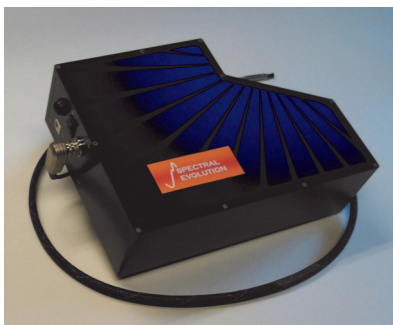# SPECTRAL EVOLUTION

## Plastic/Polymer Identification

Plastic is widely used in every industry. NIR spectroscopy is an excellent technology for identifying plastics and measuring polymer identities. It provides rapid, accurate, and non-destructive material analysis for industrial and research applications. With a compact, portable NIR spectrometer, sending samples to the lab can be eliminated, and measurements performed in real-time at the point of inspection.

Portable full range UV/VIS/NIR spectroradiometers, like the SPECTRAL EVOLUTION SR-Series, can be used to:
- Accurately identify plastics for recycling so that one type doesn't contaminate another and cause processing problems
- Sort polymer resins
- Monitor quality control during thermoplastic production
- Sort and identify raw materials
- Measure raw material purity
- Analyze moisture content

The SR-Series delivers the following benefits for plastic/polymer identification:
- Rapid, reliable and non-invasive measurement
- Cost-effective analysis
- Portability—bring the analyzer to the application
- No sample preparation
- Easy to use DARWin SP Data Acquisition software included with each instrument
- Easy to use with 3rd party chemometric software for further analysis



*SR-3500 portable spectrometer*

The absorbance and reflectance of light in the NIR spectral range results in vibrations of polymer resin molecules. NIR spectra can be attributed to specific polymer resins, including the following five major resins:
- Polyethylene terephthalate (PET)
- High density polyethylene (HDPE)
- Polyvinyl chloride (PVC)
- Polypropylene (PP)
- Polystyrene (PS)

With an NIR spectroradiometer like the SR-3500, qualitative analysis can be performed on starting materials, materials in process, and finished product, off-line in a lab setting, on-line separated from the processing stream, or in-line in the process itself. By using chemometrics software, analysis can encompass quantitative information gained from the spectra to further identify the physical and chemical characteristics of the resins.

## Plastic/Polymer Applications

- Measure polymer and plastic attributes, in-, on-, or at-line
- Accurately identify specific plastics in recycling
- Qualitative measurement in thermoplastic production
- Incoming materials QC
- Analysis of physical attributes, including density and viscosity
- Monitor the disappearance of chemical double bonds in reactions and control processes in other polymerization reactions
- Final quality assessment of finished product
- Quantify the constituent parts of polymers, including residual solvents and monomers
- Measure and identify additives like antioxidants and UV inhibitors
- Improve production through in-line process measurements
- Accurately and quickly measure water content
- Determine physical properties like molecular weight, tacticity, melting point, and other production values
- Determine the OH number in polyester, polyol, polyester, etc.
- Quick and accurate determination of moisture content

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