

Description

To demonstrate feasibility and determine optimal drum melting conditions for its neat Converge® Polyol materials, Novomer conducted a drum melting trial with Converge® Polyol 212-20 at Nordson's lab and engineering facility in Duluth, Georgia.



Trial Conditions

The drum melter used in the trial required a straight sided 55 gallon drum filled with polyol with a minimum of 6 inches of freeboard height necessary for the ring seal. Three electrically heated temperature zones - the platen, pump, and the discharge hose can be individually controlled, but were set at the same temperature for the Converge trial. Temperature overshoot when changing set point was no greater than 2°C.

The platen melts material within 2 inches and softens material within 5 to 6 inches, allowing for a residence time of melted material at set temperature of less than 10 minutes inside the unit.

Based on a conveyed viscosity limitation of the pump of approximately 30,000 cP the initial starting temperature was fixed at 90°C, resulting in a viscosity of approximately 20,000 cP for the neat Converge® Polyol 212-20. At this temperature, the polyol was transferred

into 5 gallon cans at a rate of 3 kg/min, filling each can to a weight of 20 kg in approximately 7 minutes, and cooling to room temperature in 24 to 30 hours.

Results

After purging the system, two cans were filled at 90°C conditions. Retain samples were collected after each 5 gallon can was filled to be analyzed for decomposition products and no significant change was noted. Three temperatures were tested, 90°C, 105°C, and 120°C, with transfer flow rate varying as a function of reduced viscosity with increased temperature.

Residue of approximately one inch remained at the bottom of the drum due to the finned platen configuration. Nordson estimated that with a flat platen installed, residue would be about 0.5 inches (less than 2% of total drum contents).

Based on these results, melting of Converge® Polyol 212-10 could be accomplished at 65-70°C with a comparable flow of approximately 3 kg/min.

Temperature (°C)	Flow rate	Viscosity (cP)
90	3.0	~20,000
105	4.6	~4500
120	5.2	~1500