

Brookfield Gel Timer with DV360 Software

The Brookfield Gel Timer system is crucial for industries using thermoset resins and adhesives. It provides a reliable method to determine gel time and peak exotherm, replacing the discontinued Sunshine gel timer.

Test Principle

- The Brookfield Gel Timer measures the gel point and peak exotherm of thermoset resins and adhesives.
- It uses a torque measurement to determine the gel time and a temperature probe to measure the exotherm.

Background

- Thermoset resins are widely used in various industries for bonding applications.
- The Brookfield Gel Timer was developed in response to the discontinuation of the Sunshine gel timer in 2016.
- The system includes optional firmware and software for automated control and data acquisition.

Equipment

- Brookfield Gel Timer apparatus
- DVNext, DV3T, or DV2T instruments with optional firmware
- DV360 software
- SC4-13RD disposable aluminum sample chamber
- DVP94Y temperature probe
- Dow Corning® Molykote® 111 silicone grease
- Lab clamp stand
- Small plastic cup and syringe



Settings

- Torque equivalent to Sunshine gel time: 24% of Full-Scale Range (RV spring torque range)
- Speed: 1 rpm
- Target torque for gel-time: 80%
- Temperature decrease after peak exotherm: 2°C

Procedure

1. Prepare the adhesive by mixing the two-part adhesive in a small plastic cup.
2. Transfer the mixed adhesive into the SC4-13RD sample chamber.
3. Lower the rheometer to immerse the glass rod in the adhesive.
4. Coat the temperature probe with silicone grease and insert it into the sample.
5. Start the Gel Time test using the DV360 software.
6. Monitor the torque and temperature until the target torque is reached.
7. Remove the rod and insert the temperature probe into the sample.
8. The software will determine the peak exotherm and stop the test.

Observations

- The adhesive's set-up time is approximately 15 minutes.
- The exothermic temperature rise spans 7.2°C, from 21.7°C to 28.9°C (Figure 1).
- The modest exotherm ensures customer safety.

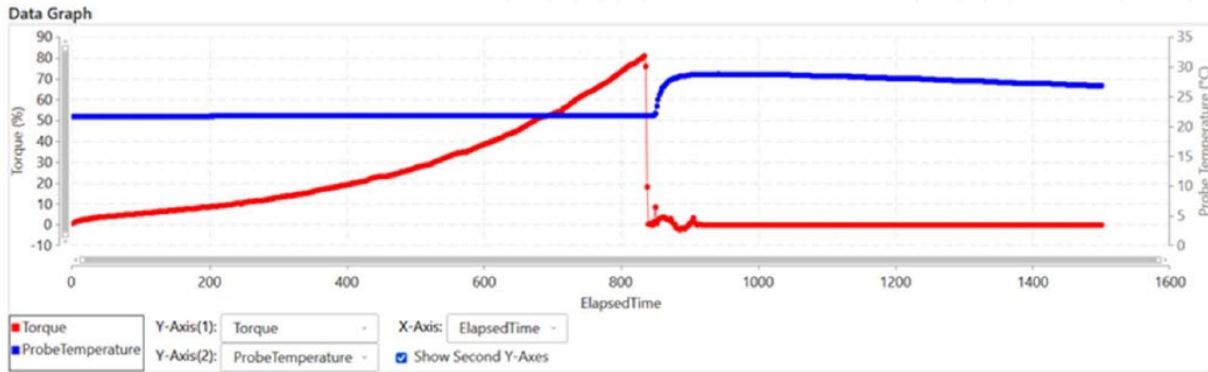


Figure 1: Torque, %, and Probe Temperature, °C, versus Elapsed Time, s, for curing adhesive.

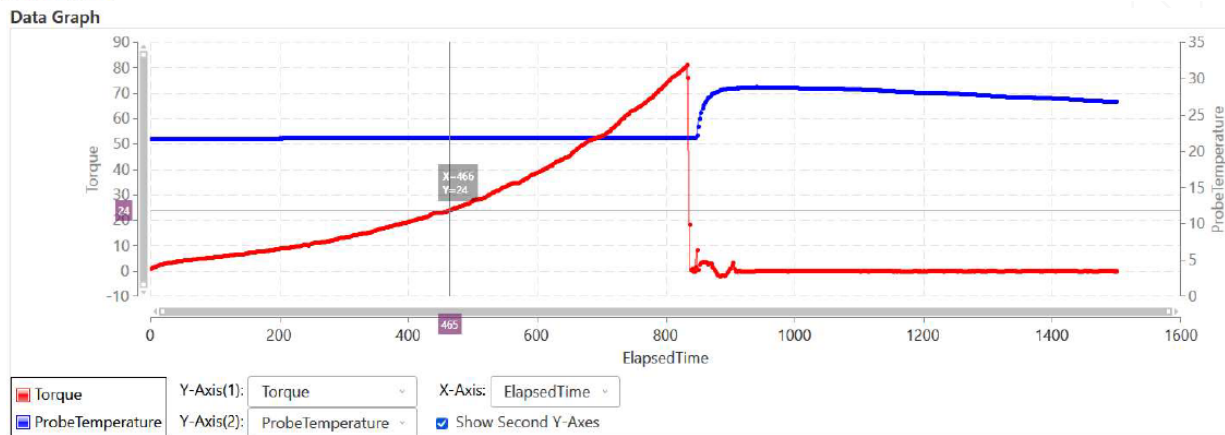


Figure 2: Cursor crosshairs set to “Sunshine gel time equivalent” torque, 24%. The corresponding gel time, in this case, is 466 s.

Results

- The gel time equivalent to the Sunshine gel time is 466 seconds (Figure 2).
- The peak exotherm and gel time are accurately determined using the Brookfield Gel Timer system.

Discussion

- The Brookfield Gel Timer provides a reliable and accurate method for determining gel time and peak exotherm.
- It offers a suitable replacement for the discontinued Sunshine gel timer.
- The system's automated control and data acquisition enhance efficiency and accuracy.
- The modest exotherm observed ensures safe handling of the adhesive during testing.