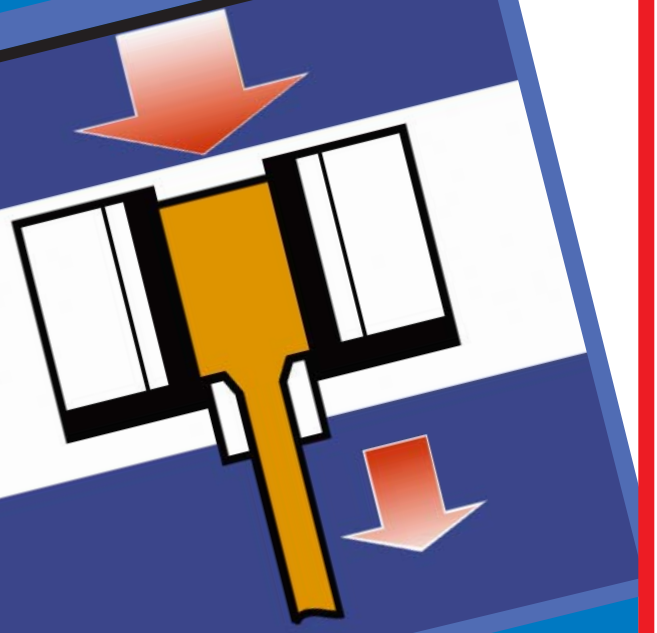
CEAST 50 years 1953 - 2003

DENSITY METER



CEAST

DESIGN AND PRODUCTION OF INSTRUMENTS AND APPARATUS FOR QUALITY CONTROL ON MATERIALS

These instruments are made in compliance with CE health and safety requirements

CE

Density Meter - code 6007.000

Thermostatic device and stirrer

Introduction

The gradient column method accurately determines the density of small solid specimens in any form - e.g. sheet, film, granule, powder etc. This method is also used in marine biology to determine the density of fish eggs.
A graduated glass tube is filled with two miscible solutions. The resulting mixture varies at a linear rate with the lowest density at the top of the tube and highest at the bottom. Calibrated glass maker floats of precisely know density are introduced into the column and sink to a point where their density matches that of the solution.
The column is calibrated by graphical or statistical methods. The column tubes are graduated in 2 mm divisions over a length of 700 mm, so that with a density range of 0.1 cm 3 each graduation would represent 0.0003 cm 3 .
A sample of unknown density is introduced into the column and allowed to reach equilibrium. The measurement of its height in the tube with reference to the marker floats gives a measure of its density.
Independent tests have shown that, depending on use, the density distribution of the gradient can remain usable for up to 40 weeks.

Standards

The instrument was manufactured according the following standards
ISO 1183 - BSI 3715
and others equivalent.

CEAST Density Gradient Apparatus

Two graduated glass tubes are housed in a cylindrical Perspex water jacket, mounted on a base board. A solid state thermoregulator, with a ten turn dial mechanism enables the test temperature to be set to 0.1°C with ease. A continuously rated circulator, and a circulation tube which reaches to the bottom of the jacket ensures a closely controlled temperature over the whole length of the column. A chromium plated copper cooling coil is also fitted.
The use of two columns facilitates the testing of a wide range of materials in one apparatus. Alternatively when test frequency is high, two similar columns aid sample identification and will enable the testing to continue while one column is being refilled.
If low temperatures are required, as in marine biology one column tube may be replaced by a refrigerated dip cooler. The circulation tube is black and is fitted with translucent white side panels to give a background when sighting the samples. By varying the sighting angle a contrasting background is obtained for light or dark samples. A back light may be added when testing clear film. Both the column clearing device and the gravity filling apparatus are securely fixed to the circulator-control box with a single wing nut fitting when in use and connected via a shuttered mains outlet at the rear of the box.

Filling Equipment

The Ceast Gradient Filling Platform connects on to both the two column units. The magnetic stirrer motor is housed in a white stove enamelled aluminium case which forms the platform for the two interconnected conical flasks, one of which contains a glass enclosed magnetic stirrer bar. Two nylon screw pinchcocks are fitted for controlling the liquid flow through silicone rubber tubes into a P.T.F.E. filling tube. The use of pinchcocks and silicone rubber tubes eliminates problems caused by blocked and leaking glass taps, or contamination of the solutions by tap grease. The conical flasks are retained on the platform by a Perspex plate with plastic straps which locate in the lip of the platform ends. An on/off neon indicator switch and 5 amp fuse are fitted. To prepare a column both cocks are closed. The front flask, which contains the stirrer, is filled with a low density solution and connected to the Both solutions should be miscible. The interconnecting cock is opened to obtain hydrostatic equilibrium. When the outlet cock is opened the light solution flows through the filling tube to the bottom of the column tube. Equilibrium is maintened by the higher density solution flowing into the front flask producing a progressively increasing density supply to the column tube.

CEAST Pumped Filling Equipment

This new method, increasingly used by major plastics manufacturers normally reduces the column filling time by at least two thirds.
The filling equipment is positioned on the bench and is fitted with a peristaltic pump which metres the mixed solution to the column tube at a constant rate.
Considerably less time is taken to fill a linear column with this method as the filling rate does not decrease with the weight of liquid above the column as with the gravity method.

Filling equipment

Column Clearing Device

The Ceast Automatic Column Clearing Device connects on to both single, two or three column units. The plastic mesh basket is lowered into the column tube after the gradient column has filled.
The basket line is unclipped from the device and would round the tube, the device is the removed.
When the quantity of samples in the gradient make identification difficult, the device is reconnected to the apparatus and the basket line clipped to the reel When switched on the device will slowly raise the basket clearing the samples and floats from the column without disturbing the gradient. A trip bar switch automatically switches off the device when basket reaches the top or the bottom of the gradient tube.

Calibrated Density Floats

Ceast have manufactured Density Floats for many years and supply laboratories and equipment manufacturers world wide.
The floats are manufactured from coloured glass with numbers or letters in a contrasting coloured glass, fused into the body of the float.
The floats are annealed and aged before being calibrated at 23°C to ± 0.0002 g/cm^3 . Floats from 0.8000 g/cm 3 to 2.000 g/cms are usually in stock or on short delivery. Other densities or calibration temperatures on request.

Nominal Dimensions

Glass Column:	• Outside diameter 540 mm
	• Length 850 mm
	• Graduations 2 mm over 700 mm length
Apparatus:	• Overall height 970 mm
	• Width 305 mm
	• Depth 305 mm
	• Net weight 11 kg
Electrical Supply:	• 220/240 V

Table to chose the liquid system to be used with Density Meter in function of the required range	
System	**Density range [g/cm³]**
Methanol-benzyl alcohol	0.80 to 0.92
Isopropanol-water	0.79 to 1.00
Isopropanol-diethylene glycol	0.79 to 1.11
Ethanol-carbon tetrachloride	0.79 to 1.59
Toluene-carbon tetrachloride	0.87 to 1.59
Water-sodium bromide	1.00 to 1.41
Water-valcium nitrate	1.00 to 1.60
Carbon tetrachloride-trimethylene dibromide	1.60 to 1.99
Trimethylene dibromide-ethylene bromide	1.99 to 2.18
Ethylene bromide-bromoform	2.18 to 2.89

Other models available

- Density Meter One column code 6001.000
- Density Meter Three columns code 6008.000

CEAST
www.ceast.com
TÜV MANAGEMENT SERVICE ISO 9001

CEAST S.p.A. • Via Airauda, 12 • 10044 Pianezza (TO) Italy
• Tel: (+39) 011.966.40.38 (10 lines) • Fax: (+39) 011.966.29.02
E-MAIL: Int. Sales: InfoItaly@ceast.com - Int. after sales: aftersalestech@ceast.com

CEAST USA Inc. • 4816 Sirus Lane, Charlotte, NC 28208
• Tel. 704-423-0042 • Fax 704-423-0081
E-MAIL: USA Sales: salesusa@ceast.com - USA Service: Keith@ceast.com

CEAST GmbH • Bunsenstr. 5, D-82152 Martinsried
• Tel. ++49 (0) 89/85 90 28 12 - 89 50 18 10 • Fax ++49 (0) 89/89 94 98 51
E-MAIL: Sales and Service: info.germany@ceast.com

AP007-01 0600