## Consolidation

Ref. Standards : IS:2720 (Part-XV), IS:12287, BS:1377, ASTM D2435

Consolidation of clay deposit leads to distress in buildings such as cracks and failures. Consolidation is reduction of volume of soil due to expulsion of water from its pore space caused by sustained loading. This phenomenon is time dependent. The one dimensional consolidation test performed on an undisturbed sample of clay is useful for understanding the history of the soil deposit. The test results can be used for calculating the settlement of structures built on clayey soil.

### Consolidation Apparatus :

AIM 125, AIM 125-1, AIM 126, AIM 126-1, AIM 127, AIM 127-1, AIM 127-2, AIM 127-3, AIM 129, AIM 129-1 AIM 129-2, AIM 129-3 & AIM 10125

The standard outfit comprises of a fixed ring type of consolidometer cell for testing specimens of 60 mm dia x 20 mm thick, but the unit is so designed that specimens of varying sizes from 50 mm dia to 100 mm dia can also be tested. Besides, the same loading unit can be used with floating ring consolidometer cells, which are supplied at extra cost.

The standard outfit is supplied with a set of weights to give a total pressure of 10 kg/cm$^2$ (besides a seating load of 0.05 kg/cm$^2$ on the specimen), but an additional set of weights is required to reach the full capacity of 20 kg/cm$^2$.

The necessary accessories to perform the permeability test of the 'Varying Head' type can also be provided at extra cost. The outfits for three-gang and six-gang are available in which three / six consolidometers can be mounted on a single frame. The consolidation may be measured by the conventional dial gauges or using the transducers and electronic readout unit.

### Electronic Measurement System :

- Digital readout reduces the possibility of operator error.
- Direct reading in mm.
- Plug-in transducer module system.
- Facility for connecting readout unit to compatible logging or printing system.
- Compatible to existing Aimil Models.

Electronic measurement of the vertical consolidation of soil specimen, using a displacement transducer connected to a precalibrated readout unit, offers the operator all the advantages of a digital display without the errors which can occur while reading conventional dial gauges.

The basic equipment for monitoring the test comprises of a readout unit and a transducer module for connection to a consolidation frame. Consolidation is measured by mounting the transducer in the same position as a conventional dial gauge. The movement of the transducer stem performs exactly the same function as would the dial gauge spindle and the output is converted into an electrical signal. The signal is then displayed in true engineering units on the readout unit. For three gang unit or six gang unit, 3 or 6 transducer modules are used, but the readout unit is of three or six channel type.

AIM 125

AIM 126-1

## "GeoStar" the Geotechnical Software for Testing, Analysis and Reporting

AIM 10125

### The analysis and reporting of following Tests can be performed

- Unconsolidated Undrained Triaxial Test
- Consolidated Undrained Triaxial Test
- Consolidated Drained Test
- Direct / Residual Shear Test
- CBR Test
- One Dimensional Consolidation Test

These package of softwares are supplied as required by the purchaser and are accessed by an activation license supplied by Aimil, allowing the customer to build up a suite of software on an "as required basis" depending upon the need.

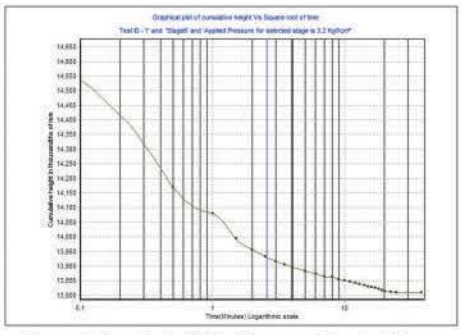
### Common Features for all the tests:

- The Software allows selection of British / Indian Standards for analysis as required.
- Tests can be performed in SI, Imperial or metric Units
- Clear and easy to use. Test information is presented on menu driven screen.
- Each package guides through the test procedure in a very user friendly way.
- A database is set up to store and manage completed analysis records. Currently MS – Access is offered as default database. For other database systems like SQL etc.. such third party license is required to be obtained by the user.
- The software directly reads the data format for analysis from StarDAQ
- An option to enter the data manually and save it in a format understood by "GeoStar" makes the system so flexible for those, who have only the experimental setup without the automatic Data Acquisition or Data logging system.
- Extensive search functions are available based on Date of Analysis, Analysis done by different user accounts, or search based on duration etc. For easy retrieval of old data.
- The default reports are generated automatically, in crystal reports and can be printed directly. The reports can also be exported to Word, Excel or pdf formats and the usage is governed by the third party license that are available with the users.
- Customisable Report Header / Footer.
- The inbuilt utilities include Master Unit Converter, Unit conversion Calculator, besides the normal and Scientific system calculators.
- Database back up and restore facilities are available.
- Complete User activity logging is available.

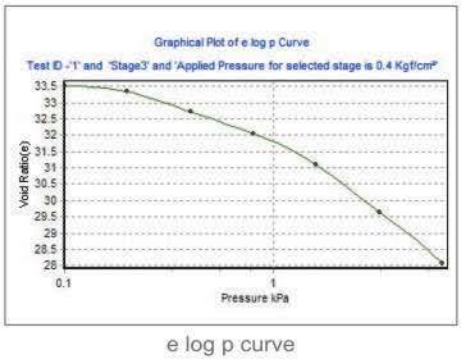
### Special features & graphs available with consolidation software :

- Calculate dry density, initial void ratio and moisture content of specimen
- Calculate the pre consolidation pressure of the soil
- Software should be user friendly with option for manual as well as automatic recording system
- Plot time Vs Deformation readings and give the value of $t_{50}$
- Plots void ratio Vs effective stress increments. It should the Cc, Mv, Av, Cv and Cs values for the desired loading cycles

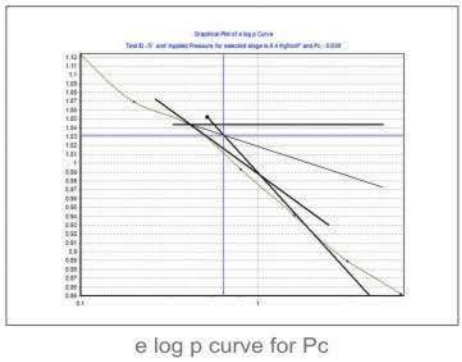

'GeoStar' Welcome Screen



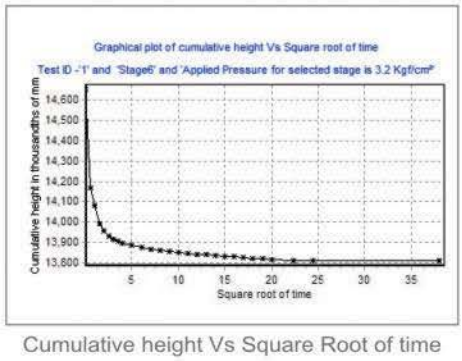
Cumulative height Vs Square Root of time




e log p curve



e log p curve for Pc




Cumulative height Vs Square Root of time

**Consolidation Apparatus :** The constituents of various models are detailed in the table.

| | AIM 125 Single gang | AIM 126 3-gang | AIM 127 Single gang Electronic | AIM 129 3-gang Electronic | AIM 127 - 1 Single gang Electronic with DAQ & Software | AIM 129 - 1 3 - gang Electronic with DAQ & Software |
|---|---|---|---|---|---|---|
| No. of Loading Units mounted on frame | 1 | 3 | 1 | 3 | 1 | 1 |
| AIM12502 Consolidation Cell Assembly consists of the following : | | | | | | |
| AIM 1250201 Fixed ring with Guide ring | 1 | 3 | 1 | 3 | 1 | 3 |
| AIM 1250202 Top Porous stone | 1 | 3 | 1 | 3 | 1 | 3 |
| AIM 1250203 Bottom Porous stone | 1 | 3 | 1 | 3 | 1 | 3 |
| AIM1250204 Pressure Pad | 1 | 3 | 1 | 3 | 1 | 3 |
| AIM 1250205 Channelled base with water inlet | 1 | 3 | 1 | 3 | 1 | 3 |
| AIM 1250206 Gasket | 1 | 3 | 1 | 3 | 1 | 3 |
| AIM 1250207 Water Jacket | 1 | 3 | 1 | 3 | 1 | 3 |
| AIM 12503 Set of weights : 7 x 0.05 kg/cm$^2$ 5 x 0.1 kg/cm$^2$, 6 x 0.2 kg/cm$^2$, 6 x 0.5 kg/cm$^2$, 5 x 1.0 kg/cm$^2$ | 1 | 3 | 1 | 3 | 1 | 3 |
| AIM 12504 Water Reservoir with plastic tube, T - connection and a pinch cock | 1 | 3 | 1 | 3 | 1 | 3 |
| AIM 070 Dial Gauge, 5 mm travel, 0.002 mm least count | 1 | 3 | - | - | - | - |
| **Electronic Instrumentation System** | | | | | | |
| AIM 12801 Displacement sensor, 0-20mm complete with 3 m long cable (side entry) mounting bracket | | | 1 | 3 | 1 | 3 |
| Consolidation Indicator, Single channel | - | - | 1 | - | 1 | - |
| AIM 13001 Consolidation Indicator, Three channel | - | - | - | 1 | | 1 |
| **StarDAQ** | | | | | | |
| AIM 101 Aimil Data Acquisition System | | - | - | - | 1 | 1 |
| AIM 10125 GeoStar Analysis and Reporting Software Module for One Dimensional Consolidation (Odeometer) Test for single user license | | | - | - | 1 | 1 |

**Note:** Consolidation Apparatus with six cell will be provided on request.

### Ordering Information:

| | |
|---|---|
| **AIM 125** | Consolidation Apparatus, Single gang |
| **AIM 125-1** | Consolidation Apparatus, Single gang, New Bench Model, Analogue |
| **AIM 126** | Consolidation Apparatus, Three gang |
| **AIM 126-1** | Consolidation Apparatus, Three gang, New Bench Model, Analogue |
| **AIM 127** | Consolidation Apparatus, Single gang, Electronic |
| **AIM 127-1** | Consolidation Apparatus, Single gang, Electronic with StarDAQ & Software |
| **AIM 127-2** | Consolidation Apparatus, Single gang, New Bench Model, Electronic |
| **AIM 127-3** | Consolidation Apparatus, Single gang, New Bench Model, Electronic with StarDAQ & GeoStar |
| **AIM 129** | Consolidation Apparatus, Three gang, Electronic |
| **AIM 129-1** | Consolidation Apparatus, Three gang, Electronic with StarDAQ & Software |
| **AIM 129-2** | Consolidation Apparatus, Three gang, New Bench Model, Electronic |
| **AIM 129-3** | Consolidation Apparatus, Three gang, New Bench Model, Electronic with StarDAQ & GeoStar |
| **AIM 10125** | GeoStar Analysis and Reporting software Module for one dimensional Consolidation (Odeometer) Test for single user license |

**Note:** As per BS/ASTM is also available.

### Optional Extras :

| | Specimen Size | | | |
|---|---|---|---|---|
| | 60mm dia x 20mm thick | 50mm dia x 20mm thick | 70mm dia x 20mm thick | 100mm dia x 25mm thick |
| Consolidation Cell Assembly : Complete with Fixed Ring, Guide Ring, Pair of Porous Stones, Perforated Pressure Pad, Chanelled Base, Gasket and Flanged Water Jacket | AIM 12502 | AIM 12511 | AIM 12512 | AIM12513 |
| Set of Weights to give 10 kg/cm$^2$ Pressure (Comprising 29 assorted weights) | AIM 12520 | AIM 12521 | AIM12522 | AIM 12523 |
| Floating Ring type Consolidometer : Consolidation Cell Assembly complete with Fixed Ring and Guide Ring, Pair of Porous Stones, Pressure Pad and Cutting Collar | AIM 12530 | AIM 12531 | AIM 12532 | AIM 12533 |
| Set of Weights to give 10 kg/cm$^2$ Pressure (Comprising 10 weights of 1.0 kg/cm$^2$ ) | AIM 12540 | AIM 12541 | AIM 12542 | AIM 12543 |
| Varying Head Stand Pipe 50 cm long with mm scale | AIM 12550 | AIM 12550 | AIM 12550 | AIM 12550 |
| Water Trough | AIM 12560 | AIM 12560 | AIM 12560 | AIM 12560 |
| Specimen Cutting Ring | AIM 12570 | AIM 12571 | AIM 12572 | AIM 12573 |