

MEASURING NYLON, EVA OR EVOH IN A MULTILAYER FILM WITH THE INFRACAL FILTOMETER



INTRODUCTION



Multilayer films often contain a core layer of barrier material such as Nylon, EVA or EVOH. The thickness of these layers are critical for both performance and cost. The InfraCal Filtometer can measure an individual layer within a multi-layer film in less than a minute reducing analysis time and replacing more cumbersome analyses. The InfraCal Filtometer is easy-to-use and portable allowing for measurements where they are needed, in the production area, on a loading dock or in a warehouse as well as in the laboratory. Polymers such as Nylon, EVOH,

EVA, and polyethylene have characteristic absorbances in the mid-infrared range that can be used for material identification or for quantitative measurements. A quick analysis to determine the thickness of the barrier layer is important for quality control.

PRINCIPLE OF OPERATION

The InfraCal Filtometer is a compact, fixed-filter mid-infrared analyzer with no moving parts and an insignificant optical air path. It weighs less than 5 pounds and can be operated from a battery pack or a cigarette lighter adapter cable. This makes it portable, sturdy and operable in a range of ambient conditions typically found in field environments. An internal calibration table and easy-to-use operator interface allows for analysis by non technical personnel. Polymers such as Nylon, EVOH, EVA, and polyethylene have characteristic absorbances in the mid-infrared range that can be used for material identification or for quantitative measurements. The fixed filter in an InfraCal Filtometer is preset for the particular desired analysis.

ANALYSIS

Nylon, for example, is often measured by either optical microscopy or gravimetric solvent extraction. Both of these are time consuming analyses. Nylon has an infrared absorbance unique to polyethylene layers or tie layers at 3300 cm^{-1} . With the InfraCal Filtometer preset for this wavelength, the nylon thickness can be measured without any mechanical or chemical preparation. EVOH and EVA also have unique infrared wavelengths. With EVA, there are limits as food contact layer of the film and it can affect the physical properties of the sealant or tie layer. For analysis, a film is placed on a card and the card is inserted into the analyzer. A beam of infrared light is passed through the sample and absorbance is measured by the detector. As the layer increases in thickness the absorbance increases. An internal calibration table converts the absorbance to the desired unit of measure.

PRODUCT SPECIFICATIONS

Dimensions: 6.5 x 6.5 x 5" (165 x 165 x 127 mm)

Weight: 4.5 lbs. (2.0 kg)

Display: 4 digit, 7-segment red LED, 5/8 in. character height

Power Requirements:

Voltage - 12 V dc, +2% max.

Power - 7.5 watts max., 5 watts typical

Input - Switchcraft 760 plug or equivalent, center positive

Suggested Power Sources:

Wall supply; AC/DC converter type (supplied as standard)

12 volt auto battery adapter connector

Portable 12 volt battery pack

Measurement Range:

0.02 to 5%

Operating Temperature Range:

40°F (4°C) to 110°F (45°C)

User Selected Calibration:

Zero balance adjustment

Up to 20 point curve fitting calibration

Communications Port:

RS232 port, 9-pin D-Sub female, PC compatible, for upload to PC, datalogger or printer

InfraCal IR Card Reader Filtometer, Model CH-2

Part Number: 405-1004

