



# RheoSense

Simply Precise®

## Unlocking 100 °C Viscosity Measurement with *m*-VROC II

The *m*-VROC® II is now capable of measuring viscosity across a wide temperature range, from 4°C to 100°C. Certain samples, such as engine oil or 3D printing materials, necessitate testing at temperatures exceeding 80°C. Even samples that are solid at room temperature but transition to a liquid state at elevated temperatures can be tested and analyzed with the *m*-VROC II.

Highlighted features of the instrument include:

- Ability to test small sample quantities repeatedly, thanks to the microfluidics and the sample retrieval feature
- High accuracy,  $\pm 2\%$ , and excellent repeatability,  $\pm 0.5\%$
- Precise temperature control with Peltier technology

The plot here illustrates viscosity results obtained for a paraffin wax 3D printing material with a melting temperature of 60-70 °C. Consequently, while the sample remains solid at room temperature, it becomes liquid above ~60 °C, enabling viscosity measurement with VROC technology.

The test procedure involved the following steps:

1. Preheating the syringe and sample to 70 °C in the oven, ensuring the sample's liquidity at this temperature.
2. Back-loading 80  $\mu$ L of the sample into the 100  $\mu$ L test syringe using a positive displacement pipette.
3. Equipping the *m*-VROC II unit with a B05 chip to conduct measurements on the sample at temperatures of 80 °C and 96 °C, with three repeats at a fixed shear rate (automatic measurement protocol), retrieving the sample when necessary.
4. Performing pre-CCS cleaning twice using heptane. Each time, 100  $\mu$ L of heptane was loaded into the syringe and run at 80 °C to remove any residual sample from the chip.
5. Utilizing the Chip Cleaning Station (CCS) for the final cleaning of the chip and reservoir with the oil cleaning protocol.



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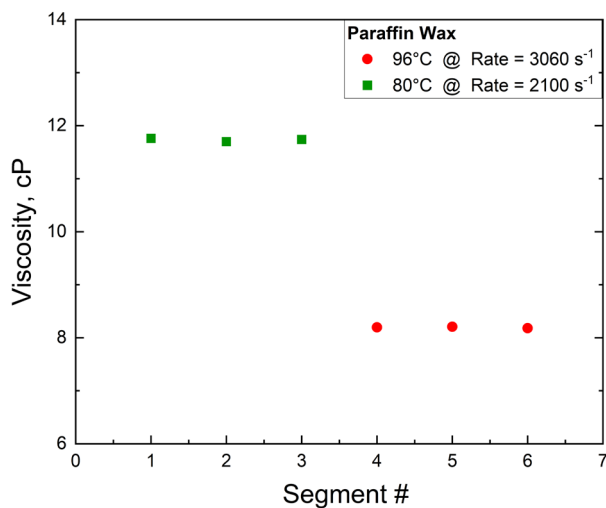
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We obtained three viscosity readings at each temperature using only 80  $\mu\text{L}$  of sample, demonstrating the superior repeatability. The average viscosity was measured as 11.73 cP at 80  $^{\circ}\text{C}$ , and 8.19 cP at 96  $^{\circ}\text{C}$ .



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