

**Technical Specifications of Electronic Direct Shear Apparatus (IS 2720-Part XIII) and  
Motorised Sample extruder**

Technical specification of Direct shear instrument capable of measuring shear strength of sand, compacted clay specimens, as well as interfacial adhesive strength between different materials are as below:

1. The instrument should have a load sensor and two displacement sensors for vertical and horizontal displacements
2. The instrument should have Digital display showing displacement and load measurements
3. The instrument should have a Multiple User software capable of plotting shear stress variation with respect to increase in normal stress, Horizontal Displacement versus Shear force etc.
4. The instrument must be supplied with all the accessories for sample preparation and extrusion such as standard shear box of 60X60X25 mm dimension, specimen cutter 60X60X25mm, grid plates, loading cap, guide pins, weights etc.(Conforming to IS 2720-part XIII)
5. The instrument should have a Touch panel display unit for programming each test and should have a Ethernet for online transfer of data to a computer.

6. The instrument should have motor driven speed gear drive capable of attaining following strain rates i.e. 1.25, 0.625, 0.25,0.125, 0.05, 0.025, 0.01, 0.005, 0.002, 0.001, 0.0004, and 0.0002 mm/min

**Technical specification of Electronically operated Hydraulic Sample extruder is as follows**

1. The instrument should be capable of extracting specimen from specimen cutter of (60X60X25 )mm size
2. The instrument should be supplied along with all standard adopter plates and adopter tubes.

**General Specifications of Digital Direct Shear Apparatus and Motorised Sample extruder.**

1. The equipment must be installed by the technical persons of the vendors.
2. Proper demonstration and training should be given to the users by the application engineer after successful installation by the well-trained service engineer.
3. All the necessary accessories should be provided.
4. The list of at least five users of quoted model installations in India including contact details (name of the person-in-charge, email and phone number) is to be provided. This information will be used for obtaining technical and after sales support of the bidder..
5. There must be a local Service Centre in Chennai or nearby cities in India. The downtime should not be more than 36 hours. Detail of service persons to be provided during bid submission.
6. Payment conditions: 90% on delivery and 10% after installation and demonstration
7. The system should be delivered within 16 weeks from the opening of the letter of credit or issue of the purchase order, whichever is later.
8. Individual costs should be indicated for the different items (parts) quoted. IIT Madras reserves the right to exclude some items from the purchase. Items must be quoted separately.
9. Costs and related information should be given only in the financial bid.