CLOSED CUP FLASH POINT TESTER

PE-TVZ

Pensky-Martens

GOST R EN ISO 2719-2008, EN ISO 2719:2002, ASTM D 93, GOST 6356

Data Sheet
Operating Manual

4215-036-23050963-2006 RE

Version 1.1 EN dated 26.10.2015

Part number: 1.40.10.0162

Saint Petersburg

2015

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1. GENERAL INSTRUCTIONS

1.1. This Data Sheet certifies parameters and technical specifications of the tester PE-TVZ, which are guaranteed by the Manufacturer.

1.2. The Data Sheet contains main specifications of the instrument and establishes rules of its operation, adherence to which will provide for fault-free operation of the instrument.

1.3. Requirements of the international standards EN ISO 2719: 2002, ASTM D93 and GOST 6356-91 (GOST 9287-59 Vegetable oils) are considered for oil products testing.

1.4. The Manufacturer performs guarantee service, maintenance and minor repairs of the tester.

2. PURPOSE

2.1. The flash point tester PE-TVZ is intended for usage as laboratory equipment to perform closed cup flash point determination of oil products according to method B EN ISO 2719: 2002, ASTM D93 and GOST 6356-91 (GOST 9287-59 Vegetable oils) are considered for oil products testing.

3. PRINCIPLE OF OPERATION

3.1. Principle of the tester PE-TVZ operation is that the cup with analyzed sample is heated with specified speed and the burner flame is set to the sample at temperature intervals, which are prescribed by the Standard. The lowest temperature, at which vapors of investigated material inflame, is determined as flash point.

4. CONSTRUCTION

4.1. The tester PE-TVZ (Figure 1) consists of:

- test cup (1), with cup handle (2);
- cover (3) with igniter (4) and stirring device (5);
- opening for measuring thermometer (6);
- cover rotation device (7);
- the tester body with electric fan (8);

- electric heater (inside of the instrument) with manual control of heating power (buttons 9 and 10), and switch on rear wall of the instrument (11);
- face panel (12), where following is located: liquid-crystal display (13) and control buttons: POWER (9, 10), STOP (14) – reset, (18) – lowering of burning igniter, and indicators of power supply (15), stirrer operation (16) and electric heater operation (17).

4.2. The body of the electric heater is made of metal according to dimensions of Appendix A1 ASTM D93. Wall thickness is 7 mm in order to deliver uniform heat flow to the cup with sample. Temperature is adjusted manually using the electronic power regulator (buttons 9 and 10).

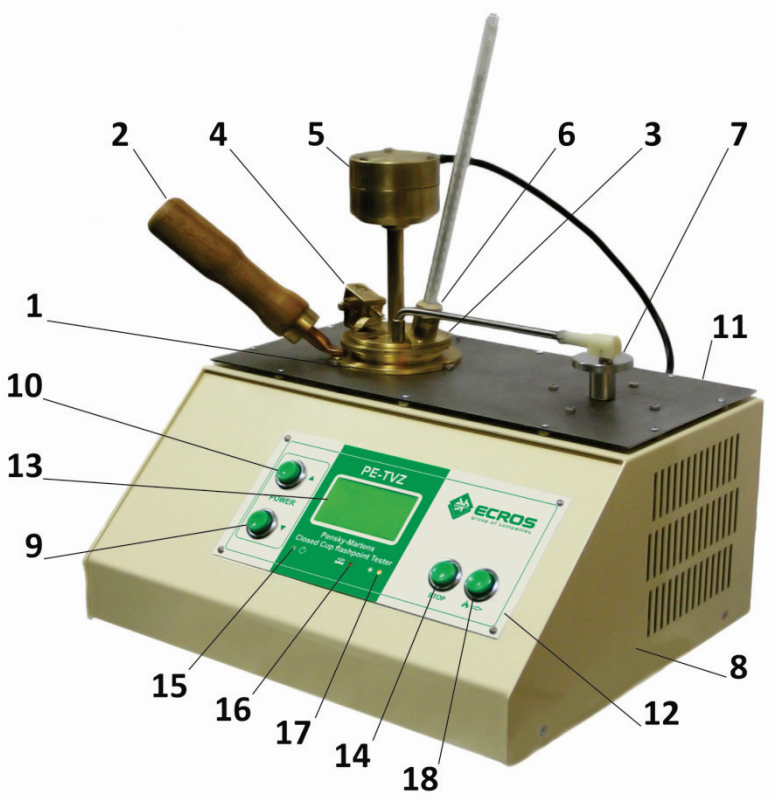

Figure 1

4.3. The test cup (1) is made of Brass L-59 according to dimensions requirements of Fig. A1.2. ASTM D93. For easy installation, the cup is equipped with lightweight handle, which is fastened to the flange.

4.4. The cover with shutter (3) is made of Brass L-59 according to dimensions requirements of Fig. A1.3. ASTM D93. The shutter is mounted in such way, so it would rotate along central axis of the cover between two extreme positions, so in one of extreme positions all holes in cover A, B and C will be completely closed, and in another one - completely opened. When holes are completely opened, tip of ignition device (4) (igniter) will be completely lowered.

On the cover (3) the stirring device (5) is fastened, which is equipped with two two-blade metal mixing arm manufactured according to requirements of Appendix A1 ASTM D93, Fig. A1.4. The stirrer axis is connected to the stepper motor, which provides for rotation speed of 100 rpm.

4.5. The stepper motor with disk drive (7) is used as device for cover rotation (3). The device opens and closes holes A, B, and C, meanwhile flame of igniter (4) lowers into a vapor space within 0.5 second, then stays in lower position for 1 second and elevates into upper position.

4.6. Body of the tester (8) is made of metal, covered by thermal- and corrosion-resistant coating. Ventilation holes are located on sidewalls. The electric fan for heater quick cooling after test is installed on right side of body. On rear wall of the instrument, there are switch POWER and fuse 0.25 A, connectors for network cable and power supply of stirring device motor.

4.7. Electronic control circuit is built on basis of microprocessor and it controls operation of stepper motors, fan, and heater and provides for the tester operation according to requirements of EN ISO 2719: 2002, ASTM D93 and GOST 6356, information is displayed on liquid-crystal display (13)

4.8. The closed cup flash point tester PE-TVZ was submitted for predelivery inspection, tuned, adjusted and packaged into transportation crate.
ATTENTION! Minor changes can be introduced into construction of PE-TVZ, which are not reflected in this manual.

5. Technical Specification

5.1. Maximum heating temperature, °C. .....up to 370

5.2. Power supply voltage from AC mains
with frequency of 50 Hz, V ..... 220± 22

5.3. Power consumption, no higher than, VA..... 400

5.4. Instrument weight, kg 6.8

5.5. Service life, years..... at least 5

5.6. Operating conditions:
5.6.1. Air temperature, ^{o}C.....-15÷35
5.6.1. Relative humidity, % .....-30÷90

5.7. Overall dimensions (body), mm:
5.7.1. Length 307
5.7.2. Width 255
5.7.3. Height..... 153

5.8. Range of flash point determination, °C.....25-370

5.9. Ignition device, type..... oil

6. SCOPE OF DELIVERY

6.1. The closed cup flash point tester PE-TVZ
complete with cup and cover, pcs. 1

6.2. Power cable, pcs. 1

6.3. Thermometer TH 1-1, pcs. 1

6.4. Thermometer TH 1-2, pcs. ..... (at the Customer's request)

6.5. Data Sheet, Operating Manual, copies 1

6.6. Packaging crate, pcs. 1

6.7. SPTA of the tester PE-TVZ

6.7.1. Wick for ignition device, set 1

7. PERFORMING OF TEST

7.1. Procedure for preparation of the ignition device (4)

7.1.1. Unscrew two bolts and remove the ignition device (4).
7.1.2. Separate a band of 12 strands of 10 cm length from unwound wick.
7.1.3. Pass a band of strands by half of length through wire loop, which was preliminary installed into ignition device from side of flame.
7.1.4. Draw loop, until tip of band would appear.
7.1.5. Fill the ignition device with supplied oil GOST 8808-2000 by 5/6 of volume.
7.1.6. Jerk wick strand a few times into both directions until oil appear on the tip of the ignition device from side of flame.
7.1.7. Cut the wick strand, leaving tip of length 2.5 mm.
7.1.8. Install the ignition device into the instrument and tighten two bolts.
7.1.9. Turn on the tester and when required temperature is reached, light up the wick.

7.1.10. Duration of wick continuous burning without refilling is 25 minutes.

ATTENTION! To provide for normal operation capability of the tester PE-TVZ, it is necessary to daily wash in benzene the cover (3) with igniter (4), cup (1), lower part of stirring device (5) and parts, which are exposed to analyzed fuel and oil for the ignition device.

7.2. Prepare the sample of oil product according to item 2 GOST 6356 (GOST 9287-59 Vegetable oils).

7.2.1. Prior to test, mix sample of product to be tested for 5 min by shaking in flask, which is filled by no more than 2/3 of its volume.

NOTE. Samples of products with flash point less than 50°C shall be cooled to the temperature, which is by at least 17°C lower than suspected flash point.

7.2.2. Prior to testing, samples of extremely viscous and hard products shall be heated to sufficient fluidity, but no higher than temperature, which is by 17°C lower than suspected flash point.

7.2.3. Samples of oil products, which contain more than 0.05% of water, shall be dewatered by processing with freshly baked and cooled sodium chloride, calcium chloride or sodium sulfate or by filtering through filtering paper. Then take upper layer for tests.

NOTE. If necessary (if sample contains water), it is allowed to shortly heat sample, but not above temperature, which is by 17°C lower than suspected flash point.

7.2.4. If it is suspected, that sample of oil product contains volatile impurities, then processing from items 7.2.1. and 7.2.3. are excluded and take upper layer for testing.

7.3. Preparation and performing test with the tester PE-TVZ.

7.3.1. Install the tester on even and stable table in place, where there is no noticeable air draft. To protect from air drift, cover the instrument on three sides by screed.
When several instruments are in use, it is allowed to correspondingly increase width of screen.

7.3.2. Wash the cup (1) and cover (2) of the instrument by solvent, then dry them to remove all remains of solvent and cool down to the temperature, which is by at least 17°C is less than suspected flash point.

7.3.3. When testing products with flash point up to 50°C, it is necessary to cool the heating pot to the temperature, which is by at least 17°C lower than suspected flash point. The temperature of the cup (1) shall be equal to the temperature of sample, which is prepared according to item 7.2.1.

7.3.4. Product to be tested shall be poured into the cup (1) up to mark, at that prevent wetting of the cup walls above this mark.

7.3.5. Close the cup by cover (3), install it into the heater slot, install the thermometer (6), and then light up the ignition device (4) and adjust flame, so its shape will be close to ball of diameter 3-4 mm.

7.3.6. While testing of toxic product or product, which evolves toxic materials during decomposition or burning, it is necessary to perform test adhering to safety rules, which are implemented for operation with toxic materials. In such case, the instrument shall be installed under exhaust hood or use appropriate gas mask and decontamination means.

7.3.7. Press buttons POWER (9, 10) to set required heating power, which will provide for the product heating at speed from 5 to 6°C per 1 min., at that control unit microprocessor provides rotation speed of the stirrer 100 rpm (from 1.67 s-1). When required power (9, 10) is set, heating and stirring will be started immediately and will provide for heating at set power during operation of the stirring device (5). The cooling fan in the body stops. The button STOP (14) - resets power of the heater to zero, heating and stirring stopped.

7.3.8. Tests for flash point shall be performed after reaching the temperature, which is by 17°C less than suspected flash point. For products with flash point up to 104°C, perform test for flash point after each temperature increase by 1 °C and for products with flash point over 104°C after each 2°C. At the moment of test for flash point it is necessary to press the button (18), at that the control unit microprocessor will:

- stop stirring (5);
- actuate (7) mechanism on cover (3), which opens the shutter;
- lower flame of igniter into a vapor space within 0.5 second;
- remains in lowest position for 1 second;
- lift flame of igniter (4) into upper position.

7.3.9. Reading of the thermometer at the moment, when the first (blue) flame clearly appears above surface of product inside the

instrument, is assumed as the flash point. Colored (bluish) halo, which sometimes surrounds flame prior to moment, when it causes the actual flash, shall not be assumed as the flash point.
If flash is unclear, it shall be confirmed by subsequent flash after the temperature increase by 1 or 2°C. If after that flash would not occur, repeat the test.

7.3.10. When the test is concluded, turn off the electric heater using the button STOP (14) – heater power will be reset to zero, heating and stirring stopped. At that, the fan in body will start to operate in order to quickly cool the heating element and heating top of the tester. Extinguish the ignition device and remove the cup with sample from the instrument.

7.3.11. Cooling of the instrument PE-TVZ is mandatory after each test, according to requirements to GOST 6356 and construction of the instrument. Failure to comply with this rule may result in shortened operation life of the instrument.
When operation is complete, turn off the instrument using the switch POWER (11) at the back wall of the instrument.

7.4. Perform processing of results.

7.4.1. Correction for barometric pressure is according to item 4 GOST 6356.

7.4.2. The arithmetic mean value of at least two consecutive determinations is assumed as the test result. Acquired value of flash point (°C) shall be rounded to nearest integer.

8. SAFETY PRECAUTIONS

8.1. As regards the level of protection against electric shock, the device is manufactured according to class 1.

8.2. The device shall be connected to the earthing loop by means of a three-pole plug or by wire to the earthing loop.

8.3. It is strictly prohibited to work with the unearthed instrument as well as use the water/gas-supply, flammable liquids pipelines, sewage networks, earthing connectors of lightning dischargers, etc. as earthing system. It is prohibited to use adapter to connect to two-pole sockets without earthing contact.

8.4. While testing of toxic product or product, which evolves toxic materials during de-composition or burning, it is necessary to perform test adhering to safety rules, which are implemented for operation with toxic materials. In such case, the instrument shall be in-stalled under exhaust hood or use appropriate gas mask and decontamination means.

9. TROUBLESHOOTING

Trouble	Possible cause	Remedy
Indicator POWER is not lit	Fuse is burned	Replace fuse 0.25A on rear side of the instrument body
Holes A, B and C do not open or close completely	Incorrect adjustment.	Adjust length of drive and fasten by nut
Ignite lamp (igniter) is not lit	There is no oil in oil cup	Add 2-3 drops of oil
	Wick burned out	Adjust length of wick or replace it
Motor of the stirring device does not work	Faulty microprocessor board	Send for repairs to the manufacturer

10. PACKAGING, TRANSPOTRATION, STORAGE

10.1. The tester PE-TVZ in transportation package can be transported by any types of closed transportation means.

10.2. Store the tester PE-TVZ in closed position - in the transportation package under environment temperature from +5 to + 40°C and relative air humidity up to 98%.

11. WARRANTY

11.1. Ecohim Co. Ltd. guarantees the compliance of the product with the requirements stipulated in item 5 hereof provided the consumer adheres to the operation, transportation and storage conditions.

11.2. Within the guaranteed service life, the free-of-charge repair or replacement of the device on the claim is provided in case the consumer has observed the storage, transportation and operation rules.

11.3. The warranty maintenance shall be only performed by the authorized service centers.

12. CLAIMS INFORMATION

12.1. In case of revealing any faults within the guaranteed service life or incompleteness when unpacking the product, the consumer shall submit the claim report to the manufacturer's address:

Ecohim Co. Ltd.
22 17th Line, building I, Suite 406 Vasilyevsky Island,
Saint Petersburg 199178;
Telephone/Fax: +7 (812) 322-96-00, 449-31-22, 449-31-23;
E-mail: info@ecohim.ru, URL: www.ecohim.ru

12.2. No claims for the device may be submitted:

- on expiration of the warranty period;
- if the consumer has broken the operation, storage and transportation rules provided in the operating documentation.

13. CERTIFICATE OF ACCEPTANCE

The open cup flash point tester PE-TVZ for oil products serial number _____ has been manufactured and accepted in accordance with the statutory requirements of the state standards and current technical documentation and recognized to be ready for service.

Date of manufacture _____

Stamp of the Technical
Control Department

Inspector _____

APPENDIX 1 – INFORMATION ON THE REPAIRS PERFORMED

Data of failure	Nature and causes of the failure	Note of the organization having performed the repair	Remarks