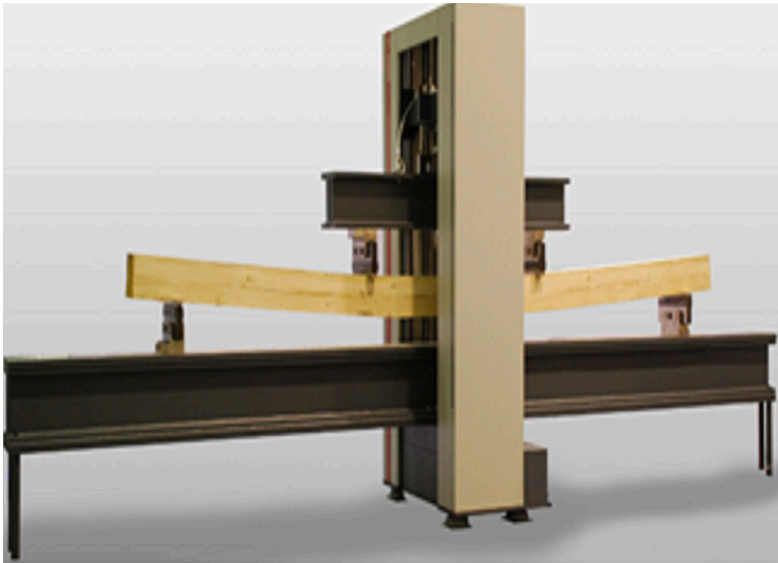




EIE INSTRUMENTS PVT. LTD.
(An ISO 9001:2015 Certified Company)

FLEXURAL STRENGTH TESTING MACHINE - FOR TIMBER - EN 408



As per : EN 408/ASTM D198/ISO 3349/BS 373

General Description

Automatic Servo controlled with Machine for Three- and Four-Point Flexure Testing, Testing Capacity: 300kN.

Capable of conducting compression and flexural tests on concrete, Timber or other building material specimens and allied products of size :

- **(L) 1000mm to 3000mm,**
- **(W) Width 25mm to 250mm and**
- **(H) Hepth 75mm to 600mm**
- Capability to be loaded in load, displacement or strain control basis.
- System accuracy better than + 1%.
- Arrangement for automatic pacing system.

Supplied with windows-based user friendly for Data acquisition and analysis with features for on line graphical presentation in addition to the numerical test results.

Salient Features: -

- Conforming to Testing Procedures laid down in various national and international standards for building material/ concrete/Timber specimen
- Suitable for static tests on rock, concrete, Timber and other building materials.
- Based on SERVO HYDRAULIC CLOSED LOOP FEEDBACK control mechanism
- Fully Computer Controlled operation with User friendly Software
- Controlling on Load or Displacement or user supplied strain gauge (quarter Bridge) or External displacement sensors as mounted on specimen
- High stiffness C Frame Type Flexure loading frame

- High speed Data Acquisition card with 100 kHz sampling rate
- Programmable Rate of Loading (Pace Rate) in all control modes, including user input file for loading/hold/ unloading applications
- Facility to change the parameter like rate of load or rate of displacement without stopping and restarting during testing
- Facility for setup and execution of monotonic, cyclic and user defined test procedures
- 8 Additional input channels for external transducers- 4 channels for Pressure transducers and load cells and four general purpose channels
- Windows based user-friendly Application Software for controlling and data acquisition
- Start, Stop, Hold operation through computer
- Inching/Release operation to set Sample
- Auto release facility after specimen failure
- Facility in the software to study Post failure behaviors of specimens
- Online Plotting of Graphs (Load v/s Displacement, Load v/s Time, Displacement v/s Time) with display of data
- Advance Statistical Analysis
- Safety Limits for Over Load, over travel etc.

Main components

1. Flexure Loading Frame Capacity –

2. Hydraulic Jack

- a) Proportional Valve Plate
- b) Proportional Valve
- c) Load Cell (Compression Type)
- d) Displacement Transducer

3. Hydraulic Power Pack

4. PC Based Control System and Application Software

Detailed Specifications

1. FLEXURE LOADING FRAME CAPACITY – 300 KN

- A free-standing rigid and robust load frame rigid with fixed bottom base frame & fixed cross head with Jack mounted on it.
- Hydraulic Jack along with integral displacement sensor.
- A load cell fitted on jack with testing range from 2% to 100% capacity of machine with a resolution of 0.1kN and accuracy of $\pm 1\%$ of indicated load.
- Suitable to conduct three point and four-point flexural tests on concrete/Timber beams of various dimensions up to (Length 3000mm x Width 250mm x Depth 600mm).
- Capacity of the frame : 300kN
- Ram Travel (mm) : 150mm
- Vertical Clearance : 600mm
- Horizontal Clearance : 4000mm
- Distance between upper roller : 100-1000mm
- Distance between lower roller : 150-3000mm
- Roller Diameter : 38mm Length of Roller : 300mm

2. HYDRAULIC JACK

A piston and rod arrangement with surface finish of 0.2 microns. End plates with PTFE seals and Guide for better side thrust. Inline coaxially mounted LVDT fitted in the Jack to measure displacement of Jack and run the system in displacement control mode.

- Compression Load : 300kN
- Stroke Length : 200 mm

- Operating Pressure : 180 bars Type : Double acting single ended type

a) Proportional Valve Platefitted on the plate.

b) Proportional Valve Make of the valve : HUWADE : 20LPM Max Pressure : 210 Bar

c) Load Cell (Compression Type) : strain gauge-based type load cell with full wheat-stone bridge configuration. Structure of the load cell is such that it can be loaded in compression over few million numbers of times. Of Alloy tool steel, electro less nickel-plated structure for outstanding corrosion resistance.

- Capacity : 300 kN
- Make : Adi-Artech or equivalent
- Full Scale Output : 2.0 mV/V
- Safe overload : 150%
- Operating Temperature : 0 to +60 deg C

d) Displacement Transducer

Actuator with integral displacement sensor which is co-axially fitted to the lower part of the actuator.

Magnetic ring is fixed to the ram of the actuator. Contact less linear position transducer with magneto strictive technology.

Range : 200mm

3. HYDRAULIC POWER PACK

- Compact in design and suitable for the supply of required flow and pressure for the movement of the actuator.
- Includes all the accessories like pressure line filter, return line filter, oil level, relief valve, pressure gauge, digital temperature indicator and air-cooled heat exchanger.
- Anti-vibration mountings provided as standard along with the HPS.
- Flow of the pump : 10LPM
- Motor capacity : 1 H.P.
- Capacity of the tank : 100 litres Max.
- Operating pressure : 350 bars

With necessary cable and fittings for the operation of the machine.

4. PC BASED CONTROL SYSTEM AND APPLICATION SOFTWARE

a)Signal Conditioning & Controlling Unit.

Dedicated servo-controller card for desired processed signal through the P.I.D controller to the servo valve to operate in selected control mode. The parameters like rate of loading, safety limits for load to be programmed through the software. Rate of loading from 0.1kN/sec-20kN/sec in Load control and 0.01mm/sec-1mm/sec in displacement control.

Specifications of Controller ·

- Auto PID operation with Closed loop update rate of 10 kHz to control Pace rate automatically as programmed in the software
- No. of control channels- 4 (Load/Displacement/ Strain/ External LVDT Control) Selection and controlling of multiple frames (Max. up to 4)
- Type of Loading – Static and low frequency cyclic
- High speed Data Acquisition card with 100 kHz sampling rate
- Flexibility to change test mode from load to displacement or vice versa seamlessly any time during the test
- Computerized control operation to Start, Stop & Hold the test system
- Resolution- Load: 0.1kN
- System accuracy- Load accuracy: < + 0.5% of indicated value of load
- Displacement accuracy: + 0.5% of indicated value of displacement

- Displacement Measurement- Through LVDT
- Displacement Range- 50mm
- Displacement Resolution- 0.001mm
- Rate of Loading- Load control – 0.5kN/sec. to 20kN/sec
- Displacement control- 0.01mm/sec to 1mm/sec
- 8 Additional input channels for external transducers- 4 channels for Pressure transducers and load cells and four gener

b) **Computer for Controlling and Data acquisition**

With dedicated computer of following or better configuration with built in data acquisition card. Computer (Make- HP/Lenovo) Intel i5 processor, 500 GB HDD, 4GB RAM, Key Board Optical Mouse, 6USB Ports, 19" LCD Monitor, Deskjet Colored Printer (Make- HP), UPS (Make- APC)

c) **Application Software**

The software package to include test routines for Compression and Flexure tests on concrete/Timber according to relevant standards such as IS, EN, ASTM etc.

Test Software- Salient Features

- Windows based user-friendly software with easy graphical user interface Programmable rate of loading/displacement in load and displacement control i.e., kN/sec. or N/mm²/sec or mm/sec or micro strain/sec. and sample parameters (Shape, Dimension, weight etc.)
- Facility to set up and execution of monotonic, cyclic and user defined test procedures
- Facility to create Test Profiles for different samples
- Provides block programming with sine, square, triangle, ramp, hold, processes, and ability to play digitized profiles
- Facility to change the rate of loading or rate of displacement during the test
- Auto Fast lift operation to adjust the gap
- Autozeroing/ Independent Taring of each channel
- Auto release of machine after sample failure
- To see the post failure behavior of the specimen Computer/Software programmable Safety Limits for Load and Displacement Facility to hold load at desired point and restart the loading during the test.
- Online display of numerical values of Load, Stress and Displacement simultaneously with peak hold facility
- Online plotting of data of Load v/s Time, Displacement v/s time, Load v/s Displacement, Stress v/s Strain graphs
- Real time clock for tracking date, time and runs
- Facility to save test data along with order information about the specimen such as age, specimen no., size, dimensions etc. in user defined file/directory
- Facility to avoid unauthorized use by creating user's password Analysis Software Plotting of following graphs a) Load v/s Time b) Displacement v/s Time c) Load v/s Displacement d) Stress v/s Strain e) Stress v/s Time
- Calculation of various results (Young's modulus, Maximum strain, Compressive Strength, Flexural Strength, Flexural toughness etc.)
- Facility to plot the data for a selected run
- Comparative analysis using multi graphs · Statistical analysis of the test results
- Batch Summary Report Generation
- Detailed Summary Report Generation
- Facility to print Test Reports
- Facility to Export Data to MS Excel

SAFETY FEATURES

The following safety features to be incorporated in the system-

- Over Load protection
- Over Travel protection

- Front door for operator safety
- Low oil level Indicator
- Protection against contamination of oil

Note - The machine will be supplied complete with 1 piece of portable crane hand operated to handle the samples of weight up to 500 kg.

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