

Quality control of paint resins

Application

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Resins such as alkyd or acrylic resins are essential ingredients of paints. The rapid determination of the resin quality is of particular interest. The capability to respond quickly to quality control requirements increases productivity and therefore profit. This example shows the quality control analysis of two resins used for high quality paints in the car industry. One resin showed good adhesion properties while the other one failed. The poor quality resin failed because the high molecular weight fraction was not present (figure 1, hatched area).

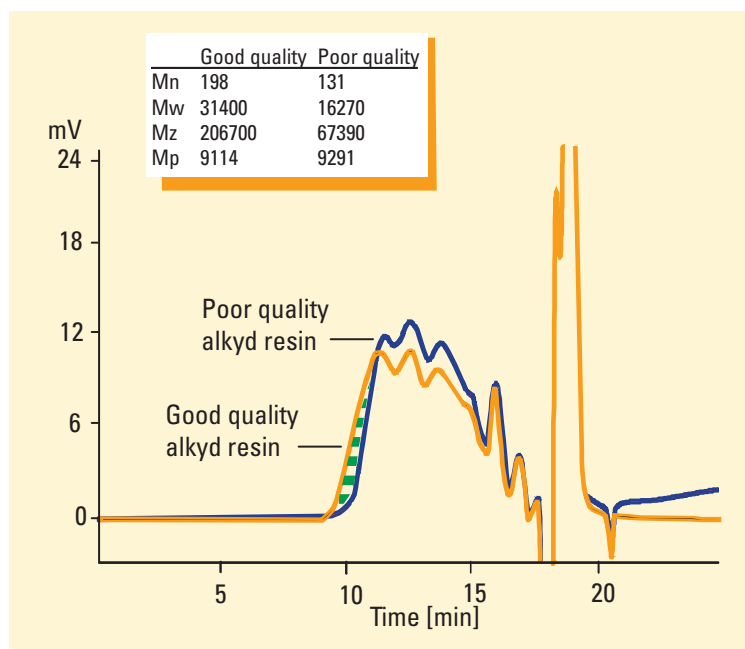


Figure 1
Quality control of two resins

Conditions

Sample preparation

Resins were dissolved in THF. Polystyrene EasyCal vial standards (Agilent p/n 5064-8281) were used for narrow standard calibration.

Column

PLgel 10² Å, 7.5 x 300 mm, 5 µm (Agilent p/n 79911GP-501) in series with a PLgel 5 x 10³, 7.5 x 300 mm, 5 µm (Agilent p/n 79911GP-502) and a PLgel 10⁴ Å, 7.5 x 300 mm, 5 µm (Agilent p/n 79911GP-504)

Mobile phase

Tetrahydrofuran

Flow rate

1.5 mL/min

Column compartment temperature

20 °C

Injection volume

100 µL

Detector

Refractive index detector



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The ChemStation GPC data analysis software provides the conventional graphical information of the chromatograms with the additional rapid numeric data in form of molecular weight averages and the report subsets. With the report subsets we could easily determine that the high molecular weight fraction (between the arrows) was 22 % for the high quality polymer but only 14 % for the low quality polymer.

HPLC performance

RSD of M_w	< 1%
RSD of M_n	< 2%

Equipment

Agilent 1100 Series GPC-SEC system

consisting of

- vacuum degasser for efficient degassing of the mobile phase
- isocratic pump with large solvent cabinet
- autosampler with single valve design
- thermostatted column compartment for precise column temperatures
- refractive index detector with automatic recycle valve
- ChemStation Plus with GPC-SEC data analysis software

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