Smoke Point of Kerosene and Aviation Turbine Fuel
ASTM D1322

SP20 – Automated Smoke Point



Methods:
ASTM D1322, D1655, D7566, IP 598, DEF STAN 91-091 FTM 791-2107 JIS K2537

- **Referee in ASTM and IP methods**
- **Embedded temperature, humidity, pressure sensors**
- **Atmospheric conditions compensation capability**
- **User friendly, fast test time**
- **Increases precision**
- **Reduces labor**

Performing the smoke point test manually requires highly skilled technician with years of experience. Additionally, the manual test is time consuming. **The automation of the smoke point test introduced by AD Systems had drastically improved the precision of the test** in comparison with the original manual method, and consequently became the referee in ASTM D1322 and IP 598.

The SP20 uses a system that adjusts the size of the flame associated to a video camera that observes the flame. When the flame attains the shape described in the test method, the SP20 memorizes and reports the height of the flame.

The SP20 comes **with embedded temperature, humidity and pressure sensors.** An atmospheric conditions compensation (patent pending*) can then be applied. Upon switching on, the SP20 is ready for a direct sample measurement, no matter of the ambient conditions**, reducing by 2 hours the labor** normally spent for the complete calibration procedure, including the preparation of the 7 mixes.

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Significance and Use

This test method provides an indication of the relative smoke producing properties of kerosene and aviation turbine fuels in a diffusion flame. The smoke point is related to the hydrocarbon type composition of such fuels. Generally, the more aromatic is the fuel the smokier is the flame. A high smoke point indicates a fuel of low smoke producing tendency.

The smoke point is quantitatively related to the potential radiant heat transfer from the combustion products of the fuel. Because radiant heat transfer exerts a strong influence on the metal temperature of combustor liners and other hot section parts of gas turbines, the smoke point provides a basis for correlation of fuel characteristics with the life of these components.

Principle

The SP20 uses a patented system (License TOTAL RM) based on a video camera that observes the flame and an actuator that adjusts the size of the flame. The flame image is digitalized and the dedicated software determines the height of the flame when its shape corresponds to the one described in the test method. This specific flame is the one with the maximum height without smoke generation. An atmospheric conditions compensation (patent pending*) can be applied by the SP20.

Operation

The smoke point test with the SP20 is very easy:

(1) the operator prepares the candle according to the test method instructions.
(2) the candle is positioned on the SP20.
(3) the operator keys in all sample details and initiate the test.



Then the all procedure is automated. The candle is automatically lit, the five minutes stabilization time is followed by the three determinations of the flame height. At the end of test, the SP20 instrument calculates the mean value of the three flame heights measured and reports the result. The result is saved in a built-in data base and can be printed, transmitted to LIMS or copied on USB stick.

Benefits

The SP20 is an automated instrument that strictly follows the test method with an **improved precision**. It **eliminates the subjectivity** inherent to the manual test where the visual rating of the flame varies from one operator to another. Thanks to the digital imaging technology of the SP20, the shape of the flame described in the test method is automatically repeatedly determined and the corresponding flame height is precisely recorded in the same conditions. The **SP20 is drastically reducing labor** in comparison with the SP10 and manual instruments. Thanks to its **embedded temperature, humidity and pressure sensors**, an atmospheric conditions compensation (patent pending*) can be applied, then only one single set of calibration is needed. In addition, the SP20 **eliminates all safety risks** linked to the visual observation of an open flame while using a manual smoke point.

Ordering information	Description
AA220-002	SP20 – Automated Smoke Point Delivered ready for operation

Technical specifications	Description
Test duration	Less than 10 minutes
Flame height	0 to 50.0 mm
Resolution	0.05 mm
Precision	0.1 mm
Interface	8” full-color touch screen
Ambient sensors	Pressure: 300 to 1100 HPa Humidity: 10 to 90% RH Temperature: 5 to 50°C
Languages	En, Fr, Ru, Sp, Po, Ch, Ge
Results storage	Up to 1 000 000 results database (14GB) USB stick, LAN
Communication	USB (2), Ethernet (1), RS232 (1)
Printing	Serial port (printer is optional)
Dimensions	W x D x H (mm) W x D x H (inches) 330 x 330 x 420 13”x 13”x 16”
Weight	10 kg (22 lb)
Electrical	100/240V – 50/60 Hz – 75W

We reserve the right to alter specifications without notification

Your local distributor:

Agence Nord:
ZA Object'Ifs Sud - Lot A3
6 Allée Emilie du Châtelet
14123 Ifs
tél : 02.31.34.50.74
fax : 02.31.34.55.17

Agence Est:
Parc Club des Tanneries
2 Rue de la Faisanderie
67380 Lingolsheim
tél : 03.88.04.01.81
fax : 03.68.93.01.52

DELTA LABO

Agence Sud:
Bât Le Venango. 392 Rue Jean Dausset
AGROPARC - BP11575
84916 Avignon Cédex 9
tél : 04.90.27.17.95 fax : 04.90.27.17.52

www.deltalabo.fr
info@deltalabo.fr

For additional information:

AD Systems
Allée de Cindais - 14320 Saint André sur Orne - France
☎ +33 (0)2 31 75 02 68
Email: sales@adsystems-sa.com
www.adsystems-sa.com

* https://www.adsystems-sa.com/patents

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