



Safer & Faster Flashpoint Testing with PBT - Peltier Boost Technology

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The patented PBT - Peltier Boost Technology™ by eralytics™ (www.eralytics.com) opens up unique new technical features for flashpoint testing according to the safest flashpoint methods ASTM D6450 & D7094. The Peltier elements are arranged above the measuring chamber following a revolutionary concept developed by eralytics' internationally renowned flashpoint specialists Mr. Andreas Schwarzmann and Dr. Roland Aschauer, both long-term members of the ASTM D02.08 flashpoint group. Paired with the conveniently small size (1-2ml) of the continuously closed sample cup (CCCFP design) this new concept allows for extremely safe flashpoint tests over the full required temperature range of -25 to 420°C (-13 to 788°F) in a single portable ERAFLASH™ flashpoint tester. Additionally, the high speed heating and cooling technology significantly shortens the turnaround time, making flashpoint testing more economical than ever before.

Closed Cup Flashpoint Methods

The classification of the flammability of fuels and other materials by their flashpoint has been an established practice since the early 19th century. Today the flashpoint is defined in numerous international test methods and measured by instruments using either 'open cup' or 'closed cup' methods. Both types of instruments are designed to detect the lowest temperature at which vapours from a test sample 'flash' when an ignition source is applied.

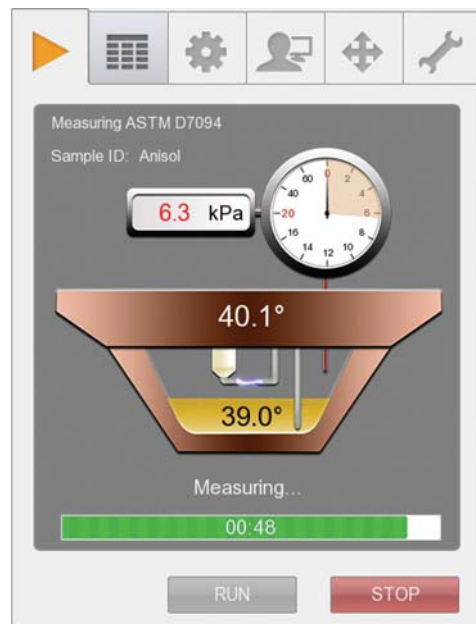
'Closed cup' instruments are often specified as the instrument of choice because their test results are less affected by laboratory conditions and give a more precise and lower (safer) result.

Over 100 years ago the two traditional flashpoint methods ASTM D56 (TAG method) and ASTM D93 (Pensky-Martens method) were developed; today they are specified internationally for testing fuels and other materials. Both methods share a common principle; 70-75ml of sample are heated and a test flame or glowing wire is lowered into the vapour space above the liquid in a specified interval to test whether vapour ignites. This procedure is repeated until the flashpoint is reached.

Continuously Closed Cup Flashpoint Methods

Due to strict safety regulations in modern laboratories, the use of an open flame in combination with highly flammable liquids is a major safety issue. The requirement for a safer flashpoint method resulted in the development of the so called Continuously Closed Cup Flash Point method (CCCFP) ASTM D6450 published in 1999 and the Modified Continuously Closed Cup Flash Point method (MCCCFP) ASTM D7094 published in 2004.

Due to its extremely safe design, which completely prevents the risk of fire or hazardous fumes in the laboratory, today ASTM D7094 is the choice method for modern flashpoint testing for a variety of liquids and solids.



Not only does the small measuring chamber require only 1-2ml of sample to remain closed during measurement, but there are no open flames or glowing wires required for this test method.

An electric arc inside the closed chamber, instead, is used to ignite the vapours and the flashpoint is detected by monitoring the pressure in the closed measuring cell.

The flash is detected by measuring the sudden pressure increase just a few milliseconds after ignition and is automatically extinguished due to the lack of oxygen in the closed measuring cell. In combination with a fully heat-insulated sample cup holder, safe to touch even after measurements at very high temperatures, any safety concern related with flashpoint testing is a thing of the past.

Another reason for the wide industry acceptance of the Modified Continuously Closed Cup Flash Point method ASTM D7094 is the ASTM proven excellent correlation to the traditional closed cup method ASTM D93 (Pensky-Martens). For ASTM D7094 the ASTM Flashpoint Committee officially states that there is no statistically significant bias observed compared to ASTM D93 Procedure A and the official precision data of D7094 are even better than the ones for ASTM D93.

New Technologies Taking Modified Continuously Closed Cup Flashpoint testing (MCCCFP), According to ASTM D7094, to a Next Level

PBT - Peltier Boost Technology

With the patented PBT - Peltier Boost Technology the Austrian eralytics GmbH has taken this safe MCCCFP method to the next level. The PBT is one of the many features of eralytics' latest development, the automated flashpoint tester ERAFLASH.

ERAFLASH operates in full compliance with ASTM D6450 and D7094. In combination with the unique Peltier Boost Technology ERAFLASH is the first flashpoint tester worldwide to cover the full temperature range of -25 to 420°C (-13 to 788°F) in a single analyser.

The innovative arrangement and protection of the Peltier elements above the measuring chamber enable testing in the temperature range below 0°C and in excess of 200°C, without the need to change to another instrument. Moreover, measurements down to 0°C require no additional external cooling.

The PBT also offers previously unmatched heating and cooling rates allowing significantly shorter turnaround times and making flashpoint testing more cost effective than ever before. For example, measuring the flashpoint of FAME or fresh and used oils, which is usually carried out in the temperature range between 100°C and 250°C requires a very long cooling time in traditional closed cup instruments until the unit is ready for the next test.

The PBT allows ERAFLASH to cool the sample cell from 200°C to 100°C in less than 80 seconds. Even in the low temperature range, the unit can cool from room temperature to 0°C in less than 90 seconds.

Starting at room temperature, 100°C are reached in less than 50 seconds and for a temperature of 200°C only an additional 70 seconds are needed.



CPT - Contamination Prevention Technology



Cleaning after measurements often took time and involved maintenance activities or replacing sensors or other elements of the chamber assembly. ERAFLASH is different; its innovative CPT-Contamination Prevention Technology, a combination of an advanced electrode protection and self-cleaning ignition system, reduces cleaning and maintenance to a minimum.

Measurements of oils, in particular, can cause contamination of the electrode and its insulating ceramics. If cleaning is not performed on a regular basis sample residues can creep up the ceramic and cause electronic malfunctions.

In ERAFLASH the CPT totally prevents such contaminations; the electrodes and the sample sensors are sealed and the specially designed electronics are well protected. Furthermore the automatic arc cleaning removes any residuals by burning them off.

Combustion Graphics

The precision data of ASTM D7094 were evaluated in an inter-laboratory study where a large fraction of contaminated samples were used. Several samples were contaminated with small concentrations of material with a much lower flashpoint (e.g. diesel fuel and jet fuel with small amounts of gasoline or lubricating oil containing diesel fuel). Although the flashpoint measurement of such samples is a big challenge, the precision data were better for D7094 than for the traditional D93 Pensky Martens closed cup method.

To facilitate the analysis of such demanding samples and of special R&D applications, ERAFLASH displays the Combustion Graphics directly on the large colour touch screen. This makes it easy to detect even small amounts of flammable compounds, such as Methanol in FAME/Biodiesel.

QuickCal – High Precision Dry Block Calibration

The periodical calibration of the temperature sensors is a must for flashpoint testers to ensure accurate results; it is therefore also required by international standards like ISO.

To ensure maximum precision, eralytics offers the specially designed dry block calibrator QuickCal for calibrating the ERAFLASH temperature sensor. The compact size allows it to be directly attached and connected to the instrument. The QuickCal calibrator is automatically controlled by the ERAFLASH for a most convenient and accurate calibration of the temperature sensors.

For a fast on-site calibration ERAFLASH also comes with a Certified Reference Material Calibration Program.

