

# AUTO DENSITY GRADIENT APPARATUS

3 COLUMN DGA & 6 COLUMN DGA (RR/DGA)

# AUTO DENSITY GRADIENT APPARATUS

The **Advanced Auto Density Gradient Apparatus** from Ray-Ran has become the world's benchmark for accurate density measurement of small solid specimens using the column method. Built with operator simplicity in mind, its ease of operation and high accuracy makes it ideal for product development and quality control within production, research and development labs and teaching institutions.

Offered as a **3 or 6 column version**, the built-in on-board Microprocessor System accurately calculates the specimen's density to a resolution of 0.0001g/ml more quickly and more accurately by measuring the samples position in the column relative to the calibrated marker floats. Once the correct position of the sample is recorded the density is displayed on the LCD screen. Column linearity can also be checked and shown in **Techni-Test**.

The on-board liquid crystal display (LCD) provides simple on-screen instruction and using the alpha/numeric keypad test parameters such as operator list, material reference numbers and batch numbers can be entered and stored for results presentation. Batch statistics of mean, standard deviation and co-efficient of variation are automatically updated after each test and results are shown in graphical and



tabular format for analysis when downloaded to the supplied **Techni-Test Software**.

For results accuracy the Density Gradient Apparatus is supplied with built in digital temperature control to ensure the temperature of each column is at 23°C +/- 0.1°C. For ambient temperatures in excess of 23°C the integrated cooling coil can be used in conjunction with an optional water chiller unit so the correct temperature can be maintained. This can be even more accurately controlled using the optional microprocessor-controlled water flow valve kit.

Test results are displayed in g/cm<sup>3</sup> which can then be downloaded via the on-board USB or Ethernet connection to Ray-Ran's dedicated **Techni-Test Software** where results are displayed in graphical and tabular form. CSV files of the results can also be saved which can be exported into other user programs for generating test reports.

To build a column a peristaltic pumped filling system is supplied with the apparatus. Column filling speeds are variable from 0.5ltrs/hr to 1.5ltrs/hr. The resulting solution has a density which when introduced into the column increases uniformly from top to bottom. Calibrated glass marker floats with known densities are introduced into the column and sink to a point where

their density matches the solution. A linear encoder which is attached to a trammel guide is used to calibrate the gradient of the column by focusing the optical microscope onto the centre of the calibrated float and entering the floats density value into the microprocessor. Once test samples have been introduced into the column and have reached a point of static equilibrium they are accurately sighted using the microscope. The resultant density of the sample is obtained and displayed on the LCD without the need for complicated graphs. An automatic sweep mechanism is used to extract the floats and samples from each column.

## 3 COLUMN DGA & 6 COLUMN DGA (RR/DGA)

### TECHNICAL SPECIFICATION

- Automatic density calculation
- Automatic calibration system
- LCD display
- Resolution 0.000001 g/ml
- Accuracy 0.0001 g/ml
- Backlight
- Variable speed pumped filling system
- Twin conical filling flasks
- Automatic magnetic stirrer
- Automatic sweep mechanism
- Stainless steel sweep baskets
- 7x optical microscope
- Digital temperature control to 0.1°C
- Mini USB port
- Cooling coil
- 110v 60hz and 240v 50Hz
- Product user manual
- Traceable calibration certificate
- CE declaration certificate
- 1 year return to base warranty
- Conforms to ISO1183 & ASTM D1505

### OPTIONAL ANCILLARIES

- Thermal Printer
- Water chiller unit
- Glass marker floats 0.7g/ml up to 2.2g/ml
- Microprocessor controlled filling system

### WEIGHTS & DIMENSIONS: AUTO DENSITY GRADIENT APPARATUS

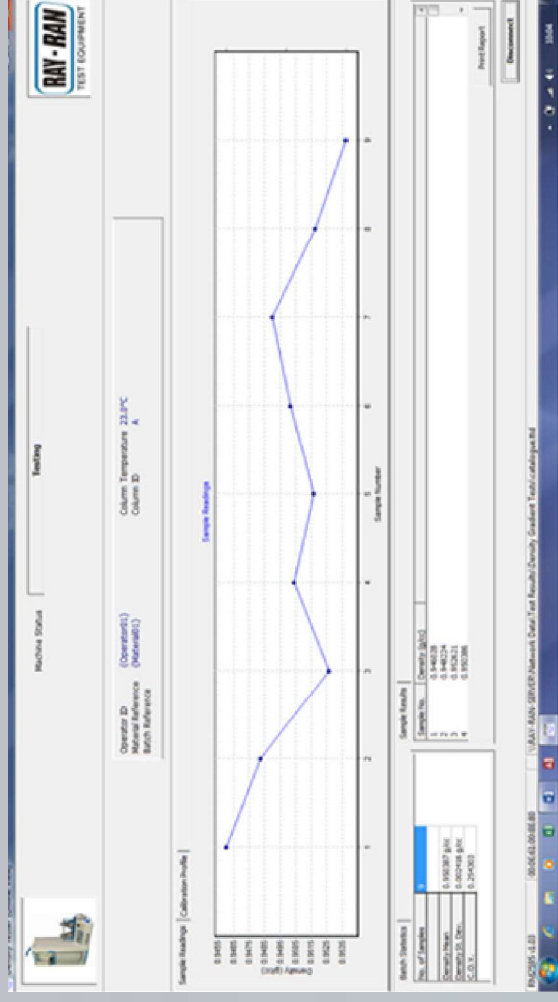
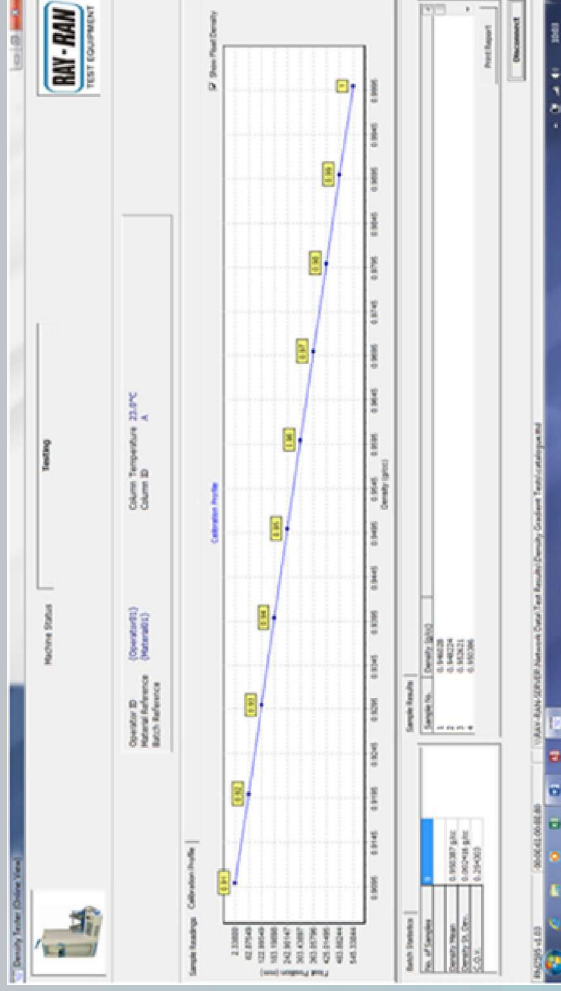
	3 COLUMN DGA	6 COLUMN DGA
Net Weight (kg)	70	80
Width (cm)	85	120
Depth (cm)	40	40
Height (cm)	110	110



# DENSITY MEASUREMENT MADE SIMPLE WITH TECHNI-TEST

**Techni-Test** is an easy to use software package supplied with the **Advanced Density Gradient Apparatus** which allows user defined test data to automatically download from the apparatus for report information and for the operator to analyse all aspects of the Density test.

From the graph each density reading is clearly identified giving accurate data point analysis of the materials under test. Placing the cursor over each plotted point the Density value can be read on the screen. Density results are also shown in tabular form. Test reports can be printed from the main screen when required by selecting the Print Report dialogue box to print the report. Batch statistics such as Mean, Standard Deviation and Co-efficient of Variation (COV)



are also displayed and are updated after each test result is downloaded. By selecting the tabs you can select between the test results data and look at the linearity of the column that's been calibrated.

In Test Results Viewer mode users have the ability to upload saved results from previous test for Material Comparison, Data Manipulation or File Export. Abnormal results that could be caused by air or dust particles are clearly identified and can be removed from the test data bringing the batch statistics into a normal range ensuring that the test procedure does not have to be repeated saving time and material. Exporting the results file in Viewer Mode is simple. The Export file format is .CSV and can be opened with Microsoft Excel.