



Direct Shear Apparatus

Available Variants

- Motorised Single Speed With Proving Ring And Dial Gauge
- Motorized Single Speed Electronic Digital
- 50 KN Large Electronic Digital With Software
- Hand Operated
- Motorised Twelve Speed With Proving Ring And Dial Gauge
- 50 KN Large With Proving Ring And Dial Gauge

Compliance Standards

IS:2720 (PART 13) 1986
IS:11229 - 1985 (R.A.2020)

IS:2720 (Part 39)
IS 11539

Introduction / Objective

The test covers the determination of consolidated drained or undrained shear strength of a soil material by direct shear. Normal Load, Strain and shearing force are measured directly during the test. Specimen size 60mm square can be tested.

In many engineering problems such as design of foundation, retaining walls, slab bridges, pipes, sheet piling etc. the value of the angle of internal friction and cohesion of the soil involved are required for the design and development. Direct shear test is used to predict these parameters quickly.

The laboratory report cover the laboratory procedures for determining these values for cohesion less soils.

Applications

Direct Shear Apparatus, Large, Motorized, Capacity 50 kN (5000 KGF). For testing sands, gravel, gravelly clays and clay-gravel for use in rolled fill embankments.

Common Salient Features

- Multiple reversal type
- Loading yoke with direct and lever for applying load

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GST TIN No. : 24AABCE4018L1ZU
I.T. PAN No. : AABCE 4018L
IEC No. : 0813026598 Dt. 04/03/2014
CIN No. : U29199GJ2004PTC045078
TAN No. : AHME00572F



- Normal stress capacity 8 Kg/Sq. cm
- Load is applied either directly or through a counter balanced detachable lever
- Provision is made for the load to be applied either through a steel ball recessed in the loading pad or direct through a boss on the pre-calibrated loading yoke
- Loading unit is provided with V-strips and roller strips for frictionless movement of shear box housing

Common Loading Unit

Supplied complete with loading yoke with direct and lever for applying load. Normal stress capacity 8Kg/Sq.cm.

Load is applied either directly or through a counter balanced detachable lever.

Provision is made for the load to be applied either through a steel ball recessed in the loading pad or direct through a boss on the pre calibrated loading yoke.

The loading unit is provided with V strips and roller strips for frictionless movement of shear box housing.

Common Shear Box And Housing Details

Shear box assembly is provided for 60 mm x 60 mm x 25 mm thick specimen.

The assembly consists of two halves of loading pad and one base plate.

The mould / shear box assembly is made of brass or gunmetal as specified for the respective variant and is provided with two porous stones.

The gripper assembly consists of 2 plain grid plates, 2 perforated grid plates, one base plate and one loading pad where specified.

Shear box housing is provided with two ball roller strips.

Specimen cutter is provided as specified for the respective variant.

Common Weight Set

The following set of weights is provided to give normal stress of 3 kg/cm² through lever.

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To Give Kg/cm² Quantity

0.05	4 Nos.
0.1	1 No.
0.2	1 No.
0.5	3 Nos.
1.0	1 No.

Variant-Specific Details

Motorised Single Speed With Proving Ring And Dial Gauge

Salient Features

- Multiple reversal type, Motorized, Single speed
- Electrically operated to give a single constant rate of strain of 1.25mm/min
- Mould assembly made of gunmetal with two porous stones
- Includes Shear box housing, Specimen Cutter of steel, Set of weights to give normal stress of 3 kg/cm² through lever and Loading unit with capacity of 8 kg/cm²
- Supplied complete with 1 No. dial gauge of 0.01mm x 25mm travel
- Also supplied with 1 no. Proving ring of 2.5 KN Capacity with EIE'S Own calibration certificate

Details

Loading unit supplied complete with loading yoke with Direct & Thorough Lever for applying load.

The loading unit has normal stress capacity of 8Kg/Sq.cm.

Specifications

Specification	Details
Normal Stress Capacity	8 Kg/Sq.cm
Shear Box Assembly	For 60 mm x 60 mm x 25 mm thick specimen
Electric Motor	1/2 HP, 1440RPM
Shear Box Assembly	Complete with two halves of loading pad, one base plate

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Specification	Details
Operation On	230 Volts, 50 Hz, AC Supply
Dimensions	38" x 19" x 47"
Weight Approx.	110 kg

Motorized Single Speed Electronic Digital

Introduction

The test covers the determination of consolidated drained or undrained shear strength of a soil material by direct shear.

Normal Load, Strain and shearing force are measured directly during the test.

Specimen size 60mm square can be tested.

The complete system consist of Microprocessor based Touch screen PLC-HMI, Load Frame, Mould assembly or shear box made of brass with accessories, Shear box housing with two ball strips, specimen cutter with set of weights to give normal stress of 3 kg/cm² through lever.

Salient Features

- Password protected operation of touch screen Panel
- The screen displays load, shear stress, horizontal and vertical displacements
- Independent taring and calibration of each Channel
- Facility for selection of measurement unit KN, KG

Load Frame

The Load Frame is silent and rigid to not to transmit any vibration to the sample during the test or cause friction between the loading frame and shear box housing assembly.

The floor mounted Load frame consist of loading head driven by electric motor with gearbox to ensure variable speed from 0.0002mm/min to 1.25 mm/min.

Strain rate will remain constant irrespective of the stress.

2 KN Load cell is used for Load measurement while 2 Nos. 0.001 mm sensitivity LVDT is used for vertical and horizontal measurements.

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The load frame has V-strips on which the shear box housing rests.

The lead screw connected to the shear box housing helps application of shear stress.

Suitable for specimen of size 60 x 60 x 25mm square.

Normal stress is applied to the specimen by utilizing a weight hanger, a lever arm (amplification ratio 10:1) and a vertical loading yoke.

Hanger can receive slotted weights which is amplified by the lever arm and transferred to the specimen by the vertical loading yoke as a normal force up to 3 kg/cm².

The system receives the output signal from the sensors i.e. Load cell and Displacement Sensors attached to the apparatus.

The data of all three channels of Test can be transferred to computer through RS-485 and can be online monitored. Software at extra cost.

Working on 220/230 Volts, AC single Phase.

Shear Box And Housing

It comprises of Shear box assembly, 60 mm square, complete with a U-bracket, guide pins and spacing screws, made of brass.

Gripper assembly consisting of two plain grid plates, two perforated grid plates, one base plate, one loading pad, all made of brass.

Two porous stones, each 6 mm thick are also supplied.

Shear box housing of brass, complete with two ball roller strips.

Specimen cutter and mould extracting tool also supplied along with.

50 KN Large Electronic Digital With Software Compliance Standard

IS:2720 (Part 39) / IS 11539

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Applications

Direct Shear Apparatus, Large, Motorized, Capacity 50 kN (5000 KGF).

For testing sands, gravel, gravelly clays and clay-gravel for use in rolled fill embankments.

Apparatus Details

- Load Frame fitted with a motor, gear box & loading lever system
- Shear Load Capacity: 50 kN (5000 kgf)
- Vertical Load Capacity: 50 kN/m²
- No. of Speeds: 72-ranging from 0.0014 mm/min to 10.16 mm/min
- Change gears: 12
- Shear Box assembly for square specimen size 30 x 30 x 15 cm, 1 off
- Plain gripper plates, 2 off
- Perforated Gripper Plates, 2 off
- Perforated Spacer Plates, 2 off
- Base Plate, 1 off
- Loading Pad, 1 off
- Shear Box housing, large, complete with two ball roller strips, 1
- Suitable for operation on 415 volts, 50Hz, 3 phase, A.C. Supply

Set Of Weights

Weight	Quantity / Details
20 kg	5 off each to give 50kN/m ² (0.5 kg/cm ²)
10 kg	2 off each to give 25kN/m ² (0.25kg/cm ²)

Construction Details

In addition to other components like shear box assembly, Gripper assembly, porous stones, plain grid plates, perforated grid plates, loading pads, specimen cutter, set of weights, shear box housing, loading unit as per the conventional instrument, the Electronic Digital Direct Shear Machine is fitted with following additional electronics components.

- Large on-board LCD Screen display
- Direct entry via touch sensitive keyboard
- Facility to start or stop the complete instrument from software itself
- User can control and vary the Motor Speed from the software itself
- Pause and speed reset during the test

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Software Features

- On-Line Data Acquisition Software
- On-Line Data Transmission from Signal Conditioning Unit to Computer
- Off-Line Data Analysis Software that does all the Calculations of Direct Shear Test
- Has option for manual as well as automatic recording of data
- Calculates Area, Volume, Bulk density, Dry density, Moisture content etc. of the specimen
- Easy to set up and conduct the test
- Company logo and address on welcome screen
- Password protected login screen
- Software automatically detects the available Communication Ports (com-ports) to establish RS-232 connection
- Facility to identify and display true/false com-port connection by green or red lamp indication within the software, Eliminating human error
- User can enter new party name and address details to save all test specific information for later work
- Previously stored party name and address details can also be loaded by browsing directory of stored data
- An operator can feed in various input information about the test sample
 - Test no.
 - Test Material
 - Sample type
 - Test Speed
 - Date & Time
 - Density of test sample
 - Sample weight
 - Moisture content
 - Location of test sample
 - Area correction option
 - No. of tests
- Large on-board LCD Screen display
- Direct entry via touch sensitive keyboard
- Facility to start or stop the complete instrument from software itself
- User can control and vary the Motor Speed from the software itself
- Pause and speed reset during the test
- Self test diagnostic features
- Facility to select the specimen type: Square or circular
- Facility to select the area correction option: Yes or No
- Facility to select the type of sample: Drain or Undrain
- Real time graph building during the specific test
- Can store the data of previous test for future use

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Software Graphs And Results

- Horizontal Displacement vs Shear Force
- Horizontal Displacement vs Vertical Displacement
- Normal stress vs Shear Force
- Display maximum value of the Dilation Angle along with C & ϕ Values
- Four different graph windows on a single screen for a specific test sample
- Four different readings for each test so each reading can be compared in real time
- Last graph displays the overlap of three different readings for easy comparison
- Tabulated test data, graphs and all test-specific calculations are provided in real time, allowing the operator to monitor tests in process
- Automatic calculation of Friction Angle & Cohesion Intercept for Peak & residual values
- Can export logged readings easily to Excel or PDF file
- Compatible with most soil & rock direct shear test system
- Facility to represent results in 2 different units
- MKS - METER, KILOGRAM, SECOND SYSTEM
- FPS - FOOT, POUND, SECOND SYSTEM
- An operator can change the background of the software
- An operator can also add or remove the specific parameters within the software as per the requirements

Hand Operated

Details

The apparatus comprises of the following:

Loading Unit

Supplied with loading yoke with direct and lever for applying load.

Normal stress capacity 8Kg/Sq.cm.

Load is applied either directly or through a counter balanced detachable lever.

Provision is made for the load to be applied either through a steel ball recessed in the loading pad or direct through a boss on the pre calibrated loading yoke.

The loading unit is provided with V strips and roller strips for frictionless movement of shear box housing.

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Consists of loading unit, shear box assembly for 60 mm x 60 mm x 25 mm complete with two halves of loading pad, one base plate.

All made of gunmetal with two porous stones.

Shear box housing of gunmetal, specimen Cutter of steel with set of weight to give normal stress of 3 kg/cm² through lever.

Weight Set

To Give Kg/cm² Quantity

0.05	4 Nos.
0.1	1 No.
0.2	1 No.
0.5	3 Nos.
1.0	1 No.

Complete set as above but without proving ring and dial gauge.

Motorised Twelve Speed With Proving Ring And Dial Gauge

Objective

In many engineering problems such as design of foundation, retaining walls, slab bridges, pipes, sheet piling etc. the value of the angle of internal friction and cohesion of the soil involved are required for the design and development.

Direct shear test is used to predict these parameters quickly.

The laboratory report cover the laboratory procedures for determining these values for cohesion less soils.

Salient Features

- Aesthetical appearance
- Powder coated exterior body
- Tactfully designed complete system
- Multiple reversal type system

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- Motorized, Twelve speed design
- Electrically operated to give twelve different constant rate of strain at 1.25, 0.625, 0.125, 0.05, 0.01, 0.005, 0.002, 0.001, 0.0004 and 0.0002mm/min.
- Supplied with loading yoke with direct and lever for applying load
- Normal stress capacity 8 Kg/Sq. cm
- Load is applied either directly or through a counter balanced detachable lever
- Provision is made for the load to be applied either through a steel ball recessed in the loading pad or direct through a boss on the pre-calibrated loading yoke
- The loading unit is provided with V-strips and roller strips for frictionless movement of shear box housing
- Suitable for operation on 230 Volt, 50 Hz, Single Phase, A.C. Supply

Accessories

1. Loading unit with normal loading of 8 kg/cm² on 60 mm square specimen
2. Shear box assembly for 60 mm x 60 mm x 25 mm thick specimen
3. Shear box housing, complete with two ball roller strips, made of gunmetal material
4. Two porous stones, each of 6 mm thick, fitting to the shear box
5. Gripper assembly consisting of 2 plain grid plates, 2 perforated grid plates, one base plate and one loading pad, all made of gunmetal
6. Specimen cutter for a specimen size of 60 mm square & 25 mm thick specimen
7. Set of weight to give normal stress of 3 kg/cm² through lever

Complete With

- Dial Gauge of 0.01 mm x 25 mm travel
- High sensitivity proving ring - 200 kg fitted with 0.002 mm dial gauge with our own calibration certificate in a case

Specifications

Specification	Details
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Overall Dimensions	1120 X 480 X 1220 MM
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Weight Approx.	130 kg (Uplacked)
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50 KN Large With Proving Ring And Dial Gauge

Apparatus Details

- Load Frame fitted with a motor, gear box & loading lever system
- Shear Load Capacity: 50kN (5000kgf)

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- Vertical Load Capacity: 50 kN/m²
- No. of Speeds: 72-ranging from 0.0014 mm/min to 10.16 mm/min
- Change gears: 12
- Shear Box assembly for square specimen size 30 x 30 x 15 cm, 1 off
- Plain gripper plates, 2 off
- Perforated Gripper Plates, 2 off
- Perforated Spacer Plates, 2 off
- Base Plate, 1 off
- Loading Pad, 1 off
- Shear Box housing, large, complete with two ball roller strips, 1

Set Of Weights

Weight	Quantity / Details
20 kg	5 off each to give 50 kN / m ² (0.5 kg/cm ²)
10 kg	2 off each to give 25 kN / m ² (0.25 kg/cm ²)

Supplied With Following Accessories

- High sensitivity Proving Ring for shear load measurement, capacity: 50kN (5000 kgf), one
- Consolidation Dial Gauge 0.01 mm x 25 mm, one
- Strain Dial Gauge 0.01 mm x 25 mm with magnetic spacer, one
- Suitable for operation on 415 volts, 50 Hz, 3 phase, A.C. Supply

Specifications

Specification	Details
Weight Approx.	1500 kg
Dimension (L x W x H)	82" x 26" X 66"

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