PRODUCT SPECIFICATIONS

Thermo Scientific 21Plus!

Measurement and control system

The Thermo Scientific™ 21Plus! quality control system for continuous web processes supports a comprehensive measurement and control portfolio that offers a combined suite of over forty specialized application packages. The system provides a fast return on investment through improved product quality, process efficiency and raw material savings.

Features

- Supports up to 6 frames and 15 sensors
- 2000 point profile resolution (8000 for Biax film)
- Advanced applications controls
- Windows® operating system
- OPC link capability
- Intuitive FLEX HMI operator displays
- Integrated maintenance diagnostics
- Multiple language support

Applications

- Extrusion lines
- Biax lines
- Coating lines
- Plastics and rubber calendaring lines
- Nonwoven lines
- Building products
- Carpet coating lines
- Abrasives lines
- Glass/mineral/rock wool lines
- Battery separator film
- Battery anode/cathode coating

The 21Plus! provides a wide range of application solutions for the continuous web industry. Its scalable distributed system architecture is designed for seamless modular expansion to ensure maximum profitability from the process, both now and in the future. Low cost of system ownership is assured through a combination of reliable performance and ease of maintenance.

Sensors

The 21Plus! supports the full complement of Thermo Scientific web gauging sensor technologies such as infrared, optical, terahertz, nuclear, X-ray, as well as compliant third party sensors.

The sensors are application matched to the types of materials in the web, the web structure and the process environment, as well as the desired measurement requirements such as thickness, basis weight or moisture. All of our sensors are designed to provide fast, high-resolution measurements without compromising sensor precision. The Thermo Scientific™ Beta Plus transmission sensors provide data across the entire

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web width, allowing full control resulting in more saleable product per production time. The Thermo Scientific™ X-Ray Master transmission sensor is also available where X-ray is preferred over nuclear. Both basis weight sensors are designed to provide fast, high-resolution measurements with great sensor precision.

Our advanced infrared measurement technologies provide a unique set of solutions for a wide range of materials. The Thermo Scientific™ PROSIS™ IR sensor family is designed for both single and multi-layer polymer structures. This includes the thickness or weight measurement of individual layers in a coextruded multi-layer product, complex coated product, laminated product, nonwoven, cavitated films of varying density and many others. Besides thickness, it can simultaneously provide measurement of moisture content, binder content, or % retained solvents.

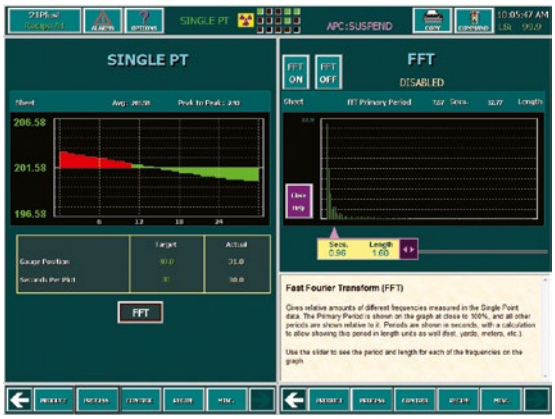
There are two other non-contacting Thermo Scientific thickness sensors available to measure various materials depending on their structure. First, the Thermo Scientific™ Terahertz Sensor, developed by Picometrix® (a division of Luna Innovation Inc.), can provide multi-layer thickness measurement for coextruded sheet, foam, roofing shingle, TPO, calendered textile or polymers, calendered wire cord and any other non-metallic materials. Alternatively, the Thermo Scientific™ ShadowMaster™ optical caliper sensor can also be used to provide total thickness measurement of flexible materials and foam-structured products.

Operator stations

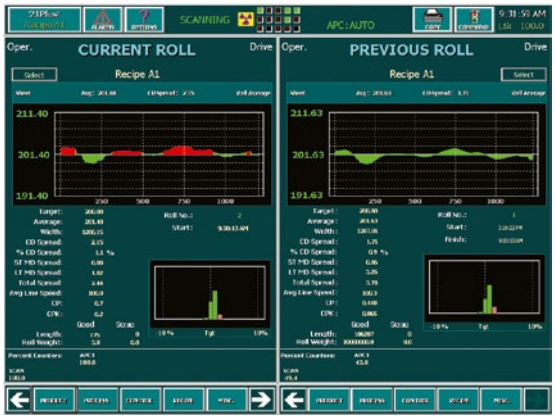
Operator stations are available for either environmental or control room operations, depending on process requirements. Both include touch-screen flat panel monitors with high-resolution graphics and powerful processing capability for the system's interactive displays and supervisory controls. The operator stations are PC-based and communicate with other system modules across an Ethernet Local Area Network (LAN).

Thermo Scientific FLEX operator interface

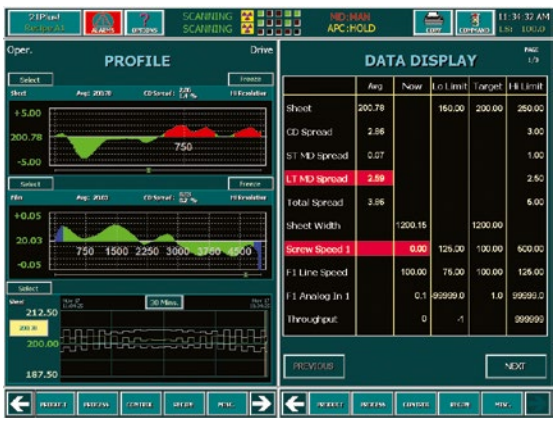
Process visibility, ease of interpretation and operational responsiveness are assured with the system's intuitive human-machine interface (HMI). The FLEX operator interface includes recipe management, HMI displays, automatic control initiation, quality and process alarm annunciation, process analysis monitoring, system maintenance and diagnostics.



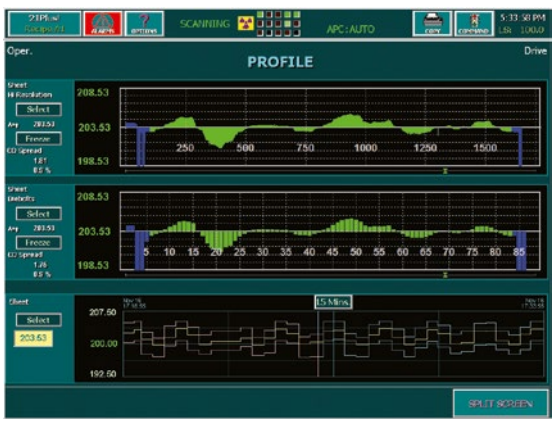
Process analysis display



Production reports



Product quality / alarm display



Product full profile display

The system supports optional de-facto links to programmable logic controllers (PLC) such as Allen Bradley®, Modbus and Siemens. Specific link products are also available as options for both information and control purposes. An OPC interface is available with 21Plus! to communicate data with other compliant systems.

Advanced application controls

A complete portfolio of Thermo Scientific™ Advanced Application Controls is available to improve quality, productivity and raw material savings. These include machine direction, cascaded, profile and target optimization controls.

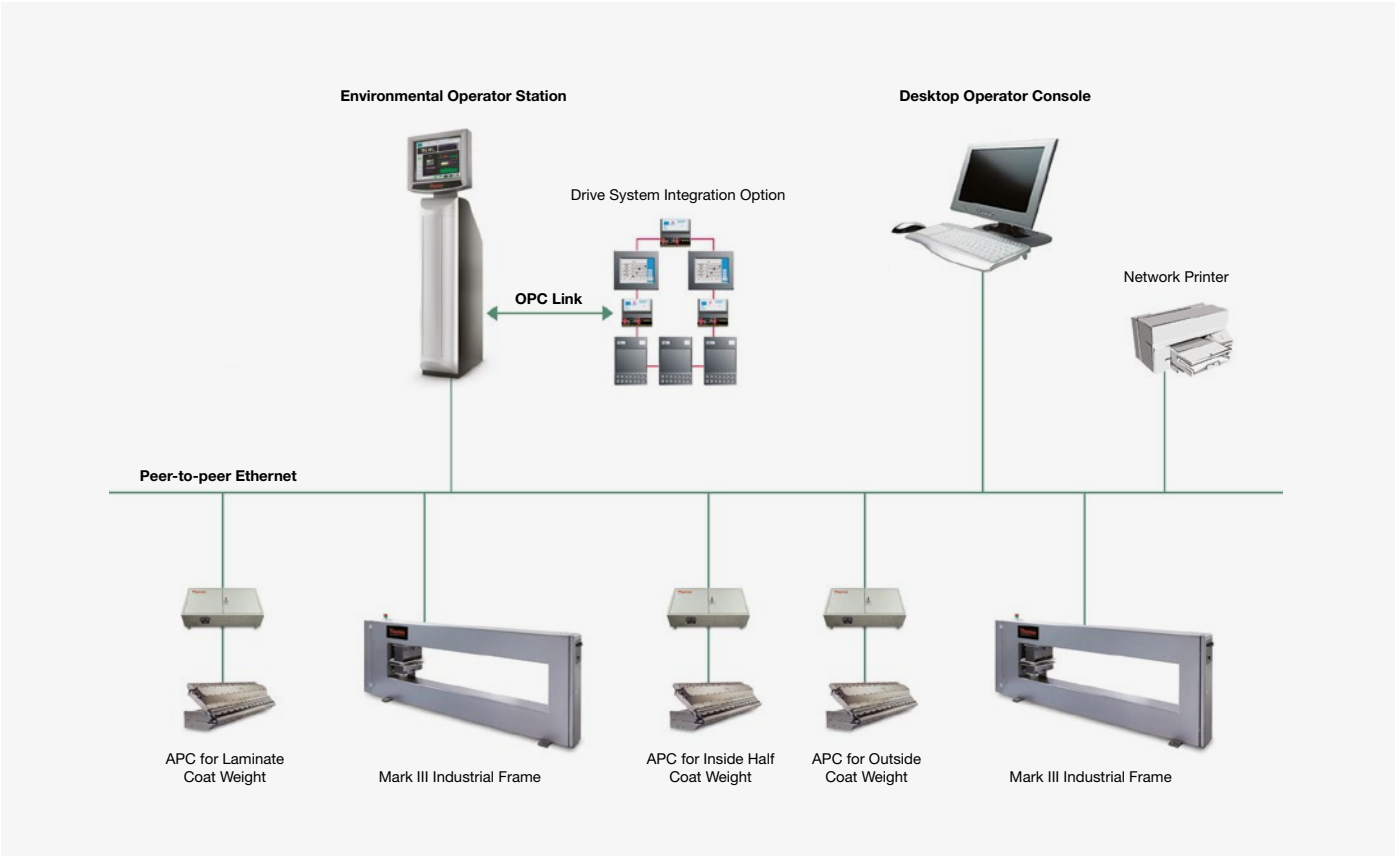
The 21Plus! system incorporates many application-specific control algorithms for fast attenuation of process upsets. These control strategies can greatly leverage the potential benefits of the system when interfaced to suitable process actuators.

Machine direction (MD) control maintains the average thickness or weight of the product to a desired value at the end of each scan by supervising either the line speed or screw speed setpoints. Enhanced MD controls for biax processes include cascade strategies that supervise the cast-end average sheet target to control the final film weight or thickness. Also plastics and rubber controls are available with three-zone cross direction strategies including roll-screwdowns, roll-bend and cross-axis control.

Target Management Control (TMC) provides further process optimization potential for raw material savings by supervising the average weight or thickness target to a minimum acceptable quality value, commonly referred to as down-gauging.

Auto Profile Control (APC) maintains flat thickness, shape or weight profiles of the final product by supervising the heating power of the extrusion die bolts at the cast end of the process. Features such as Accelerated Time Response (ATR) and randomization for gauge band reduction further enhance APC performance.

Thermo Scientific 21Plus! System configuration for extrusion coating



Intelligent measurement

Each scanning frame is part of an intelligent network and performs its measurement and control functions with an iBox that is based on a Pentium® class processor.

Thermo Scientific™ scanner platforms include the Mark III, medium sized L400, L220 low profile, C-Frame and single beam for single-sided applications.

The Mark III and L220 design incorporates a proven rigid tubular steel exoskeleton structure that provides stability while isolating the internal components from hostile environments such as high temperature, moisture, dust and fiber.

The L220 combines a rugged scanning platform with a lower profile design for tight installation spaces. The entire beam structure is welded, heat treated and precision-machined for measurement accuracy and sensor alignment.

The C-frame is available for installations with restricted space, harsh environments, or when all of the measurement hardware must be retracted from the machine. C-frames can be configured for upright or suspended mounting, horizontal, vertical or angled passes lines.

The single-sided Box Beam is a unique design for back-scatter sensors. This closed-beam mount is intended for demanding 21Plus! applications such as compact, hostile and dirty environments.

ISO 9001 REGISTERED COMPANY *Thermo Fisher Scientific, Erlangen, Germany is ISO Certified.*

Thermo Scientific Mark III industrial scanner

Thermo Scientific L220 Scanner

Thermo Scientific C-Frame Scanner

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