progression

Textiles | Determination of Finish Level on Fiber

Summary

The rapid and precise determination of the finish level on natural and man made fiber materials is an important factor for process and quality control. The finish coatings applied to most fiber materials are used to improve processing or to enhance the physical performance of the fibers. Advanced new chemistry has provided many types of finishes that can be used with a wide variety of fiber types. These finishes can be applied in various quantities depending on the final application.

Traditionally, the analysis of the finish levels on fibers involve a lengthy (about 6 hours) and tedious solvent extraction process.

Progression's Nuclear Magnetic Resonance (NMR) technology has proven to be an excellent tool in the direct analysis of finish on fiber. The non-destructive analysis can be completed in minutes and requires no chemicals.

Benefits

❙ Independent of color

❙ No consumables required

❙ Solvent free analysis

❙ Fast analysis (< 2 minutes)

❙ Operator independent

❙ Standard samples and calibrations

❙ Preconfigured methods for all fiber types
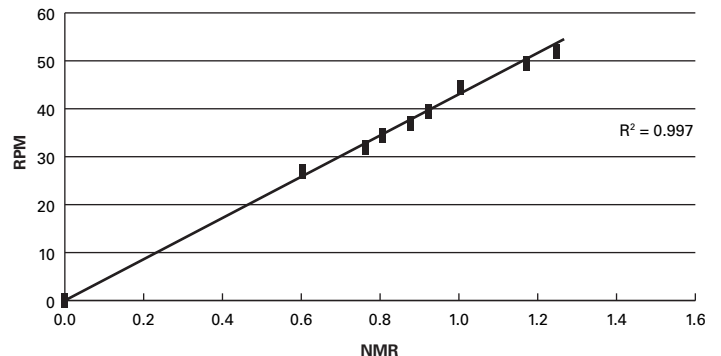
❙ 100% of sample is measured

Sampling

Fiber samples are loaded into a sample test tube for analysis. The NMR analysis can be performed at ambient temperature in minutes. The full sample volume (20 ml) is measured to provide a reliable and representative analysis of the finish level.

Calibration and Results

Typical precision of finish levels by NMR

Fiber type	Tested range	Mid-range precision 95% confidence
Polyamide (e.g. Nylon 66, Nylon 6)	0.005 @ 0.88%	0.35
Aramid (e.g. Kevlar, Twaron, Nomex)	0.004 @ 1.14%	0.20
Polyester (e.g. Dacron, Orel, Fortrel)	0.002 @ 0.92%	0.13
Acetate (e.g. Cellulose Acetate, Estron)	0.005 @ 1.58%	0.21
Rayon (e.g. Viscose)	0.004 @ 1.63%	0.12
Polyurethane (e.g. Spandex, Lycra)	0.034 @ 9.6%	0.18

Finish Application Speed vs. NMR

$R^2 = 0.997$

Solvent Extraction vs. NMR

$R^2 = 0.987$