

Multi-parameter analysis of polymers with near-infrared spectroscopy (NIRS)



Faster quality control along the production cycle of bulk material to final product

NIRS for increased productivity

02

Multi-parameter analysis of polymers becomes faster and easier with Metrohm NIR solutions. From incoming material inspection to final product control, Metrohm NIR solutions give you confidence in the quality of your polymer products along the entire production cycle.

To this day, manufacturers of plastics and polymers rely for the most part on physical and wet chemical methods to monitor the quality of their product. Due to the time consuming nature of these methods and the infrastructure (laboratory) and costs (chemicals, consumables) involved, these methods can negatively impact the productivity of the polymer process.

Metrohm offers NIR solutions for fast and reliable routine quality control of feedstock, intermediates, and final products in the polymer industry. Metrohm NIR solutions require no chemicals for analysis, can be directly applied in the quality control process by anyone. The reliable results of crucial chemical and physical properties are provided in a matter of seconds.

Metrohm NIR solutions for polymer analysis means ...

- **Accurate results for multiple parameters in a matter of seconds**
 - A single measurement provides information about several physical and chemical parameters
- **Lower costs compared to wet chemical methods**
 - No chemicals and reagents required, hence also no costs for waste disposal
- **Straightforward and safe operation with no environmental impact at all**
 - Solvent free analysis, analyzer can be operated by any personnel

Plastics Producer



Examples of NIR application

- Quality Control of produced polymer
- Quick method for R&D and Pilot Plants
- Atline checking of polymerization process

Offline (in the laboratory), atline

Metrohm provides a complete portfolio of dedicated NIRS analyzers for offline, atline, or online use. These analyzers cover the near-infrared (800-2500 nm) and the visible wavelength (400-800 nm) range, which means

color information can be obtained simultaneously. They are operated by the proven, intuitive Vision Air software enabling even users with little expertise to perform the analysis with a few mouse clicks. The results of multiple parameter are obtained and displayed simultaneously.

The results of a multi-parameter analysis from a single measurement as displayed by Vision Air

    	Time	Sample number	Operating Procedure	Hydroxyl	Moisture	Isocyanate
	30/08/2016 09:39	PE-009	Polyurethane Test	350	0.89	2.02

Plastics Compounder



Examples of NIR application

- Final QC of compounded polymer
- Incoming inspection of polymer
- Incoming inspection of additives
- Quick method for R&D and pilot plants

Plastics Converter



Examples of NIR application

- Check of incoming materials
- Check of produced products

Offline (in the laboratory), atline

Offline (in the laboratory), atline

Plastics and NIR measurement parameters

Polymer Types	NIR applications
Polyethylene	• Melt Flow Rate (MFR) • Density • Molecular Weight • Additive content
Polypropylene	• Melt Flow Rate (MFR) • Additive content
PET	• Intrinsic Viscosity • Melt Flow Rate • Diethylene glycol • Isophtalic acid
Polyamide	• Relative viscosity • Carboxyl end groups • Amine end groups
PVC	• Molecular weight
Polystyrene	• Melt Flow Rate (MFR)
Polyurethane	• Hydroxyl value • NCO content

Metrohm NIR Polymer Analyzer

The Polymer Analyzer is a dedicated analyzer for the analysis of polymers. The measurement device consists of a DS2500 Near-Infrared Analyzer with pre-calibration models for PE, PP, PET and Nylon based on a large collection of real product spectra. Due to these pre-calibration models the polymer analyzer can be used immediately for the analysis of these polymers without any method development.



For more information about our analyzers and applications, visit [metrohm.com](https://www.metrohm.com) and contact your local Metrohm sales representative.

For more solutions for the polymer industry, visit www.metrohm.com/industries/polymer-and-plastic

www.metrohm.com

