EN 61010-1. 2. Specifications are subject to change without notice. 3. Appropriate brick platens can be supplied as an option. 4. A set of spacers to suit stated specimen sizes are supplied with the machine.



500kN frame



2000kN frame



5000kN frame

See p14 for ordering information, controllers, options and accessories ▾

FA Series Fully Automatic Concrete Compression Testers

The machine pictured right is from the FA Series – Model TO317E-FA – with a maximum testing capacity of 450,000lbf or 2000kN. This machine is primarily designed for the testing of 4in (100mm) and 6in (150mm) concrete cubes, 100mm and 150mm concrete cylinders.

The Tinius Olsen FA Series of digital compression testers features highly robust frames for exceptional stability when testing concrete cylinders or cubes. These compact testers are made up of three core pieces: the heavy duty load frame, hydraulic pump, and control and display systems.

The large lower bearing block includes a bellows to prevent leaks caused by dust and debris getting into the loading piston. The other advantage of this large bearing block is that it allows for a wide horizontal entrance opening and plenty of ready access for loading and removing specimens.

This series also includes the rapid change platen system with which operators can quickly and easily change accessories, quickly switching between cylinder, block, cube and beam specimen testing.

The hydraulic pumping system is attached to the loadframe and connected to the piston by a high pressure hydraulic hose. The rate of loading and piston return on test completion is controlled automatically by the controller.

While these machines are ideally positioned to test cubes and cylinders, testing can be taken to another level by adding a flexure testing attachment that will work with the pumping unit in the TO317E-FA frame. After installing a simple manual valve system, you are ready to test the flexural strength of concrete beams, up to 100kN (22,000lbf) maximum load.

Alternatively, a different attachment for testing the compression of hollow prisms can be attached to the main test frame. This attachment, model TO314-LU-SPL, can test up to three stacks of hollow prisms.

The FA Series features front and rear doors for easy loading of cylinders and also brushing out of broken specimens to the rear. The rear also features a debris chute that doubles as



protection for the hydraulic hose and valve connections.

Further safety features include physical limit switches, electronic limit switches and emergency panic button to ensure that your investment lasts for years of testing.

The FA Series comes with three controller options:

- EDI, a straightforward design using a membrane keypad and an LCD display to let operators select the test parameters simply and efficiently.
- A more advanced system with 10in TFT resistive touchscreen display. Easy to read and operate, it features simple and logical input screens and displays a real-time graph of test load vs time.
- The FA Series can also be connected to a PC running TO's Horizon software and the test and machine controlled by computer. At the same time, Horizon software will generate and display load, or stress, vs time graphs; complete SPC analyses are also available.

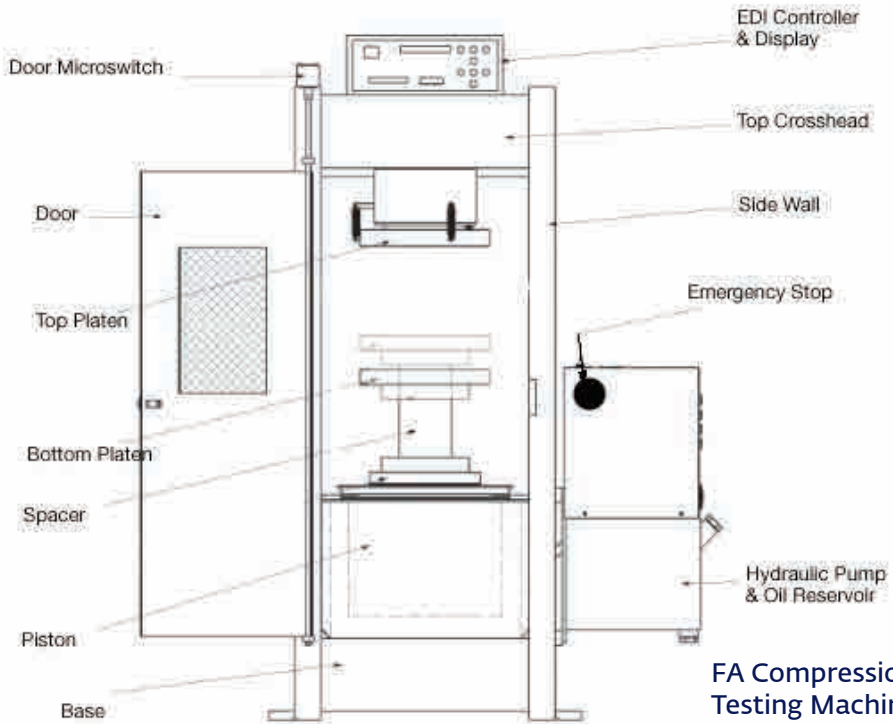
Key features

- Meets or exceeds key ASTM, EN, AASHTO standards.
- Manual pace rate control.
- Automatic stress determination and display.
- Interlocked safety doors with mesh window as standard.
- Overload and over travel safety protection.
- Self aligning platen with fast accessory change capability.
- Menu driven interface.
- Automatic data logging.
- Peak load capture and recording.

SPECIFICATIONS

Model	Capacity	Horizontal clearance	Vertical clearance	Piston stroke	Lower platen diameter
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TO-317E-STD	2000kN/ 450,000lbf	340mm/ 13.4in	340mm/ 13.4in	50mm/2in	222mm /8.75in
TO-320E	3000kN/ 675,000lbf	340mm/ 13.4in	340mm/ 13.4in	50mm/2in	222mm /8.75in
TO-320E-FA-CT-5000	5000kN	620mm	610mm	50mm	341mm

Notes: 1. These models conform to all relevant European CE Health and Safety Directives EN 50081-1, 580081-1, 73/23/EEC, EN 61010-1. 2. Specifications are subject to change without notice. 3. Appropriate brick platens can be supplied as an option. 4. A set of spacers to suit stated specimen sizes are supplied with the machine.



FA Compression Testing Machine



Supplied as standard – DG and FA models

- RS232 cable
- Spacers (150, 100, 60, 35mm)
- Lower platen
- Spherical seat with upper platen

Optional accessories – DG and FA models

- **TO-320-5500** Platen set for 6 x 12in concrete cylinders
- **TO-320-5502** Platen set for 4 x 8in concrete cylinders
- **TO-320-5504** Platen set for 3 x 6in concrete cylinders
- **TO-320-5510** Platen set for 2in cubes
- **TO-320-5512** Platen set for 6in cubes
- **TO-320-5518** Platen set for blocks up to 12in
- **TO-320-5519** Cylindrical Specimen caps – two caps per set
- **TO-320-5520** Rubber insert for 6in cap with 60 shore A hardness (bag of 10)
- **TO-320-5521** Compression frame jig assembly (without platens)
- **TO-320-5521-01** 50mm square platen set for TO 320-5521
- **TO-320-5521-02** 2in square platen for TO 320-5521
- **TO-320-5521-03** 40mm square platens
- **TO-320-5522** Flex jig/attachment
- **TO-320-5524** Cylindrical specimen cap, 4in diameter – two per set
- **TO-320-5525** Rubber insert for 4in cap with 60 shore A hardness (bag of 10)
- **TO-320-5523** BS EN 12390 stability compliant oil filled ball seat, platens
- **TO-320-5527** BS EN 12390 stability compliant oil filled retrofit ball seating

- **TO-320-5528** Tensile split strength test attachment
- **TO-320-5529** RS232 cable
- **TO-320-5532** Rectangular platen set for prisms, 475 x 250mm
- **TO-320-5534** Platen set, 165mm dia, with concentric rings in upper platen
- **TO-31727-1** Strain measurement attachment
- **TO-33101-BS** Flexural test frame, 100kN, no pump, using CTM two-way valve
- **TO-33101-ASTM** Flexural test frame, 100kN, no pump, using CTM two-way valve
- **TO-314-LU-SPL** 1000kN loading frame for testing hollow prisms – three stack max.
- **TO-320-LU-SPL** Prism/block test frame 3000kN, no pump, uses CTM valve
- **TO-343** Mold in cast iron for 100mm cube
- **TO-344** Mold in cast iron for 150mm cube
- **TO-344-20** Mold in cast iron for 200mm cube
- **TO-417** Mold in cast iron for 50mm cube
- **TO-414** Mold in steel for 70.6mm cube
- **TO-417-CI** Three-gang mold in cast iron for 50mm cube
- **TO-417-3-NB** Three-gang mold in Navy Brass for 50mm cubes-per ASTM
- **TO-320-5541** Platen Handling Assembly w/250x445mm platen set for 2000kN or 3000kN CTM
- **TO-320-5542** Platen Handling Assembly w/250x750mm platen set for 3000kN CTM

Optional accessories – FA models only

- **21001104** Civil Engineering primary platform for Horizon software
- **21001146** Civil Engineering (concrete) library for Horizon software

Ordering information – DG models

- **TO-302E-DG-01** 50kN DG Compression Tester configured for 110VAC, 60Hz
- **TO-302E-DG-02** 50kN DG Compression Tester configured for 220VAC, 60Hz
- **TO-302E-DG-03** 50kN DG Compression Tester configured for 220VAC, 50Hz
- **TO-305E-DG-01** 100kN DG Compression Tester configured for 110VAC, 60Hz
- **TO-305E-DG-02** 100kN DG Compression Tester configured for 220VAC, 60Hz
- **TO-305E-DG-03** 100kN DG Compression Tester configured for 220VAC, 50Hz
- **TO-308E-DG-01** 250kN DG Compression Tester configured for 110VAC, 60Hz
- **TO-308E-DG-02** 250kN DG Compression Tester configured for 220VAC, 60Hz
- **TO-308E-DG-03** 250kN DG Compression Tester configured for 220VAC, 50Hz
- **TO-309E-DG-01** 25/250kN DG Compression Tester, dual mode, configured for 110VAC, 60Hz
- **TO-309E-DG-02** 25/250kN DG Compression Tester, dual mode, configured for 220VAC, 60Hz
- **TO-309E-DG-03** 25/250kN DG Compression Tester, dual mode, configured for 220VAC, 50Hz
- **TO-311E-DG-01** 500kN DG Compression Tester configured for 110VAC, 60Hz
- **TO-311E-DG-02** 500kN DG Compression Tester configured for 220VAC, 60Hz
- **TO-311E-DG-03** 500kN DG Compression Tester configured for 220VAC, 50Hz
- **TO-314E-DG-01** 1000kN DG Compression Tester configured for 110VAC, 60Hz
- **TO-314E-DG-02** 1000kN DG Compression Tester configured for 220VAC, 60Hz
- **TO-314E-DG-03** 1000kN DG Compression Tester configured for 220VAC, 50Hz
- **TO-315E-DG-01** 1500kN DG Compression Tester configured for 110VAC, 60Hz
- **TO-315E-DG-02** 1500kN DG Compression Tester configured for 220VAC, 60Hz
- **TO-315E-DG-03** 1500kN DG Compression Tester configured for 220VAC, 50Hz
- **TO-317E-DG-01** 2000kN DG Compression Tester configured for 110VAC, 60Hz
- **TO-317E-DG-02** 2000kN DG Compression Tester configured for 220VAC, 60Hz
- **TO-317E-DG-03** 2000kN DG Compression Tester configured for 220VAC, 50Hz
- **TO-317E-STD-DG-01** 2000kN DG Standard Compression Tester configured for 110VAC, 60Hz
- **TO-317E-STD-DG-02** 2000kN DG Standard Compression Tester configured for 110VAC, 60Hz
- **TO-317E-STD-DG-03** 2000kN DG Standard Compression Tester configured for 110VAC, 60Hz
- **TO-320E-DG-01** 3000kN DG Compression Tester configured for 110VAC, 60Hz
- **TO-320E-DG-02** 3000kN DG Compression Tester configured for 220VAC, 60Hz
- **TO-320E-DG-03** 3000kN DG Compression Tester configured for 220VAC, 50Hz
- **TO-320E-DG-CT-5000-01** 5000kN DG Compression Tester configured for 110VAC, 60Hz
- **TO-320E-DG-CT-5000-02** 5000kN DG Compression Tester configured for 220VAC, 60Hz
- **TO-320E-DG-CT-5000-03** 5000kN DG Compression Tester configured for 220VAC, 60Hz

Ordering information – FA models

- **TO-302E-FA-01** 50kN FA Compression Tester configured for 110VAC, 60Hz
- **TO-302E-FA-02** 50kN FA Compression Tester configured for 220VAC, 60Hz
- **TO-302E-FA-03** 50kN FA Compression Tester configured for 220VAC, 50Hz
- **TO-305E-FA-01** 100kN FA Compression Tester configured for 110VAC, 60Hz
- **TO-305E-FA-02** 100kN FA Compression Tester configured for 220VAC, 60Hz
- **TO-305E-FA-03** 100kN FA Compression Tester configured for 220VAC, 50Hz
- **TO-308E-FA-01** 250kN FA Compression Tester configured for 110VAC, 60Hz
- **TO-308E-FA-02** 250kN FA Compression Tester configured for 220VAC, 60Hz
- **TO-308E-FA-03** 250kN FA Compression Tester configured for 220VAC, 50Hz
- **TO-309E-FA-01** 25/250kN FA Compression Tester, dual mode, configured for 110VAC, 60Hz
- **TO-309E-FA-02** 25/250kN FA Compression Tester, dual mode, configured for 220VAC, 60Hz
- **TO-309E-FA-03** 25/250kN FA Compression Tester, dual mode, configured for 220VAC, 50Hz
- **TO-311E-FA-01** 500kN FA Compression Tester configured for 110VAC, 60Hz
- **TO-311E-FA-02** 500kN FA Compression Tester configured for 220VAC, 60Hz
- **TO-311E-FA-03** 500kN FA Compression Tester configured for 220VAC, 50Hz
- **TO-314E-FA-01** 1000kN FA Compression Tester configured for 110VAC, 60Hz
- **TO-314E-FA-02** 1000kN FA Compression Tester configured for 220VAC, 60Hz
- **TO-314E-FA-03** 1000kN FA Compression Tester configured for 220VAC, 50Hz
- **TO-315E-FA-01** 1500kN FA Compression Tester configured for 110VAC, 60Hz
- **TO-315E-FA-02** 1500kN FA Compression Tester configured for 220VAC, 60Hz
- **TO-315E-FA-03** 1500kN FA Compression Tester configured for 220VAC, 50Hz
- **TO-317E-FA-01** 2000kN FA Compression Tester configured for 110VAC, 60Hz
- **TO-317E-FA-02** 2000kN FA Compression Tester configured for 220VAC, 60Hz
- **TO-317E-FA-03** 2000kN FA Compression Tester configured for 220VAC, 50Hz
- **TO-317E-STD-FA-01** 2000kN FA Standard Compression Tester configured for 110VAC, 60Hz
- **TO-317E-STD-FA-02** 2000kN FA Standard Compression Tester configured for 110VAC, 60Hz
- **TO-317E-STD-FA-03** 2000kN FA Standard Compression Tester configured for 110VAC, 60Hz
- **TO-320E-FA-01** 3000kN FA Compression Tester configured for 110VAC, 60Hz
- **TO-320E-FA-02** 3000kN FA Compression Tester configured for 220VAC, 60Hz
- **TO-320E-FA-03** 3000kN FA Compression Tester configured for 220VAC, 50Hz
- **TO-320E-FA-CT-5000-01** 5000kN FA Compression Tester configured for 110VAC, 60Hz
- **TO-320E-FA-CT-5000-02** 5000kN FA Compression Tester configured for 220VAC, 60Hz
- **TO-320E-FA-CT-5000-03** 5000kN FA Compression Tester configured for 220VAC, 60Hz

Controllers for DG and FA models

The DG Series has the option of two controllers while the FA Series can also be connected to Tinius Olsen's Horizon software:

- **Enhanced Digital Indicator (EDI)** – this straightforward design uses a membrane keypad and a white backlit LCD display to enable operators to select the test parameters simply and efficiently.
- A more advanced system with 10in

TFT resistive touchscreen display. Easy to read and operate, the controller features simple and logical input screens and displays a real-time graph of test load vs time.

- The FA Series can also be connected to a PC running TO's Horizon software and the test and machine controlled by computer. At the same time, Horizon software will generate and display load, or stress, vs time graphs.

Horizon software – FA models only

Tinius Olsen is proud to introduce the next evolution of testing software with our Horizon package. As part of our development process, we have taken the best features of our existing software offerings, including Test Navigator, QMat, and EP600 software, added a host of report writing and data manipulation capabilities and in the process, created a new, unparalleled testing platform that will make easy work of your materials testing programs, whether they're designed for the demanding rigors of R&D or the charting and analysis functions of QC testing.

One of the first features you see within the Horizon software is its use of the most current Windows environments. These familiar formats make it easy to use and learn, especially since the same familiar functionality is maintained throughout the program.

Ordering information

- **21001104** Civil Engineering primary platform for Horizon software
- **21001146** Civil Engineering (concrete) library for Horizon software



Key features

- Test Method Library
- Test Editor
- Tabbed Test and Recall Area
- Multiple Machine Control
- Output Editor
- Multilingual
- Method Editor
- Result Editor
- Multifaceted security
- Touchscreen-enabled*

*Touchscreens require the use of Windows 8 operating system and a touchscreen.

Touchscreen-based Enhanced Digital Indicator – DG and FA models

The new touchscreen-based EDI display enhances Tinius Olsen's existing EDI offering. It is an advanced digital control and display system with a 10in (diagonal) resistive touchscreen display, and is compatible with test frames that use the existing EDI controller. It is supplied with a stylus for easier operation for users wearing gloves. Easy to read and operate, it features simple and logical input screens and displays a real-time graph of test load vs time.

Ordering information

- **TO-30235-DG-T** Touchscreen-based enhanced digital indicator for DG models
- **TO-30235-FA-T** Touchscreen-based enhanced digital indicator for FA models

Key features

- Touchscreen TFT with 800 x 480 pixels.
- Icon-driven software showing figures and diagrams for ease of use.
- Unique data storage options with both internal storage (of 200 tests) and direct to USB thumb drive storage.
- Optional integrated thermal printer.
- Simultaneous display of load vs time graph, stress and actual load rate.



Enhanced Digital Indicator – DG and FA models

EDI is a straightforward design using a membrane keypad and LCD to enable simple and effective selection of test parameters. The TO EDI head is supplied with all TO concrete Compression Testing Machines DG, FA models and the Flex Testing Machine DG model.



Ordering information

- **TO-30235-DG** EDI with pressure sensor for digital compression testing machine
- **TO-30235-FA** EDI with pressure sensor for fully automatic compression testing machine

Key features

- White backlit LCD display, four lines, 40 characters per line.
- Multi unit Force and Stress, Imperial, Metric, SI.
- Force calibration range 1% to 100% accuracy +/- 1% of applied force.
- Pace rate control indication.
- Peak Force and Stress results.
- Specimen area input from specimen menu.
- Parallel printer O/P dot matrix format any size paper.
- RS232 output – ASCII comma delimited results data.
- Two channel I/P to accommodate CTM and flex unit or CTM and Block test unit.
- Approximately 2000 stored results.
- Young's modulus and strain measurement can be calculated when accompanied by compressometer.

Accessories for DG and FA models

The Flow Table is designed for determining the workability of Portland cement concrete. The 76.2cm diameter table top is finely machined from a solid brass

casting; the stand is made from cast iron. Operation is simple: the ground and hardened steel cam is designed to drop the table by 12.5mm.

Ball Seating Platen



BS EN 12390 requires certified stability and alignment, which is achieved using an oil-filled ball seating and upper platen.

Ordering information

- **TO-320-5523** BSEN 12390 stability compliant oil-filled ball seat, platens
- **TO-320-5527** BSEN 12390 stability compliant oil-filled retrofit ball seating

Platen Handling Assembly

Block Platens 460 x 280 x 75mm with sliding rail assembly can be installed for testing concrete blocks and other structural materials. Sliding rail assembly allows the platens to be easily installed without removing existing circular compression platens. They can be installed on all semi-auto and automatic compression machines. They must be factory installed.

Ordering information

- **TO-320-5541** Platen Handling Assembly w/250 x 445mm platen set for 2000kN or 3000kN CTM
- **TO-320-5542** Platen Handling Assembly w/250 x 450mm platen set for 3000kN CTM



Key features

- Improves laboratory efficiency.
- Reduces manual handling.
- Compatible with Semi-Automatic and Fully Automatic Compression Machines.

Compressometer and Extensometer for DG and FA models

An extensometer is a device that is used to measure changes in the length of an object. It is useful for stress-strain measurements

and tensile tests. Compressometers are used for determining strain and deformation characteristics of concrete cylinders.

Longitudinal Compressometer

This apparatus is used for determining strain and deformation characteristics of 150mm diameter x 300mm long standard concrete cylinders. It consists of two frames for clamping to the specimen using five tightening screws with hardened and tapered ends. Two spacers hold the frames in position. An adjustable pivot rod rests on pivot screws. A spring enables the pivot rod to remain in contact with pivot screws. The ball chain is for adjusting the tension of the spring. A dial gage, fixed to the top frame, is for making deformation measurements.



Optional accessories

- **TO-072** Analog dial gage, 5mm x 0.002mm
- **TO-072-DG** Digital gage, 5mm x 0.001mm

Ordering information

- **TO-372** Longitudinal Compressometer with TO-072 analog dial gage

Lateral Extensometer

This is used to determine the lateral extension of 150mm diameter x 300mm high cement concrete cylinders while running a compression test. The extensometer consists of two movable frames pivoted at one end. A dial gage measures the lateral extension, and a removable spacer strip is for the initial setting of the dial gage. The extensometer is attached to the specimen by screws. Supplied complete with TO-072 dial gage or TO-072DG digital gage.



Applicable standards

- ASTM C469

Optional accessories

- **TO-072** Analog dial gage, 5 x 0.002mm
- **TO-072-DG** Digital gage, 5 x 0.001mm

Ordering Information

- **TO-373** Lateral extensometer to fit 150 x 300mm cylinders with dial gage
- **TO-373-DG** Lateral extensometer to fit 150 x 300mm cylinders with digital gage

Flexural Testing Machine for DG and FA models

These machines are designed to test the flexural strength of concrete beams. The design provides maximum rigidity throughout their working range as the downward movement of the piston applies load. A spacer is provided for testing different beam sizes and load is indicated on a digital indicator. For 150 x 150 x 700mm beams, the support span is 600mm and loading span 200mm; for 100 x 100 x 500mm beams, the support span is 400mm and loading span 133mm.

One of the key considerations when using concrete in construction is how well it is going to stand up to bending pressures and how often it needs to be supported. With concrete, the most effective way to study the destructive testing is the Flexural Test. On a specimen beam ideally 150 x 150 x 750mm and/or 100 x 100 x 500mm the maximum tensile stress reach at the bottom of the test beam is considered the Flexural Strength/Modulus of Rupture of the material.

Key features

- Lightweight, rugged high strength frame.
- Self-aligning four-point loading roller assembly.
- Maximum capacity of either frame is 100kN (22,000lbf).
- For testing 100 x 100 x 500mm and 150 x 150 x 700mm beams.



Applicable standards

- BS 1881, ASTM C 78-02, BS EN 12390-5:2000

Ordering information

- **TO-33101-ASTM** Flexure Testing Frame 100kN machine no pump for use with CTMs using 2-way valve
- **TO-33101-BS** Flexure Testing Frame 100kN machine no pump for use with CTMs using 2-way valve
- **TO-331-ASTM** Flexure Testing Manual Machine ECO, for 10 x 10 x 50cm & 15 x 15 x 70cm beams
- **TO-331-BS** Flexure Testing Manual Machine ECO, for 10 x 10 x 50cm & 15 x 15 x 70cm beams
- **TO-332-ASTM-01** Flexure Testing Machine, 100kN, for 10 x 10 x 50cm & 15 x 15 x 70cm beams DG EDI, 110V, 60Hz
- **TO-332-ASTM-02** Flexure Testing Machine, 100kN, for 10 x 10 x 50cm & 15 x 15 x 70cm beams DG EDI, 220V, 60Hz
- **TO-332-ASTM-03** Flexure Testing Machine, 100kN, for 10 x 10 x 50cm & 15 x 15 x 70cm beams DG EDI, 220V, 50Hz
- **TO-332-BS-01** Flexure Testing Machine, 100kN, for 10 x 10 x 50cm & 15 x 15 x 70cm beams DG EDI, 110V, 60Hz
- **TO-332-BS-02** Flexure Testing Machine, 100kN, for 10 x 10 x 50cm & 15 x 15 x 70cm beams DG EDI, 220V, 60Hz
- **TO-332-BS-03** Flexure Testing Machine, 100kN, for 10 x 10 x 50cm & 15 x 15 x 70cm beams DG EDI, 220V, 50Hz

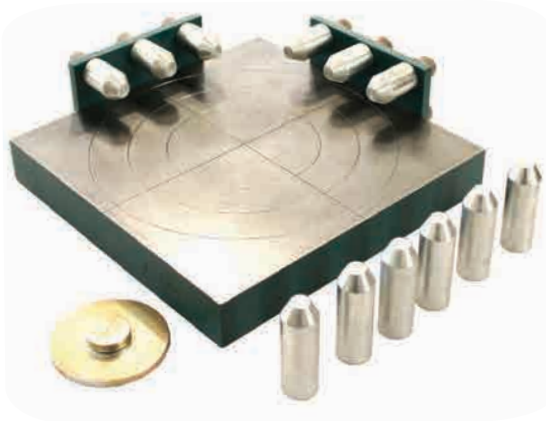
Accessories for DG models

Other accessories that can be used with DG Series machines to assist with most of the processes of the Compression Tester.

Self-Centering Platen

The self-centering platen is a cubical platen with pins mounted on two sides that help the sample to center itself in position. These adjustable pins on two axes are of different

sizes and are used based on the type and size of sample. The platens are specially designed and can only be used with 2000kN and 3000kN compression testers.



Key features

- 150mm and 200mm cubes.
- Adjustable spacer pins on two axes
- Specimen self-centers against the pins.
- Shorter middle pins for cylindrical specimens.
- Only for 2000kN and 3000kN machines.

Ordering information

- **TO-320-5535** Self-centering 220mm square lower platen, suitable for use with 2000kN and 3000kN frames

Compression Frame Stand

All models in the series can be mounted on a machine stand to bring the testing area to a convenient and safe working height.

Ordering information

- **TO-STAN01** Compression Testing machine stand for 1000kN frame and below
- **TO-STAN02** Compression Testing machine stand for 2000kN frame
- **TO-STAN03** Compression Testing machine stand for 3000kN frame



Motorized Flow Table

The Flow Table is designed for determining the workability of Portland cement concrete. The 76.2cm diameter table top is finely machined from a solid brass casting; the stand is made from cast iron. Operation is simple: the ground and hardened steel cam is designed to drop the table by 12.5mm.



Ordering information

- **TO-336-01** Motorized Flow Table, 110V, 60Hz
- **TO-336-02** Motorized Flow Table, 220V, 60Hz
- **TO-336-03** Motorized Flow Table, 220V, 50Hz

Applicable standards

- AASHTO T-126

Pan Type Concrete Mixer

For quality specimens to be manufactured, efficient mixing of concrete prior to molding is essential. Efficient mixing helps by coating the surface of all aggregate particles with cement paste and also creates uniformity in the mixture. The pan model is suitable for mixing small quantities of concrete, typically used in laboratories.

The design of the paddles ensures uniform and efficient mixing of cement, aggregate and other materials, in both wet and dry conditions. The lid and mixing paddles can be easily removed, giving operators maximum access and convenience when loading and emptying the pan. This mixer has wheels and is truly mobile.



Applicable standards

- BS 1881 Part 125:1986

Ordering information

- **TO-9891-01** Pan Mixer, 40-liter capacity, 415V, 60Hz, 3ph
- **TO-9891-02** Pan Mixer, 40-liter capacity, 415V, 50Hz, 3ph

SPECIFICATIONS

Mixing capacity	40 litres
Overall dimension	910 x 875 x 1250mm
Motor	2HP, 3ph AC, 960rpm

Air Entrainment Meter – Type A

Entrainment of a small amount of air in cement concrete has been found to considerably improve the durability of concrete. The recommended limits specified for the air content are between 3% and 6.5%. Smaller percentages may result in deterioration taking place more quickly and larger percentages may reduce the strength without any improvement in the durability of concrete.

Further, when use of admixtures is made to increase workability of concrete, the air content should be checked to ensure that the percentage of air remains between 1% and 2% for optimum performance of the concrete structure.

An Air Entrainment Meter, as specified in ASTM standards, is used to determine these

percentages. It consists of a pressure-tight flanged cylindrical measuring bowl, fitted with a removable flanged and conical cover assembly with a seal in between.

The conical cover has an air valve and a pet cover for bleeding off the water. A cylindrical stand pipe, which is graduated in percent of air content, is fixed on the conical cover assembly.

The required pressure is applied to the specimen with the help of a pressure bulb. The whole assembly is mounted on a flat base. Each apparatus is supplied complete with a calibrating cylinder, pressure gage, funnel, trowel and tamping bar.



Applicable standards

- EN 12350-7, ASTM C 231

Supplied as standard

- Calibration kit
- Rubber mallet
- Tamping rod
- Gaging trowel
- Measuring cylinder
- Straight edge

Optional accessories

- – Calibration kit
- – Rubber mallet
- **TO-345** Tamping rod
- **TO-428** Gaging trowel
- – Measuring cylinder
- – Straight edge
- – Syringe

Ordering information

- **TO-340-A** Air Entrainment Meter Type A
- **TO-341-A** Air Entrainment 10 liters Type A
- **TO-342-A** Air Entrainment 100 liters Type A

Air Entrainment Meter – Type B

Key features

- Seven-liter capacity.
- Shock-proof pressure gage mounting.
- Lightweight aluminum construction.
- Heavy-duty plastic carrying case for easy transport to site.

The proper control of entrained air in concrete is recognized as one of the most important functions in modern concrete manufacture. To the concrete engineer and technician, the Air Entrainment Meter offers an instrument for use in testing and designing concrete mixes.

The instrument is designed so that the operating parts form an integral unit. The container is rigid, thus providing an accurate device for the performance of unit weight testing. For convenience, the tare weight in grams is stamped on the bottom. When used with the supplied monograph, the air meter provides quick and easy particle density and percent of free moisture in aggregate determinations.

The Air Entrainment Meter's multi-range feature accurately measures entrained air up to 22%. It is supplied complete with straight edge, syringe and carrying case.



SPECIFICATIONS

Dimensions	248 x 337mm
Capacity	7 liters
Readings	Up to 22% entrained air
Accuracy	±0.25% full scale
Aggregate size	50mm maximum
Container	Tare weight stamped on bottom; two-piece clamping device for positive seal
Pressure gage	In shockproof mounting
Weight	6.8kg

Applicable standards

- EN 12350-7; ASTM C 231, ASTM C 213, AASHTO T-152

Supplied as standard

- – Calibration kit
- – Rubber mallet
- **TO-345** Tamping rod
- **TO-428** Gaging trowel
- – Measuring cylinder
- – Straight edge

Optional accessories

- – Calibration kit
- – Rubber mallet
- **TO-345** Tamping rod
- **TO-428** Gaging trowel
- – Measuring cylinder
- – Straight edge
- – Syringe

Ordering information

- **TO-340-B** Air Entrainment Meter Type B

Accelerated Curing Tank

Curing is the process of maintaining satisfactory moisture content and temperature in freshly cast concrete for a definite period of time immediately following placement. This serves two major purposes: it prevents or replenishes the loss of moisture from the concrete and maintains a favorable temperature for hydration to occur for a definite period.

The fully insulated water tank holds standard cast cubes that are placed on two removable racks with sufficient free circulation of water around each cube.

The pump, drain valves, heater, thermostat and recirculation pump are housed in a compartment at one end of the tank. The models can cure in warm, cold and boiling water.



Key features

- Warm water method.
- Temperature range: $55 \pm 2^{\circ}\text{C}$.
- Boiling water option where temperature range is $100 + 2^{\circ}\text{C}$.
- Accelerated curing tanks with refrigeration system for low temperature are also available on special request.

Applicable standards

- EN 12390-2, ASTM C31, C192, AASHTO T23

Ordering information

- **TO-355-1-ACB-02** Accelerated Curing Tank for six molds of 150mm size ambient to 100°C , 415V, 60Hz, 3ph
- **TO-355-1-ACB-03** Accelerated Curing Tank for six molds of 150mm size ambient to 100°C , 415V, 50Hz, 3ph
- **TO-355-1-ACW-02** Accelerated Curing Tank for six molds of 150mm size ambient to 55°C , 415V, 60Hz, 3ph
- **TO-355-2-ACW-03** Accelerated Curing Tank for six molds of 150mm size ambient to 55°C , 415V, 50Hz, 3ph
- **TO-355-2-ACB-02** Accelerated Curing Tank for 12 molds of 150mm size ambient to 100°C , 415V, 60Hz, 3ph
- **TO-355-2-ACB-03** Accelerated Curing Tank for 12 molds of 150mm size ambient to 100°C , 415V, 50Hz, 3ph
- **TO-355-2-ACW-02** Accelerated Curing Tank for 12 molds of 150mm size ambient to 55°C , 415V, 60Hz, 3ph
- **TO-355-2-ACW-03** Accelerated Curing Tank for 12 molds of 150mm size ambient to 55°C , 415V, 50Hz, 3ph

Vibrating Table

Tinius Olsen's Vibrating Table is ideal for this type of compaction and capable of securing four 150 mm cube molds at once. In addition to the securing clamp, the table has ridges along its edges to prevent molds from sliding off during operation. The specially designed vibro motor means vibration frequency can be varied from 60Hz to 43Hz. Maximum load capacity is 140kg.



Ordering information

- **TO-364-01** Vibrating Table, table top 750 x 750mm, 110V, 60Hz
- **TO-364-02** Vibrating Table, table top 750 x 750mm, 220V, 60Hz
- **TO-364-03** Vibrating Table, table top 750 x 750mm, 220V, 50Hz
- **TO-365-01** Vibrating Table, table top 500 x 500mm, capacity 140kg, 110V, 60Hz
- **TO-365-02** Vibrating Table, table top 500 x 500mm, capacity 140kg, 220V, 60Hz
- **TO-365-03** Vibrating Table, table top 500 x 500mm, capacity 140kg, 220V, 50Hz
- **TO-366-01** Vibrating Table, table top 2 x 1m, 110V, 60Hz
- **TO-366-02** Vibrating Table, table top 2 x 1m, 220V, 60Hz
- **TO-366-03** Vibrating Table, table top 2 x 1m, 220V, 50Hz
- **TO-367-01** Vibrating Table, table top 1 x 1m, 110V, 60Hz
- **TO-367-02** Vibrating Table, table top 1 x 1m, 220V, 60Hz
- **TO-367-03** Vibrating Table, table top 1 x 1m, 220V, 50Hz

Auto Blaine Apparatus

Tinius Olsen's Automatic Blaine Apparatus is an automated version of Blaine apparatus and follows international standards. It is used to determine the fineness of cement using the Blaine air-permeability apparatus, in terms of specific surface expressed as total surface area in square centimeters per gram, or square meters per kilogram, of cement.



Key features

- Single touch operation.
- Automatic control of fluid movement.
- Automatic sensing to ensure error-free, repeatable, measurements.
- Automatic temperature measurement.
- Auto formula correction to calculate the Blaine value with temperature variation (as per ASTM and EN).
- Facility to configure and monitor various cement types.
- Timing accuracy up to 200mSec.
- Storage of up to 10,000 data points.
- Easy, tamper-proof calibration using a lockable ball valve.

Applicable standards

- ASTM C204, AASHTO T153, BS 4359, 4550, UNI 7374, EN196, NF P15 442, UNE 80.106

Standard features

- **TO-391-301** One Air Permeability Apparatus (Blaine type) consisting of one manometer tube mounted on a stand with sensor
- **TO-391-302-01** Data Acquisition System with vacuum pump fitted in a box at 110VAC, 60Hz
- **TO-391-302-02** Data Acquisition System with vacuum pump fitted in a box at 220VAC, 60Hz
- **TO-391-302-03** Data Acquisition System with vacuum pump fitted in a box at 220VAC, 50Hz
- **TO-39001** Permeability cell with plunger

- **TO-39003** Perforated metal disc
- **TO-39006** Rubber tube
- **TO-39007** Filter paper discs (set of 12)
- **TO-39008** Dibutylphthalate liquid
- **TO-39009** Punch
- **TO-39010** Non-perforated metal disc
- **TO-39011** Syringe fitted with nylon tube
- **TO-320-5529** RS232 cable

Optional accessories

- **TO-39001** Permeability cell with plunger
- **TO-39003** Perforated metal disc
- **TO-39006** Rubber tube
- **TO-39007** Filter paper discs (set of 12)
- **TO-39008** Dibutylphthalate liquid
- **TO-39009** Punch
- **TO-39010** Non-perforated metal disc



Ordering information

BS/EN Standards

- **TO 391-3-EN-01** Automatic Blaine apparatus with standalone data acquisition at 110VAC, 60Hz
- **TO 391-3-EN-02** Automatic Blaine apparatus with standalone data acquisition at 220VAC, 60Hz
- **TO 391-3-EN-03** Automatic Blaine apparatus with standalone data acquisition at 220VAC, 50Hz

ASTM Standards

- **TO 391-3-ASTM-01** Automatic Blaine

apparatus with standalone data acquisition at 110VAC, 60Hz

- **TO 391-3-ASTM-02** Automatic Blaine apparatus with standalone data acquisition at 220VAC, 60Hz
- **TO 391-3-ASTM-03** Automatic Blaine apparatus with standalone data acquisition at 220VAC, 50Hz

Packaging information

- Net weight: 20kg; gross weight: 50kg
- Packaging dimensions: 76 x 53 x 84cm

Jolting Apparatus

The Jolting Apparatus is used for making standard rectangular specimens measuring 40.1 x 40 x 160mm of Portland and Pozzolana cement mortar to determine transverse strength. The machine consists of a mold table, which is seated on a rotating cam driven at 60rpm. The rectangular mold table is connected by two support arms to the spindle.

The three-gang mold on the top is clamped rigidly to the mold table using the supplied hopper. The hopper supports the mold while free fall of the table is stopped by the cam.

The machine is supplied with one mold and a hopper.



Applicable standards

- BS 3892-1, 4551-1, EN 196-1, 413-2, 459-2, 1774-1, 1015-10, 11, 13454-2, ISO 679

Key features

- Easy and quick to start.
- Automatic function.
- No attention required during test.
- Easy clamping and unclamping of mold on table.

Standard features

- **TO-422** Three-gang mold 40.1 x 40 x 160mm, feeding hopper

Ordering information

- **TO-421-01** Jolting Apparatus, 110V 60Hz
- **TO-421-02** Jolting Apparatus, 220V 60Hz
- **TO-421-03** Jolting Apparatus, 220V 50Hz

Cement Autoclave

The Cement Autoclave is ideal for conducting accelerated soundness tests on cement and consists of a stainless steel pressure vessel with insulated outer shell. The temperature and pressure are measured by RTD probes and the system controlled by a PID controller, but the system has a spring-loaded pressure release safety valve to maintain safe operation.

Applicable standards

- ASTM C188, C141, C151, C155, AASHTO T107

Optional accessories

- **TO-40801** Heating elements
- **TO-40802** Silicon rubber lid gasket
- **TO-40803** Spring loaded, safety loaded, safety valve

Ordering information

- **TO-408-1-01** Cement Autoclave, 110VAC, 60Hz
- **TO-408-1-02** Cement Autoclave, 220VAC, 60Hz
- **TO-408-1-03** Cement Autoclave, 220VAC, 50Hz



SPECIFICATIONS

Working pressure	21 ± 1kg/cm ² at 215°C (300psi at 419°F)
Pressure vessel	150 x 500mm depth
Weight	70kg
Heater	2000W

Key features

- Rustproof stainless steel pressure vessel and enclosure.
- Microprocessor-based PID controller for accurate control of temperature and pressure.
- Three-part safety mechanism to protect the operator and equipment.
- Simple to use.

Flow Table

The Flow Table is designed for determining the workability of Portland cement concrete. The 70mm diameter table top is finely machined from a solid brass casting; the stand is made from cast iron. Operation is simple, where the ground and hardened steel cam is designed to drop the table by 50mm.

The Flow Table consists of a brass table top 250 ± 2.5 mm diameter, mounted on a rigid stand. The table top is reinforced with equally spaced ribs and allowed to drop through 12mm by a ground and hardened cam.

The motor drive assembly using the geared motor box is designed to rotate the cam through the shaft at 100rpm. It is suitable for operation on 220V, 50Hz/110V, 60Hz, single phase AC supply. Complete with flow mold 100mm base diameter, 70mm top diameter and 50mm high.

Note: A manually operated version of this flow table is also available.

Applicable standards

- BS 4551-1, 3892-1, ASTM C 87, C 109, C 185, C 230, C 243, C 348, AASHTO T71, T106, T137

Ordering information

- **TO-411-ASTM-01** Flow Table, electrically operated, 110V, 60Hz
- **TO-411-ASTM-02** Flow Table, electrically operated, 220V, 60Hz
- **TO-411-ASTM-03** Flow Table, electrically operated, 220V, 50Hz
- **TO-411-BS-01** Flow Table, electrically operated, 110V, 60Hz
- **TO-411-BS-02** Flow Table, electrically operated, 220V, 60Hz
- **TO-411-BS-03** Flow Table, electrically operated, 220V, 50Hz
- **TO-410-BS/ASTM** Flow Table, manually operated, as per ASTM and BS



Mortar Mixer

This mixer is designed to mix mortars and cement paste to standard requirements and can be operated in either manual or automatic mode.

The mixer features microprocessor control of the speed and mixing program and employs an elliptical mixing motion for thorough and efficient mixing.

Applicable standards

- BS 3892-1, 3892-3, 6463-103, 4551-1, ISO 679, EN 196-1, 196-3, 413-3, 459-2, 1744-1, 13279-2, 1015-2, 13395-1, 13454-2

Standard features

- Mixing bowl
- Paddle
- Scraper
- Sand dispenser
- Water burette

Ordering information

- **TO-412-01** Mortar Mixer with sand and water dispenser, 110VAC, 60Hz
- **TO-412-02** Mortar Mixer with sand and water dispenser, 220VAC, 60Hz
- **TO-412-03** Mortar Mixer with sand and water dispenser, 220VAC, 50Hz

SPECIFICATIONS

Speed (rpm)	Paddle	Mixing Head
Low	140 ± 5	62 ± 5
High	285 ± 10	125 ± 10
Rated power	180W	
Bowl capacity	5 liters	
Weight	54kg	
Dimension (LxWxH)	530 x 350 x 580mm	



Laboratory Ball Mill

The Laboratory Ball Mill is primarily designed for grinding pigments and cement.

The material is ground at a specific speed for a specific period using a specific quantity of grinding steel balls. The size range of balls provided to support the tests is from 12.5 to 40mm. The size of ball varies with the requirement of the tests and complied standard. The Laboratory Ball Mill capacity also varies according to the application and ranges from 5-20kg.

The equipment is provided with a counter for recording the number of revolutions.

Apart from the cement industry, it is also used in the paint, plastic, granite and tile industries.



Optional accessories

- **TO-44101** Steel ball 40mm, single ball
- **TO-44102** Steel ball 30mm, single ball
- **TO-44103** Steel ball 25mm, single ball
- **TO-44104** Steel ball 19mm, single ball
- **TO-44105** Steel ball 12.5mm, single ball

Ordering information

- **TO-441-02** Laboratory Ball Mill, 5kg capacity without steel balls, 415V, 60Hz, 3ph
- **TO-441-03** Laboratory Ball Mill, 5kg capacity without steel balls, 415V, 50Hz, 3ph
- **TO-441-10-02** Laboratory Ball Mill, 10kg capacity without steel balls, 415V, 60Hz, 3ph
- **TO-441-10-03** Laboratory Ball Mill, 10kg capacity without steel balls, 415V, 50Hz, 3ph
- **TO-441-20-02** Laboratory Ball Mill, 20kg capacity without steel balls, 415V, 60Hz, 3ph
- **TO-441-20-03** Laboratory Ball Mill, 20kg capacity, without steel balls, 415V, 50Hz, 3ph



Pulverizer

Pulverizers are used specifically for grinding soft and brittle material into fine powder.

Aimed at the cement industry, this machine helps in crushing or grinding up any stone up to 45mm size to powder for better quality cement. The strong steel frame of this machine offers longer duration of run time and helps in crushing approximately 250kg of materials in eight hours.

This machine, used for crushing materials to produce fine mesh samples, is a self-contained grinder with a rotating disc that has planetary movement in vertical plane.



Key features

- Designed for grinding materials to produce fine mesh samples.
- Ideal for use in cement and chemical industries.
- Self-contained grinder with a rotating disc features planetary movement in vertical plane.
- 250kg materials can be crushed in approximately eight hours.
- Discharging opening adjustment range: 3-10mm.
- Suitable for crushing any type of stone up to 45mm.

Ordering information

- **TO-443-01** Pulverizer, 110V, 60Hz
- **TO-443-02** Pulverizer, 220V, 60Hz
- **TO-443-03** Pulverizer, 220V, 50Hz

Los Angeles Abrasion Apparatus

The Los Angeles Abrasion Machine comprises a heavy steel cylinder, rotated about a horizontal axis.

The cylinder incorporates a removable internal shelf. Two alternative shelf positions are provided: one for ASTM and one for the EN test method.

The heavy duty steel cylinder is manufactured from structural steel plate. The filling aperture is provided with a cover. The machine is fitted with a digital revolution counter and steel tray for specimen unloading. It is also supplied with one set of abrasive charges as standard.



Applicable standards

- ASTM C 131, C 535, EN 1097-2, AASHTO T96

Supplied as standard

BS/EN Standards

- **TO-45801-EN** Abrasive charge, consisting of a set of 12 hardened steel balls of 48mm diameter

ASTM Standards

- **TO-45801-ASTM** Abrasive charge, consisting of a set of 12 hardened steel balls of 48mm diameter

AUS Standards

- **TO-45801-AS** Abrasive charge, consisting of a set of 12 hardened steel balls of 48mm diameter

Key features

- European and ASTM methods.
- Revolution counter.
- Full width cover.
- Cabinet option is also available with Los Angeles.

Optional accessories

- **TO-45801-EN** Abrasive charge, consisting of a set of 12 hardened steel balls of 48mm diameter
- **TO-45801-ASTM** Abrasive charge, consisting of a set of 12 hardened steel balls of 48mm diameter
- **TO-45801-AS** Abrasive charge, consisting of a set of 12 hardened steel balls of 48mm diameter

Ordering information

BS/EN Standards

- **TO-458-01-EN** Los Angeles Abrasion Testing Machine with abrasive charge, 110V 60Hz
- **TO-458-02-EN** Los Angeles Abrasion Testing Machine with abrasive charge, 220V 60Hz
- **TO-458-03-EN** Los Angeles Abrasion Testing Machine with abrasive charge, 220V 50Hz

ASTM Standards

- **TO-458-01-ASTM** Los Angeles Abrasion Testing Machine with abrasive charge, 110V 60Hz

- **TO-458-02-ASTM** Los Angeles Abrasion Testing Machine with abrasive charge, 220V 60Hz
- **TO-458-03-ASTM** Los Angeles Abrasion Testing Machine with abrasive charge, 220V 50Hz

AUS Standards

- **TO-458-01-AS** Los Angeles Abrasion Testing Machine with abrasive charge, 110V 60Hz
- **TO-458-02-AS** Los Angeles Abrasion Testing Machine with abrasive charge, 220V 60Hz
- **TO-458-03-AS** Los Angeles Abrasion Testing Machine with abrasive charge, 220V 50Hz

Jaw Crusher

Jaw crushers were one of the earliest crushing machines to be developed in the materials industry, before it began to modify functionalities and introduce new types to the market.

With a simple and solid structure, reliable operation, easy maintenance and repair, and low production and construction fees, jaw crushers have long been widely used for coarse, medium and fine crushing of various kinds of ores and rocks in many industrial sectors such as metallurgy, chemistry, building material, power plant and transportation.

The Tinius Olsen Jaw Crusher is compact and of rugged construction for general laboratory use in small pilot plant operations. Two jaws of manganese steel are provided and the moveable jaw produces two blows for every revolution to reduce oversizing to a minimum.

Ordering information

- **TO-442-01** Jaw Crusher, 110V 60Hz
- **TO-442-02** Jaw Crusher, 220V 60Hz
- **TO-442-03** Jaw Crusher, 220V 50Hz



Key features

- Designed to speed up crushing of aggregates, ore, mineral, coal and similar materials.
- Compact and rugged for laboratory and small production units.
- Manganese steel jaws adjustable up to 6mm opening.
- Supported with strong steel frame.

Aggregate Impact Tester with Blow Counter

The Aggregate Impact Tester with Blow Counter is used to determine aggregate impact value and has been designed in accordance with ASTM and BS Standards.

The sturdy construction consists of a base and support columns that form a rigid framework around the quick release trigger mechanism to ensure an effective free-fall of the hammer during test. The free-fall can be adjusted through 380 + 5mm. The hammer is provided with a locking arrangement.

Applicable standards

- BS812-112

Supplied as standard

- **TO-45601** Cylindrical Cup
- **TO-45602** Metal measure, 75mm ID x 50mm deep
- **TO-45603** Tamping rod
- **TO-45604** Automatic blow counter

Optional accessories

- **TO-45601** Cylindrical cup
- **TO-45602** Metal measure, 75mm ID x 50mm deep
- **TO-45603** Tamping rod
- **TO-45604** Automatic Blow counter

Ordering information

- **TO-456-BS** Aggregate Impact Tester with Blow Counter as per BS specification



Key features

- ASTM & BS compliant.
- Blow counter.
- Sturdy frame.
- Adjustable free-fall.

Accelerated Polishing Machine

Tinius Olsen manufactures state-of-the-art Aggregate Polishing Machines. Specimens are manufactured in accurately machined and matched molds. They are then removed from the molds and located on the 'Road Wheel'.

The wheel is then rotated and enters into contact with a spring-loaded solid rubber tire. Abrasive charges are continuously fed by mechanical feeders at a fixed speed. Feed rates for corn emery and flour emery are as per British and American standards. The water is supplied at a controlled rate through a water container. Used water and abrasives are collected in a large removable tray.

Applicable standards

- BS812, ASTM D331

Ordering information

- **TO-203-01-BS** Accelerated Polishing Machine as per BS, 110VAC, 60Hz
- **TO-203-02-BS** Accelerated Polishing Machine as per BS, 220VAC, 60Hz
- **TO-203-03-BS** Accelerated Polishing Machine as per BS, 220VAC, 50Hz
- **TO-203-01-ASTM** Accelerated Polishing Machine as per ASTM, 110VAC, 60Hz
- **TO-203-02-ASTM** Accelerated Polishing Machine as per ASTM, 220VAC, 60Hz
- **TO-203-03-ASTM** Accelerated Polishing Machine as per ASTM, 220VAC, 50Hz



Key features

- High safety standards
- Sealed long life bearings.
- Sealed control bearings.
- Heavy welded steel mainframe with adjustable pads.
- Specimens manufactured and easily removed from accurately machined moulds.
- Water gravity fed from high level tank through calibrated flow meter.

Universal Penetrometer

Penetrometers are used for testing a wide variety of materials such as grease, petroleum, bitumen, tar, asphalt, rubber, cement and soils.

In this test, a chosen force is applied over a given area for a known period of time and the depth of penetration or the depression made in the sample is measured in tenths of a millimetre, which is expressed as a penetration number.

An accurately fabricated steel base has been designed to facilitate penetration tests to be made over a wide surface area of sample. Adjustable feet are provided in the base for levelling. The display and penetration arm are adjustable to permit the testing of samples immersed in a thermostat bath.

The unit is compact with in-built timer to control the duration of penetration, which is preset in the factory to five seconds. The instrument is provided with levelling screws. Each penetrometer is supplied with a plunger weighing 47.5g for testing bituminous product, one 50g weight and one 100g weight. It also includes the cone and penetration unit.



Applicable standards

- EN 12350-2, ASTM C143

Standard features

- **TO-515** Penetrometer cone
- **TO-516** Bitumen penetration kit

Optional accessories

- **TO-515** Penetrometer cone
- **TO-518** Bitumen penetration kit
- **TO-51801** Penetration needle

- **TO-51802** Transfer dish (copper)
- **TO-51803** Aluminium sample containers
- **TO-04201** Penetration test cone
- **TO-04202** Penetration test cup

Ordering information

- **TO-512-01** Universal Penetrometer with timer, 110V, 60Hz
- **TO-512-02** Universal Penetrometer with timer, 220V, 60Hz
- **TO-512-03** Universal Penetrometer with timer, 220V, 50Hz



Automatic Compactor for Bituminous Mixes – Light Compaction

The Automatic Compactor eliminates the laborious process of manual compaction and results in consistent laboratory specimens.

This equipment consists of a drive mechanism that lifts a 4.5kg weight and drops it through a height of 457mm.

A removable rammer foot facilitates preheating. A compaction pedestal with specimen holder is fixed to the base. An automatic blow counter enables the number of blows to be preset before each test and automatically stops the machine on completion.

Key features

- Rugged construction to withstand hard work.
- Fully automatic and easy to operate.
- Uniform compaction.
- Automatic blow counter.



Applicable standards

- BS598-107, EN 12697-10, -30, AASHTO T245

Standard features

- **TO-55002** Compaction mold
- **TO-55003** Base plate
- **TO-55004** Extension collar

Optional accessories

- **TO-55002** Compaction mold

- **TO-55003** Base plate
- **TO-55004** Extension collar

Ordering information

- **TO-553-1-01** Automatic Compactor for Bituminous Mixes of 100mm dia sample, 110V, 60Hz
- **TO-553-1-02** Automatic Compactor for Bituminous Mixes of 100mm dia sample, 220V, 60Hz
- **TO-553-1-03** Automatic Compactor for Bituminous Mixes of 100mm dia sample, 220V, 50Hz

Marshall Stability Test Machines

Marshall Stability Test Equipment is used by highway departments, contractors, engineers, testing laboratories and other government agencies to test the stability of bituminous samples.

It is used for measurement of resistance to plastic flow of cylindrical specimens of bituminous paving mixture loaded on the lateral surface.

The machine can provide measurement data for use with hot mixture containing asphalt or tar and aggregate up to 25.4mm maximum size. The equipment comprises a bench top loading frame with a screw-driven adjustable crosshead.

The Marshall Stability Test Machines are available in two models: digital, using a loadcell to measure force and an LVDT to measure displacement; and a non-digital version that uses a proving ring to measure force and a micrometer to measure displacement.

Key features: Analog and Digital

- Single speed, bench top load frame.
- Maximum loading capacity of 50kN.
- Geared screw jack and motor drive.
- Precise speed.
- Limit switch protection for both upward and downward movement.

ANALOG AND DIGITAL SPECIFICATIONS

Maximum vertical clearance	470mm
Minimum vertical clearance	250mm
Horizontal clearance	265mm
Platen diameter	133mm
Platen travel	25mm
Platen speed	50.8mm/min
Rated power	375W
Dimension (LxWxH)	550 x 400 x 870mm
Weight	60kg

Applicable standards

- ASTM D1559, BS 598-107, EN 12697-34, AASHTO T-245

Optional accessories

- **TO-55002** Compaction mold
- **TO-55003** Base plate
- **TO-55004** Extension collar
- **TO-55005** Compaction pedestal suitable for 4in dia specimen
- **TO-55006** Compaction rammer 10lb
- **TO-55018-1** Sample ejector (hydraulic) for 4in dia specimen Applicable standards

Analog



Standard features

- **TO-55001** Breaking head assembly
- **TO-274** 50kN proving ring
- **TO-072** Dial gage

Ordering information

- **TO-550-1-01** Marshall Stability Apparatus, single-speed machine including machine mounted 50kN proving ring and digital dial gage, 110VAC, 60Hz
- **TO-550-1-02** Marshall Stability Apparatus, single-speed machine including machine mounted 50kN proving ring and digital dial gage, 220VAC, 60Hz
- **TO-550-1-03** Marshall Stability Apparatus, single-speed machine including machine mounted 50kN proving ring and digital dial gage, 220VAC, 50Hz

Digital



Standard features

- **TO-55001** Breaking head assembly
- **TO-55020** Data acquisition system comprising:
 - Digital indicator
 - Load cell 50kN
- Displacement transducer 0-20 mm

Ordering information

- **TO-550-2-01** Digital Marshall Apparatus, including 50kN loadcell and LVDT displacement transducer, 110VAC, 60Hz
- **TO-550-2-02** Digital Marshall Apparatus, including 50kN loadcell and LVDT displacement transducer, 220VAC, 60Hz
- **TO-550-2-03** Digital Marshall Apparatus, including 50kN loadcell and LVDT displacement transducer, 220VAC, 50Hz

Ring and Ball Apparatus

This equipment is used to determine the temperature at which a sample of bituminous material loaded by a 9.5mm diameter steel ball drops a specified distance when heated under specified conditions.

The Ring and Ball Apparatus has a magnetic stirrer with adjustable heating facility and digital display of temperature. Each unit comes with a bath of heat-resistant glass, tapered rings, ball centering guide, steel balls, ring holder and a hot plate.



Applicable standards

- ASTM D 36, E 28, STPTC PT 3, AASHTO T53, BS:2000, EN 1427

Standard features

- **TO-56101** Tapered rings (set of two)
- **TO-56102** Ball centering guide (set of two)
- **TO-56103** Steel ball of 9.5mm dia (set of two)
- **TO-56104** Ring holder
- **TO-56105** Electric hot plate

Optional accessories

- **TO-56101** Tapered rings (set of two)
- **TO-56102** Ball centering guide (set of two)
- **TO-56103** Steel ball of 9.5mm dia (set of two)
- **TO-56104** Ring holder
- **TO-56105** Electric hot plate

Ordering information

- **TO-561-EN-01** Ring and ball apparatus, electrical heating, 110V, 60Hz
- **TO-561-EN-02** Ring and ball apparatus, electrical heating, 220V, 60Hz
- **TO-561-EN-03** Ring and ball apparatus, electrical heating, 220V, 50Hz
- **TO-561-ASTM-01** Ring and ball apparatus, electrical heating, 110V, 60Hz
- **TO-561-ASTM-02** Ring and ball apparatus, electrical heating, 220V, 60Hz
- **TO-561-ASTM-03** Ring and ball apparatus, electrical heating, 220V, 50Hz

Centrifuge Extractor Apparatus

This equipment is used to determine the bitumen percentage in bituminous paving mixtures.

It has a removable, precision machined, aluminum rotor bowl, mounted on a vertical shaft. A filter paper disc is pressed in between the rotor bowl and cover plate by tightening a knurled nut.

The bowl assembly is enclosed in a housing mounted on a cast body. In the electrical operating model, the rotor bowl is coupled to a motor. The solvent may be introduced during test through a cup on the housing cover.

This equipment is electrically operated with an in-built dimmerstat for speed variation from 0rpm to 3600rpm. Each unit is supplied with a set of 25 filter paper discs.



Applicable standards

- ASTM D 2172, AASHTO T-58, T-164, EN 12697-1

Optional accessories

- **TO-56301** Filter paper disc (set of 25) for TO-563-1
- **TO-56302** Filter paper disc (set of 25) for TO-563-2

Ordering information

- **TO-563-1-01** Centrifuge Extractor, electrically operated, capacity 1500kg, 110V, 60Hz
- **TO-563-1-02** Centrifuge Extractor, electrically operated, capacity 1500kg, 220V, 60Hz
- **TO-563-1-03** Centrifuge Extractor, electrically operated, capacity 1500kg, 220V, 50Hz
- **TO-563-2-01** Centrifuge Extractor, electrically operated, capacity 3000kg, 110V, 60Hz
- **TO-563-2-02** Centrifuge Extractor, electrically operated, capacity 3000kg, 220V, 60Hz
- **TO-563-2-03** Centrifuge Extractor, electrically operated, capacity 3000kg, 220V, 50Hz

Ductility Testing Machine



Bituminous surfaces exposed to varying temperature conditions undergo a great deal of expansion and contraction. An important characteristic of the binder is its ductility and the degree of ductility has an effect on the cracking of bituminous surfaces caused by traffic stress.

The ductility is expressed as the distance in centimeters to which a standard briquette can be elongated before the thread formed breaks under specified conditions. A molten bitumen sample is pored into a standard mould, allowed to cool to room temperature and then placed in a water bath so that the briquette can be brought to test temperature

before mounting in the testing machine.

Designed to test three specimens simultaneously, the machine consists of a carriage moving over a lead screw. An electric motor driven reduction gear unit ensures smooth constant speed and continuous operation. The entire assembly is mounted with water bath completely encased in metal bound hardwood. It is equipped with an electric pump circulator and heater. The temperature is controlled by a digital temperature controller. Two rates of travel – 5 cm/minute and 1cm/minute – are provided. The machine is supplied with four ductility molds, each with a base plate.

Applicable standards

- ASTM D 113, AASHTO T51

Standard features

- **TO-56501** 3 x ductility molds

Optional accessories

- **TO-560501** 3 x ductility molds

Ordering information

- **TO-565-DG-01** Ductility testing machine, electrically operated, 110V, 60Hz
- **TO-565-DG-02** Ductility testing machine, electrically operated, 220V, 60Hz
- **TO-565-DG-03** Ductility testing machine, electrically operated, 220V, 50Hz
- **TO-565-DG-C-01** Ductility testing machine with cooling, electrically operated, 110V, 60Hz
- **TO-565-DG-C-02** Ductility testing machine with cooling, electrically operated, 220V, 60Hz
- **TO-565-DG-C-02** Ductility testing machine with cooling, electrically operated, 220V, 50Hz

Benkelman Beam

The Benkelman Beam uses a balanced beam in conjunction with a suitable vehicle to measure road flexure. It is a convenient, accurate device for measuring the deflection of flexible pavements under moving wheel loads.

Operating on a simple lever arm principle, the unit consists of a reference beam, body, two-part probe beam and rear zero adjust. The equipment is supplied with a wooden carrying case.



Key features

- Lightweight aluminum construction.
- Easy to transport.
- Unique telescopic design to simplify field set-up.
- Compact, reduced storage space needed.

Applicable standards

- AASHTO T-256

Standard features

- Dial gage with TO-566-1
- Digital gage with TO-566-1D

Optional accessories

- **TO-072** Dial gage for TO-566-1
- **TO-072-DG** Digital gage for TO-566-1D

Ordering information

- **TO-566-1** Benkelman beam with dial gage
- **TO-566-1D** Benkelman beam with digital gage

Pavement Dynamic Cone Penetrometer

The Pavement Dynamic Cone Penetrometer (DCP) is a very robust instrument, designed for rapid in-situ evaluation of strength of sub-grade and the bases for roads and runway pavements. Continuous measurements can be made down to a depth of 800mm or, when an extension is fitted, to a depth of 1200mm. Where pavement layers have different strengths, the boundaries can be identified and the thickness of the layers determined.

A typical test takes only a few minutes and provides a very efficient method of obtaining information that would normally require test-pits. Correlations have been established between measurements with DCP and California Bearing Ratio (CBR) so that results can be interpreted and compared with CBR specifications for pavement design. Agreement is generally good over most of the range but differences are apparent at low values of CBR, especially for fine grained materials.

The design of this DCP is similar to the one described by Kleyn, Maree and Savage (1982) in their paper "The application of the pavement DCP to determine the bearing properties and performance of road pavements", published in proceedings of International Symposium on Bearing Capacity of Roads and Airfields, Vol.1. (The Norwegian Institute of Technology) and developed by TRRL, UK.

It incorporates an 8kg weight dropping through a height of 575mm and a 60° cone having a diameter of 20mm. It is supplied complete with assembly tools and weighs about 20kg.

The DCP needs three operators to: hold the instrument, raise and drop the weight, and record the results. The instrument is held vertically and the weight raised to the handle limit and allowed to fall onto the anvil.

The equipment is supplied with top bottom rod, handle, hammer, scale, cone and anvil plus wooden carrying case.

Key features

- A simple and robust instrument for rapid in-situ measurement of the structural properties of road pavements.
- Provides fast and efficient method of obtaining information.
- For continuous measurements up to a depth of 800mm and 1200mm with the extension rod.
- Portable and fits in a carrying case.

Standard features

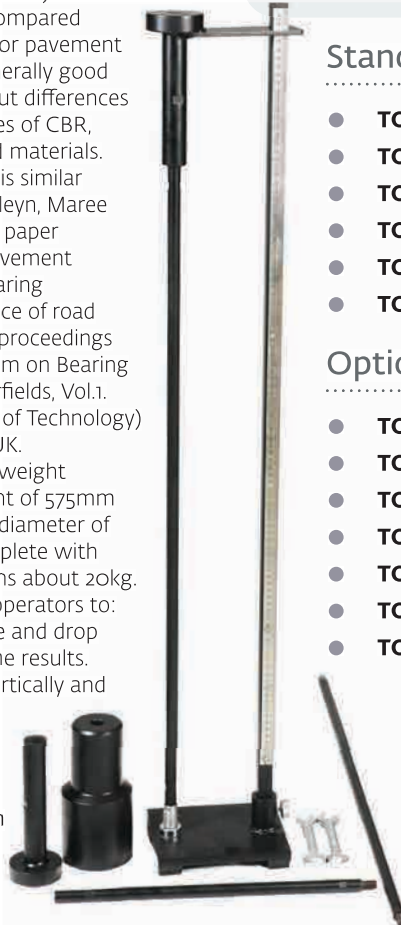
- **TO-56701** Top and bottom rod
- **TO-56702** Handle
- **TO-56703** Hammer
- **TO-56704** Scale
- **TO-56705** Cone 60°
- **TO-56706** Anvil

Optional accessories

- **TO-56701** Top and bottom rod
- **TO-56702** Handle
- **TO-56703** Hammer
- **TO-56704** Scale
- **TO-56705** Cone 60°
- **TO-56706** Anvil
- **TO-56707** Bottom rod

Ordering information

- **TO-567** Pavement Dynamic Cone Penetrometer with carrying case



Pavement Core Drilling Machine

This gasoline engine-powered road building drill has been designed specifically for the purpose of drilling test cores from holes in roads, airport runways, bridges, etc.

The machine consists of two vertical support columns, which carry the drill head/engine assembly accurately with the help of a screwed spindle.

The 6HP gasoline engine with pulley mechanism works with minimum vibrations. The double precision bit advances with a screwed spindle, which provides a constant, accurate drill pressure, minimum core chipping and long bit life.

The complete assembly is supplied on a rigid metal base with leveling facility, and is suitable for coring applications in a vertical downwards motion only.



SPECIFICATIONS

Bit diameter	150mm
Length	350mm
Maximum depth of core	450mm
Drill speed	Variable speed from 200-900rpm
Drive motor	6HP gasoline engine
Guide shafts	40mm diameter
Screwed spindle	20mm diameter
Water tap	12mm
Drill wrenches	Included

Applicable standards

- EN 12504-1

Optional accessories

- **TO-55101** Core Bit 50mm dia x 200m long
- **TO-55102** Core Bit 50mm dia x 450m long
- **TO-55103** Core Bit 75mm dia x 200m long
- **TO-55104** Core Bit 75mm dia x 450m long
- **TO-55106** Core Bit 100mm dia x 450m long
- **TO-55109** Core Bit 150mm dia x 200m long
- **TO-55110** Core Bit 150mm dia x 450m long

Ordering information

- **TO-551** Pavement Core Drilling Machine with engine but without diamond core bits

CBR Test Apparatus

The empirical California Bearing Ratio test (CBR test) was developed in California, USA. It determines the relative bearing ratio and expansion characteristics under known surcharge weight of base, sub-base and sub-grade soils for the design of roads, pavements and runways. The test is used extensively in selection of materials and control of sub-grades.

The test can be performed in the laboratory on prepared samples or in-situ on location. Because of its empirical nature, it is valid only for the application for which it was developed i.e., the design of highway base thickness.

This load frame is designed for Unconfined, Triaxial, CBR and other routine tests.

With the **analog version**, the loading system comprises of a screw jack with detachable handle. The lower platen moves up and down. The top bracket is adjustable for vertical clearance and has an adaptor for connecting standard proving rings. A dial gage mounting bracket is provided on one of the two pillars.

With the **digital version**, the loading system comprises of a screw jack with detachable handle. The lower platen moves up and down. The top bracket is adjustable for vertical clearance and has an adaptor for connecting standard load cells. A display sensor mounting bracket is provided on one of the two pillars and a data acquisition system accompanies the equipment. Rate of strain: 1.00 and 1.27mm/min.

Applicable standards

- BS 1377, 1924; EN 13286-47; ASTM D1883; AASHTO T193

Key features: Analog and Digital

- Two-speed machine (BS/EN and ASTM).
- Rapid platen adjustment.
- Complete with stabilizing bar.
- Compact, bench-mounting design.
- Options for mechanical or electronic measurement.

ANALOG AND DIGITAL SPECIFICATIONS

Dimensions	550 x 400 x 1220mm
Maximum vertical clearance	800mm
Horizontal clearance	255mm
Platen diameter	133mm
Platen travel	105mm
Weight	80kg

Note This test is being of an empirical nature, is valid only for the application for which it was developed, i.e. the design of highway base thicknesses.





Analog



Standard features

- **TO-274** Proving ring 50kN
- **TO-072** Dial gage 0.25 x 0.01mm

Digital



Standard features

- **TO-12101** Data acquisition system comprises digital indicator, load cell 50kN, displacement sensor 0.20mm

See the next pages for more details of the standard accessories supplied with the main units.

DIFFERENCES ACCORDING TO STANDARDS

	BS/EN standards	ASTM/AASHTO standards
Mold	152 x 127mm (inside dia x height)	152.4 x 177.8mm (inside dia x height)
Collar	51mm height, fits both ends of mold	50.8mm height, fits both ends of mold
Base plate	Solid, fits both ends of mold	Perforated
Construction	All Steel, plated	All Steel, plated
Weight	7.3kg	9kg

Standard features

- **TO-12001-BS** BS CBR mold with collar and base plate
- **TO-12002-BS** BS CBR base plate
- **TO-12003-BS** BS CBR extension collar
- **TO-12004-BS** Penetration piston as per BS
- **TO-12005** Adjustable bracket for penetration dial gage
- **TO-12006-BS** BS spacing compacting disc
- **TO-12007-BS** BS annular surcharge weight 2kg
- **TO-12008-BS** BS split surcharge weight 2kg
- **TO-12009** Perforated swell plate
- **TO-12010** Metal tripod for dial gage
- **TO-12011-BS** BS CBR cutting collar
- **TO-274** Proving ring, 50kN
- **TO-072** Dial gage 25mm travel x 0.01mm least count
- **TO-12101-01** Electronic CBR kit; digital indicator, 50kN load cell and 20mm LVDT, 110VAC, 60Hz
- **TO-12101-01** Electronic CBR kit; digital indicator, 50kN Load cell and 20mm LVDT, 220VAC, 60Hz
- **TO-12101-01** Electronic CBR kit; digital indicator, 50kN Load cell and 20mm LVDT, 220VAC, 50Hz
- **TO-11202** Compacting rammer for light compaction 2.5kg x 300mm fall
- **TO-11202-H** Compacting rammer for heavy compaction 4.5kg x 450mm fall

■ CBR Test Apparatus – Analog only

■ CBR Test Apparatus – Digital only

- **TO-12004-BS** Penetration piston as per BS
- **TO-12005** Adjustable bracket for penetration dial gage
- **TO-12006-BS** BS spacing compacting disc
- **TO-12007-BS** BS annular surcharge weight 2kg
- **TO-12008-BS** BS Split surcharge weight 2kg
- **TO-12009** Perforated swell plate
- **TO-12010** Metal tripod for dial gage
- **TO-12011-BS** BS CBR cutting collar
- **TO-072** Dial gage 25mm travel x 0.01mm least count
- **TO-11202** Compacting rammer for light compaction 2.5kg x 300mm fall
- **TO-11202-H** Compacting rammer for heavy compaction 4.5kg x 450mm fall

Ordering information

- **TO-120-1-01-BS** CBR Test Apparatus complete with accessories, 110VAC, 60Hz
- **TO-120-1-02-BS** CBR Test Apparatus complete with accessories, 220VAC, 60Hz
- **TO-120-1-03-BS** CBR Test Apparatus complete with accessories, 220VAC, 50Hz
- **TO-121-1-01-BS** CBR Test Apparatus with accessories, 110VAC, 60Hz
- **TO-121-1-02-BS** CBR Test Apparatus with accessories, 220VAC, 60Hz
- **TO-121-1-03-BS** CBR Test Apparatus with accessories, 220VAC, 50Hz

Optional accessories

- **TO-12001-BS** BS CBR mold with collar and base plate
- **TO-12002-BS** BS CBR base plate
- **TO-12003-BS** BS CBR extension collar

ASTM D1883; AASHTO T193

Standard features

- **TO-12001-ASTM** ASTM CBR mold with collar and base plate
- **TO-12002-ASTM** ASTM CBR base plate
- **TO-12003-ASTM** ASTM CBR extension collar
- **TO-12004-ASTM** Penetration piston as per ASTM
- **TO-12005** Adjustable bracket for penetration dial gage
- **TO-12006-ASTM** ASTM spacing compacting disc
- **TO-12007-ASTM** ASTM annular surcharge weight 2.27kg
- **TO-12008-ASTM** ASTM split surcharge weight 2.27kg
- **TO-12009** Perforated swell plate
- **TO-12010** Metal tripod for dial gage
- **TO-12011-ASTM** ASTM CBR cutting collar
- **TO-274** Proving ring, 50kN
- **TO-072** Dial gage 25mm travel x 0.01mm least count
- **TO-12101-01** Electronic CBR kit; digital indicator, 50kN load cell and 20mm LVDT, 110VAC, 60Hz
- **TO-12101-01** Electronic CBR kit; digital indicator, 50kN Load cell and 20mm LVDT, 220VAC, 60Hz
- **TO-12101-01** Electronic CBR kit; digital indicator, 50kN Load cell and 20mm LVDT, 220VAC, 50Hz
- **TO-11202** Compacting rammer for light compaction 2.5kg x 300mm fall
- **TO-11202-H** Compacting rammer for heavy compaction 4.5kg x 450mm fall
- **TO-12003-ASTM** ASTM CBR extension collar
- **TO-12004-ASTM** Penetration piston as per ASTM
- **TO-12005** Adjustable bracket for penetration dial gage
- **TO-12006-ASTM** ASTM spacing compacting disc
- **TO-12007-ASTM** ASTM annular surcharge weight 2.27kg
- **TO-12008-ASTM** ASTM Split surcharge weight 2.27kg
- **TO-12009** Perforated swell plate
- **TO-12010** Metal tripod for dial gage
- **TO-12011-ASTM** ASTM CBR cutting collar
- **TO-072** Dial gage 25mm travel x 0.01mm least count
- **TO-11202** Compacting rammer for light compaction 2.5kg x 300mm fall
- **TO-11202-H** Compacting rammer for heavy compaction 4.5kg x 450mm fall

Optional accessories

- **TO-12001-ASTM** ASTM CBR mold with collar and base plate
- **TO-12002-ASTM** ASTM CBR base plate
- **TO-120-1-01-ASTM** CBR Test Apparatus complete with accessories, 110VAC, 60Hz
- **TO-120-1-02-ASTM** CBR Test Apparatus complete with accessories, 220VAC, 60Hz
- **TO-120-1-03-ASTM** CBR Test Apparatus complete with accessories, 220VAC, 50Hz
- **TO-121-1-01-ASTM** CBR Test Apparatus with accessories, 110VAC, 60Hz
- **TO-121-1-02-ASTM** CBR Test Apparatus with accessories, 220VAC, 60Hz
- **TO-121-1-03-ASTM** CBR Test Apparatus with accessories, 220VAC, 50Hz

Motorized Sieve Shaker

A motorized sieve shaker along with digital timer delivers more accurate results compared to mechanical sieves. A compact and lightweight design makes it easy for handling operations and noise reduction makes it more eco-friendly.

Electrically operated mechanical Sieve Shakers are offered for dry sieving. These produce accurate results and eliminate personal errors involved in manual sieving. The Sieve Shakers are popular not only in soil laboratories but also in a number of industries where sieving is required, such as for ores, refractory materials, minor aggregates, pigments, powdered coal, soap, cement, roofing materials, plastic molding powders and pharmaceuticals.

The design is compact and lightweight and can be mounted on a bench top. This eliminates the use of concrete foundation. A digital timer, adjustable from 0-99min, is incorporated as an integral part of the equipment.

The Sieve Shaker can carry up to eight sieves of 20cm diameter. It is driven by a ¼ HP geared motor. The table is inclined from the vertical axis and the direction of inclination changes progressively in a clockwise direction. In addition to the gyratory motion of the table, there is a tapping motion as well.

Key features

- Ideal for dry sieving.
- Used for ores, refractory materials, minor aggregates, pigments, powdered coal, soap, cement, roofing materials, plastic molding powders, and pharmaceuticals.
- Compact and lightweight for benchtop use.
- Employs noise reduction technology.



Applicable standards

- EN 932-5

Standard features

- Adaptor for 20cm dia sieve
- Digital timer
- Geared motorized unit

Optional accessories

- **TO-05401** Adapter for 30cm dia sieve

Ordering information

- **TO-054** Motorized sieve shaker

Triaxial Test Load Frame

Triaxial tests

Tinius Olsen's modular triaxial test components include:

- 50kN (11,200lbf) capacity Load Frame.
- Triaxial Cell with accessories for drained and undrained testing of 2.8in/70mm dia specimens to confining pressures of up to 145psi (1,000kPa).

- Data Acquisition system.
- Set of Electronic Measurement Transducers for load, displacement, pressure and volume change.
- Data System Software for recording, analysis and report generation.
- De-aired Water Tank System for

precise applications of confining, back and saturation pressures.

The 50kN capacity machine has an integral electronic kit for triaxial testing of soil specimens up to 100mm diameter x 200mm long.

It consists of a rigid twin-column construction with an integral, fully variable microprocessor-controlled drive unit and LCD display with a touch-sensitive keyboard.

The drive system and keyboard entry provide the load frame with a variety of features, including pause and speed reset during test, RS232 interface for computer control, operator programming of speed and control, and self-test diagnostics.

A robustly constructed steel case protects against water and dirt. All operating controls are mounted on the front panel of the machine.



Key features

- Microprocessor control.
- Large on-board LED display.
- Direct entry via a touch sensitive keyboard.
- Rapid approach and return to datum of platen.
- Variable speed to 9.99mm/min.
- Samples up to 100mm dia.

Applicable standards

- BS598, 1377, 1924; EN 12697-23, 24, 13286-47; ASTM D1883; AASHTO

Ordering information

- **TO-064E-01** Digital Triaxial Test Loading Frame, 110VAC, 60Hz
- **TO-064E-02** Digital Triaxial Test Loading Frame, 220VAC, 60Hz
- **TO-064E-03** Digital Triaxial Test Loading Frame, 220VAC, 50Hz

SPECIFICATIONS

Capacity	50kN
Type	Microprocessor-controlled stepper motor drive
Platen speed range	Up to 9.99mm/min
Rapid approach speed	25mm/min
Horizontal clearance	364mm
Maximum vertical clearance	910mm
Maximum platen travel	100mm
Specimen diameter	38mm (50, 75 and 100mm can also be used)

Triaxial cells

The cells are for testing specimens measuring 38mm diameter x 76mm long and 50mm diameter x 100mm long.

The Triaxial Cell consists of a perspex (acrylic plastic) chamber with an anvil and a loading plunger. Releasing four tie rods easily splits the cell. It is leakproof up to 10 bar (10kg/cm) fluid pressure. Cells that withstand pressures of 20 bar can be made on request.

An oil plug and air vent are provided for introducing a thin layer of oil over water. This provides an effective sealing at the plunger for long duration tests. The cell is also fitted with four ball valves of no-volume change type, at the base.



Applicable standards

- BS1377, ASTM D12850, D 4707

Standard features

38mm Triaxial Cells

- **TO-07501** Top loading pad, perspex, 38mm diameter
- **TO-07502** Plain perspex disc 38mm diameter x 6mm thick
- **TO-07503** Porous stone 38mm diameter x 6mm thick
- **TO-07504** Sheath stretcher for 38mm diameter specimen
- **TO-07505** Sand former for 38mm diameter (1 qty)
- **TO-07506** Rubber sheath for 38mm diameter specimen (set of 12)

- **TO-07507** 4 x drainage tube (short), 38mm diameter
- **TO-07508** 4 x drainage tube (long), 38mm diameter
- **TO-07509** 'O' rings for 38mm diameter specimen (set of 4)
- **TO-03105** Split mold, 38mm diameter

50mm Triaxial Cells

- **TO-07501** Top loading pad, perspex, 38mm diameter
- **TO-07502** Plain perspex disc, 38mm diameter x 6mm thick
- **TO-07503** Porous stone 38mm diameter x 6mm thick
- **TO-07504** Sheath stretcher for 38mm diameter specimen
- **TO-07505** Sand former for 38mm diameter (1 qty)

- **TO-07506** Rubber sheath for 38mm diameter specimen (set of 12)
- **TO-07507** 4 x drainage tube (short), 38mm diameter
- **TO-07508** 4 x drainage tube (long), 38mm diameter
- **TO-07509** 'O' rings for 38mm diameter specimen (set of 4)
- **TO-07510** Brass pedestal 38mm diameter
- **TO-07521** Top loading pad, perspex, 50mm diameter
- **TO-07522** Plain perspex disc 50mm diameter x 6mm thick
- **TO-07523** Porous stone 50mm diameter x 6mm thick
- **TO-07524** Sheath stretcher for 50mm diameter specimen
- **TO-07525** Sand former for 50mm diameter
- **TO-07526** Rubber sheath for 50mm diameter specimen (set of 12)
- **TO-07527** 4 x drainage tube (short), 50mm diameter
- **TO-07528** 4 x drainage tube (long), 50mm diameter
- **TO-07529** 'O' rings for 50mm diameter specimen (set of 4)
- **TO-07530** Brass pedestal, 50mm diameter
- **TO-03105** Split mold, 38mm diameter
- **TO-03301** Split mold, 50mm diameter
- **TO-07540** Top loading pad, 38mm diameter (plain)
- **TO-07541** Top loading pad, 50mm diameter (plain)
- **TO-07504** Sheath stretcher for 38mm diameter specimen
- **TO-07505** Sand former for 38mm diameter (1 qty)
- **TO-07506** Rubber sheath for 38mm diameter specimen (set of 12)
- **TO-07507** 4 x drainage tube (short), 38mm diameter
- **TO-07508** 4 x drainage tube (long), 38mm diameter
- **TO-07509** 'O' rings for 38mm diameter specimen (set of 4)
- **TO-07510** Brass pedestal, 38mm diameter
- **TO-07521** Top loading pad, perspex, 50mm diameter
- **TO-07522** Plain perspex disc, 50mm diameter x 6mm thick
- **TO-07523** Porous stone 50mm diameter x 6mm thick
- **TO-07524** Sheath stretcher for 50mm diameter specimen
- **TO-07525** Sand former for 50mm diameter
- **TO-07526** Rubber sheath for 50mm diameter specimen (set of 12)
- **TO-07527** 4 x drainage tube (short), 50mm diameter
- **TO-07528** 4 x drainage tube (long), 50mm diameter
- **TO-07529** 'O' rings for 50mm diameter specimen (set of 4)
- **TO-07530** Brass pedestal, 50mm diameter
- **TO-03105** Split mold, 38mm diameter

Optional accessories

- **TO-07501** Top loading pad, perspex, 38mm diameter
- **TO-07502** Plain perspex disc, 38mm diameter x 6mm thick
- **TO-07503** Porous stone, 38mm diameter x 6mm thick
- **TO-075** Triaxial cell suitable for 38mm and 50mm diameter specimens
- **TO-075-38** Triaxial cell suitable for 38mm diameter specimens

Ordering Information

Triaxial Oil Water Constant Pressure System

The Oil Water Constant Pressure System is an extremely versatile apparatus that can be used for a wide range of applications.

This system provides an effective alternative to a Mercury and Water Constant Pressure system, especially where space is at a minimum. The apparatus is designed to provide confining pressure up to 16 bar to Triaxial Cells.

The system consists of an oil pump, driven by an electric motor during the entire period of operation to maintain the desired pressure. The unit provides variable pressure up to 16 bar, which can be increased or decreased simply by turning a control knob. A transparent oil water interchange vessel is provided to transmit water pressure to the test apparatus.

SPECIFICATIONS

Range	10 bar (10kg/cm ²)
Resolution	0.05 bar (0.05kg/cm ²)
Accuracy pressure	± 1% of the indicated

Note: Supplied complete with pressure gages, flow valves and connecting pressure hose.

Ordering information

- **TO-081-1-01** Constant Pressure System, oil/water type, 110VAC, 60Hz
- **TO-081-1-02** Constant Pressure System, oil/water type, 220VAC, 60Hz
- **TO-081-1-03** Constant Pressure System, oil/water type, 220VAC, 50Hz
- **TO-081-2-01** Oil Water Constant Pressure System with two cells, oil/water type, 110VAC, 60Hz
- **TO-081-2-02** Oil Water Constant Pressure System with two cells, oil/water type, 220VAC, 60Hz
- **TO-081-2-03** Oil Water Constant Pressure System with two cells, oil/water type, 220VAC, 50Hz

Key features

- Use of mercury is eliminated.
- Maintains constant pressure continuously.
- Pressure capacity, 10 bar (10kg/cm).
- Also suitable for mobile laboratories.



Triaxial Data Acquisition System

The Triaxial Data Acquisition System comprises a 10kN (1000kgf) capacity external load cell, a 20 bar (20kg/cm) capacity pore pressure transducer, an LVDT displacement sensor with a range of ± 10 mm, and a 3-channel digital indicator that has been specially designed to meet the requirements of triaxial testing.

Ordering information

- **TO-085-01** Triaxial Data Acquisition System, 110VAC, 60Hz
- **TO-085-02** Triaxial Data Acquisition System, 220VAC, 60Hz
- **TO-085-03** Triaxial Data Acquisition System, 220VAC, 50Hz



SPECIFICATIONS

TO-08501	3-channel digital indicator
Mode of display	Micro-controller multi-line alpha numeric VFD display for all simultaneous channels – no need for channel selection
TO-08502	External load cell
Capacity	10kN (1000kgf)
Load cell excitation	5V, DC
Resolution	0.01kN (1kgf)
Sensing element	Strain gages in full bridge configuration
TO-08503	Pore pressure transducer
Capacity	20 bar (20kg/cm ²)
Pressure cell excitation	5V, DC
Resolution	0.01 bar (0.01kg/cm ²)
Sensing element	Strain gages in full bridge configuration
TO-08504	LVDT displacement transducer
Range	± 10 mm
Sensing element	LVDT

Triaxial De-aired Water Apparatus

The De-aired Water Apparatus works on the principle of removal of dissolved air from the water present in the soil in order to measure the pore pressure. It is used to study the levels of dissolved oxygen acceptable for geotechnical test methods for soil.

Benefits include:

- Time to consolidate soil samples is reduced
- For simultaneous flushing of many hydraulic piezometer lines in dams and earth works to considerably reduce labor and disturbance at the top ends.

Note Any dissolved air in the water will lead to errors in the measurement of pore pressure, particularly at low pressure, and also gives slow or incorrect saturation results.



Applicable standards

- BS1377

Optional accessories

- Pressurized storage tank, capacity 20 liters
- Valves and pressure gage (for storing de-aired water to be used in the field)
- Water pump

Ordering Information

- **TO-097-1-01** De-aired Water Apparatus, 110VAC, 60Hz
- **TO-097-1-02** De-aired Water Apparatus, 220VAC, 60Hz
- **TO-097-1-03** De-aired Water Apparatus, 220VAC, 50Hz

Key features

- Fully microprocessor controlled.
- Real time clock function included.
- Oil free-vacuum pump.
- The unit is fully automatic and shuts off when the de-airing program is complete.

Direct Shear Test Apparatus

Every building or structure imposes loads on the soil supporting the foundation and this develops stress among the soil particles; failure of this stress leads to the sliding of one body of soil relative to the surrounding mass.

Tinius Olsen's direct shear test apparatus is a motorized dead weight testing machine designed for direct and residual shear testing on undisturbed and remolded soil specimens. The machine uses a 10:1 beam loading device to control confining pressures, a load cell with readout measures shear pressure and a displacement transducer to measure shear and vertical displacement.



SPECIFICATIONS	
Mode of display	Micro-controller multi-line alpha numeric display for all simultaneous channels
Capacity	2kN (200kgf) load cell
Range	± 20 mm. LVDT displacement sensor with 3m long cable
Shear measurement	Direct/residual
Fast forward/reverse speed	10mm/min
Rates of strain	Up to 9.99mm/minute
Specimen size	60 x 60 x 25mm

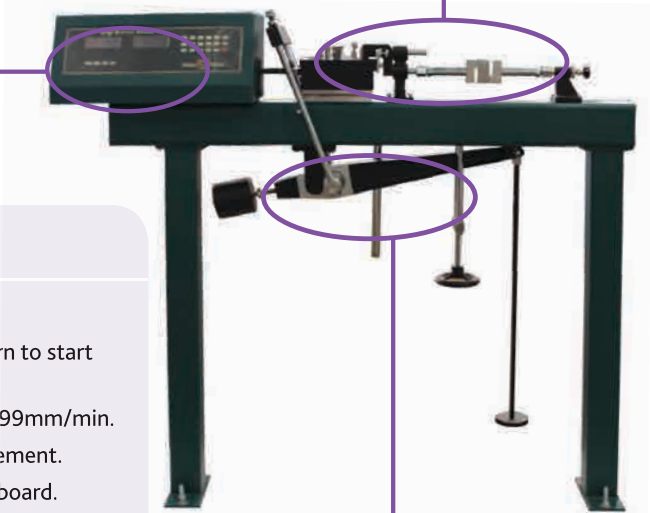


Key features

- Microprocessor control.
- Rapid approach and return to start datum.
- Fully variable speed to 9.99mm/min.
- Reduced operator involvement.
- Direct entry through keyboard.
- Direct reading in engineering units.
- Modular transducer system.

Applicable standards

- BS 1377; EN 1997-2; ASTM D3080



Standard features

- **TO-10401** Shear box assembly
- **TO-10402** Shear box housing with linear bearing case
- **TO-10405** Specimen cutter
- **TO-10410** Weight set to attain $3\text{kg}/\text{cm}^2$ stress on sample
- **TO-10501** Data acquisition system

Optional accessories

- **TO-10401** Shear box assembly
- **TO-10402** Shear box housing with linear bearing case

- **TO-10405** Specimen cutter
- **TO-10410** Weight set to attain $3\text{kg}/\text{cm}^2$ stress on sample

Ordering information

- **TO-105-2-01** Direct shear test apparatus, 2kN with data acquisition unit, 110VAC, 60Hz
- **TO-105-2-02** Direct shear test apparatus, 2kN with data acquisition unit, 220VAC, 60Hz
- **TO-105-2-03** Direct shear test apparatus, 2kN with data acquisition unit, 220VAC, 50Hz

Point Load Index Tester

The tester is used for determining the Diametral Point Load Strength Index of rock cores and irregular lumps, which can be tested without any treatment. The Point Load Test is primarily an index test for strength classification of rock materials. This instrument is mainly intended for field measurements on rock specimens but can also be used in the laboratory. The results may also be used to predict the uniaxial compressive strength of rock. The apparatus is light and portable.



Applicable standards

- EN DD ENV 1997-2, ASTM D-5731

Ordering information

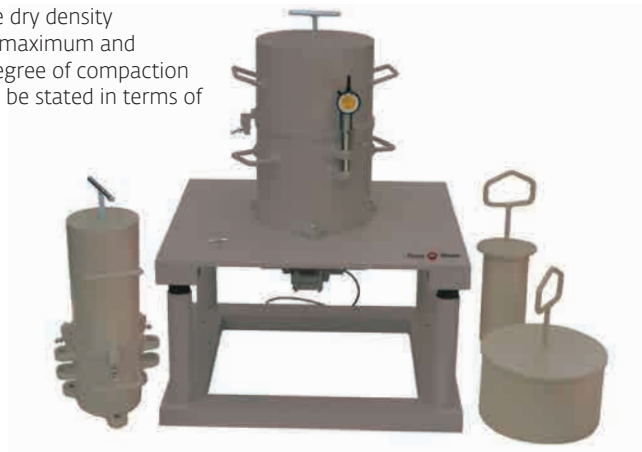
- **TO-206-1-ECO** Point Load Index Tester with ECO digital read out

Key features

- Rock core specimens can be tested without any preparation.
- Tester can be used in the laboratory as well as at the drilling site.
- Results can be used to predict uniaxial compressive strength of rock.
- A wide range of core sizes can be tested.
- The selected (which is any one unit via SI, Metric or Imperial fixed) engineering unit will be displayed on the front panel through LED.
- Peak load displayed on sample failure.
- Four key buttons to Program, Start and Stop, Set Break Point, and Zero.
- Battery or mains operation.
- Failure detection definable.

Relative Density Apparatus

Relative density relates the dry density of cohesionless soil to the maximum and minimum densities. The degree of compaction of cohesion or less soil can be stated in terms of relative density.



Standard features

- **TO-11501** Vibrating table, frequency 3600rpm
- **TO-11502** Cylindrical metal mold volume 3000ml
- **TO-11503** Guide sleeve for TO-11502
- **TO-11504** Surcharge base plate for TO-11502
- **TO-11505** Handle for TO-11504 and TO-11509
- **TO-11506** Surcharge weight for TO-11502
- **TO-11507** Cylinder metal mold volume 15000ml
- **TO-11508** Guide sleeve for TO-11507
- **TO-11509** Surcharge base plate for TO-11507
- **TO-11510** Surcharge weight for TO-11507
- **TO-11511** Dial gage holder
- **TO-11512** Calibrating bar 75 x 300 x 3 mm
- **TO-072** Dial gage
- **TO-11502** Cylindrical metal mold volume 3000ml
- **TO-11503** Guide sleeve for TO-11502
- **TO-11504** Surcharge base plate for TO-11502
- **TO-11505** Handle for TO-11504 & TO-11509
- **TO-11506** Surcharge weight for TO-11502
- **TO-11507** Cylinder metal mold volume 15000ml
- **TO-11508** Guide sleeve for TO-11507
- **TO-11509** Surcharge base plate for TO-11507
- **TO-11510** Surcharge weight for TO-11507
- **TO-11511** Dial gage holder
- **TO-11512** Calibrating bar 75 x 300 x 3mm
- **TO-072** Analog dial gage

Ordering information

- **TO-115-01** Relative Density Apparatus 110V, 60Hz
- **TO-115-02** Relative Density Apparatus 220V, 60Hz
- **TO-115-03** Relative Density Apparatus 240V, 50Hz

Optional accessories

- **TO-11501** Vibrating table, frequency 3600rpm

Automatic Soil Compactor

Preparing specimens for compaction studies can be costly and time consuming. The Tinius Olsen Compactor automatically compacts soil specimens, eliminating the effort of hand compaction. The height and weight of the hammer is adjustable to suit test requirements. An automatic blow pattern ensures optimum compaction for each layer of soil. The hammer itself travels across the mold and the table rotates the mold in equal steps on a base that is extremely stable. The number of blows per layer can be set at the beginning of the test by means of the simple digital counter system.

Key features

- Pre-set blow pattern ensures even compaction.
- Solid state controls for reliability and ease of maintenance.
- Automatic counter reset after completion of blow pattern.

Standard features

BS standards

- **TO-11201** Proctor compaction mold for light compaction – 105mm ID x 115.5mm high
- **TO-11201-H** Compaction mold for heavy compaction – 152mm ID x 127mm high

ASTM standards

- **TO-11301** Compaction mold for light compaction – 101.6mm ID x 116.4mm high
- **TO-11301-H** Compaction mold for heavy compaction – 152mm ID x 116.4mm high

AUS standards

- **TO-11201-AS** Light compaction mold
- **TO-11201-H-AS** Heavy compaction mold



Applicable standards

- BS1377, EN 1997-2, 1924; ASTM D558, D560, D698, D1557; AASHTO T99, T134, T135, T136, T180

Optional accessories

- **TO-11201** Proctor compaction mold for light compaction – 105mm ID x 115.5mm high
- **TO-11201-H** Compaction mold for heavy compaction – 152mm ID x 127mm high
- **TO-11301** Compaction mold for light compaction – 101.6mm IDx 116.4mm high
- **TO-11301-H** Compaction mold for heavy compaction – 152mm IDx 116.4mm high
- **TO-11201-AS** Light compaction mold – 400 x 600mm
- **TO-11201-H-AS** Heavy compaction mold – 400 x 600mm



Ordering information

- **TO-114-BS-01** Automatic Soil Compactor, to BS EN standards, configured for operation at 110VAC, 60Hz
- **TO-114-BS-02** Automatic Soil Compactor, to BS EN standards, configured for operation at 220VAC, 60Hz
- **TO-114-BS-03** Automatic Soil Compactor, to BS EN standards, configured for operation at 220VAC, 50Hz
- **TO-114-ASTM-01** Automatic Soil Compactor, to ASTM standards, configured for operation at 110VAC, 60Hz
- **TO-114-ASTM-02** Automatic Soil Compactor, to ASTM standards, configured for operation at 220VAC, 60Hz
- **TO-114-ASTM-03** Automatic Soil Compactor, to ASTM standards, configured for operation at 220VAC, 50Hz
- **TO-114-AS-01** Automatic Soil Compactor, to AUS standards, configured for operation at 110VAC, 60Hz
- **TO-114-AS-02** Automatic Soil Compactor, to AUS standards, configured for operation at 220VAC, 60Hz
- **TO-114-AS-03** Automatic Soil Compactor, to AUS standards, configured for operation at 220VAC, 50Hz

SPECIFICATIONS

Rammer	Circular faced, 50.8mm/2in diameter foot; adjustable to either 2.5kg/5.5lb or 4.5kg/10lb weight
Drop	Adjustable to either 305mm/12in or 457mm/18in
Controls	Digital counter system, selector switch for either standard proctor test or modified proctor/CBR testing
Dimensions	(WxDxH) 250 x 430 x 1400mm/ 10 x 17 x 55in
Weight (net)	190kg/419lb

Note: Compaction molds are not included and must be ordered separately

Consolidation Apparatus

The Consolidation Apparatus consists of a fixed ring type of consolidometer cell for testing specimens of 60mm dia x 20mm thick, but a variety of specimen sizes from 50 to 100mm dia can also be tested. Additionally, the same loading unit can be used with optional floating ring consolidometer cells.

The standard consolidation apparatus is supplied with a weight set to achieve a total pressure of 10kg/cm² (in addition to the seating load of 0.05kg/cm² on the specimen), but an additional set of weights is required to reach the full capacity of 20kg/cm².

The consolidation is measured by conventional dial gages or digital gages and common configurations include a single and

three-gang consolidometers, with a six-gang version available on special request.



Applicable standards

- BS 1377; EN 1997-2; ASTM D2435, D4546; AASHTO T216

Standard features

- **TO-12501** Consolidation Unit
- **TO-12502** Cell assembly complete with all accessories suitable for 60mm diameter x 20mm thick specimens
- **TO-12503** Set of 29 weights to generate 10kg/cm² stress on 60mm diameter specimen
- **TO-12504** Water reservoir with tube, T connection and pinch cock

Optional accessories

- **TO-12502** Cell assembly complete with all accessories suitable for 60mm diameter x 20mm thick specimens
- **TO-12503** Set of 29 weights to generate 10 kg/cm² stress on 60mm diameter specimen
- **TO-12504** Water reservoir with tube, T connection and pinch cock

■ Consolidation Apparatus
– Analog only

■ Consolidation Apparatus
– Digital only

- **TO-070** Dial gage, 5mm x 0.002mm
- **TO-12801** Digital displacement sensor, 0-10mm
- **TO-12802** Digital indicator for single channel
- **TO-13001** Digital indicator for three channels

Ordering information

- **TO-126-1-AN** Consolidation stage, single station, with TO-070 analog dial gage
- **TO-126-3-AN** Consolidation stage, three station, with three TO-070 analog dial gages
- **TO-126-1-DG** Consolidation stage, single station, with TO-072DG digital gage
- **TO-126-3-DG** Consolidation stage, three station, with three TO-072DG digital gages

Analog



Digital

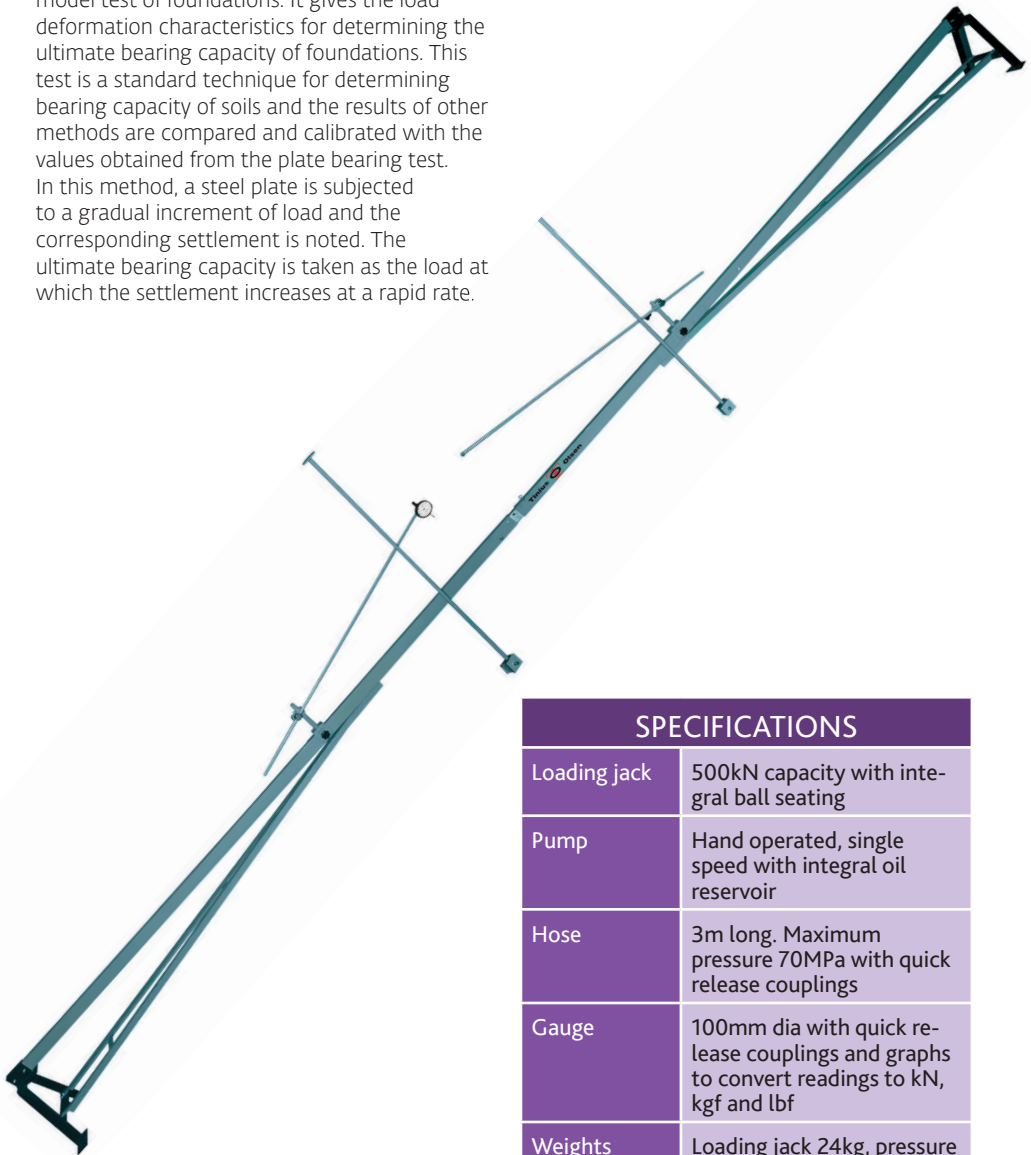


Key features: Analog and Digital

- High capacity – 8800kPa on 50mm diameter specimens using 11:1 beam ratio.
- Triple beam ratio, 9:1, 10:1, 11:1.
- Compact unit ensures maximum space saving.
- Digital readout reduces the possibility of operator error.
- Direct reading in mm.
- Plug-in transducer module system.
- Facility for connecting readout unit to compatible logging or printing system.

Plate Bearing Test Apparatus

The Plate Bearing Test is essentially a model test of foundations. It gives the load deformation characteristics for determining the ultimate bearing capacity of foundations. This test is a standard technique for determining bearing capacity of soils and the results of other methods are compared and calibrated with the values obtained from the plate bearing test. In this method, a steel plate is subjected to a gradual increment of load and the corresponding settlement is noted. The ultimate bearing capacity is taken as the load at which the settlement increases at a rapid rate.



SPECIFICATIONS

Loading jack	500kN capacity with integral ball seating
Pump	Hand operated, single speed with integral oil reservoir
Hose	3m long. Maximum pressure 70MPa with quick release couplings
Gauge	100mm dia with quick release couplings and graphs to convert readings to kN, kgf and lbf
Weights	Loading jack 24kg, pressure system 12.5kg

Note: The equipment is used in conjunction with a reaction beam. This is not supplied with the equipment.



Key features

- Determination of bearing capacity of the soil in situ.
- Designing for static loads on spread footings.
- Repetitive and non-repetitive plate loading tests of soils and flexible pavements.

Applicable standards

- BS1377; EN 1997-3; ASTM D1194, D1195, D1196

Standard features

- **TO-15715** Grooved M.S. Plate, 30cm x 30cm square x 25mm thick
- **TO-15716** Grooved M.S. Plate, 45cm x 45cm dia square x 25mm thick
- **TO-15717** Grooved M.S. Plate, 60cm x 60cm dia square x 25mm thick
- **TO-15718** Grooved M.S. Plate, 75cm x 75cm dia square x 25mm thick
- **TO-15721** Plane M.S. Plate, 30cm x 30cm dia square x 25mm thick
- **TO-15722** Plane M.S. Plate, 45cm x 45cm dia square x 25mm thick
- **TO-15723** Plane M.S. Plate, 60cm x 60cm dia square x 25mm thick
- **TO-15724** Plane M.S. Plate 75cm x 75cm dia square x 25mm thick

Optional accessories

- **TO-46801** Hand operated hydraulic jack, capacity 500kN (50,000 kgf)
- **TO-475** Hydraulic hand operated pump with 200mm dia load gage capacity 500kN (50,000kgf)
- **TO-47503** High pressure flexible metallic pipe 5m long
- **TO-15702** Ball and socket arrangement consisting of two steel plates, with one steel ball in-between the plates
- **TO-15703** Extension rod long, 12mm dia x 25cm for taking dial gage readings (16 sets)
- **TO-15704** Magnetic base with female thread on top, for holding extension rod (four sets)
- **TO-15705** Top end plate 50mm dia with male thread, for fitting onto extension rods and positioning dial gage plunger (four sets)
- **TO-15706** Column 15cm dia x 25cm long, with flanges, complete with four bolts and nuts (two sets)
- **TO-15707** Column 15cm dia x 50cm long, with flanges, complete with four bolts and nuts
- **TO-15708** Datum bar lightweight, portable, total span 5m height approximately 30cm, mounted on two removable legs. It is made in two parts. Provision exists for datum bar of 2.5m span to be used. A spare leg is provided for the purpose. Complete with two quick release clamps for positioning and holding the dial gage brackets (two sets)
- **TO-15709** Anchor spikes (set of 10)
- **TO-15711** Quick release clamp for positioning dial gage bracket (set of four)
- **TO-072** Dial gage 0-25 x 0.01mm (set of four)

Ordering information

- **TO-157** Plate bearing test apparatus

Unconfined Compression Tester for Rocks

This equipment is used for determining unconfined compressive strength of intact rock core specimens. The rock sample is cut to length and the ends are machined flat. The specimen is placed in a loading frame and, if required, heated to the desired test temperature. Axial load is continuously increased on the specimen until peak load and failure are obtained.

The load frame is extremely versatile and designed to conduct Triaxial Unconfined test and Unconfined compression test on rock specimens with diameters from 38-100mm and AX, BX, NX specimens.

The instrument consists of a cabinet that houses the gear system and motor with sturdy angle iron frame. Loading is done through the bottom loading platen, which is carried on a lead screw that advances upwards. The top load bracket, which slides over two upright pillars, can be positioned at any desired height and locked. It carries a screw adaptor for standard proving rings or load cells.

The loading part of the unit is detachable from the main unit for ease of transport and to avoid damage to the tension rods.

Rates of strain: 12 fixed speeds between 1.25 and 0.0064mm/min.

Suitable for operation on 230V, 50Hz, single phase, AC supply.



Key features

- Two-pillar type.
- Enclosed motor and gear system.
- Jewel lamps indicating direction of motion.
- Operational ease.

Applicable standards

- ASTM 2938, D7012

Standard features

- **TO-065** Load frame, 200kN capacity 12-speed
- **TO-21701** Loading platen as per ASTM standard
- **TO-21704** Electronic conversion kit with 200kN load cell and 25mm LVDT with data acquisition

Ordering information

- **TO-217-S2-SP2-03** Unconfined compression tester 200kN with 200kN load cell and 25mm LVDT with data acquisition

DAQ – Specifications

- Keypad for data logger configuration.
- Inbuilt RTC for the real time in standalone mode.
- Standalone and real-time data acquisition.
- LCD display of four lines, 20 characters, with back light.
- Operating temperature range of -45-70°C.
Live channel data
- Peak hold facility
- Inbuilt battery for real-time clock
- Input as analog voltage
- Analog inputs: maximum four channels
- Maximum input voltage: 0-5V, +/-5V

- Memory communication: internal storage minimum capacity should be 128MB or store on a PC that is configurable.
- Should be compatible with USB/RS232.
- Communication interfaces: Ethernet, RS232, USB, web server, Modbus server (slave)



Model To-900 Mobile Laboratory



At Tinius Olsen we offer a complete mobile lab solution to the construction and civil engineering industry. Conceived with rigorous QC/QA requirements in mind and the need to have these on project locations, the mobile laboratory concept is quick and easy to install.

The labs are not only configured with Tinius Olsen equipment but they can also accommodate equipment supplied by the end user on site.

The novel use of retired shipping containers, rebranded by Tinius Olsen, is cost effective for our customers, supports efficient logistics and is environmentally friendly.

Ordering information

- **TO-900-1** Mobile lab unit (single block unit) fitted as per TO mobile lab specification
- **TO-900-2** Mobile lab unit (double integral block unit) fitted as per TO mobile lab specification
- **TO-900-3** Mobile lab unit on site, start up and training 10 working days
- **TO-900-4** Mobile lab unit on site, equipment calibration and issue of certificates

Key features

- Custom designed in 6m (20ft) or 12m (40ft) containers.
- Thermal insulation for all four sides and roof.
- Internal walls and roof covered with laminated pylon wooden frame with split air conditioning system.
- Working space equipped with lab work table, wooden shelving, steel sinks and drain points.
- Standard door frame with aluminium door and fire exit.
- Concealed electrical wiring and outlets with single and three-phase power.
- Optional facility to provide generator, based on load requirements.

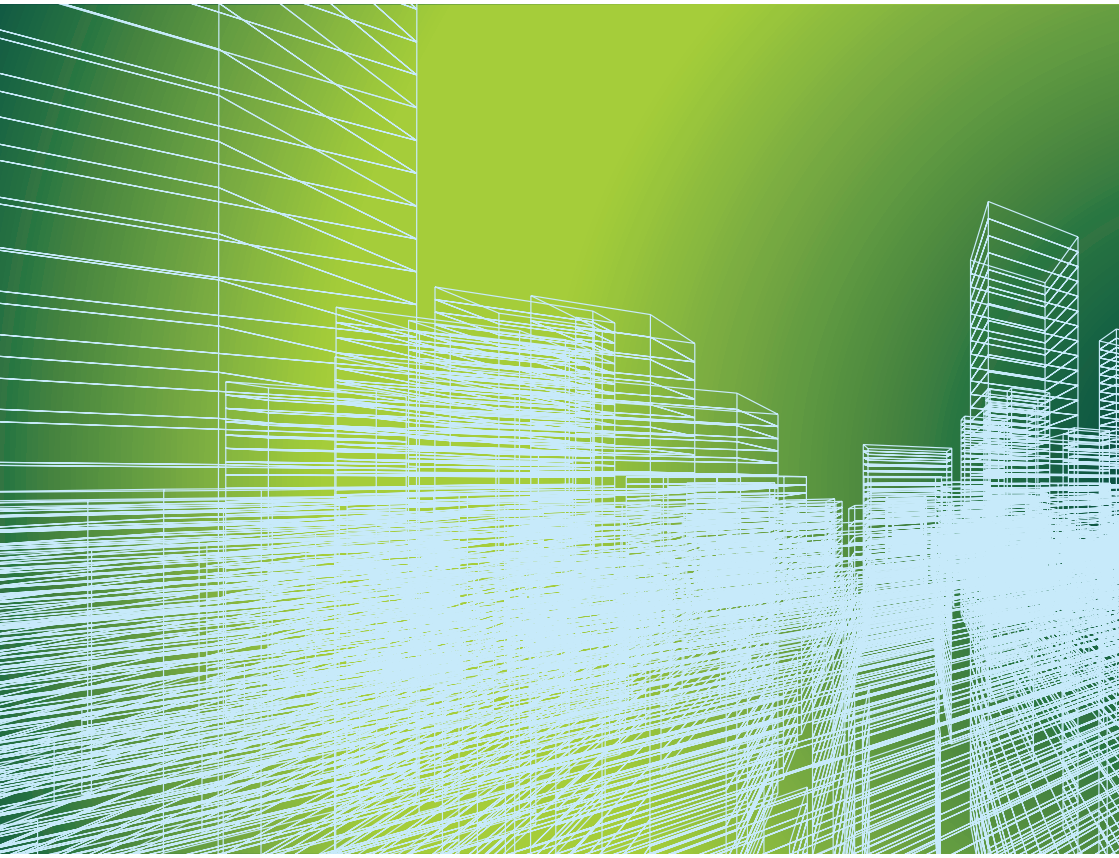


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The First Name in Materials Testing



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