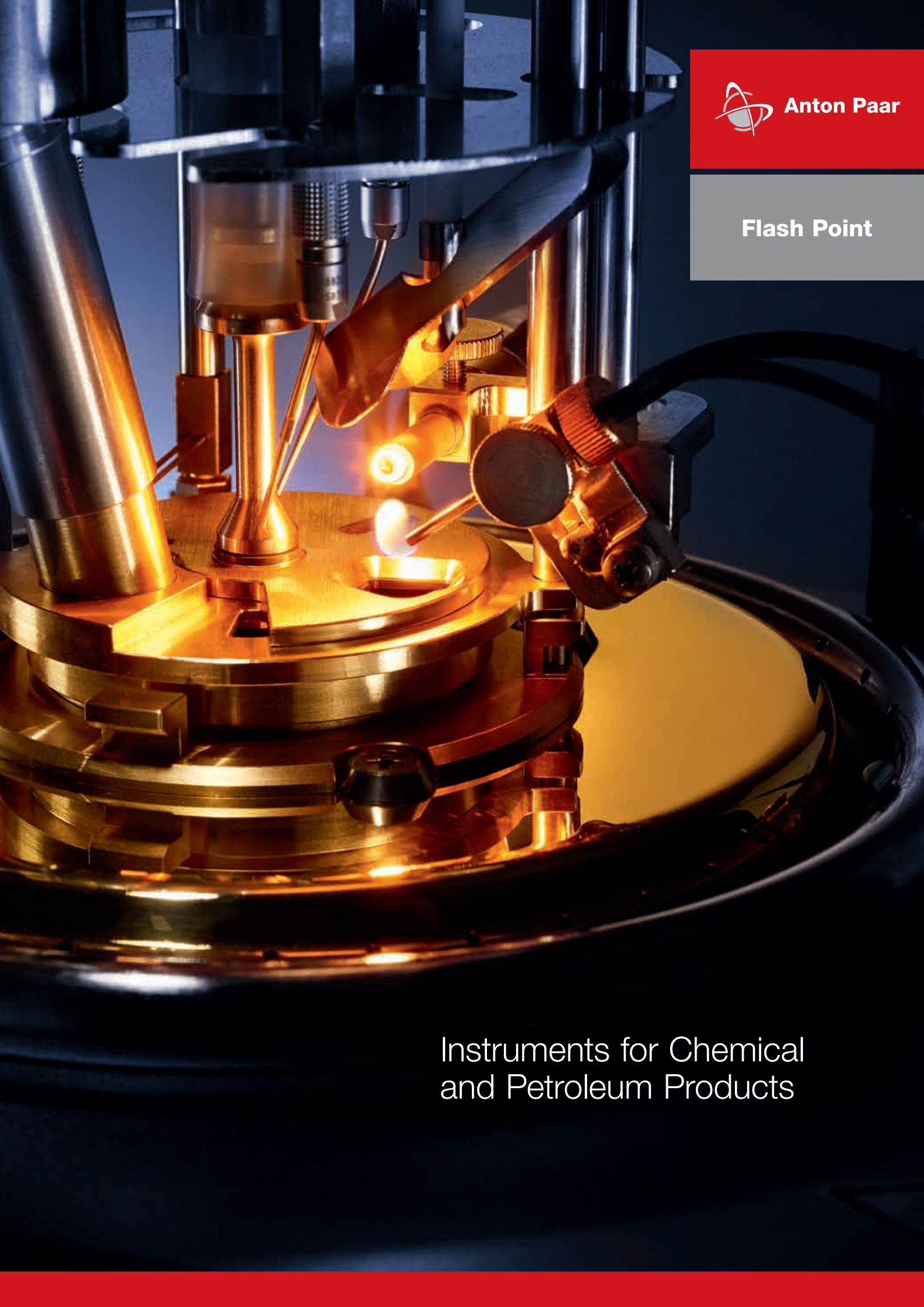


Anton Paar

Flash Point

Instruments for Chemical and Petroleum Products

A Tradition of Competence

140 years of technological advances lie between the first flash point tester and today's Anton Paar product line of flammability measuring instruments.

Mr. Berthold Pensky developed the first closed-cup flash point tester and set a milestone for the production of high-quality and high-precision flash point testers. Aligned to the requirements of various industrial branches the instruments from Berlin met a worldwide demand.

The acquisition of Petrotest by Anton Paar resulted in the combination of the spirit of research and inventive talent with the advantages of a worldwide, well-established sales and service team.

Founded in 1922, Anton Paar today employs over 2000 people in 20 countries who manage a global business and provide the whole value chain, starting from product ideas, research and development, production, sales, application support and after-sales services.

As a result of this unique concentration of talents and know-how, Anton Paar's product portfolio has grown continuously. It now covers a wide range of laboratory instruments, process technologies and automation systems, ranging from standardized QC to complex R&D solutions.

Anton Paar is close to you and your work. An experienced local team speaks your language and provides application support and training. Anton Paar thinks globally and acts locally.

Flash Point Measurement

All methods – all standards – one product line

Anton Paar has the suitable flammability tester for each type of measuring task in its product line. Tests according to standardized methods in the temperature range of -30 °C to 400 °C are possible to cover a wide range of applications. This includes: the petrochemical field, calibration and regulation authorities, transportation and shipping, engineering, waste management and the cosmetics and food industries.

Cleveland method …

… open-cup determination for expecting flash and fire point in the range of 79 °C to 400 °C (175 °F to 752 °F).

Pensky-Martens methods …

… closed-cup determination for expecting flash point in the range of 40 °C to 370 °C (104 °F to 698 °F).

Comprising:

Method A
for distillate fuels (diesel, kerosene, heating oil, turbine fuels), new lubricating oils and other homogeneous liquids.

Method B
for residual fuel oils, cutback residual, used lubricating oils, non-homogeneous materials like mixtures of petroleum liquids and solids, surface-film-building petroleum liquids.

Method C
for biodiesel (FAME).
Requires electronic flash point detection!

Pensky-Martens closed-cup (PMCC).

PMA 5 is standardized for both biodiesel and biodiesel blended fuels along with distillate fuel such as diesel, heating oil and kerosene and potentially flammable liquids as lubricating oils.

Product highlights are:

- One-Twist head
- Multi-detector
- Integrated fire-extinguishing device
- Gas and electric ignition
- 1-button operation
- Tray

For standardized, comfortable, versatile and safe flash point testing the PMA 5 Pensky-Martens tester is the right choice!

Tag method …

… closed-cup determination for expecting flash point below 93 °C (200 °F).

Abel method …

… closed-cup determination for expecting flash point in the range of -30 °C to 70 °C (-22 °F to 158 °F).

All Methods – All Standards – One Product Line

ABA 4
Abel Flash Point Tester

Standard methods

Abel flash point:	ISO 13736, IP 170
Equilibrium procedure:	ISO 1523, IP 492, EN 924, ISO 1516, IP 491
Optional Abel-Pensky:	DIN 51755-1

Benefits at a Glance

- Two cooling systems with Peltier elements according to the ISO 13736 standard: an economical air-cooled model and a low-temperature version with external water cooling
- The two ignition systems in each unit give you the flexibility to work with an electric or gas igniter: if the gas ignition is used, the electric igniter will automatically relight the gas flame during the test, if necessary
- The One-Twist swivel-around multi-function head guarantees the safe and easy one-hand connection of all sensors and actuators such as the shutter-release, igniter, and detector contacts
- An extended measuring range up to 110 °C enables you to go beyond the conventional scope of the Abel method

TAG 4
Tag Flash Point Tester

Standard methods

Tag flash point:	ASTM D56, FTM 791-1101
Equilibrium procedure:	ASTM D3941, ISO 1523, IP 492, EN 924, ASTM D3934, ISO 1516, IP 491

Benefits at a Glance

- Two cooling systems with Peltier elements are available: an economical air-cooled model and a low-temperature version with external water cooling
- The two ignition systems in each unit give you the flexibility to work with an electric or gas igniter: if the gas ignition is used, the electric igniter will automatically relight the gas flame during the test, if necessary
- The One-Twist swivel-around multi-function head guarantees the safe and easy one-hand connection of all sensors and actuators such as the shutter-release, igniter, and detector contacts
- An extended measuring range up to 110 °C enables you to go beyond the conventional scope of the method

PMA 5
Pensky-Martens Flash Point Tester

Standard methods
Pensky-Martens methods for petroleum products:
ASTM D93 A+B+C, ISO 2719 A+B+C, JIS K 2265-3 A+B,
IP 34 A+B, GOST R EN ISO 2719

Benefits at a Glance

- Integrated fire-extinguishing system automatically controlled or manually released (requires N_2 or CO_2 gas)
- The One-Twist swivel-around multi-function head guarantees the safe and easy one-hand connection of all sensors and actuators such as the shutter release, stirrer, igniter and detector contacts
- A multi-detector combines the flash point detector and the temperature probe in a solid housing with a perfectly adjusted immersion depth
- Memory for 1000 tests, 20 operators, 100 sample names
- Statistical analysis (Min, Max, Mean, Repeatability)
- Data handling via USB stick for import into Excel ® or to LIMS

CLA 5
Cleveland Flash & Fire Point Tester

Standard methods
ASTM D92, ISO 2592, JIS K 2265-4, AASHTO T48,
FTM 791-1103, IP 36, GOST 4333

Benefits at a Glance

- Memory for 1000 tests, 20 operators, 100 sample names, 21 test methods
- Statistical analysis (Min, Max, Mean, Repeatability)
- Measures the flash point of silicone samples without any problems
- Automatically lights up the test flame, relights it by an electric igniter and suppresses the gas source at the end of the test

Versatility by Options

PMA 4 SC Sample Changer

The Pensky-Martens closed-cup tester with sample changer measures the flash point of up to 12 samples automatically. PMA 4 SC is suitable for flammability applications on both biodiesel and biodiesel blended fuels along with diesel, heating oil and kerosene. It is also commonly used for other potentially flammable liquids.

On-site calibration

The calibration set is a mandatory accessory for all flash point tester calibration programs. It is used to calibrate the sample temperature sensor Pt100 dynamically against certified liquid-in-glass thermometers.

The on-site calibration feature is very cost-effective and available at any time.

Multi-detector functionality check

The holding device for multi-detectors (PMA and ABA/TAG) allows you to check the functionality of your Pt100 and thermo-couple and enables calibration services to calibrate the Pt100.

The diagnosis function of the sensitive sensors prevents unnecessary service costs in case of unexpected measurements.

Small-scale samples

The test insert millicup for small sample volumes between 2 mL to 15 mL allows the application of the flash point tester for small sample quantities.

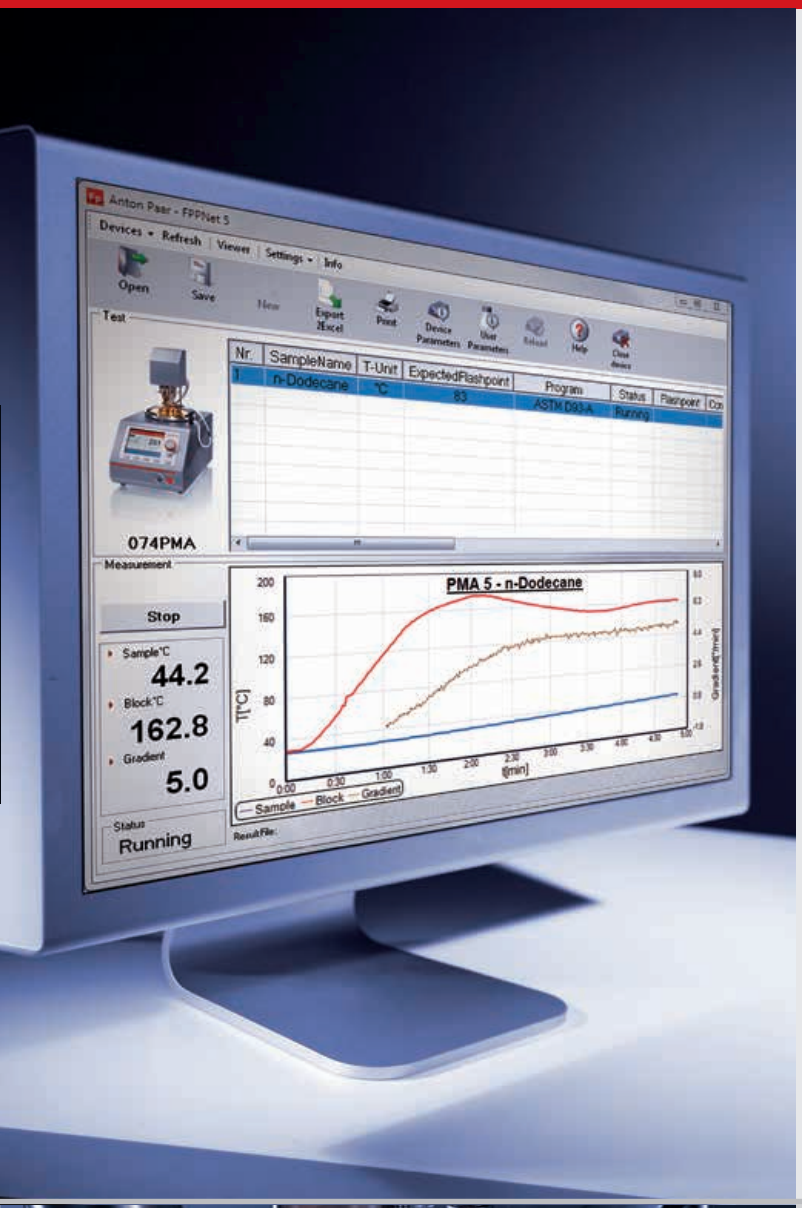
A reduced sample volume of 80 % is valuable for the cosmetics industry and also the R&D field.

Versatility by stainless steel

The test insert is a stainless steel alternative to the 75 mL standard type made of brass.

The multi-detector combines the flash point detector with a sturdy stainless steel temperature probe. Although not in compliance with official standards it extends the spectrum of samples.

High Throughput



FPPNet – Software for automatic flash point testers

The software serves the purpose of reading and evaluating test data as well as controlling the automatic flash point testers PMA 5, CLA 5, ABA 4, TAG 4, PMA 4 SC (sample changer version) and their previous models (PMA 4, CLA 4).

It is easy to operate, with self explanatory menus.The flash point tester is connected to the PC-RS232 interface by using a null modem cable or the USB port.

Benefits at a Glance

- Monitoring of real-time test progress on the PC screen
- Traceable documentation of all parameter adjustments
- Graphical display of the sample temperature, heater temperature and heating rate

Test procedures for the following flash point test methods:

Pensky Martens	ASTM D93-A+B+C, ISO 2719-A+B+C, JIS K 2265
Cleveland	ASTM D92, ISO 2529, JIS K 2265
Abel	ISO 1516, ISO 1523, ISO 13736
Tag	ASTM D56, ASTM D3934, ASTM D3941
User-defined programs	Can differ from standard test methods

Operating system: MS Windows® | XP SP3 | Vista | Windows 7

Multi-detector ensures full conformity with ASTM standard requirements

As clearly stated in the ASTM standards for closed-cup flash point testing, e.g. ASTM D 93-07, the flash point values are a function of the apparatus design and can therefore not be obtained by different test methods, or with a different test apparatus. Only the Anton Paar closed-cup flash point testers PMA 5, ABA 4, TAG 4 strictly follow these technical specifications without any constructive deviation such as additional openings in the lid for placing a flash point detector.

The solution is the Anton Paar multi-detector which combines the flash point detector and the temperature probe in a solid housing.

Specifications

Technical specifications	ABA 4		TAG 4	
Test programs	Abel flash point: ISO 13736, IP 170 | Equilibrium procedures: ISO 1523, IP 492, EN 924 | ISO 1516, IP 491 | Optional Abel-Pensky: DIN 51755-1 | 2 individually designable test programs		Tag flash point: ASTM D56, FTM 791-1101 | Equilibrium procedures: ASTM D3941, ISO 1523, IP 492, EN 924 | ASTM D3934, ISO 1516, IP 491 | 2 individually designable test programs	
Operation				
Configuration	ABA 4 (air-cooled)	ABA 4 (liquid-cooled)	TAG 4 (air-cooled)	TAG 4 (liquid-cooled)
Application range (°C/°F selectable)	10 °C to 110 °C	-30 °C to 110 °C	10 °C to 110 °C	-30 °C to 110 °C
Ignition type	Gas and electric (interchangeable)		Gas and electric (interchangeable)	
Stirring speed	According to method or user-defined		–	
Heating rate	According to method or user-defined		According to method or user-defined	
Cooling by Peltier elements	By built-in fan	With tap water or a low-cost circulation cooler	By built-in fan	With tap water or a low-cost circulation cooler
Barometric pressure correction	Flash point is automatically corrected to barometric pressure		Flash point is automatically corrected to barometric pressure	
Flash detection	Thermocouple		Thermocouple	
Sample temperature	Pt100		Pt100	
Test place	1 (standardized test insert with multi-detector included)		1 (standardized test insert with multi-detector included)	
Safety	Overheat protection, automatic shut-off | Detects a "flash" outside the cup | Test aborted by warning message		Overheat protection, automatic shut-off | Detects a "flash" outside the cup | Test aborted by warning message	
Calibration	User self-made sample-temperature-sensor calibration: dynamic against certified liquid-in-glass IP-thermometer or static by reference resistors | Barometric-pressure-sensor calibration		User self-made sample-temperature-sensor calibration: dynamic against certified liquid-in-glass ASTM-thermometer or static by reference resistors | Barometric-pressure-sensor calibration	
Handling	Splash-proof membrane touch-key panel with large LCD | Space-saving footprint		Splash-proof membrane touch-key panel with large LCD | Space-saving footprint	
Documentation				
Memory	99 tests		99 tests	
Interfaces	2x RS232		2x RS232	
Display	Splash-proof membrane touch-key panel with large LCD		Splash-proof membrane touch-key panel with large LCD	
Requirements and dimensions				
Power supply	115 V/230 V, 50 Hz/60 Hz, 180 W	115 V/230 V, 50 Hz/60 Hz, 150 W	115 V/230 V, 50 Hz/60 Hz, 180 W	115 V/230 V, 50 Hz/60 Hz, 150 W
Gas supply	50 mbar of propane or butane		50 mbar of propane or butane	
Dimensions	230 mm x 470 mm x 470 mm (W x D x H)		230 mm x 470 mm x 470 mm (W x D x H)	
Weight net	8 kg		8 kg	

Technical specifications	PMA 5	CLA 5
Test programs	ASTM D93 A+B+C | ISO 2719 A+B+C | JIS 2265-3 A+B | IP 34 A+B | GOST R EN ISO 2719 | 15 individually designable test programs	ASTM D92 | ISO 2592 | JIS K 2265-4 | AASHTO T48 | FTM 791-1103 | IP 36 | GOST 4333 | 10 individually designable test programs
Operation		
Configuration		
Application range (°C/°F selectable)	Up to 405 °C	Up to 400 °C
Ignition type	Gas and electric (interchangeable)	Gas
Stirring speed	According to method or user-defined	–
Heating rate	According to method or user-defined	According to methods, programmable and pre-heat mode
Cooling	Built-in forced air (fan)	Built-in forced air (fan)
Barometric pressure correction	Flash point is automatically corrected to barometric pressure	Flash point is automatically corrected to barometric pressure
Flash detection	Thermocouple	Ionization detector
Sample temperature	Pt100	Pt100
Test place	1 (standardized test insert with multi-detector included)	1 (standardized test insert)
Safety	Overheat protection, automatic shut-off | Automated fire-extinguishing system | A potential-free alarm relay contact is also available to connect a fire suppression or remote alarm system | Password protection | Detects a "flash" outside the cup | Test aborted by warning message	Overheat protection, automatic shut-off | Test aborted by warning message
Calibration	User self-made sample-temperature-sensor calibration: dynamic against certified liquid-in-glass ASTM-thermometer or against up to 21 user-defined temperature points from an external calibration certificate or static by reference resistors | Barometric-pressure-sensor calibration	User self-made sample-temperature-sensor calibration: dynamic against certified liquid-in-glass ASTM-thermometer or against up to 21 user-defined temperature points from an external calibration certificate or static by reference resistors | Barometric-pressure-sensor calibration
Handling	Splash-proof membrane key panel with color display | Jog shuttle with LED indication for input of test parameters, sample name and program selection | Selection of °C or °F, as well as further test parameters | Multi-language user support (English, German, French) | Progress of test displayed in different colors (user-defined) | The jog shuttle and 4 softkeys underneath the display are used for operation	Splash-proof membrane key panel with color display | Jog shuttle with LED indication for input of test parameters, sample name and program selection | Selection of °C or °F, as well as further test parameters | Multi-language user support (English, German, French) | Progress of test displayed in different colors (user-defined) | The jog shuttle and 4 softkeys underneath the display are used for operation
Documentation		
Memory	1000 tests, 20 operator names and 100 samples	1000 tests, 20 operator names and 100 samples
Statistics	Mean, Min, Max, Repeatability	Mean, Min, Max, Repeatability
Interfaces	3x USB, 1x RS232, 1x LAN	3x USB, 1x RS232, 1x LAN
Input options	Optional keyboard/bar code reader	Optional keyboard/bar code reader
Display	5.7'' QVGA color; real-time measurement displayed	5.7'' QVGA color; real-time measurement displayed
Requirements and dimensions		
Power supply	115/230 V, 50/60 Hz, 1000 W	115 V/230 V, 50 Hz/60 Hz, 600 W
Gas supply	Test flame: 50 mbar of propane or butane | Fire extinguisher: 6 bar to 12 bar of nitrogen or carbon dioxide	50 mbar of propane or butane
Dimensions	230 mm x 410 mm x 460 mm (W x D x H)	230 mm x 390 mm x 460 mm (W x D x H)
Weight net	14 kg	12 kg

Technical specifications of PMA 4 SC: Next page

Specifications

PMA 4 SC **Standard Methods**

ASTM D93 A+B+C, ISO 2719 A+B+C, JIS K 2265-3, IP 34 A+B

Technical Specifications	
Application range	Up to 405 °C (°C/°F selectable)
Test places	1 to 12
Ignition	Gas and electric (interchangeable)
Heating	According to method or user-defined
Stirring	According to method or user-defined
Cooling	Built-in forced air (fan)
Flash detection	Thermocouple
Sample temperature	Pt100
Barometric pressure correction	Automatic correction
Safety	Overheat protection, automatic shut-off, fire-extinguishing system, detects a "flash" outside the cup, test aborted by warning message
Interfaces	Depending on PC configuration
Gas supply	▸ Test flame: 50 mbar of propane or butane ▸ Fire extinguisher: 6 bar to 12 bar of nitrogen or carbon dioxide
Power supply	115 V/230 V, 50 Hz/60 Hz, 1000 W
Dimensions	900 mm x 490 mm x 620 mm (W x D x H)
Weight	35 kg

Go Beyond the Conventional Scope

Extended Measuring Range for ABA 4 and TAG 4

Thanks to state-of-the-art Peltier element technology two cooling versions are available for ABA 4 and TAG 4: an economical version with internal air cooling for flash point measurements from +10 °C to +110 °C and and a low-temperature version with a low-cost external liquid cooling from -30 °C to +110 °C. This enables you to go beyond the conventional scope of the method.

ABA 4 and TAG 4 are suitable for flash point applications on jet fuels, solvents, chemicals etc. and give you the choice between gas or electric ignition as well as conducting both static and dynamic Pt100 sample calibration. ABA 4 and TAG 4 also provide automatic barometric pressure correction and thermocouple flash point detection.

More applications – High safety: Versatile CLA 5

Only the Anton Paar Cleveland open-cup (COC) flash and fire point tester CLA 5 measures flash points of silicone samples without any problems.

CLA 5 is also commonly used for flash and fire point applications of lubricants or bituminous material. It automatically measures and describes the properties of a sample in response to heat and a test flame under controlled conditions. The flash point measures the tendency to form a flammable mixture with air while the fire point indicates the tendency of sustained burning.

For skin forming bituminous materials, ease of use is enhanced by an optional automatic skin removal kit. CLA 5 meets the highest safety standards. In addition to overheat protection and automatic heat shut-off during the test, an optional stainless steel sample temperature sensor Pt100 increases operating safety.

XPTIP005EN-C

www.anton-paar.com