

Flash Point Testing of Flavours and Fragrances using the Setaflash CCC (ASTM D6450; ASTM D7094)

Application Note

Flash point determination is essential for the safe classification and handling of flavour and fragrance materials. These substances are typically volatile, high in value and often available only in limited quantities, placing greater demands on both the accuracy and efficiency of the testing process.

The choice of method and instrumentation has a direct impact on cost, safety and confidence in the result. The Setaflash CCC is a fully automated Continuously Closed Cup flash point tester designed to meet these requirements, combining strict method compliance with advanced safety systems and efficient operation.

How the Continuously Closed Cup test method works

Continuously Closed Cup testing is designed to measure flash point under tightly controlled conditions.

During testing, a small sample is placed in a closed chamber and heated at a defined rate. At regular intervals, a high-voltage electric arc is introduced into the chamber. A flash is detected when ignition causes a defined pressure increase.

In accordance with ASTM methods, a flash is recorded when this pressure reaches at least 20 kPa within 100ms.

This approach offers several important advantages:

- The closed environment prevents vapour loss
- Ignition conditions are precisely controlled
- Detection is based on pressure, removing subjective visual interpretation



Method integrity and compliance

Flash point is an empirical measurement, meaning the result is defined entirely by the method used to determine it. Even small variations in ignition, sample volume or chamber design can lead to different results.

For this reason, results obtained using different methods cannot be directly compared or correlated. Industry standards reinforce that only values obtained using the specified method are valid for specification purposes and correlated results are not permitted.

Any attempt to convert or estimate flash point values introduces risk into classification and compliance decisions.

The Setaflash CCC operates in full compliance with:

- ASTM D6450
- ASTM D7094
- IP 620

Ensuring that all results are valid, traceable and suitable for regulatory reporting.

Reducing cost through minimal sample volume

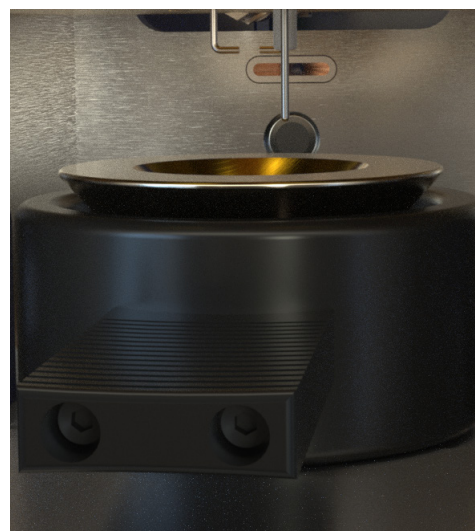
In fragrance applications, sample consumption is a key cost driver. Many materials are expensive and difficult to replace, making efficient use of sample essential.

The Setaflash CCC requires:

- 1 mL sample for ASTM D6450
- 2 mL sample for ASTM D7094

This significantly reduces material usage compared with larger-volume methods, lowering the cost per test while preserving valuable samples for further analysis or production.

In routine laboratory operation, this reduction in sample requirement can have a measurable impact on overall testing costs. The small sample size and closed cup design also helps to minimise the release of volatile vapours and strong odours into the laboratory during testing.



Designed for maximum safety

Testing volatile fragrance materials requires careful control of fire risk. The Setaflash CCC has been designed with safety as a central consideration, incorporating multiple independent protection systems within a fully enclosed test environment.

These include:

- Optical fire detection that continuously monitors the test chamber
- an inert gas fire extinguisher with automatic and manual activation
- pre-test ignition checks to identify potential risk conditions
- over-temperature protection and an independent emergency stop

The integration of fire detection and extinguisher provides an additional layer of protection when testing highly volatile samples.

This approach increases operator safety and helps prevent fires.

Ensuring valid and repeatable results

Reliable flash point measurement depends on maintaining correct and consistent test conditions throughout the analysis. One of the most common causes of unreliable results is poor or inconsistent sample homogeneity.

In conventional systems, incorrect stirring can go unnoticed, leading to non-uniform samples and unreliable flash detection.

The Setaflash CCC addresses this through dual-verification stirrer detection. The instrument confirms the presence of the stirrer before the test begins and continuously monitors its rotation during the test to ensure correct mixing conditions are maintained.

This ensures that:

- each test is performed under valid conditions
- variability caused by poor mixing is eliminated
- results can be trusted without the need for repeat testing

Automatic flash detection and barometric pressure correction further improve consistency, ensuring repeatable results across different operating conditions.

**Dual-verification stirrer detection
ensures every test is performed under valid conditions**

Improving laboratory efficiency

In routine laboratory environments, efficiency is determined not only by test speed but also by the time between tests. Delays in heating, cooling or cleaning can significantly reduce throughput.

The Setaflash CCC is designed to minimise this downtime. A quick test function allows the instrument to reach the required temperature before the sample is introduced, reducing waiting time. After each test, Peltier-assisted cooling rapidly returns the system to its starting condition, allowing the next test to begin without delay.

A removable test cup simplifies cleaning between samples and reduces the risk of cross-contamination, supporting faster turnaround in multi-sample test environments.

In practice, these features combine to create a more efficient test procedure and enable a higher number of tests to be completed in a given time.



Data integrity and traceability

Maintaining confidence in test results requires robust data handling and quality control. The Setaflash CCC incorporates features to support this, including automatic barometric correction, internal storage of more than 200,000 results and built-in Statistical Quality Control (SQC) software compliant with ASTM D6299.

These features support ISO 17025 requirements by enabling continuous monitoring of result validity and ensuring full traceability of all data.

Real-world impact for fragrance laboratories

In practical laboratory use, the combination of low sample volume, integrated safety systems and automated validation delivers measurable benefits.

Laboratories can expect:

- reduced sample consumption and lower cost per test
- improved operator safety when handling volatile materials
- fewer invalid tests and reduced need for repeat analysis
- increased confidence in reported results

For laboratories working with high-value fragrance compounds, these improvements translate directly into greater efficiency and more reliable decision-making.

Setaflash CCC Continuously Closed Cup Flash Point Tester 35600-0

Flash point testing of flavours and fragrances requires a balance of accuracy, safety and efficiency. The Setaflash CCC has been designed to meet these requirements by combining minimal sample consumption, advanced safety features and automated validation within a single instrument.

This approach enables laboratories to reduce operating costs, improve safety and maintain confidence in their results, while ensuring full compliance with recognised test methods.

For further information on the Setaflash CCC please visit www.stanhope-seta.co.uk/product/setaflash-ccc/

To discuss your application or arrange an instrument demonstration, please contact marketing@stanhope-seta.co.uk

