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Improving Mooney Viscosity Measurements

CTS want to ensure that labs have the proper tools to reduce variability in Mooney Viscosity results both within the lab and between labs. The first step is to help labs understand how **equipment** and **sample preparation** affect readings. The second step is to help labs understand **test methodology**.

After reviewing publications from the International Institute of Synthetic Rubber Producers, Inc., (IISRP), ACS Rubber Division, American Society for Testing and Materials (ASTM), and consulting the ACS Rubber Division's Advisory Committee on Test Procedures, we have created two brief guides to assist labs in identifying some sources of test error.

Part One: Effect of Equipment and Sample Preparation on Results

Low (or lower) Mooney results

- worn dies
- worn rotor

High (or higher) Mooney results

- drive shaft friction
- "cold" rotor ensuing from long loading times

Higher or lower Mooney results

- incorrect rotor size (large or small)
- dirty or contaminated dies
- incorrect pressure on pneumatically closed dies; dies out of alignment
- underfilled or overfilled cavity
- film placed between specimen and rotor (*NEVER* do this as this is incorrect)
- drifts in test temperature
- mill massing of specimens

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Part Two: Test Methodology

General Procedure

- prepare a checklist
- gather and read all relevant documents (test method, test instructions, calibration history, etc.)
- examine the test samples/specimens for proper identification, dimensions, and possible defects
- cross train with colleagues if possible (informal lab visit to observe other technicians)

Specific Procedure

- check temperature control device
- check rotor / die geometry
- check seal between rotor shaft and cavity
- use brass tools to work with rotor and die (cleaning, etc.)
- minimize and be consistent in sample handling
- if possible, run a material that is well known to the lab as an internal check on consistency
- if an alignment or slippage problem is suspected, zero out friction in seal when running empty
- load specimen, check seal between rotor shaft and cavity, check for proper specimen volume, size, orientation
- after specimen loading, wait one minute without rotation
- report minimum viscosity during the last 30 seconds of the test
- consider the test and results: was the procedure proper and consistent with previous runs, do the results compare well with expectations and other results