

Shipbuilding-Shop test code for centrifugal oil purifiers

1. **Scope** This Japanese Industrial Standard specifies shop test code for marine centrifugal oil purifiers (hereinafter referred to as “purifier”).

Remark: This standard makes reference to the following standards:

JIS B 8312 – Gear pumps and screw pumps – Testing methods

JIS K 2213 – Turbine oils

JIS K 2275 – Crude oil and petroleum products – Determination of water content

2. **Definition** The principal terms used in this standard shall mean as follows:

- (1) **Oil flow quantity** The oil flow quantity shall mean the total quantity to purified oil and waste liquid discharged during a unit time.
- (2) **Revolution speed** The revolution speed shall mean the number of revolution of bowl per minute. Furthermore, the revolution speed shall, as a rule, be measured at the bowl spindle. However, when this measuring method is impractical on account of the construction of the purifier, the number of revolutions may be converted from the revolution speed of the driving spindle or the driving motor.

3. Testing oil

3.1 Oil used for tests other than performance test For the oil used for tests other than the performance test **JIS K 2213** Class 1 (No additive) shall, as a rule, be used. The testing oil shall be heated before use to such an extent that the kinematic viscosity assumes approximately 24 mm²/s for the separating type centrifugal oil purifier, and approximately 50 mm²/s for the cylinder type centrifugal oil purifier. However, a part of them may be changed by agreement between the parties concerned.

3.2 Oil used for the performance test The oil used for the performance test shall, as a rule, be as follows.

- (1) The oil used for the performance test of separating water shall be of the oil specified in 3.1 mixed with fresh water by 2% in volume.
- (2) The oil used for the performance test of separating solid shall be of the oil specified in 3.1 mixed with solid particles such as graphite, polishing powder, or other proper solids by 0.3% in mass.

4. **Test item** The purifier shall be subjected to the following items of test. However, for the subsequent products of same manufacturer and same design, the test items marked with * may be omitted.

- (1) **Starting test**
- (2) **Stopping test**
- *(3) **Performance test**
- *(4) **Over speed test**
- *(5) **Oscillation test**
- (6) **Endurance test**
- (7) **Operating test for accessories**
- (8) **Overhaul inspection**

5. **Testing arrangement** Testing equipment shall be arranged as shown in **Figs. 1 and 2**, and shall be well prepared for all the tests specified in 4. The driving motor and purifier oil pump used for the testing shall be as follows:

- (1) **Driving motor** The motor shall, as a rule, be of the one which is to be equipped on the purifier.
- (2) **Purifier oil pump** The purifier oil pump shall be tested as follows:
 - (a) The pump driven by the same motor with the purifier shall be tested together with the purifier.
 - (b) The pump driven by an independent motor shall be tested independently and the combined test with the purifier may be omitted.
 - (c) When the pump performance test is needed, the pump shall be tested in accordance with **JIS B 8312**

6. **Tests and inspection** The purifier shall be tested as follows: The testing power supply shall, as a rule, have the rated value or a value close to this value of motor terminal voltage and frequency (for AC supply), which may partly be modified by an agreement between the parties concerned.

(1) **Starting test** The purifier shall be started under no load and the accelerating state of the rotating assembly shall be inspected. In addition, the time required from start up to the designed revolution speed, frequency (for AC supply), voltage and maximum current shall be recorded.

(2) **Stopping test** The stopping test shall be as follows:

(a) Operating at the designed revolution speed under no load or water sealed condition, the time required from cutting off the power supply until stop shall be measured. In addition, the operating condition shall be also inspected.

(b) In case the brake is equipped, operating at the designed revolution speed under no load or water sealed condition, the time required from applying the brake immediately after cutting off the power supply until stop shall be measured and the operating condition shall be also inspected.

(3) **Performance test** The performance test shall be divided into the performance test of separating water and that of separating solids, and purifying the testing oil specified in 3.2 at the designed oil flow quantity, the following items shall be inspected for at least 3 times or more.

(a) The quantity of purified oil and waste liquid shall, as a rule, be measured during more than 1 minute using measuring tank. However, a well-calibrated flow meter may be used instead of the measuring tank.

(b) Water droplets and foreign matters remaining in the purified oil shall be inspected with a microscope of 100 to 500 magnification.

(c) Oil droplets in the waste liquid shall be observed by visual inspection.

Remark: When needed or required, water droplets remaining in the oil shall be measured in accordance with JIS K 2275. The oil remaining in water shall be measured by a suitable physical way.

(4) **Over speed test** Operating for 5 minutes at 110% or more of the designed revolution speed under the water sealed condition (a different driving motor may be used), the condition of purifier shall be inspected.

(5) **Oscillation test** Operating under the water sealed condition and oscillating approximate 5 cycles per minute with inclination of 22.5 degrees to the left and right against the vertical axis the operating condition of the purifier shall be inspected for 5 minutes.

(6) **Endurance test** Operating continuously for 2 hours under the designed condition, the temperature rise of each portion, motor input and revolution speed shall be measured and also the vibration and noise shall be inspected. In this test, the purifier may be operated without circulating the testing oil continuously under water sealed condition. However, when the purifier with oil pump is tested under the water sealed condition, the oil shall be circulated through the pump using the by-pass pipe.

(7) **Operating test for accessories** In case of the purifier equipped with automatic or remote control devices, the operation of these devices shall be inspected.

(8) **Overhaul inspection** After the tests on (1) to (7) the gear cover is removed and the tooth face of the main gear shall be inspected. The bowl shall be overhauled and inspected especially adhering condition of separated sludge inside the bowl shall be inspected.

7. **Tests record** The test results shall be recorded on the recording sheets and reported. Examples of recording sheets are shown for **Reference**.

Over Speed Test				
Volt.	Amp.	Rev. speed of motor	Over speed of bowl	Over speed of rotor
V	A	min ⁻¹	min ⁻¹	min ⁻¹

Oscillation Test				
Inclination	Rev. speed	Temp. rise	Vibration	Noise
°	min ⁻¹	°C	mm/s	dB(A)