

Soap Hardness Analysis

Understanding the hardness of soap is essential for ensuring product quality and consistency. Hardness affects the user experience, shelf-life, and resistance to wear. Monitoring soap hardness during formulation helps manufacturers optimize texture for ease of use and durability.

Test Principle:

- This test compares the hardness of two soap formulations (premium and budget) using a penetration test. The force required to penetrate the soap is measured to assess firmness.

Equipment:

- Instrument: CTX Texture Analyzer with 50 kg load cell
- Software: Texture Pro

Accessories:

- 2 mm Cylinder Probe (TA-39), Confectionery Jig (TA-CJ), Fixture Base Table (TA-BT-KIT)

Settings:

- Test Type: Compression
- Pre-Test Speed: 1.0 mm/s
- Test Speed: 2.0 mm/s
- Post-Test Speed: 10.0 mm/s
- Target Distance: 8 mm
- Trigger Load: 30 g

Procedure:

1. Attach the 2 mm cylindrical probe and align it over the confectionery jig.
2. Insert the soap sample, ensuring it is centrally aligned with the probe.
3. Begin the penetration test at the set speed, allowing the probe to penetrate the soap to a depth of 8 mm.
4. Clean the probe after each test and ensure consistency across all samples.



Observations:

- Figure 1: Load vs. Time graph shows the hardness of premium and budget soaps. The higher peak in Sample A (premium) indicates it is significantly harder than Sample B (budget).

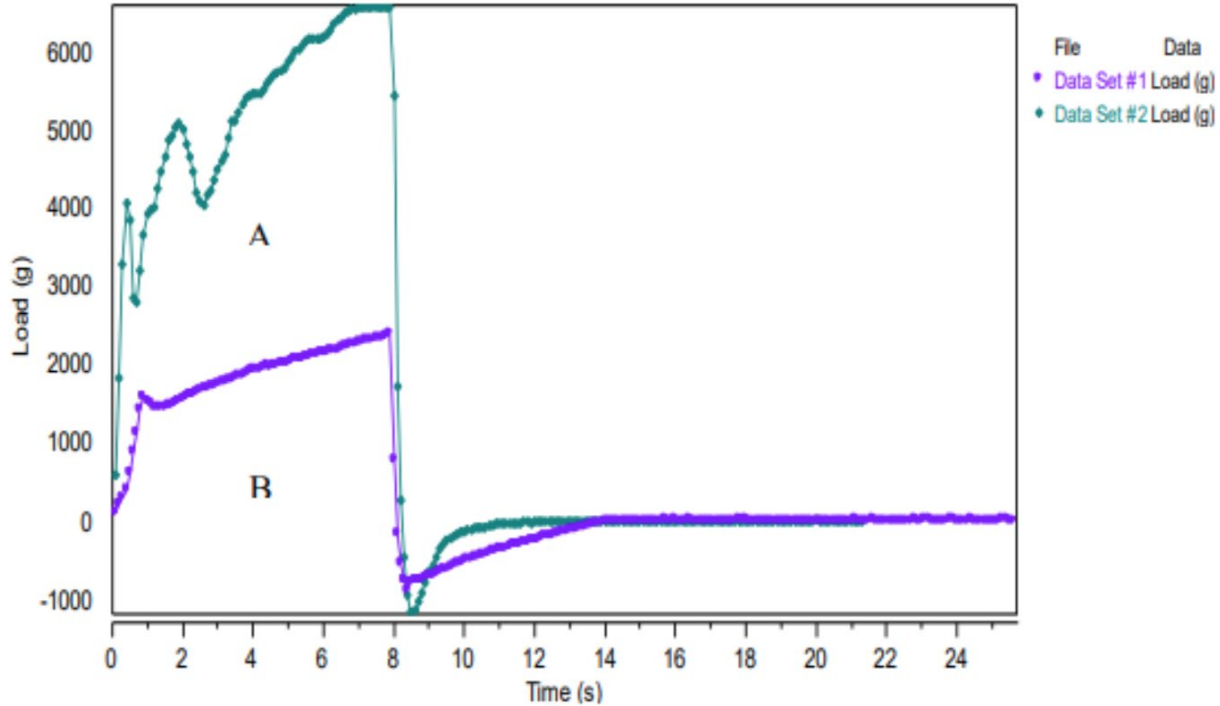


Figure 1

- The area under the curve represents the work done to penetrate the sample, with higher values indicating more energy required to break the internal bonds of harder samples.

Results:

Sample A (Premium Soap):

- Hardness: 6087 g ± 387
- Work Done: 346.1 mJ ± 59.8

Sample B (Budget Soap):

- Hardness: 2421 g ± 65
- Work Done: 146.4 mJ ± 5.5

Conclusion:

The test results provide valuable insights into the texture and firmness of soap, which can help manufacturers ensure consistent product quality. The higher hardness and work done values in the premium soap indicate a firmer product that may last longer, while the budget soap is softer and easier to break down.