

	Technical Specifications for Verification and Inspection of Oil Meters	S/N	CNMV 117																				
		Rev.	3																				
1. These Technical Specifications are developed pursuant to Paragraph 2, Articles 14 and 16 of the Weights and Measures Act. 2. The date of promulgation, document number, date of enforcement and content of amendment are listed as follows : <table><tr><th>Rev.</th><th>Date of Promulgation</th><th>Document No. (Ching-Piao-Szu-Tsu)</th><th>Date of Enforcement</th><th>Content of Amendment</th></tr><tr><td>1</td><td>29.05.2003</td><td>No. 09240005130</td><td>01.07.2003</td><td></td></tr><tr><td>2</td><td>10.11.2005</td><td>No. 09440004060</td><td>01.12.2005</td><td>Supplementation of definition of error, revision of verification and inspection requirements on equipment and multi-nozzle dispenser sharing the same lead sealed adjusting device.</td></tr><tr><td>3</td><td>98.12.16</td><td>No.09840006380</td><td>01.01 2010</td><td>1. Supplementation of requirements for the necessary applications for re-verification of machine transfer or petroleum products change 2. Supplementation of requirements for the failure to inspection against certain nozzles 3. Supplementation of requirement that the standard measuring buckets (tanks) over 20L shall be used for diesel oil meters with a caliber over 20 mm 4. Revision of requirements for verification and inspection of low flow rates 5. Revision of requirements for using seals to replace lead seal</td></tr></table>				Rev.	Date of Promulgation	Document No. (Ching-Piao-Szu-Tsu)	Date of Enforcement	Content of Amendment	1	29.05.2003	No. 09240005130	01.07.2003		2	10.11.2005	No. 09440004060	01.12.2005	Supplementation of definition of error, revision of verification and inspection requirements on equipment and multi-nozzle dispenser sharing the same lead sealed adjusting device.	3	98.12.16	No.09840006380	01.01 2010	1. Supplementation of requirements for the necessary applications for re-verification of machine transfer or petroleum products change 2. Supplementation of requirements for the failure to inspection against certain nozzles 3. Supplementation of requirement that the standard measuring buckets (tanks) over 20L shall be used for diesel oil meters with a caliber over 20 mm 4. Revision of requirements for verification and inspection of low flow rates 5. Revision of requirements for using seals to replace lead seal
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NO GUARANTEE OF THE TRANSLATION

In case of discrepancies between the English translation and Chinese text, the Chinese text shall govern.

1. Scope: This specification applies to flow meters for oil (hereinafter referred to as "oil meters") subject to verification and inspection, but excludes whose outlet diameter is larger than 160mm.
2. Construction
 - 2.1 The measuring unit of an oil meter is the liter, symbol: L.
 - 2.2 An oil meter shall be clearly marked with the following information:
 - (1) Instrument serial number and model number.
 - (2) Kind of petroleum product.
 - (3) Maximum flow rate or caliber of outlet.
 - (4) Manufacturer's name or trademark.
 - 2.3 The measuring device of an oil meter shall be connected firmly and no leakage.
 - 2.4 An oil meter shall be equipped with a filtering device.
 - 2.5 The information listed in paragraph 2.2 and other markings of an oil meter shall be correct, obvious and indelible.
 - 2.6 The display (indicator) of an oil meter shall be marked with the measuring unit or other symbols.
 - 2.7 The flow display (indicator) of an oil meter shall be clear, smooth and accurate.
 - 2.8 An oil meter with price-indicating device shall be clearly marked for easy scrutiny the unit price and units of measurement.
 - 2.9 The digits of display (indicator) of an oil meter shall advance in ascent sequence on the decimal system basis, without intermittence or repetition.
 - 2.10 The indication and value of a cycle on the display (indicator) of an oil meter shall be a positive or negative power of 1 or 10.
 - 2.11 When an oil meter equips with a zero-setting device, the oil volume display (indicator) shall be reset to zero prior to each operation; if the meter also equips with a pricing device, the price display (indicator) shall also be reset to zero simultaneously.
 - 2.12 If an oil meter equips with two or more filling nuzzles, both nuzzles shall be able to be operated independently without affecting each other.
 - 2.13 An oil meter with a preset quantity device shall indicate the operating instructions of the device clearly.
 - 2.14 An oil meter with a coin slot or credit card reading device (or other similar devices) shall be able to display (indicate) the oil volumes and the corresponding prices automatically.
 - 2.15 Under no circumstance can the flow adjusting devices or errors adjusting device of an oil meter be adjusted after it is verified and sealed.

In case of a multi-nozzle dispenser sharing a sealed adjusting device being repaired, adjusted or reconstructed, all its nozzles shall be re-verified, and each nozzle shall be attached with a verification compliance tag after passing the re-verification. However, upon removing the original seal and adjusting a certain nozzle under witness by BSMI's verification technician, it is allowed that only the adjusted nozzle is verified and attached with the verification compliance tag.

Among the multi-nozzle dispensers sharing the same sealed adjusting device, if

certain nozzle fail to inspection, the verification/inspection compliance tags on them shall be removed, and “Suspended Use” labels shall be attached, but the seal shared by them should not be removed.

- 2.16 When oil meters are moved or the kinds of petroleum product are changed (not including those among every kind of gasoline), they shall be re-verified.

3. Verification, Inspection and Maximum Permissible Errors

3.1 Verification and inspection equipment shall be traceable to national standard

- (1) Standard measuring bucket (used in the comparison method):

Capacity: 10 L, minimum scale intervals shall not be more than 0.01 L;

Capacity: 20 L, minimum scale intervals shall not be more than 0.02 L.

Capacity: 50 L, minimum scale intervals shall not be more than 0.05 L.

- (2) Standard measuring tank (used in the comparison method):

Capacity: 200 L, minimum scale intervals shall not be more than 0.2 L.

Capacity: 500 L, minimum scale intervals shall not be more than 0.5 L.

Capacity: 1000 L, minimum scale intervals shall not be more than 1 L.

- (3) Standard flow meter: the measuring range shall be determined according to the capacity of the oil meter under test, and the minimum scale interval of indicator of the flow meter shall be less than 1/1000 of the measured value.

- (4) Thermometer: 0 °C~50 °C; minimum scale intervals shall not be more than 1 °C.

- (5) Timer: minimum scale intervals shall not be more than 0.2 seconds.

3.2 The errors of the meter are the permillage of the difference between the volume indicated on the oil meter under test and the actual measured volume of oil passing through the oil meter divided by the actual measured volume.

The errors referred to in the preceding paragraph shall be rounded to the first decimal.

3.3 The errors of verification or inspection of oil meters shall be conducted under a high flow rate (not less than 60% of the labeled maximum flow rate) and a low flow rate (not more than 30% of the labeled maximum flow rate; if less than 10L/min, 10L/min shall apply) separately. When implement initial verification or verification after repaired, adjusted or reconstructed, verification procedure shall be conducted twice as each of the aforementioned requirements; and the re-verification upon expiration of validity period of the previous verification or inspection shall be conducted once as each requirements. However, if the errors are over $\pm 3/1000$ of the verified or inspected oil volume, verification or inspection shall be conducted again as each requirement. Oil shall pass through the meter prior to verification or inspection every time, and the errors shall be not more than the statutory maximum permissible error.

3.4 When implement verification or inspection of errors against an oil meter by comparison method, infuse oil into a standard measuring bucket up to the required oil volume for verification first, close the valve, and have the filling nozzle drop oil for 5 seconds. Then, carry out the verification or inspection.

- 3.5 For oil meters equipped with oil volume preset devices, the errors of the displayed oil volumes shall be not more than the maximum permissible errors of verification or inspection for the preset volumes respectively.
- 3.6 When implement verification or inspection against a diesel oil meter with caliber over 20 mm, the standard measuring bucket/tank with the capacity more than 20 L shall be used.
- 3.7 The implement verification and inspection against oil meters with filling nozzle caliber of 35~160mm (hereinafter referred to as "big caliber") may be conducted by a standard flow meter or standard measuring tank.
When necessary, the applicant may provide the standard instruments for verification and inspection mentioned in the preceding paragraph, such standard instruments shall be traceable to national standards.
- 3.8 Before implementing verification or inspection on a big caliber oil meter by a standard flow meter, all necessary devices and meter under test shall be connected in series firmly and allow oil following the piping system to eliminate the air inside the piping system completely, and reset the display (indicator) to zero. There shall be no leakage exiting during test.
- 3.9 When verifying or inspecting a big caliber oil meter with a standard flow meter, the formula for calculating the verification factor and the errors is as follows:

$$F = \frac{F_m \times V_{mm}}{V_{fm}}$$

$$E = \frac{1 - F}{F}$$

F : factor of the flow meter under test.

F_m : factor of a standard flow meter.

V_{mm} : measured volume on a standard flow meter.

V_{fm} : measured volume on the flow meter under test.

E : Errors (%)

The F values in the formula above shall be rounded to the fourth decimal. The E value shall be rounded to the first decimal. Other values shall be read as shown on displays or indicators.

- 3.10 When verifying or inspecting a big caliber oil meter with a standard flow meter, the verification or inspection shall be conducted twice continuously after adjusting the accuracy according to the factor of the oil meter under test. The flow rate shall be not less than 30% of the labeled maximum flow rate of the oil meter under test, the oil volume measured not less than 1000 times of minimum scale intervals or 2000 L, and the errors not more than the verified maximum permissible errors respectively.
The errors (%) referred to in the preceding paragraph shall be rounded to the first decimal.

- 3.11 When verifying or inspecting a big caliber oil meter with a standard measuring tank, the flow rate shall not be less than 30% of the labeled maximum flow rate of the oil meter under test and the verification or inspection shall be conducted by comparison method.
 - 3.12 The verified maximum permissible errors of an oil meter shall be $\pm 5/1000$ of the oil volumes for verification.
 - 3.13 The inspection maximum permissible errors of oil meters are the same as the verification maximum permissible errors.
 - 3.14 The period of validity of verification is two years, commencing from the day that a verification compliance mark is affixed to the oil meter, and expiring on the first day of the next month after two years.
4. Verification Compliance Marks
- 4.1 The flow-adjusting device of the oil meter shall be sealed after passing verification to prevent from being adjusted, and the verification compliance tag should be pasted clearly on the front face of the oil meter.