

TELEDYNE **ANALYTICAL INSTRUMENTS**

Film Thickness Measurement

Monitoring film thickness continuously can help coating companies provide uniformity in their films. One example is in the metallization of polymer films for either gas barriers, light reflectors, electrical conduction, or heat insulation. Optical monitoring of the entire film web can improve quality and reduce waste.

Defining the Problem

Metallization of polymer films are typically performed in a vacuum oven. Aluminum or other metals are fed into a crucible, heated to the melting point, and under vacuum are deposited on the underside of a moving polymer film. Depositing too much metal can result in films that, if used in a thermal insulation mode, can explode -- and if underdeposited will not heat the product sufficiently. Over or under coating the film also has a large economic impact on the producer because in either case he will generate unhappy customers.

The Teledyne Solution

Teledyne can provide a product that is robust and designed to operate in an industrial environment. The system consists of three components; the industrial rail with all the fiber optic connections, 2) the multichannel detector card, and 3) the data acquisition system (third party software) that records and displays the collected data.

The fiber optic cables are fed into the vacuum chamber and connected to the optical rail (which resides inside the chamber). The detector card located in a NEMA 4x enclosure outside the vacuum chamber sends and receives light which is converted into a thickness reading.

The readings are then recorded by a National Instruments analog to digital converter and

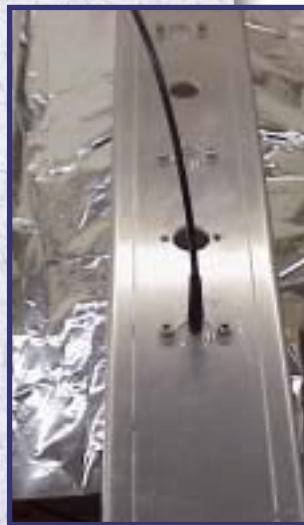
fed into a software package that displays a graph of the thickness versus time on a monitor.

Photometric Transmitter

Teledyne offers a low cost UV, VIS or NIR Modular Photometric detector blocks that optically measures the thickness of metalized film across a web continuously. Each channel is read out to an A/D converter and sent to a third party data recording device.



24 channel detector rack with digital acquisition



Fiber Optic Rail



Corrosion Probe Pipeline Retraction

Benefits of the Film Thickness System

- Real time film thickness across web
- Continuous data recording
- Reduced film waste



Film Thickness Measurement

PRODUCT SPECIFICATIONS

Transmitter

Measured parameter:	Metalize film thickness
Resolution:	0.02AU
Temperature range:	-40 to +300° C
Response time:	< 30 sec
Maximum Zero shift:	0.005AU (over +20 to +40° C)
Long term output drift:	<2% signal loss / year
Repeatability:	1% of range
Light source:	LED (guaranteed 10 year minimum life) or Xenon flash lamp (three year life)
Channels:	Blocks of 6, total number of blocks is customer dependent

User Display & Control

Type of display:	None
Display:	3-1/2 digits in user defined engineering units
Input device	National Instruments A/D converter

Electrical

Power requirement:	24 VDC (9-32 VDC) If 110/220 VAC is available; Teledyne will supply an AC/DC power supply
Power consumption:	0.48 Watts (check with factory for specific unit selected)
Detector outputs:	0-5V
Analog loop resistance:	500 Ohms, maximum @ 24V
Alarms:	Optional
Certification:	Available upon request

Mechanical

Transmitter weight:	1 lb per channel
Enclosure construction:	Extruded Aluminum, (NEMA 4X, purge kits optional)
Enclosure:	8" H x 3-7/8" W x 1.5" D

Optical Rail

Materials:	Aluminum
Max Temperature rating:	240° F
Fiber Optic connections:	SMA-905
Fiber Optic Cables:	600/660u core / cladding
Dimensions:	Customer dependent

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Warranty

Instrument is warranted for 1 year against defects in material or workmanship. NOTE: Specifications and features will vary with application. The above are established and validated during design, but are not to be construed as test criteria for every product. All specifications and features are subject to change without notice.

