

Small craft – Test method at sea trials

1. Scope This Japanese Industrial Standard specifies the test method at sea trials (hereinafter referred to as “trial”) of small craft (excluding inflatable boats and small sail boats) with a length of less than 24 m and a gross tonnage of less than 20 tons.

Remark: This standard specifies general sea trial procedures. If this standard is difficult to apply for reasons of ship type, ship size and engine type, sea trials may be carried out in a manner corresponding to this standard.

2. Definitions For the purposes of this standard, the following definitions apply:

- (1) **Light condition** The condition of a small craft with its hull and machinery equipment and legal equipment.
- (2) **Trial condition** The condition of a small craft carrying a crew (the minimum number of persons necessary for ship operation and measuring), measuring instruments and fuel oil (1/2 of the capacity of the fuel oil service tank), in addition to the light condition of the small craft.
- (3) **Maximum continuous output** The maximum output of the engine at which it can be used continuously and safely.
- (4) **Milepost** Landmarks specifically provided for use in speed tests at trials.
- (5) **Timing of measured mile runs** Time needed for a small craft to travel between mile posts.

3. Sea trial records Trial shall be carried out by type and method of trials specified in 5, in accordance with a sea trial plan which has been prepared in advance, with the results collected in sea trial records.

4. Trial conditions The conditions of a small craft when subjected to trials shall be as follows:

- (1) Trial condition
- (2) Loaded condition

5. Types and methods of tests

5.1 Speed tests Speed tests shall be carried out for a small craft in both the trial condition and the loaded condition by making round mile post runs or by applying another equally effective method at 1/4, 2/4, 3/4 and 4/4 (or at the output corresponding to the permissible rotational speed of the engine) of the maximum continuous output.

5.2 Endurance tests Endurance tests shall be carried out on a small craft in the loaded condition at the maximum continuous output (or at the output corresponding to the permissible rotational speed of the engine) for at least one hour.

5.3 Fuel consumption test Fuel consumption tests shall be as follows.

- (1) Fuel consumption tests on a small craft in the trial condition or in the loaded condition shall be carried out at the maximum continuous output (or the output corresponding to the permissible rotational speed) continuously for a predetermined period.
- (2) During fuel consumption tests, auxiliaries not directly related to main engine operation shall, in general, not be operated. In the event that use of such auxiliaries during fuel consumption tests is unavoidable, corrections to fuel consumption may be made.
- (3) For internal combustion engines, fuel consumption, in general, is guaranteed on the basis of the results of shop tests. Fuel consumption tests for internal combustion engines at sea, therefore, shall be carried out merely for reference.

5.4 Astern tests Astern tests on a small craft shall be carried out in its trial condition by ordering “Full Astern” while the craft is running ahead at the maximum continuous output (or at the output corresponding to the permissible rotational speed) so that the ahead/astern reversing operation can be done as rapidly as is practicable, and the time before the craft comes to a stop shall be measured.

5.5 Turning tests Turning tests shall be carried out in the trial condition on a small craft running ahead on a fixed course at 1/4, 2/4, 3/4 and 4/4 of the maximum continuous output (or at the output corresponding to the

permissible rotational speed) by ordering a hard helm (to the rudder angle of 35 degrees) until the small craft has turned through 360 degrees. Turning tests shall be carried out in a similar manner on the opposite side. If the rudder cannot be turned through 35 degrees ($^{\circ}$), turning tests may be carried out at the maximum steerable rudder angles.

5.6 Steering tests Steering tests shall be carried out in the trial condition of a small craft which is running ahead at 1/4, 2/4, 3/4 and 4/4 of the maximum continuous output (or at the output corresponding to the permissible rotational speed) by taking the helm from hard over to hard over (35 degrees on one side to 35 degrees on the other side). Steering tests shall be carried out in the similar manner starting from the opposite side. If the rudder cannot be turned through 35 degrees ($^{\circ}$), steering tests may be carried out at the maximum steerable rudder angles.

Note⁽¹⁾: In addition to the case in which the rudder cannot be steered mechanically to the rudder angle of 35 degrees, cases in which dangerous conditions for a small craft are caused by excessive traversing or outboard heeling motions may be dealt with under the same principle.

5.7 Acceleration tests Acceleration tests shall be as follows.

- (1) Acceleration tests shall be carried out on a small craft in the trial condition running on a fixed course at the minimum rotational speed by bringing the throttle lever instantaneously to the top notch upon issuing an order and this running condition shall be maintained until the engine reaches the predetermined rotational speed.
- (2) During the test, the course of the small craft shall be kept constant, and acceleration tests on a reverse course shall be carried out in a similar manner.

6. Measuring items and measuring methods

6.1 General The general measuring requirements shall be as follows.

- (1) Measurements required for various tests specified in the trial plan shall be carried out.
- (2) Instruments of acceptable measuring accuracy, which have been inspected and calibrated in advance, shall be used.
- (3) Drafts shall be measured for both the trial condition and the loaded condition. Draft measurements shall, in principle, be taken before carrying out tests.
- (4) For speed tests, the timing of the measured mile run, rotational speed of the engine, exhaust gas temperatures and the trim angle of the hull shall be measured for each run.
- (5) For endurance tests, the rotational speed of the engine and exhaust gas temperatures shall be measured.
- (6) For fuel consumption tests, fuel consumption shall be measured using a flowmeter or other equally effective means.
- (7) For astern tests, periods between the issuance of an astern order and time the propeller starts running in reverse and between this and time when the craft comes to a stop, and distance between the astern order and the craft stops shall be measured.
- (8) For turning tests, the time between the issuance of a steering order and time when the craft has turned through 360 degrees, and the turning circle diameter shall be measured.
- (9) For steering tests, the time when steering motion starts and the termination of steering motions shall be measured.

In addition, checks shall be made on abnormalities in steering gear motions during steering operation.

- (10) For acceleration tests, time required before the predetermined rotational speed of the engine is reached for each run shall be measured with a stopwatch or other means.
- (11) Among the various measurements, those requiring special cautions are specified in 6.2 and thereafter.

6.2 Measuring drafts Drafts shall be measured in accordance with the following requirements.

- (1) Measurements shall be taken at a location which is least affected by winds, waves and currents, on a calm water or in the similar conditions.
- (2) After reading out draft marks provided at the bow and the stern, their mean values shall be determined.