



CFU
INTERNATIONAL TRADE
& SERVICES INC.

Universal Testing Systems

The section of Universal Testing Machines consists of detecting the deformations of various materials such as concrete, cement, metal, rock, asphalt, soil, etc. You will find sufficient types of Electromechanical & Hydraulic Testing equipments that conform to various standards as well as accessories such as grips, fixtures and load cells in this part of our General Catalogue.

Our engineering capabilities do not solely consist of standard engineering solutions but also provide customized solutions for physical testing laboratories. As CFU, our priority is to supply heavy duty Universal Testing Machines with a long economical life.

If you cannot find exactly what you are looking for, please do not hesitate to contact our expert engineers for solutions that is tailor made for your requirements.

In the Universal Testing Machines section, CFU Testing Equipment is basically grouped in four main headings;

- Electromechanical Universal Testing Machines,
- Hydraulic Universal Testing Machines,
- Servo-Hydraulic Universal Testing Machines
- Impact Testing Machines

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Automatic Tension & Compression Testing Machine
Hydraulic Universal Testing Machine
Servo Hydraulic Universal Testing Machine
Electromechanical Universal Test Machine
Impact Testing Machine
Multiplex Machine
Cold Test Bending Machine

SERVO HYDRAULIC UNIVERSAL TESTING MACHINE

Product Code

CFM-6060.SVD2	600 kN Servo Controlled Hydraulic Universal Testing Machine with Servo Valve
CFM-6100.SVD2	1000 kN Servo Controlled Hydraulic Universal Testing Machine with Servo Valve
CFM-6200.SVD2	2000 kN Servo Controlled Hydraulic Universal Testing Machine with Servo Valve
CFM-0500	Extensometer for Universal Testing Machine, 50 mm Gauge Length, 25mm Travel (Accuracy 0.01 mm)
CFM-0510	Extensometer for Universal Testing Machine, 100 mm Gauge Length 50mm Travel (Accuracy 0.01 mm)
CFM-0520	Extensometer for Universal Testing Machine, 50 mm Gauge Length (Accuracy 0.001 mm)

Models for 380V, 50-60Hz, 3ph	CFM-6060.SVD2-C	CFM-6100.SVD2-C	CFM-6200.SVD2-C
Models for 220V, 60Hz, 3ph	CFM-6060.SVD2-NC	CFM-6100.SVD2-NC	CFM-6200.SVD2-NC

Standards

EN ISO 6892-1, EN ISO 15630-1, EN ISO 7500-1

GENERAL DESCRIPTION

CFM-6060.SVD2, CFM-6100.SVD2 and CFM-6200.SVD2 controlled hydraulic universal testing machines are suitable to test various metallic and non-metallic materials and can carry out tension, compression, flexural and bending tests. On all models load cell is used for load measurement to achieve best load accuracy during test. The load accuracy of the systems is $\pm 1\%$ down to 2% of the full capacity. Strain measurements are done by the electronic displacement transducers built in the machine. Displacement or strain measurement can be also done external extensometer fitted to the specimen. The accuracy of the strain measurement on frame is 12.5 microns.

CFM-6060.SVD2, CFM-6100.SVD2 and CFM-6200.SVD2 are guaranteed to meet EN ISO 6892-1, EN ISO 15630-1, EN ISO 7500-1 and other international and national standards. Servo hydraulic universal testing systems can carry out tension test, compression test, bend test and flexure test by two pace rate type including load control and displacement control. Those two control parameters can be switched during the test. According to the preset condition, the systems can realize constant-rate loading, loading according to preset curve, testing with constant-rate displacement.

With powerful testing software, CFM-6060.SVD2, CFM-6100.SVD2 and CFM-6200.SVD2 can acquire, dispose automatically testing data, display real-time stress-strain curve, load-deformation curve, load-time curve and other related curves, at the same time, can save, output, print test report and data with customized format. With the help of advanced Material Testing Software the machine can be widely used in ultimate R&D department, Universities and Academies, Quality control and Inspection department, calibration centers/laboratories and industry.

Consists of a frame and a power pack with servo valve and advanced motion control unit. (Look at the technical specification table below) Bending fixtures should be ordered separately.



CFM-6200

LOAD FRAME

Load frames used on Hydraulic Universal Testing Machines has a motor driving system to set distance between grips for test set up has a rugged six column construction for exceptional load frame rigidity. All models feature two test spaces for tension test and compression/flexure and bending test. User can quickly change between tension and compression/flexure and bending testing without having to remove heavy fixtures. This flexible design also helps to ensure safety, reduces operator effort and improves productivity. The distance between the grips can be set by motor driven hand set system for different specimens. With an open front hydraulic wedge grips user can change jaw faces and load specimen easily.

All frames are supplied complete with jaw faces and compression platens.

POWER PACK

Servo controlled hydraulic power packs with servo valve and advanced power packs used on CFM-6060.SVD2, CFM-6100.SVD2 and CFM-6200.SVD2 to perform tests under load and displacement controls. The frequency of the P.I.D controller and data acquisition is 1000 Hz. Power packs are designed to supply the required oil to the load frames for loading, unloading or low cycle dynamic testing and also hydraulic grips.

All the operations of Data Acquisition and Controls System can be controlled from the touch screen front panel of a 240x320 LCD display or computer. There are extra two analogue channels for sensors such as Load Cells, Pressure Transducers, LVDT's, strain gauges, extensometers etc. built in the system, and one TTL displacement transducer input exists for frame displacement measurement. Additional two analogue channels can be configured optionally on the order stage for different type of applications.

Power packs can be connected to the computer through Ethernet port for advanced test cycles, data acquisition and reporting. The modulus of elasticity, Poisson's Ratio and compressibility parameters is easily and properly evaluated by attaching extensometers or LVDTs on to the sample. All the calibration values of the transducers and also all the test parameters for the last test is automatically stored on the control unit. Power pack incorporates a pressure safety valve for each frame separately with a cooling unit.

FIRMWARE

- 2 extra analogue channels
- Instrumentation amplifiers for sensor excitation and amplification
- 65.000 resolution and 1.000 Hz control for each channel
- Ethernet port for connecting to computer
- 240x320 pixel LCD display
- Touchscreen operator panel
- Can execute load or displacement controlled tests
- Free of charge PC software for test control and advanced report printout
- Factory install English and Turkish languages



Testing Grips



Compression Platens

Accessories

	CFM-6060.SVD2	CFM-6100.SVD2	CFM-6200.SVD2
1 Set of Tensile Grip	Round jaws for dia. 13-26 and 26-40 mm Flat jaws for 0-15 and 15-30 mm	Round jaws for dia. 20-40 and 40-60 mm Flat jaws for 0-40	Round jaws for dia. 20-40, 40-60 and 60-80 mm Flat jaws for 10-70
1 Set of Compression Platen Dia	128 mm	148 mm	200 mm
1 Set of Bending Fixture	30-500 mm	50-720 mm	50-720 mm



CFM-0520



CFM-0500

EXTENSOMETER

Different types of extensometers with accuracy of $\pm 0.1\%$ of indicated value are available depending on requirements. Extensometer can directly measure deformation of specimens. It either measures separately thermal expansion strain of specimens or eliminate thermal expansion to avoid effecting deformation of specimen.

All type of machines are supplied with;

- Jawfaces for round specimens (respect to machine capacity)
- Compression platens
- Bending Fixture

Data Acquisition & PC Software

The Universal Testing machine can be controlled (Start, Stop commands) by a computer with the software (given free of charge by CFT). This software provides data acquisition and management for compression, tensile and splitting tensile test throughout the test execution. The advanced functions for data base management provide an easy navigation of all saved data. The test results certificate includes all descriptive information. Therefore, test parameters can be set and details about the test carried out such as client details, test type, specimen type, user info and other information required can be entered and printed out as well as test report and graph.

Following tests can be done with the CFT software.

Standard Code	Description
EN 15630-1 and EN ISO 6892-1	Tensile Test of Reinforcing Ribbed Steel Bars
EN ISO 6892-1	Tensile Test of Metallic Materials

Universal Test Software is developed for testing tensile strength of Reinforcing Ribbed Steel Bars and Welded fabric for the Reinforcement and Prestressing of Concrete. The software includes control of machine, data acquisition, saving them and preparing reports. The user can prepare his own report and also can send the results to Microsoft Excel environment. The software accepts sample's weight, length, diameter and gauge length as input, and then the user can give start test command to the machine. The samples calculated diameter gives user a perspective about the density of rebar prior to the test. The software continuously updates load, stress and elongation percentage till the break point. When the test is completed the yield point is calculated and indicated on the graph. Each report is a group of 42 samples where 14 different diameters had been entered. The software is prepared as making at least 3 samples for each diameter. This gives user a total report about all the batch. The report includes all standart limits and one can easily check whether the sample can be acceptable. These limits are minimum yield, minimum tensile, minimum break elongation value, Tensile per yield ratio etc. The user can zoom on the graph for further inspection Break elongation value can be synchronized with the manual measurement after the test has been completed for the users that do not use extensometer.

- **Foreign Language Support and Customizable User Interface**

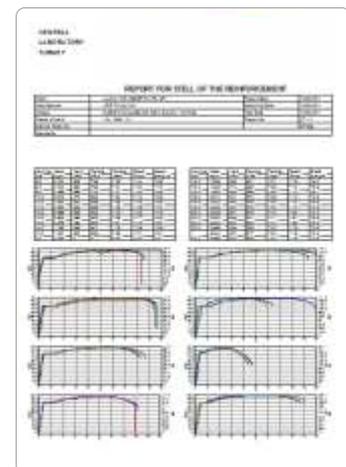
All contents of experimental data and additional information can be organized by user. Software can be performed in x different languages.

- **Capability to Save 24 test results of different specimens in one test folder**

Test results, graphics and properties of 24 different specimens can be saved in one folder. Old test folders can be reviewed and be edited easily. Advanced Graphic User Interface Software.

- **Graphical data on the screen is refreshed simultaneously during test procedure**

Load values can be monitored in high resolution graphics at every 100 milliseconds. User can highlight all 24 different specimen curves or preferred ones in different colors on the graphics. Zooming in-out and dragging can be done easily by mouse. Peak values of curves can be marked on the graphics and user can get load value of any point on the graph via high resolution.



- **Able to save frequently used texts in memory and recall them when necessary**

Frequently used information like name and location of the laboratory, type and dimensions of mostly used specimens are held in memory and can be written automatically by right clicking on information boxes and selecting frequently used text in menu.

- **Capable to Access and use previously done test data**

User can access any data of previously completed tests and use in his/ her new report since most of the tests have same structure and properties.

- **Able to edit test parameters of the testing equipment through Software**

All test parameters supported by testing equipment can be changed remotely via software. All test parameters specified by user are downloaded to the device before initialing the test procedure. By this way predefined device parameters will not cause errors in test results.

- **Graphical outCFS and reports can be saved as a MS Excel worksheet**

Test result parameters and graphics are transferred to MS Excel worksheet properly to give user a chance to edit any data and graph easily.

- **Maximum Flexibility to edit report and graph templates**

User can design his/her custom report template and graphic scheme in MS Excel. In software part, user will define which data will be screened in which cell on the worksheet. Therefore, he/she will be able to monitor test results in his/her specific design.

Technical Specifications		CFM-6060.SVD2	CFM-6100.SVD2	CFM-6200.SVD2
Maximum Load		600kN	1000kN	2000kN
Load Measurement Accuracy		1% from 2% of max capacity	1% from 2% of max capacity	1% from 2% of max capacity
Deformation Measurement Accuracy		12.5µm	12.5µm	12.5µm
Control Mode (Pace Rate Type)		Displacement Control, Load Control, Stress Control	Displacement Control, Load Control, Stress Control	Displacement Control, Load Control, Stress Control
Max Vertical Test Space Between Grips		750 mm	1050mm	1050 mm
Max Vertical Test Space Between Platens		620 mm	920 mm	920 mm
Max Horizontal Test Space		480 mm	570 mm	840 mm
Piston Stroke		250 mm	250 mm	250 mm
Testing Speed		0-100 mm/min (Displacement) 0-25 kN/s (Load)	0-100 mm/min (Displacement) 0-25 kN/s (Load)	0-100 mm/min (Displacement) 0-25 kN/s (Load)
Crosshead Speed		200 mm/min	200 mm/min	280 mm/min
Grips for Flat Specimen (2 set)		Thickness 0-30 mm	Thickness 0-40 mm	Thickness 10-70 mm
Grips for Round Specimen (2 set)		Diameter 13-40 mm	Diameter 20-60 mm	Diameter 20-80 mm
Compression Platen Size		128 mm diameter	148 mm diameter	200 mm diameter
Power Supply		380 V AC, 50 Hz, 2.5 kW Frame 220 V AC 50 Hz Power pack	380 V AC, 50 Hz, 3.5 kW 220 V AC 50 Hz Power pack	380 V AC, 50 Hz, 3.5 kW 220 V AC 50 Hz Power pack
Load Frame Dimensions		770x600x2150 mm	900x650x2400 mm	1300x900x3300 mm
Power Pack Dimensions		570x800x1020 mm	570x800x1020 mm	570x800x1020 mm
Weight		2600 kg / 250 kg	3700 kg / 250 kg	8800 kg / 250 kg

SERVO HYDRAULIC UNIVERSAL TESTING MACHINE

Product Code

CFM-0600S	Servo-Hydraulic Universal Testing Machine, 600 kN
CFM-1000S	Servo-Hydraulic Universal Testing Machine, 1000 kN
CFM-2000S	Servo-Hydraulic Universal Testing Machine, 2000 kN

Standards

EN ISO 6892-1, EN ISO 15630-1, EN ISO 7500-1

CFU-S Series Universal Testing Machines are high capacity systems with single test space and suitable for tensile, compression, flexure tests on a wide range of different materials such as round, flat and profile specimens for quality control, product development, research or process development. Testing systems for brittle materials such steel or fasteners requires high stiffness load frames that minimize the amount of deformation energy that is stored in the frame.

Servo-Hydraulic Universal Testing Machines can be controlled via. Multifunctional Remote Control Hand Set that is located on the frame, Digital Control Unit or Material Testing Program (MTP) software that installed on the PC connected to the Control Unit.

Servo-Hydraulic Universal Testing Machine can carry out tensile and yield, compression, flexure tests with load and displacement controls. CFU-S Series can be switched between load and displacement control during the test.

The main characteristics are;

- Rigid 4 columns construction providing superior axial and lateral stiffness and precision alignment,
- Closed-loop servo controlled hydraulic power pack for accurate test control,
- High speed electronic control and data acquisition unit for accurate test results,
- Multifunctional Remote Control Hand Set for fast test setup and testing,
- Single test space design with convenient vertical testing clearance,
- Double acting servo-actuator mounted on top of the crossbeam
- Actuator with anti-rotation system to prevent the natural tendency of the actuator to rotate.
- Long piston stroke for the most convenient and easy adjustment and testing of different sample lengths,
- Digital displacement transducer for the best positioning and measuring accuracy
- Easy calibration procedure,
- Material Test Program (MTP) Software for easy using,
- Chrome plated columns for easy cleaning and longest life.
- Hydraulic Wedge Actions Grips
- Grip control system mounted on the frame
- Compression platens or bending devices may be fixed directly into wedge grips,
- Limit switch on the piston as well as the safety limit valves on the hydraulic system,

Servo-Hydraulic Universal Testing Machine is consisting of Load Frame, Advanced servo controlled automatic power pack, Electronic Control Unit and Material Testing Software as standard.

Depending to standards and requirements, Video extensometers, Automatic Extensometers, Clip-On Extensometers, Flexure, Compression Test Apparatus, High Temperature Cabinets and Multifunctional Remote Control Hand Set can be integrated on the Servo-Hydraulic Universal Testing Machines.



SERVO HYDRAULIC UNIVERSAL TESTING MACHINE

FRAME

CFU-S Series Servo-Hydraulic Universal Testing Machines are manufactured 600, 1000 and 2000 kN capacities. The double acting servo actuator, which is integrated on the upper crosshead, has a long piston stroke which makes vertical testing space accessible for easy and efficient testing of different samples lengths. Load cell for measuring the load is mounted between lower grip and base plate.

Displacement transducers that mounted in the piston are used for displacement measuring. External Extensometers (Video extensometers, Long Travel Extensometers, Automatic Extensometers or Clip-On Extensometers) can be synchronously used for displacement measurements if required.

Mono block Wedge Actions Hydraulic Grips are located between end point of piston and load cell that mounted on the base platen. Not any disassembly or tools needed for changing the jaws. The jaws that can be used for 0-60 mm thickness flat specimens and 6-60 mm diameter for round specimens are provided as standard depend on capacity of the machine.

ADVANCED SERVO CONTROLLED AUTOMATIC POWER PACK WITH SERVO VALVE

The CFC-4870 Automatic Power Packs with Servo Valve, are advanced power packs can be used on any testing system ideal for R&D laboratories and Universities for advanced tests with P.I.D. Closed loop control. It can perform tests under load and displacement controls. The frequency of the P.I.D controller and data acquisition is 1000 Hz. CFC 4870 automatic power packs are designed to supply the required oil to the load frames for loading, unloading or low cycle dynamic testing. All the operations of Data Acquisition and Controls System can be controlled from the touch screen front panel of a 240x320 LCD display or computer.

The CFC-4870 can control up to 4 different. For each frame there is one load cell (or pressure transducer) input and one displacement transducer input for control. There are an extra three analogue channels for other sensors such as load cells, pressure transducers, displacement transducers etc. built in the system.

The power pack automatically controls and supplies oil to the frame which is chosen by the user via the touch screen LCD digital control unit or by choosing the test type from the computer software.

The type of displacement transducer can be TTL or analogue (It must be same type for all frames).

The main specifications of the CFC-4870 power packs are;

- Up to 5 litre/minute pump delivery (max) 280 bar 3 kW motor rate
- Loading-unloading with $\pm 0,5\%$ rate accuracy
- Staying at constant load within 0,005% accuracy of the maximum load
- The control of the load starts from 0,3 % of the maximum load capacity of the system.

All power packs can be connected to the computer through Ethernet port for advanced test cycles, data acquisition and reporting. The modulus of elasticity, Poisson's Ratio and compressibility parameters is easily and properly evaluated by attaching LVDT or extensometers on to the sample. All the calibration values of the transducers and also all the test parameters for the last test is automatically stored on the control unit. All power packs incorporate a pressure safety valve for each frame separately and a cooling unit.

Main Features

- 3 analogue channels for displacement transducers, extensometers, etc. built in the system as an addition to frame loadcells/pressure transducers
- Instrumentation amplifiers for sensor excitation and amplification
- 1/65.000 resolution and 1.000 Hz control for each channel
- Ethernet port for connecting to computer
- 240x320 pixel LCD display
- Touchscreen operator panel
- Can control 4 frames
- Can execute load, displacement or strain controlled tests. For post peak applications CFC-4870 must be selected.
- Free of charge PC software for test control and advanced report printout
- Pace rate control from 0.01 kN/s to 100 kN/s (depend on the specimen stiffness)
- Pace rate control from 0.01 mm/min to 100 mm/min (CFM-600S and 1000S) and 75mm/min (CFM-2000S)
- Multiple language support
- Real time clock/date

SERVO HYDRAULIC UNIVERSAL TESTING MACHINE

MULTIFUNCTIONAL REMOTE CONTROL HAND SET

Multifunctional Remote Control Hand Set designed for more practical process than Electronic Control Unit and PC. Piston can be moved up-down, can be adjusted test speed, can be adjusted position of grips and the jaws can be open/close by Multifunctional Remote Control Hand Set. Able to stop at maximum upper and lower position and automatically suspend when can be reached to maximum deformation of capacity should be with Remote Control Head Set.

Multifunctional Remote Control Hand Set that connected with a connection cable to Electronic Control Unit has LCD display can be seen values of load & deformation of the test.



MATERIAL TESTING PROGRAM (MTP)

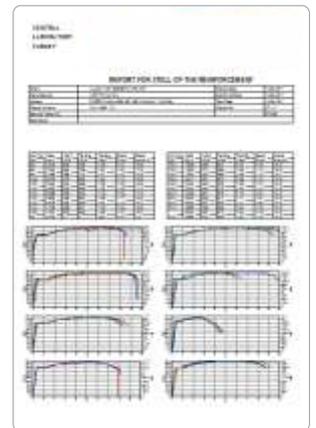
Material Testing Program (MTP) supplied standard with the machine is used to control and data processing. By using MTP Test control data input (test speed, maximum load and maximum elongation limits, etc.), sample data and user data can be entered.

Real-time image, stress-strain curve, load deformation, load-time curve, load/strain, Young Modules etc. can be displayed by the software. The upper and lower yield, maximum breaking and strain, breaking/elongation ratio of selecting point etc. can be supplied from graphic.



If require the old graphics and data can be displayed. At the same time can be recorded, reporting, output and test report can be printed. Material Testing Program (MTP) has a wide range of process. Test results can be displayed in Metric and Systeme International (SI) system.

Automatic zeroing at the beginning of the test and auto return facility after specimen failure is available on the Material Testing Program (MTP). All test results are displayed on the screen. System has automatic break detection, several break detection criteria's are available can be selected. Material Testing Program (MTP) can automatically recognize the attached extra Video extensometer, Automatic extensometer etc.



OPTIONS

Standard Extensometers

CFM-0500 Clip-On Type Extensometers, 50 mm gauge length, 0,01 mm accuracy,
CFM-0520 Clip-On Type Extensometers, 50 mm gauge length, 0,001 mm accuracy,
Clip-On Type Extensometers can measure the displacement directly from the specimens.

Automatic Extensometers

CFM-0540 Automatic Extensometer, 10-300 mm gauge length, 0,1 µm accuracy. These kind of extensometers are fully automatic computer-controlled and used for flat and round specimens with different measurement distance. By means of high sensitivity it can even used on very delicate materials.

Technical Specifications of Automatic Extensometers

Gauge Length L0 (mm)	10-300
Linearity Error	0.005 %
Travel Distance Error	± 0.5 %
Resolution (µm)	1 or 0,1
Operating Temperature Range (0C)	0-50
Indication Error (µm)	1,5
Positioning Distance (mm)	190
Travel (mm)	300 min L0



CFM-0500



CFM-0520



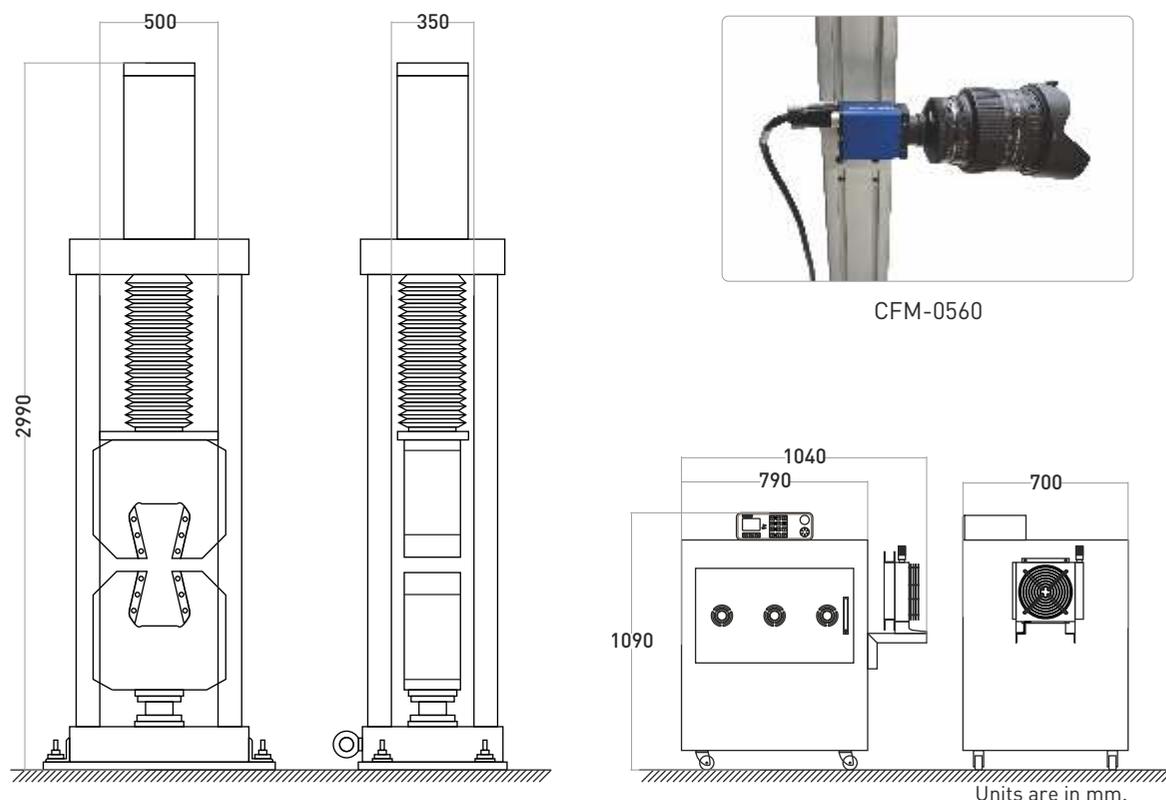
CFM-0540

Video Extensometers

CFM-0560 Video extensometers are non-contact, high resolution and sensitivity system. Displacement between two marked dots and % displacement, real image of displacement and % displacement can be obtained with this real time camera system.

High resolutions Video Extensometer's sensitivity is 0,002% dir. As generally, the average strain value between two marked lines can be obtained. Up to ten different marked dots on the sample can be calculated of percentage of displacement. The data and images on the Video extensometer can be displayed when Video extensometer connected with Material Testing Program (MTP).

Video Extensometer can be fitted a place is suitable on the load frame.



Technical Specifications

Model	CFM-0600S	CFM-1000S	CFM-2000S	
Maximum Load (kN)	600	1000	2000	
Piston Stroke (mm)	500	550	600	
Max Distance between grips (mm)	600	700	800	
Horizontal front daylight between columns (mm)	600	650	750	
Horizontal depth daylight between columns (mm)	350	450	450	
Column Dia. (mm)	100	120	200	
Test Speed (mm/min.)	Displacement	0,1-100	0,1-100	0,1-75
Test Speed (MPa/s)	Load*	1-100	2-60	2-60
Displacement Resolution (mm)	0,001	0,001	0,001	
Displacement Accuracy (mm)	0,01	0,01	0,01	
Jaws Size for Flat Specimens (mm)	0-30	0-40	0-60	
Jaws Size for Round Specimens (mm)	6-40	12-50	12-60	
Power Supply	380 VAC, 50 Hz, 3 ph.	380 VAC, 50 Hz, 3 ph.	380 VAC, 50 Hz, 3 ph.	
Height (mm)	2990	3600	4000	
Load Measurement Accuracy [Capacity of Load Cell 1%-100%]	Class 0,5	Class 0,5	Class 0,5	
Ambient Conditions	from 10°C to 30°C temp. and humidity up to %80	from 10°C to 30°C temp. and humidity up to %80	from 10°C to 30°C temp. and humidity up to %80	
Max. Working Pressure (bar)	350	350	350	

*Loading rate depends to durability and type of various specimens

ELECTROMECHANICAL UNIVERSAL TEST MACHINE

Product Code

CFM-8100.SMD2 Electromechanical Universal Test Machine, 100 kN
 CFM-8300.SMD2 Electromechanical Universal Test Machine, 300 kN

Models for 220-240 V 50-60 Hz, 1ph.	CFM-8100.SMD2	CFM-8300.SMD2
Models for 110-120 V 60Hz, 1ph.	CFM-8100.SMD2-N	CFM-8300.SMD2-N

Standards

ISO 7500-1

CFM-8100, 100 kN and CFM-8300, 300 kN capacity fully automatic CFU Electromechanical Universal Testing Machines are multi purpose versatile machines which satisfy the requirement of R&D laboratories, university laboratories, institute laboratories and quality control laboratories for tensile, compression flexural tests under load or displacement control for a wide range of materials CFM 8100 and CFM- 8300 model Electromechanical Universal Testing Machines can be used for tensile test on any material i.e (metal, plastic, textile, wood) by using suitable accessories. Those machines can also be used for general compression, flexural, tests on steel, soil, concrete, cement, rock, asphalt and similar materials, by using suitable accessories.

These Testing Machines consist of base containing the transmission components and holds two robust columns connected by upper cross head and digital graphics data acquisition and control system. The upper cross head can be adjusted to set the vertical test space for different tests. User can adjust the vertical test space by also lower crosshead moved by an electromechanical system with a single recirculating ball screw, powered by an servomotor.

Advanced closed loop control system assures accurate load or displacement pace rate on sample.

The load is measured by a load cell that located on upper crosshead and displacement is measured by an encoder fit to the servo motor on both models.

The operator will have large flexibility during the test with advanced microprocessor control and material testing software installed on PC.

CFM-8100 supplied with compression platens and load cells 50 kN capacity.CFM-8300 supplied with compression platens and load cells 300 kN capacity
 Gripping systems, extensometers and accessories are not included and have to be ordered separately.



CFM-8300

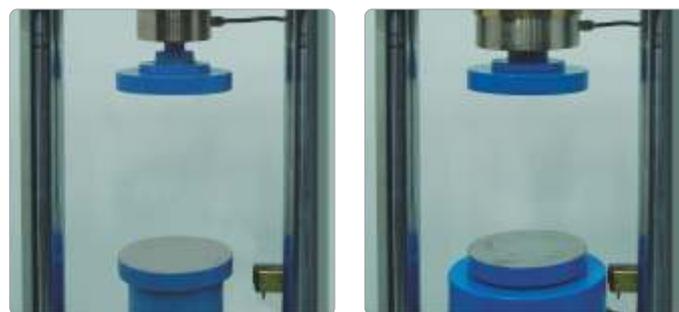
Frame Features

	CFM-8100.SMD2	CFM-8300.SMD2
Max. Load	100 kN	300 kN
Max. Vertical Test Space (*) (without accessories)	650 mm	850 mm
Distance Between Columns	440 mm	630 mm
Crosshead Travel	400 mm	200 mm
Test Speed Range	0-100 mm/min.	0-75 mm/min.
Load Rate	0,001-2 kN/s (Depend on specimen stiffness)	0,001-10 kN/s (Depend on specimen stiffness)
Machine Class	Class 1 starting from 1% of the capacity	Class 1 starting from 1% of the capacity
Encoder Resolution	0.001mm	0,001 mm
Encoder Accuracy	0,01	0,01
Overall Dimensions	1300x520x2300 mm	1100x450x1860 mm
Weight Approx.	400 kg	800 kg
(*) The distance from bottom surface of upper crosshead to top surface of lower working table.		

ACCESSORIES

General Accessories;

- CFGM-0010 Load Cell, 5 kN Capacity, S Type
- CFGM-0015 Load Cell, 10 kN Capacity, Pancake Type
- CFGM-0020 Load Cell, 20 kN Capacity, Pancake Type
- CFGM-0025 Load Cell, 50 kN Capacity, Pancake Type
- CFGM-0030 Load Cell, 100 kN Capacity, Pancake Type
- CFGM-0035 Load Cell, 300 kN Capacity, Pancake Type



Data Acquisition & PC Software

Digital display graphics data acquisition and control system are designed to control the machine and process the data from encoders, Load cells, installed on the Electromechanical Test Machine frame. It has graphical TFT display of 240x128 pixel and show both load and displacement. The digital unit sends all these information to PC and accepts commands of Start, Stop, and Test Speed etc.

Manual zeroing of all engineering values exist prior to the beginning of test.

Materials testing software is available for CFU CFM series universal testing systems. Test software provides fully customized parameter definition, test method development tools, automatic test control, data collection, results analysis, and reporting.

This flexible software solution supports multiple testing technologies and test types, allowing you to standardize your lab under a single software application. With several options for creating tests, and a separate application for running tests, you can allocate resources in the way that makes sense for your lab.

Advanced templates for testing to ASTM, ISO and EN standards for tension testing, compression testing, flexure testing, and more across a wide variety of materials and applications help ensure quick and efficient test setup and execution.

Various engineering calculations are performed automatically such as strain, tensile stress, compressional and flexural strength, elongation, yield point, elasticity modulus, absorbed energy, etc. with the software

Test results stored in computer for your future retrieve or reanalysis and reporting. Data Exchange between other Windows based applications such as Excel, Word or output in PDF format.



ELECTROMECHANICAL UNIVERSAL TEST MACHINE

MATERIALS	TESTS / METHODS	STANDARDS	ACCESSORIES
STEEL (ROUNDS AND FLATS)	Tensile Test under Load/Displacement Control	EN ISO 6892-1	CFM-8060 Tensile Grip complete with grips for round specimens from 2 to 10 mm dia., and flats 0 to 8 mm thick., 50 kN
			CFM-8310 Tensile Grips complete with grips for round specimens from 6 to 20 mm dia., and flats 0 to 15 mm thick., 300 kN
CEMENT AND MORTARS	Compression Test Under Load Control	EN 196-1 ASTM C109	CFCM-0121/E Compression Jig Assembly EN, to test portions of 40x40x160 mm mortar prism. (*)
			CFCM-0121/A Compression Jig Assembly ASTM, to test 50 mm (2") mortar cubes. (*)
	Flexure Tests Under Load Control	EN 196-1 ASTM C348 EN 12808-3 EN 1015-11	CFCM-0120/E Flexure Jig Assembly EN , to test 40x40x160 mm mortar prisms, distance between lower bearers is 100 mm CFCM-0120/A Flexure Jig Assembly ASTM, to test 40x40x160 mm mortar prisms, distance between lower bearers is 119 mm.
CONCRETE	Tensile Adhesion Strength (Adhesives for tiles, repair, rendering and plastering.	EN 1346 EN 1348 EN 1015-12 EN 1542 EN12004	CFM-8070 Pull-Headed Plate Set for EN 1348 and EN 12004
			CFM-8080 Pull-Headed Plate Set for EN 1015-12 and EN 1542
			CFM-8082 Frusto-Conical Shaped Rings. EN 1015-12, stainless steel, Ø50mm
			CFM-8064 Holders for Concrete Base Plate and Specimen EN 1348, 1015-12, 1542 (**)
			CFM-8074 Holders for Concrete Base Plate and Specimen EN 1348, 1015-12. (**)
			CFM-8084 Holders for Concrete Base Plate and Specimen EN 1542 (**)
CONCRETE	Flexure Tests on Concrete Beams under Load Control	EN 12390-5 ASTM C78, C293 AASHTO T97 BS 1881:118	CFC-5501 Bearers, used for for 3 or 4 point flexural tests on concrete beams of 100x100x400-500 mm, 150x150x600-750 mm.
	Flexure Tests on Concrete Kerbs Under Load Control	EN 1340	CFC-5502 Bearers, used for flexure test on concrete kerbs. Consist of two lower roller of 38 mm dia. x 600 mm length and upper load point of 40 mm dia with ball seating, 300kN
	Splitting Tests on Concrete Cylindrical and Cubes Specimens, and concrete paving blosks under Load Control	EN 12390-6 AASHTO C496 EN 1338	CFC-0350 Splitting tensile test device for 100x200 mm (4" x 8"), 150x300 mm (6" x 12")
CFC-0360 Splitting tensile test device for concrete cubes (EN)			
CFC-0355 Splitting tensile test device for concrete paving blocks with 60-100x220 mm (hxl) (EN)			



CFM-8060



CFM-8310



CFCM-0121/A



CFCM-0121/E



CFM-8064



CFC-5501, 4 Point



CFC-5501, 3 Point

(*) Up to the machine capacity

(**) Supplied complete with the connection apparatus fit with the ordered machine.

MATERIALS	TESTS / METHODS	STANDARDS	ACCESSORIES
CONCRETE NATURAL STONE CLAY	Flexure Tests on Clay Roofing Tiles	EN 538 EN 491	CFC-5504 Flexural Testing Assembly with 610mm length rollers, used for flexural strength tests of concrete terrazzo tiles, natural stone kerbs, concrete paving flags and natural stone slabs. Consist of two lower roller and one upper roller of 38 mm dia. x 610 mm length. (10 kN loadcell should be ordered separately for concrete and ceramic tiles)
	Flexure Tests on Natural Stone and Kerbs	EN 12372 EN 1343	
	Flexure Tests on Concrete Terrazzo Tiles	EN 13748-1 EN 13748-2	
	Flexure Tests on Concrete Paving Flags	EN 1339	
	Flexure Tests on Slabs of Natural Stone for External Paving	EN 1341	
	Flexure Tests on Glass Fiber Reinforced Cement (Precast Concrete Products)	EN 1170-4 EN 1170-5	CFM-8095 Flexure Apparatus for EN 1170
	Punching Tests for Clay Blocks	UNI 9730-3	CFM- 8090 Flexural Punching Device and Holding Plate
SOIL	CBR Under Displacement Control	EN 13286-47 ASTM D1883 AASHTO T193	CFM-0110 CBR Penetration piston, used to perform CBR tests.
	Quick Triaxial Tests	BS 1377-8 ASTM D2850 ASSHTO- T245	See the table on page 27
BITUMINOUS MIXTURES	Marshal Test Under Displacement Control	EN 12697-34 ASTM D1559	CFAS-0057 Breaking Head Stability Mould, cast iron, for 4" (101,6 mm) Marshall Samples CFAS-0058 Breaking Head Stability Mould, cast iron, for 6" (152,4 mm) Marshall Samples
	Indirect Tensile Splitting Tests	EN12697-23 AASHTO T283	CFAS-0063 Tensile Splitting Device for compacted Bituminous samples 100 mm (4") & 150 mm (6") dia.
	Duriez Test Under Displacement Control	NF P98 251 1/4 EN 12697-12 Method A and B	CFAS-0090 Duriez Compression Test Set, 80 mm diameter. Only with CFM-8300 CFAS-0092 Duriez Compression Test Set, 120 mm diameter. Only with CFM-8300
INSULATION MATERIALS	Tensile strength and tensile bond strength perpendicular to faces	EN 13494 EN 1607	Determination of tensile strength perpendicular to faces and the tensile bond strength of the adhesive and of the base coat to the thermal insulation materials, CFM-8121 Tensile-Headed Solid Plate Set, 50x50x5mm. CFM-8122 Tensile-Headed Solid Plate Set, 100x100x5mm. CFM-8123 Tensile-Headed Solid Plate Set, 150x150x5mm. CFM-8124 Tensile-Headed Solid Plate Set, 200x200x5mm. CFM-8125 Tensile-Headed Solid Plate Set, 300x300x5mm.



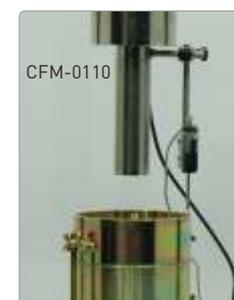
CFC-5504



CFM-8095



CFM-8090



CFM-0110



CFAS-0058

CFAS-0057



CFAS-0063



CFC-0360 CFC-0355 CFC-0350



CFM-8105 and CFM-8107

IMPACT TESTING MACHINE

Product Code

Product Code

- CFCI-0150 Motorized Pendulum Impact Tester, 150 Joules
- CFCI-0300 Motorized Pendulum Impact Tester, 300 Joules
- CFCI-0450 Motorized Pendulum Impact Tester, 450 Joules
- CFCI-0155 Izod Hammer (Striker) & Specimen Holder (Vise) for CFCI-0150
- CFCI-0305 Izod Hammer (Striker) & Specimen Holder (Vise) for CFCI-0300
- CFCI-0455 Izod Hammer (Striker) & Specimen Holder (Vise) for CFCI-0450

Standards

ASTM E 23, EN 10045, ISO 148, GOST 9454; AS 1544; JIS Z 2242,B 7722

Models for 220-240V 50-60 Hz, 1 ph.	CFCI-0150	CFCI-0300	CFCI-0450
Models for 110-120V 60 Hz, 1 ph.	CFCI-0150-N	CFCI-0300-N	CFCI-0450-N

Impact test determines the amount of energy absorbed by a material during fracture. This absorbed energy is a measure of a given material's toughness and acts as a tool to study temperature-dependent nature of brittle-ductile transition.

CFCI series motorized pendulum impact testers are fully automated and high performance devices which are ideal for testing metals according to Charpy and Izod standards up to capacities of 450J.

U-type pendulums are suspended on a sturdy steel pedestal which is designed to be attached to a concrete base or a strong floor. Pendulum is driven by an electric motor and an electromagnetic clCFCh system. The fall of the pendulum is initiated with a latch mechanism so that the fall is sudden and unaffected from any friction losses.

After the test, the pendulum is automatically captured and returned to the starting position. Angle, therefore position readings of the pendulum are done by a rotary encoder and the data is processed by a colored touch screen control unit to display absorbed energy values.

CFU impact testers can run with both user command and door triggered modes and in both modes the automation of the device together with the safety cabin is designed to prevent any unforeseen accidents and user injuries. Door triggered testing mode enables the fast and continuous testing for temperature sensitive tests and user command mode provides for more control for the operator.

Heat treated anvils and the striker are replaceable for both to be changed because wear caused by the long term use and to allow 8 mm radius striker to be mounted on the pendulum.

Typical field of use: Universities, laboratories of the institutions, automotive and aero companies, R&D Labs, steel manufacturers, etc.



IMPACT TESTING MACHINE

MAIN FEATURES

Available capacities for Charpy and Izod testing are: 150J, 300J, 450J

Fast response electromagnetic clCFCh mechanism.

Ergonomic use of control unit and cabin door.

Clearance between supports of 40 mm,

Nominal fall angle is 150 degree,

Suitable for specimens of 10 x 10 x 55 mm

Cabin door sensitive automatic testing mode that enables the fast and continuous testing and manual mode for more control for the operator.

Highly sensitive encoder to take the angle readings for every position of the hammer and to capture the very peak point of the rise angle.

Direct verification menu to verify the losses and calculate the error as described in the standards (air resistance, bearing resistance, etc.).

STANDARDS FOR CFCI SERIES

ASTM E23 Standard Test Methods for Notched Bar Impact Testing of Metallic Materials

EN 10045 Charpy Impact Test on Metallic Materials

ISO 148 Metallic Materials - Charpy Pendulum Impact Test

Fixtures/strikers are available for each test standard



Max. Absorbed Impact Energy (J)	150
Raised Angle	? 150°
Max. Impact Speed (m/s)	5,25
Anvil Span (mm)	40
Size of specimen (mm)	10 x 10 x 55
Power supply	1phs, 220V,60Hz
Overall Dimensions	2200x950x2100 mm
Weight (approx.)	800 kg

Nominal Energy (J)	150	300	450
Effective Energy (J)	120	240	360

Main Accessories

2. Specimen centering tong (U, V)
3. Anchor bolts (M22x300mm): 4 pcs

Optional Accessories

2. ASTM E23 striker (R8mm),
3. Izod Fixtures
4. Notch Cutter for impact specimen

IMPACT TESTING MACHINE

HYDRAULIC NOTCH CUTTER

Product Code

CFCI-0520	Hydraulic Notch Cutter for Impact Specimen
CFCI-0522	U Type Notch Knife for CFCI-0520
CFCI-0524	V Type Notch Knife for CFCI-0520

Hydraulic Notch Cutter is specially designed for specimen preparation of impact specimens. The machine cut the notch which according to the 'V' ASTM E23, ISO148 standards, "U" DIN 50115 and ISO83 standards 'Charpy Notch Impact Test Method for Metal Material'. Meanwhile, the machine also features in high precision, long life, low noise and concise appearance.

CFCI-0520 Hydraulic Notch Cutter is supplied complete with V Type and U Type Notch Knives (installed on the machine).



Specifications

Notch type	: V type: 2 mm or U type: 2 mm
Size of specimen	: 10×10 (7.5 or 5) ×55mm
Travel of cutting knife	: 340mm
Cutting speed	: 2.5m/min
Dimensions	: 600×500×1200mm
Power supply	: 380 V/ 50Hz
Weight	: 150kg

COLD TEST BENDING MACHINE

Product Code

CFM-8400 Cold Test Bending System, 150 kN

Standards

EN ISO 15630-1, 7438, EN 10080

CFM-8400 Cold Bending Machine is used for bending and re-bending tests of reinforcing bars, wire rod and wire for concrete in accordance with the requirements of EN ISO 15630-1.

The test piece is bent over a mandrel. The angle of bend and the diameter of the mandrel (D) is selected in accordance with the relevant product standard EN 10080. The bend test is performed with a minimum angle of bend of 180° over a mandrel, according to EN ISO 15630-1.

For re-bend test, first the test piece is bent with a minimum angle of bend of 90° over a mandrel, in a second step, the aging treatment is applied and then the test pieces bent back up to a minimum of 20°. according to EN ISO 15630-1,

After the tests, the tension (lower) side of the test piece is visually inspected for cracks or fissure visible to a person with normal or corrected vision.

The test piece is inspected for cracks and fissures visible to a person with normal or corrected vision.

Mandrels for bent and re-bend tests should be ordered separately



Technical Specifications

Maximum Loading Capacity	150 kN
Power	750 W
Piston Travel Maximum Speed	1 mm/sec.
Dimensions	1550 x 800 x 1150 mm
Weight Approx.	540 kg

The Bend Test (EN 10080)				The Re-Bend Test (EN 10080)				
Specimen Nominal Diameter d (Ø) mm	Mandrel Code	Max. Mandrel Diameter (mm)		Specimen Nominal Diameter d (Ø) mm	Mandrel Code	Max. Mandrel Diameter (mm)		
		d ≤ Ø16	d > Ø16			d ≤ Ø16	Ø16 < d ≤ Ø25	d > Ø25
		3d	6d			5d	8d	10d
8	CFC-8410/22	24	-	8	CFC-8410/1	40	--	--
9	CFC-8410/23	27	-	9	CFC-8410/3	45	--	--
10	CFC-8410/24	30	-	10	CFC-8410/5	50	--	--
11	CFC-8410/25	33	-	11	CFC-8410/6	55	--	--
12	CFC-8410/26	36	-	12	CFC-8410/7	60	--	--
14	CFC-8410/27	42	-	14	CFC-8410/8	70	--	--
16	CFC-8410/28	48	-	16	CFC-8410/9	80	--	--
18	CFC-8410/29	-	108	18		--	144	--
20	CFC-8410/30	-	120	20		--	160	--
22	CFC-8410/31	-	132	22		--	176	--
24	CFC-8410/32	-	144	24		--	192	--
25	CFC-8410/33	-	150	25		--	200	--
26	CFC-8410/34	-	156	26		--	--	260
28	CFC-8410/35	-	168	28		--	--	280
30	CFC-8410/36	-	180	30		--	--	300
32	CFC-8410/37	-	192	32		--	--	320
40	CFC-8410/38	-	240	40		--	--	400

MULTIPLEX MACHINE

Product Code

CFM-0107	Multiplex Machine with Servo Motor and LCD Control System (Only Frame), 50 kN
CFS-0870	CBR Penetration piston, used to perform CBR tests
CFM-0115	Compression Platens, used to perform uniaxial and unconfined compression tests
CFAS-0057	Breaking Head Stability Mould, cast iron, for 4" (101,6 mm) Marshall Samples
CFAS-0058	Breaking Head Stability Mould, cast iron, for 6" (152,4 mm) Marshall Samples



Multiplex Machine is used to make Uniaxial, CBR and Marshall Tests. 50 kN capacity Multiplex Machine is equipped with a servo motor and LCD graphics control system and capable of doing test with the speed range of 0,00001 mm/min to 51 mm/min suitable for CBR, Marshall, Triaxial and Uniaxial Tests.

For analog measurement the frame can be completed with load ring and dial gauge. Load ring and dial gauge should be ordered separately.

If the machine will be used with a data logger, unilogger (UTG-0325), load cell and displacement transducers should be ordered to complete the testing machine.

The tests such as Uniaxial, Triaxial, Marshall and CBR can be performed with the CFM-0107 by adding the test accessories.

Test accessories should be ordered separately according to the tests.

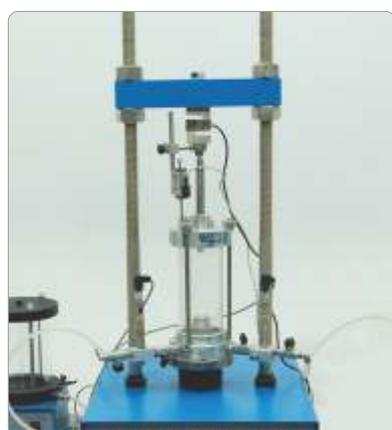
Test Speed	0,00001– 51 mm/min
Capacity	50 kN
Dimensions	550x700x1200 mm
Weight (approx.)	102 kg



Uniaxial

To Perform Uniaxial Tests

CFM-0115	Compression Platens, used to perform uniaxial and unconfined compression tests. Supplied complete with ball seating assembly.
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Triaxial

To Perform Triaxial Tests

Product Code	Description	UU	UU-CU CD
CFGM-0010	Load Cell 5 kN	1	1
CFGM-0062	Linear Potentiometric Displacement Transducer, 25 mm	1	1
CFS-0400 CFS-0401	Triaxial Cell**	1	1
CFS-0405	Block with One Connection Line for Triaxial Test Cells	1	-
CFS-0406	Block with 3 Connection Lines for Triaxial Test Cells	-	1
CFGM-0110	Pressure Transducer	1	3
CFS-0408	Oil and Water Constant Pressure System	1	2
CFS-0415	Automatic Volume Change Unit	-	1
CFG-0320	Static Unilogger 4 Channels	-	1
CFS-0416	Software to Perform UU Triaxial Tests	1	1
CFS-0417	Software to Perform CU-CD Triaxial Tests	-	1
CFS-1330 and CFGP-1140	De-Airing Water Tank, 7 L. and Hose	1	1

* Choose the suitable cell for the specimen size (CFS-0400: 38-50 mm dia. samples / CFS-0401: 70-100 mm dia. samples).
For cell accessories, sample preparation accessories and Optional apparatus for de-airing water please see Triaxial Test Systems.



Marshall

To Perform Marshall Tests

CFAS-0057	Breaking Head Stability Mould, cast iron, for 4" (101,6 mm) Marshall Samples
CFAS-0058	Breaking Head Stability Mould, cast iron, for 6" (152,4 mm) Marshall Samples
	Adaptor for Breaking Head



CBR

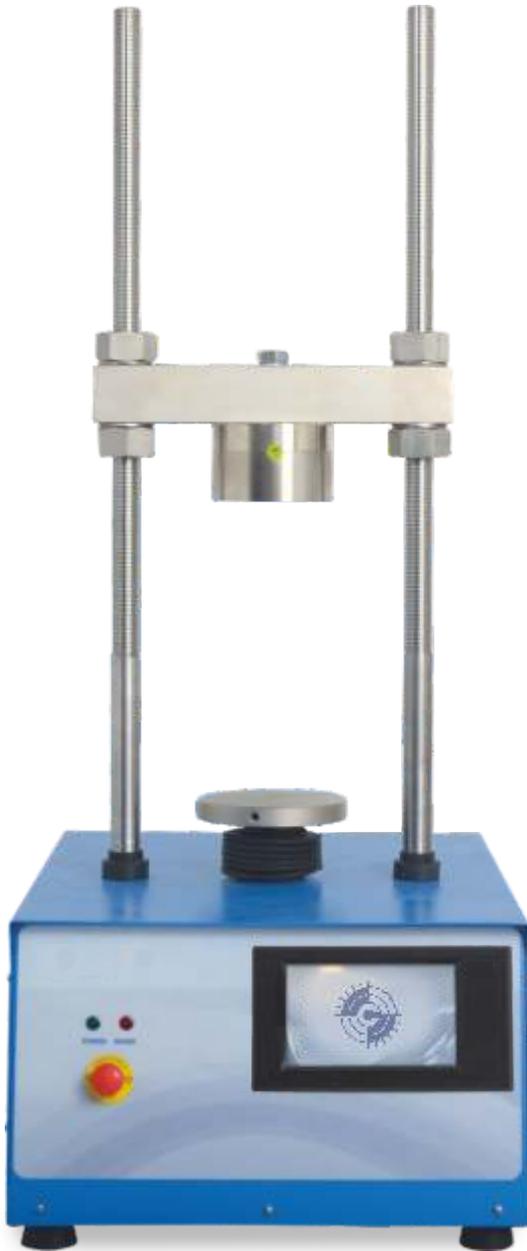
To Perform CBR Tests

CFS-0870	CBR Penetration piston, used to perform CBR tests
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MULTIPLEX MACHINE

Product Code

CFM-0108	Multiplex Machine with Servo Motor and BC100 TFT Graphics Data Acquisition and Control System, 50 kN
CFM-0115	Compression Platens, used to perform uniaxial and unconfined compression tests
CFS-0870	CBR Penetration piston, used to perform CBR tests
CFAS-0057	Breaking Head Stability Mould, cast iron, for 4" (101,6 mm) Marshall Samples
CFAS-0058	Breaking Head Stability Mould, cast iron, for 6" (152,4 mm) Marshall Samples
CFGM-0010	Load Cell, 5 kN



Multiplex Machine is used to make Uniaxial, CBR and Marshall Tests. 50 kN capacity Multiplex Machine is equipped with a servo motor and BC100 TFT graphics data acquisition and control system and capable of doing test with the speed range of 0,00001 mm/min to 51 mm/min suitable for CBR, Marshall, Triaxial and Uniaxial Tests and similar tests with appropriate accessories. CFM-0108 Multiplex Machine is composed by a robust and compact two column frame with adjustable upper cross beam.

Test accessories should be ordered separately according to the test.

Multiplex Machine is supplied complete with

- Load Cell, 50 kN
- Displacement Transducer, 25x0,001 mm

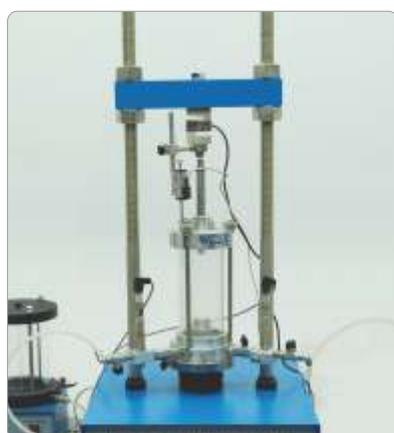
Test Speed	0,00001– 51 mm/min
Capacity	50 kN
Dimensions	550x700x1200 mm
Weight (approx.)	102 kg



Uniaxial

To Perform Uniaxial Tests

CFM-0115	Compression Platens, used to perform uniaxial and unconfined compression tests. Supplied complete with ball seating assembly.
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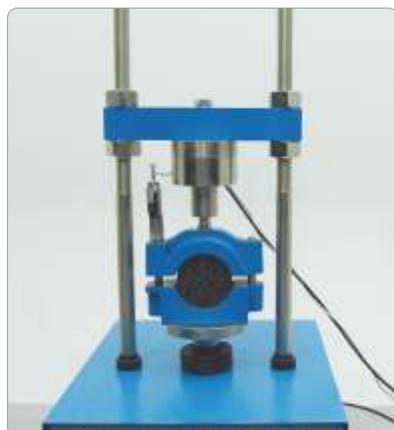


Triaxial

To Perform Triaxial Tests

Product Code	Description	UU	UU-CU CD
CFGM-0010	Load Cell 5 kN	1	1
CFGM-0062	Linear Potentiometric Displacement Transducer, 25 mm	1	1
CFS-0400 CFS-0401	Triaxial Cell**	1	1
CFS-0405	Block with One Connection Line for Triaxial Test Cells	1	-
CFS-0406	Block with 3 Connection Lines for Triaxial Test Cells	-	1
CFGM-0110	Pressure Transducer	1	3
CFS-0408	Oil and Water Constant Pressure System	1	2
CFS-0415	Automatic Volume Change Unit	-	1
CFTG-0320	Static Unilogger 4 Channels	-	1
CFS-0416	Software to Perform UU Triaxial Tests	1	1
CFS-0417	Software to Perform CU-CD Triaxial Tests	-	1
CFS-1330 and CFGP-1140	De-Airing Water Tank, 7 L. and Hose	1	1

* Choose the suitable cell for the specimen size (CFS-0400: 38-50 mm dia. samples / CFS-0401: 70-100 mm dia. samples). For cell accessories, sample preparation accessories and Optional apparatus for de-airing water please see Triaxial Test Systems.



Marshall

To Perform Marshall Tests

CFAS-0057	Breaking Head Stability Mould, cast iron, for 4" (101,6 mm) Marshall Samples
CFAS-0058	Breaking Head Stability Mould, cast iron, for 6" (152,4 mm) Marshall Samples
	Adaptor for Breaking Head



CBR

To Perform CBR Tests

CFAS-0870	CBR Penetration piston, used to perform CBR tests
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