

Annexure-I Specifications

2D Digital Image Correlation system with associated accessories, electronics and Software for geotechnical testing

2D Digital Image Correlation System for Displacement and Strain Measurements for the following applications: -

Test Requirements:-

Test 1:- Shaking Table:-

The Sand Particles will be filled and tested in a transparent container.

- Dimensions/Field of View:- 1.4 m x 1 m (X × Y)
- Strain Resolution:- 25 $\mu\epsilon$ or better
- Frequency :- 5 Hz (Maximum)

Test 2:- Landslide Tests:-

Flow of soil particles in landslide test tank

- Dimensions/Field of View :- 5 m × 1.5 m (X × Y)
- Strain Resolution:- 25 $\mu\epsilon$ or better

Test 3:- Concrete Block under static loading:-

- Dimensions/Field of View :- 150 × 150 mm (X × Y)
- Strain Resolution:- 25 $\mu\epsilon$ or better
- For the test requirements, In Plane Displacement Resolution:- 20 Microns or better
- Camera distance: Minimum 2m
- The experimental measurement performed with full field modal analyses capability with 100 – 1 fps camera.

Technical Specifications

A. HARDWARE:-

1. Camera: 2 numbers

The Camera should not have any Image Intensified Circuit and should be tested and proven for DIC Measurements

Only CMOS Cameras are to be quoted.

2. Interface: USB 3.0 or suitable communication port
3. Lenses = Suitable lenses to cover the test requirements as detailed at “Test Requirements”. The vendor must specify the selection, application of lenses and calibration required to cover the test requirements.
4. The cameras and lenses must be protected from dust. The cameras and lenses must be supplied in a hard carry case.
5. Light Source: Minimum 2 High Intensity white LED’s with good mounting stands to uniformly illuminate the surface without heating the specimen/structure. LED must have illumination control. Color Temperature range, 3200K to 5600K. Operating voltage, 100 to 240 VAC, 50/60 Hz
6. Mounting Tripod for mounting the supplied cameras. Height, minimum 35 cm and maximum 200 cm. The tripod system should have vibration absorption characteristics
7. Laptop Computer, 2.9 GHz, i-7 processor, 256GB SSD, 1TB HDD, 16 GB RAM, W10-64 Bit, MS Office, USB 3.0 Ports and other standard accessories to confirm full performance DIC
8. USB Data Acquisition Module to capture analog inputs along with the images.
 - a. No Of Channels = 4 (minimum).
 - b. 16 Bit ADC, 100 ks/s.
 - c. USB Interface
9. White spray Cans (minimum 350 ml) – 10 nos.
10. One Speckle Kit –Set of Rollers and Stamp Pads

II Complete 2D DIC Software with the following features:-

1. The DIC should be capable of carrying out calibration and measurements through a Perspex or glass window of testing specimens under dry-wet condition
2. Image Capture for the supplied camera: - Manual, Time, Images in block as per frame rate, variable time capture and Analog Capture.
3. Indication in color code if the image is focused and the noise levels.
4. Indication in color code if the image is uniformly illuminated.
5. Capture of external analog signals with the images – synchronization with Shaking table, UTM using USB/BNC cable system

III. Parameters to be measured.

- i) In-plane displacements X and Y Directions.
- ii) Strains: ϵ_{xx} , ϵ_{yy} , γ_{xy} , Principal, Von Mises and Tresca strains.- Resolution of Strain Measurement – 25 $\mu\epsilon$ or better.
- iii) Displacement, velocity of flow of the Sand Particles.

IV. Output

1. Strain Computation Algorithms:- Lagrange , Hencky, Euler-Almansi, Log Euler-Almansi, Engineering and Biot.
2. Time Filters to filter out noisy data. Option should be provided to create separate Time Filtered Variable
3. Indication of the appropriate subset size to be selected.
4. Profile over a line, point or area measurement.
5. Computation of statistical data: mean, median, min., max., standard deviation and any other .etc.
6. Export of plot and data to MATLAB/Lab view
7. Extrapolation of the data from the correlated displacement / strain data to the edge of the AOI.

Manual

- Operation, maintenance, and technical manuals must be supplied in two sets of both hard copy and soft copy for DIC system (i.e. for Hardware and Software).
- All software's must be supplied on CD/DVD

Software Licenses:

1. License : 1 perpetual license for data acquisition and post processing of data with USB dongle

Terms and Conditions

- The system should be installed and commissioned by the supplier at CBRI by company trained and experienced Engineers in the field of DIC.
- Warranty: 3 YEARS from the date of installation at CBRI
- Delivery: Within 3 Months from the date of placing of confirmed order
- Installation and Training to be provided at CSIR-CBRI at no extra cost

Vendor Qualification Criteria:

- 1) Minimum one Installation in India – Research Labs / DRDO / CSIR /IIT/ NIT

For the above the vendor has to provide the name of the user and email id and published technical papers by authors from above users / India.