

■ DS500 Density Measurement System for Polyethylene

The DS500 Density Measurement System offers a fast, reliable, ASTM approved method for measuring density in Polyethylene with an accuracy of ± 0.0005 g/cc or better in the range from 0.9100 to 0.9700 g/cc.

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■ Award Winning Design

The DS500 was originally developed by Tecrad Corporation in 1986 for which it won a prestigious I-R award in 1987. This international competition recognizes the 100 most innovative and unique product developments of the past year. The award is among the highest honors granted in the field of applied research and development. Its ultrasound technique was approved and documented by the ASTM under the designation D4883. It accepts as test specimens compression-molded plaques prepared as per document ASTM D4703 which superseded document ASTM D1928.

■ Theory of Operation

The DS500 system uses an acoustic method for determination of density. This is possible due to the nature of polyethylene which can be viewed as a composite where high density crystalline regions are embedded in a low density amorphous matrix. The degree of crystallinity determines the density of the material. The amorphous and crystalline phases show very distinct behaviors to the propagation of ultrasound. From this it can be understood that the propagation characteristics in the composite will depend on the degree of crystallinity. The DS500 system provides a measurement of crystallinity which directly correlates to density.

■ Main Advantages of the DS500

The DS500 system offers several major advantages over the determination of density using the gradient column technique:

- Extremely faster and much simpler: the DS500 system is very easy to use and measurements are completed within 15 seconds,
- No maintenance is required except periodic replacement of the water in the temperature controlled bath,
- The acoustic method is non-destructive so the test specimens can be kept on file for further reference,
- All measurement data is displayed on the video monitor and can then be stored on the computer disks.

■ Main Additional Advantages of the DS500

- The DS500 personal computer (PC) can be accessed remotely for monitoring or maintenance purposes using the Ethernet network link,
- The DS500 PC can also be used for other tasks in the lab using word processing and spreadsheet softwares,
- The DS500 PC uses standard IBM PC compatible components that can be easily upgraded by IT personnel.

■ Specifications of the DS500

Range of Operation:	Density from 0.9100 to 0.9700 g./cc.
Resolution:	0.0001 g./cc.
Accuracy:	+/- 0.0005 g./cc.
Repeatability:	+/- 0.0005 g./cc.
Personal Computer:	IBM Compatible Industrial Computer 32-bit Pentium IV Processor 512 Megabytes RAM
Storage:	1.44 MB Floppy Disk Drive 80 GB Hard Disk Drive CD-ROM /DVD-ROM Drive)
Connectivity:	10/100 Mbps Ethernet Network adapter 1 Parallel Port 2 Serial Ports 4 USB Ports
Keyboard:	101 keys
Mouse:	Microsoft Compatible
Monitor:	17-inch LCD Color Monitor
Software:	DS500 Software for Windows version 2.0 Microsoft Windows XP Professional Edition OS
Operating Temperature:	1.5 to 350C (35 to 950F)
Sample Dimension:	Length: 90 mm (3.54 in.) minimum Width: 35 to 38 mm (1.38 to 1.49 in.) Thickness: 1.2 to 3.0 mm (0.05 to 0.12 in.)

Note: Specifications subject to change without notice.