

Automatic Petroleum Tester

MPC-102S

Mini Pour/ Cloud Point Tester

Easy & quick operation

No liquid chiller

High precision

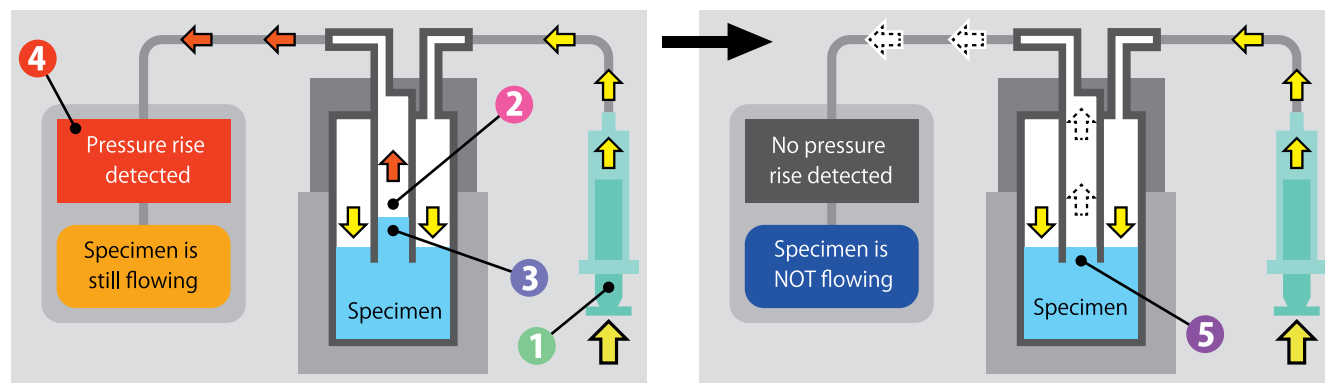
Compact design & energy efficient

ASTM standard test method (ASTM D6749 for PP, and D7683 for CP)



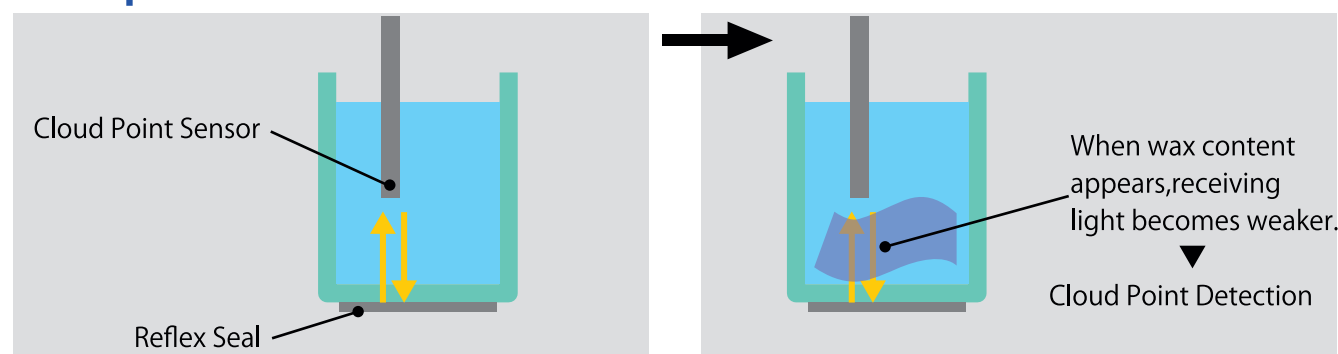
MPC-102S has been designed for automatic determination of **POUR POINT (PP) and CLOUD POINT (CP)** with small specimen size and shorter test cycle time while securing better test precision than the conventional manual methods'. PP measurement is by "**AIR PRESSURE METHOD**" (ASTM D6749), and CP measurement is by "**SMALL TEST JAR METHOD**" (ASTM D7683). The epoch-making automatic PP test method yields 1°C test resolution, while the new CP method yields 0.1°C resolution.

Principle of pour point detection



MPC-102S detects the pour point (freezing point) using our unique Air Pressure Method. The test specimen is preheated up to a specific temperature, then cooled at a controlled rate by the sequence program. At certain preset points reached during cooling, the specimen surface is subjected to the increased air pressure from the connected **Pressurizing Syringe ①** whose pressure is applied onto the circumference of the specimen surface. The central surface area of the specimen has the **Pressure Conducting Tube ②** inserted into it. The increased air pressure onto the circumference surface of the specimen causes its surface level to fall slightly. As a consequence (using the principle of the U-tube), the **surface level of the specimen inside the Pressure Conducting Tube rises ③**, and the pressure change caused by this rise is detected by the **Pressure Sensor ④**, confirming that the specimen has not yet solidified. Cooling of the specimen continues and the pour point detection is performed at the preset detection intervals. As the specimen movement reduces (which means solidification has started), **the surface level outside the Conducting Tube becomes steady ⑤** in spite of the application of increased air pressure, and therefore no more pressure change occurs inside the Conducting Tube. The measured temperature at this time is determined as the pour point. (For more details, refer to document ASTM D6749.)

Principle of Cloud Point detection



The temperature sensor to measure the specimen temperature is installed as well as Cloud Point sensor on the detector head. The Reflex Seal is fitted on the bottom of specimen cup, which can reflect the light from the sensor. Sensor is a double structure that consists of projector and receiver, and it observes the automatically adjusted light level during a test. When wax content appears from the bottom of specimen, then receiving light becomes weaker. The cloud point is detected when it reaches down to specific level.

New cooling system

With a cryo block bath model CB-80C manufactured by SCINICS®, MPC-102S works without an external liquid chiller!!

Testing intervals

PP can be determined at 1 °C, 2.5 °C or 3 °C intervals. 1 °C interval testing can allow for more precise process control, and therefore a considerable savings in the process can be realized. Likewise, CP can be determined at either 0.1 °C or 1 °C

High precision pour point determination

The typical repeatability and reproducibility are 1 °C and 2 °C respectively, when PP is determined at 1 °C intervals.

Easy sample handling

Since the required sample volume is a mere 4.5 mL and the sample cup is a test-tube type removable jar, the sample handling is extremely easy.

Easy & quick determination

Just set up a sample, select a test mode and expected pour point then press the "START" key. The sample is cooled at the steepest possible rate without affecting the formation/ growth of wax crystal, which has been known to be a critical factor for PP/ CP determination. The test cycle time is typically 1/3 to 1/2 of that of the conventional tilting methods. (*1)

*1: When a diesel fuel oil with PP of -30 °C is tested, the Air Pressure method took 45 minutes while the conventional tilting method took 140 minutes.

Data Storage Function of test result

Up to 50 successive test results can be memorized in order of date/time by the clock function of standard accessory.

If the printer of optional accessory is connected, the test date/time along with the test result can be printed.

The printing of the past test results can be printed at once.

Compact design & energy efficient

A compact and energy efficient cryo block bath model CB-80C is capable of cooling the samples to -65 °C without a liquid chiller. Electric energy consumption is only 20 % comparing to MPC-102L with external liquid chiller!!

Specifications

Mini Pour/ Cloud Point Tester **MPC-102S**

Ordering information	MPC-102S ; MINI POUR / CLOUD POINT TESTER Sequential CP and PP measuring capability. Sample cooling and pre-heating by cryo block bath.
Test standard	PP : ASTM D6749 / D97, ISO3016 CP : ASTM D7683 / D2500 , ISO3015
Specimen volume	4.5 ml
Measurement modes	Selectable from various modes. 1. CP mode : 0.1 °C or 1.0 °C intervals 2. PP mode : Programmed by the user. Programmable parameters are; *Amount of applied air pressure for PP detection, to accommodate different sample types : L (Low) for diesel fuels, H (High) for lube oils, VH (Very High) and UH (Ultra High) for residual fuels and similar samples. *Testing intervals : 1.0 °C, 2.5 °C or 3.0 °C (in total, 4 x 3 =12 modes for PP.) 3. CP / PP modes : CP is determined and then PP. PP detection is programmable by the user with the same parameters as PP modes' .
Measuring range	- 65 °C to + 51 °C
Automatic pre-heating	Automatic preheating at either + 45 °C or EPP + 10 °C. (EPP= Expected Pour Point)
Display	Big digital display on VFD. For showing real time test parameters (sample temperature, bath temperature, test result) and instrument settings.
EPP setting	EPP needs to be set prior to test starts. (EPP= Expected Pour Point)
Specimen cup	Cylindrical glass test jar with 4.5 ml sample volume with reflex seal on the bottom for cloud point test.
Sensors	Compound type sensor assembly for PP and CP. PP detected by air pressure method (patented). CP detected photo-electrically. PT100 temperature sensors.
Sample cooling rate	As standard, 4 °C / min. till EPP + 40 °C , and 1 °C / min. Thereafter cooling profile is programmable.
Safety shutdown	As hot side of TED reaches 60 °C while preheating, warning buzzer beeps and heating stops.
Data output	RS-232C = 1 channel (for PC or Optional Printer)
Power supply	100 VAC to 240 VAC, 50 / 60 Hz
Power consumption	160 VA MAX (and 150 VA for CB-80C), approximately 80 VA during a test.
Electricity consumption	80 Wh for 1 test (about 1 hour), 30 g CO ₂ (@ 0.378 kg CO ₂ / 1,000 Wh)
Operating temp. range	10 °C to 35 °C
Size (W x D x H)	300 x 460 x 320 (mm)
Weight	11 kg



Specifications of cryo block bath

Ordering information	CB-80C ; CRYO BLOCK BATH, manufactured by SCINICS®
Temperature range	-70 °C to +80 °C
Temperature control	PID control (with 2 points of revision functions)
Size (W x D x H)	222 x 407 x 238 (mm)
Weight	13 kg

Specifications subject to change without prior notice.

Apparatus

Code No.	Part name	Remarks
MPC-00-018	MPC-102S (Control unit with CB-80C)	

Standard accessories

Code No.	Part name	Qty	Remarks
MPC-01-009	Specimen cup with reflex seal	1	Cylindrical glass test jar with 4.5 ml sample volume with reflex seal on the bottom for cloud point test.
MPC-01-010	Pressure conducting tube	1	A glass tube for pour point test by air pressure method.
MPC-01-020	Detector assembly for PP and CP	1	Temperature sensor, CP sensor and air tube assembly.
520-00-243	Detector rest	1	Place to put detector head while replacing sample.
MPC-01-420	Detector insulator	1	Prevent detector head from condensation.
MPC-03-029	Power connecting cable for cooling unit	1	To supply AC power to cooling unit.
MPC-03-030	Single connecting cable for cooling unit	1	To make a communication with cooling unit
MPC-02-032	AC power cable	1	For 100 to 120 V
MPC-02-033			For 220 to 240 V
320-00-021	Fuse	1	Glass fuse for AC power cable inlet (2 A).
	MPC-102S manuals	1	Manuals for MPC-102S and CB-80C.

Optional accessories

Code No.	Part name	Remarks
070-00-068	Printer, BS2-80TS	Prints out test data and instrument settings.

Suggested spares for 2 years

Code No.	Part name	Qty	Remarks
MPC-01-009	Specimen cup with reflex seal	20	Refer to standard accessories.
MPC-01-010	Pressure conducting tube	20	Refer to standard Accessories.
MPC-01-411	Reflex seal	30	Spare seal to putting on the bottom of specimen cup.
210-00-005	O-ring P-8	2	Sealing between detector head and conducting tube.
210-00-060	O-ringG-35	2	Sealing between detector head and sample chamber.

Distributed by

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