



LAYER THICKNESS MEASUREMENT SYSTEM

Model S.E.M.C.

Complete precision system designed for the preparation of samples and measurement of the **thickness of the different layers** of a complex of Film or Co-extruded Plastic Sheets.

TECHLABSYSTEMS

ELEMENTS OF THE "SEMC" SYSTEM:

- 1 Advanced Rotation Microtome + Disposable blade holder (with 50 blades)
- 1 clamp to hold plastic sheets
- 1 Tri-ocular LED Optical Microscope + Polarizer
- 1 Digital CCD Camera of 3 Mpx (2048x1536 pixels – USB 2.0)
- 1 Image Analysis Software
- 1 "All in One" Touch Screen PC with 22" monitor + Color Printer

Fig. 1.- Tri-ocular microscope up to 1000X with 3 Mpx Digital Camera

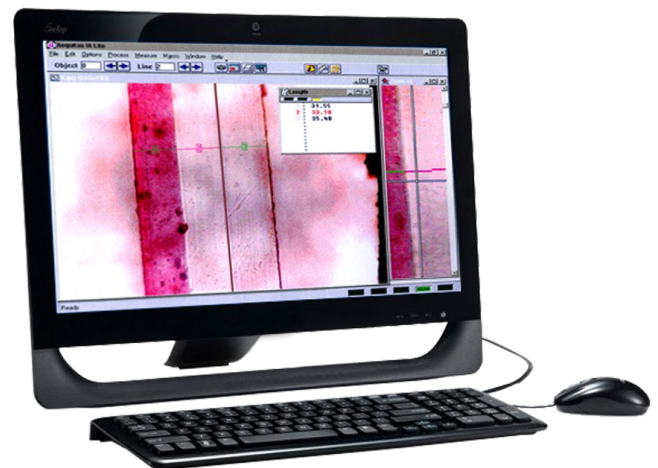
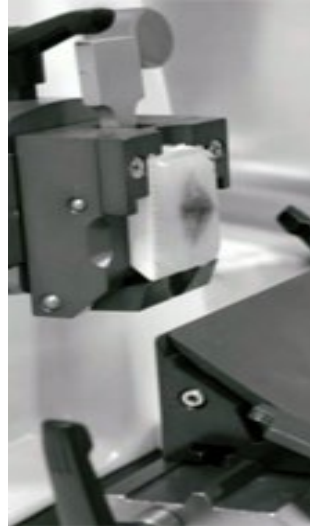


Fig.2 Rotation Microtome and PC All-in-One

ADVANCED ROTATING MICROTOME

Which allows cross sections of the sample between 0.5 and 60 microns. The preparation of the sample is very important and is carried out by placing the film sample in a sandwich between 2 sheets of polyethylene, in order to subsequently be able to easily measure the thickness of the layers under the microscope.

- Accuracy: $\pm 5\%$
- Maximum cutting area: 50x45 mm
- Blade orientation angle: 0-12°
- Macro Advance: Manual
- Horizontal displacement of the sample: 35 mm
- Vertical displacement of the sample 46 mm
- Sample orientation 8° (X-Y axes); 360° swivel
- Dimensions (L x W x H) 300 x 570 x 270 mm
- Weight 34 Kg



Cutting thickness adjustment

- 0.5-2 μm every 0.5 μm
- 2-10 μm every 1 μm
- 10-20 μm every 2 μm
- 20-60 μm every 5 μm

OPTICAL MICROSCOPE

Equipped with:

- Siedentopf tri-ocular head 30° inclined and 360° rotatable (Image division, ratio 20:80)
- N-WF10X/20mm high focal point wide field eyepieces with diopter adjustment on both eyepieces
- Reverse quintuple nosepiece
- CCIS EF-N 4X, 10X, 40X S, 100X S-Oil plan achromatic objectives
- Coaxial coarse and fine focus
- Mechanical stage with ergonomic coaxial controls on the right side
- Abbe condenser A.N. 0.90 focusable with iris diaphragm and slot
- Blue filter \varnothing 45mm, immersion oil (5ml), power cable
- power supply, hex key and protective cover
- Halogen-quartz Koehler lighting 6V/30W with intensity control
- POLARIZED LIGHT system to increase contrast in certain samples
- Universal transformer 100-240V (CE)

“C” Thread Camera Adapter

- 0.5X type C camera adapter for 1/2" sensors

PROFESSIONAL DIGITAL “CCD” CAMERA 3 Mpx

- Image Sensor 3 Megapixels CMOS Sensor 1/2"
- Adaptable C mount
- Resolution: 2048 x 1536px
- Pixel size 3.2 μm x 3.2 μm
- Image area: 6.55 x 4.92 mm
- Adapters for eyepieces 28, 30, 34 and 35 mm
- 16mm focusable macro lens
- Tube for macro observation of samples
- Calibration preparation and USB cable
- File formats BMP, TIFF, JPEG...



IMAGE ANALYSIS SOFTWARE

- **Measurement of Lines** Angle - Length - Linear intersections – Profile
- **Image formats for import and export** - Windows Bitmaps (BMP) TIFF - TARGA - PCX - GIF – JPEG
- **Single screen operation**
 - ✓ Use PC VGA screen. for both types of images (Video/Graphics)
 - ✓ The Software can process and analyze stored images without the need to have an image capture card installed.
 - ✓ Image analysis can be performed in Color or Monochrome.
 - ✓ Graphic Presentation under WINDOWS

- **Evaluation of areas**
 - ✓ Total area of detected pixels
 - ✓ Total area of undetected pixels
 - ✓ Percentage of pixels detected versus not detected
 - ✓ Histogram of the image

- **Choice of type of images**
 - ✓ User-definable rectangular areas
 - ✓ Irregular areas definable by the user
 - ✓ Color threshold and monochrome
 - ✓ Zoom the selected area
 - ✓ Visualization palette
 - ✓ Binary editing, including shrink, shrink and spread, expand, fill.
 - ✓ Manual binary editing

- **Presentación de resultados**
 - ✓ Data represented in windows on main template
 - ✓ Possibility of printing
 - ✓ All data is available via DDE (Dynamic Data Exchange) and clipboard for manipulation, presentation and storage, through standard programs such as Excel.

- **Layer Thickness Measurement**
 - ✓ To measure the thickness of each layer of the Co-extruded Film, once the image of the layers is represented clearly and with contrast on the screen, if necessary, use the polarization equipment included in the Microscope to differentiate well the limits of each layer and contrasted.

 - ✓ The separation between layers is marked with the mouse and it automatically represents the distance (thickness) of each one of the layers, it shows the thickness reading with a resolution of +/- 0.01 microns. The data and images can then be saved to the hard drive or printed.

CONTROL AND DATA REGISTRATION IN:

- All in One PC “Touch Screen” with 22” monitor
- 4Gb DDR3 Memory
- 1Tb Hard Drive
- Windows Operating System
- Keyboard and mouse
- PRINTER Color DIN A4

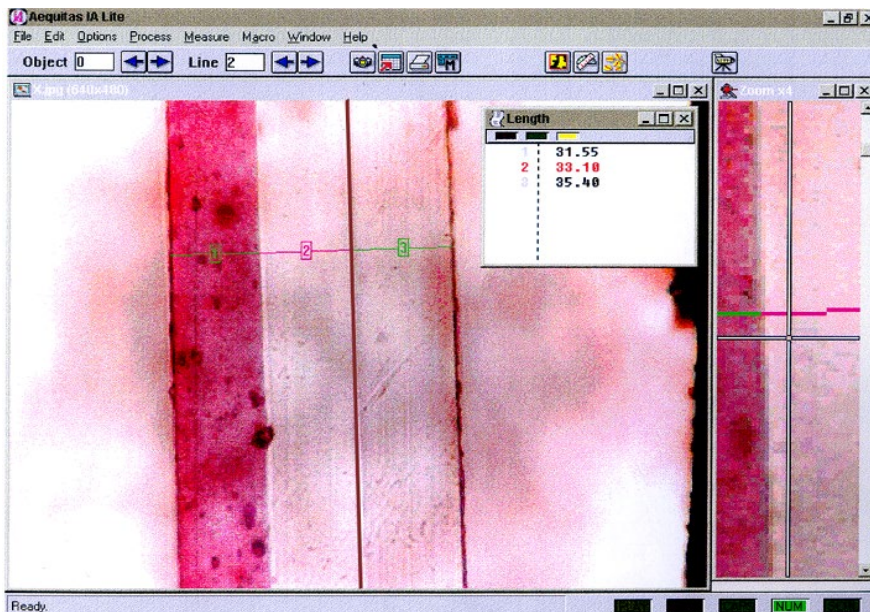


Fig. 3 – Example of screen presentation of a sample of co-extruded film made up of 3 layers.

POWER SUPPLY: 110V/60Hz or 220V/50Hz single-phase

TRANSPORT PACKAGING DIMENSIONS APPROX. Box 1: 450 x 650 x 400 mm (W x D x H)

GROSS WEIGHT APPROX. Box 1: 68 Kg (Wooden packaging with phytosanitary treatment)

TRANSPORT PACKAGING DIMENSIONS APPROX. Box 2: 750 x 800 x 600 mm (W x D x H)

GROSS WEIGHT APPROX. Box 2: 60 Kg (Wooden packaging with phytosanitary treatment)

STANDARD SUPPLY CONTENT:

- * 1 Advanced Rotation Microtome + Disposable blade holder (with 50 blades)
- * 1 clamp to hold plastic sheets
- * 1 Tri-ocular LED Optical Microscope + Polarizer
- * 1 3 Mpx Digital CCD Camera (2048x1536 pixels – USB 2.0)
- * 1 Image Analysis Software
- * 1 “All in One” Touch Screen PC with 22” monitor + Color Printer