REFLECTION POLYMER MELT PROBE

INTRODUCTION

The Reflection Polymer Melt Probe (RPMP) is an accessory invented and developed by Equitech for use with the Equispec Inline Process Spectrophotometer (IPS) (FIG 1). It is designed explicitly for reflected color measurements from a molten plastic stream in an extruder.

The RPMP (FIG. 2) consists of the body or “bolt” that is installed in the extruder and a removable fiber assembly that sends light to and receives light from the sample (FIG 3 & 4). In addition, there are six illumination fibers surrounding a central detection fiber.

The fiber assembly is typically manufactured to a length of 5 meters; longer fiber runs are achieved using extension fibers to the required length.

The RPMP requires the use of a calibration fixture, black trap, and white master calibration tile (matte finish) to complete the RPMP calibration before a color measurement with the EquiSpec IPS. In addition, the RPMP must be installed in the extruder in a location with good material flow.

FIG. 1 EQUISPEC IPS

FIG. 2 REFLECTION POLYMER MELT PROBE

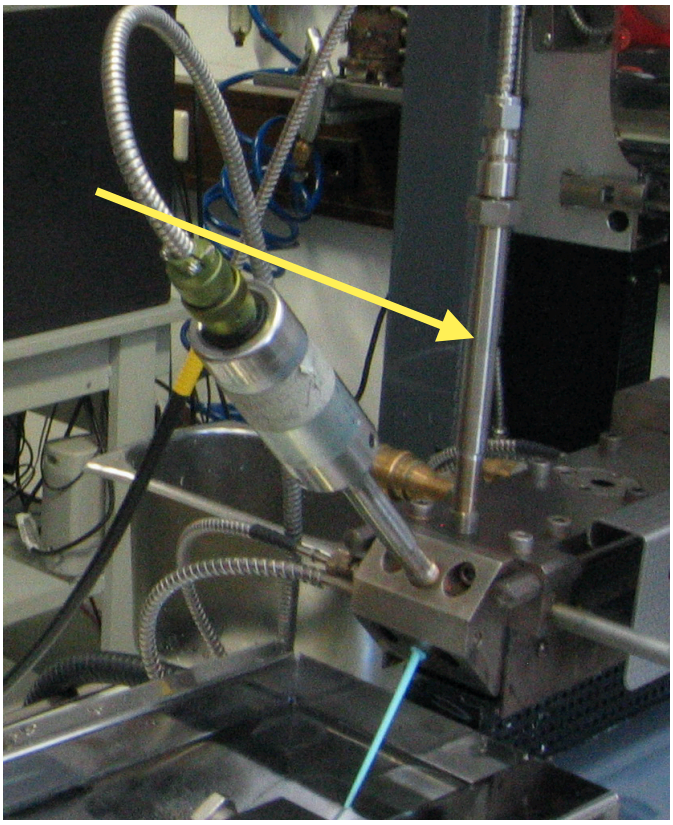

FIG. 3 RPMP IN POSITION AT AN EXTRUDER

CHARACTERISTIC	SPECIFICATIONS
Sensing Region	Max point sensitivity between 0 and 0.5mm
Lens/Window Material	Sapphire
Numerical Aperture	0.22 NA
Spot Size	1 mm
Illumination Fibers	Refraction of the light rays by the Sapphire results in illumination at approximately 28°
Optical Fiber Type	NIR-7: 6 - (400 microns) fibers around 1 (400 microns) fiber
Fiber Packaging	PVC-coated (80°C) armored fiber bundle. Teflon coated (220°C) armored fiber bundle
Fiber Length	5 meters standard
Fiber Termination	SMA 905
Mounting	1/2-20 UNF w/5.715mm (0.225”) well depth and 45 degree seat
Body & Materials	316 SS w/ Nickel Alloy Tip
Body Dimensions	165.1 mm (6.5”) length; tip length 5.436mm (0.214”)
Seal Type	Sapphire to metal
Seal Material	Sapphire / Nickel Alloy Tip
Temperature Range	-20°C to 400°C (500°C available)
Maximum Pressure	345 bar (5000 psi)

EXTRUSION OPERATION BENEFITS

The use of the RPMP provides extruders and compounders the opportunity to monitor in-line and in real-time variables such as:

- Residence time distributions
- Optimization of screw design
- Optimization of extrusion rate
- Optimization of feeder flow rates
- Determination & resolution of feeder issues
- Determination & resolution of blending issues
- Reactive extrusion monitoring
- Measurement of concentration of chemical additives
- Alarm of off-specification color or additives
- Continuous, real-time quality assurance
- Enable closed loop control

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