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TEST REPORT

Report No: 2018-ETT-01002

Type of equipment	: Outboard Engine
Applicant	: ZheJiang AnQiDi Power Machinery Co.,Ltd
	: Tengda Road, Luqiao District, Taizhou, Zhejiang, China
	Tel: +86-576-82419166 **Fax**: +86-576-82419160
Manufacturing site	: Same as above
Type designation	: F15
LABORATORY	: Hangzhou ETT Testing Technology Service Co.,Ltd.
DATE OF TEST	: Date of receipt of test item: 2018-02-05
	: Date of performance of test: 2018-02-26
DATE OF ISSUE	: Feb.28, 2018
Test specification	: EN ISO 14509-1:2008 : Small craft - Airborne sound emitted by powered recreational craft - Part 1: Pass-by measurement procedures (ISO 14509-1:2008)

Chief tester: **Checked by:** **Approved by:**

General Information

Description of the Equipment Under Test (EUT)

Table 1

Model item	Unit	F15
Overall length	mm	1048
Overall width	mm	386
Overall height	mm	1078
Transom height	mm	438
Weight	kg	51
Full throttle operating range	r/min	5500
Maximum output	kW (HP) @r/min	11@5500
Idling speed (Neutral)	r/min	1000-1100
Engine type		Four stroke 15 horsepower
Cylinders		Double cylinder
Displacement	cm^3	362
Bore× stroke	mm	63 ×58.1
Ignition system		CDI
Control system		Tiller handle or Remote steering
Starting system		Manual or electric starter
Gear positions		Forward-neutral-reverse
Gear ratio		2.08
Trim and tilt system		Manual tilt
Fuel tank capacity	L	24

Test specifications

Standards

EN ISO 14509-1:2008 ： Small craft - Airborne sound emitted by powered recreational craft - Part 1: Pass-by measurement procedures (ISO 14509-1:2008)

Mode of operation during the test /Test peripherals used

The EUT was set to normal operation and all the operation modes were observed

Instrument list

Equipment	Type	Manu.	Serial number	Latest Calibration	Next Calibration
Calibrator	NL-52	RION	00342789	2017/03/16	2018/03/15
Soundmeter	NC-74	RION	34246531	2017/03/14	2018/03/13

Address and environments

Testing institution		Hangzhou ETT Testing Technology Service Co.,Ltd.
Test number		2018-ETT-01002
Test site location		Tengda Road, Luqiao District, Taizhou, Zhejiang, China
Test site specification		meet this requirement
Environmental conditions	Water surface conditions	good
	Wave height	<150mm
	Wind speed	2.0 m/s
	Wind direction	Southeast

Noise test

Test site specifications and environmental conditions

Test site specifications

Within 30 m around the craft under test and the microphone, there was no large surfaces (e.g. retaining walls, building facades, rocks, bridges) from which sound can be reflected back to the microphone.

In the vicinity of the microphone, there was no obstacles which could disturb the sound field. Therefore, no person was between the microphone and the sound source, and any observers were in such a position that any influence on the meter reading is avoided.

The area between the craft under test and the measurement microphone was open water, free from any sound absorbing or sound reflecting objects.

Environmental conditions

The measurements were performed under the following conditions:

-- absence of precipitation

-- wind speed less than 7 m/s measured at the microphone height;

-- calm water; i.e. wave height less than 200 mm.

Background noise

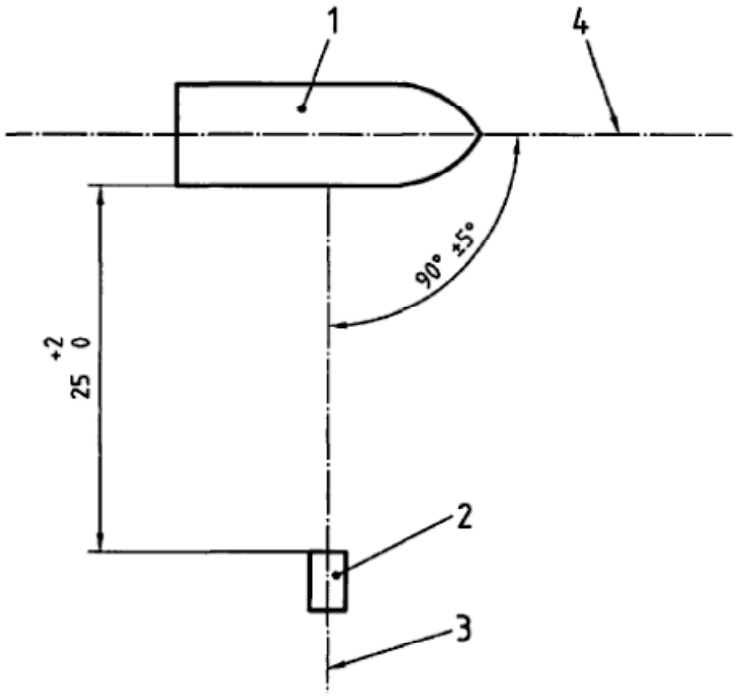
For type tests, the AS-weighted background sound pressure level, L''_{pAS},
shall be at least 10dB below the
maximum AS-weighted sound pressure level, $L'_{pAS\max}$,
obtained during the passage of the craft.

Test course, microphone positions and measurement distance

General

The test course to be followed was a straight line which is perpendicular within ±5° to a line through the microphone axis (see Figure 1).

Dimensions in metres

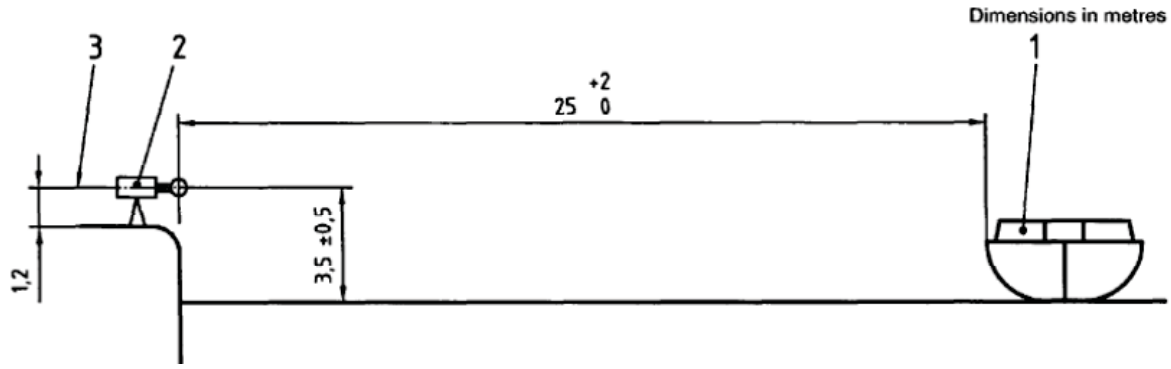


Key
1 Craft
2 Microphones
3 Microphone axes
4 Craft course line

Figure 1 - Position of the microphone and test course

The microphone was positioned at 3.5 m ± 0.5 m above the water surface and, if mounted on a solid surface, shall be positioned at least 1.2 m above that surface. The microphone shall be positioned within ± 0.5 m of the edge of the surface above which it is mounted.

Figure 2 shows the heights of the microphone position.



Key
1 Craft
2 Microphones
3 Microphone axes

Figure 2 - Microphone position and heights

The distance between the microphone and the side of the craft nearest to the microphone when passing it shall be 25^{+2}_{0} m

The intended course line should be indicated with markers, if possible.

Operating conditions

Craft was operated with an equivalent two-person load and a minimum fuel load of 10 liters, except for craft intended for one person as well as all PWC which shall have an equivalent one-person load. An equivalent one-person load is defined as 75 kg ±20 kg.

The engine of the craft was raised to operating temperature before the measurement starts. All the other operating conditions (fuel used, run-up time, etc.) was comply with the manufacturer's instructions.

For outboard motors shall be tested on standard craft as specified in clause 7**.**

The engine speed (r/min) shall be 100 % of the declared engine speed for all tests.

For propulsion systems which are equipped with adjustable trim, the trim angle shall be adjusted so that the propeller/impeller thrust is parallel to the bottom/keel-line of the craft to within 2°**,** hereafter referred to as zero trim for all test conditions.

For type tests, the propeller/impeller shall be selected such that at full throttle the engine speed falls within

±4% of the declared engine speed at level trim, in accordance with IS0 8665. In the case of spark-ignition engines without speed governor, the declared engine speed shall be the mid-point of the full throttle speed range recommended by the manufacturer for propeller selection. In the case of engines with speed governors, the declared engine speed shall be the governed speed specified by the manufacturer. For controllable pitch propellers, the pitch shall be fixed in a position required to obtain the declared engine speed at full throttle.

Test procedures

During the measurement the craft was pass through the test course as specified in clause 3.

The maximum AS-weighted sound pressure level, $L_{'pAS\,max}$,

during the passage was measured.

The AS-weighted background sound pressure level, $L_{''pAS}$,

shall be measured according to 3.3 immediately before and immediately after the passage of the craft.

For monitoring tests, the correction for background noise according to 3.3.3 shall be applied on the measured $L_{'pAS\,max}$ value to obtain the applicable measurement value, the maximum AS-weighted sound pressure level, $L_{pAS\,max}$ (but see also 6.5).

In the case of a reduced measurement distance according to 4.1.4 for type tests and for monitoring tests, the distance correction according to 9.2 shall, in addition to that stated in 6.4, be applied on $L_{'pAS\,max}$ to obtain $L_{pAS\,max}$.

At least two measurements shall be made for each side of the craft. The sound pressure level for each side of the craft shall be the average of the first two determined values of $L_{pAS\,max}$ for each side which are within 1 dB of each other. The maximum AS-weighted sound pressure level, $L_{pAS\,max}$, be recorded shall be that of the louder side of the craft.

The values of the following quantities shall be recorded: $L_{'pAS\,max}$, $L_{''pAS}$, the corrections for background noise (if any), the distance corrections (if any), and $L_{pAS\,max}$

Standard craft specifications for outboard motor type tests according to clause 4

Any series production craft with a V-hull shape meeting the dimensional, mass and operating characteristics given in Table 1 may be used as standard craft:

Declared propeller shaft power of outboard motor under test (according to IS0 8665) kW	**Length of hull** (according to IS0 8666) **m**	**Maximum beam** (according to IS0 8666) **m**	**Mass without engine** **kg**
P<6	4.0	1.6	135
6≤P<25	4.4	1.75	220
25≤P<55	5.0	1.9	400
55≤P<150	5.5	2.2	750
P≥150	7.0	2.5	1400

A variation of ±10% is allowed in the dimensional characteristics (as given in Table 1) and a variation of ±20 % is allowed in the mass of the craft (as given in Table 1). In addition, the craft shall have no covers over the outboard motor or unusual extensions behind the transom which could affect the sound level.

Outboard motors shall be fitted to the boat according to the manufacturer's instructions. No modifications on series production craft, such as applying additional absorbing components or trim tabs, are permitted.

Test record

Test model No. 1: F15

Type: Outboard motor

Model: F15

Declared propeller shaft power of outboard motor under test: 11 kW

Microphone was placed at a distance of 25m from the test source.

Speed of craft during the measurements: 29.13km/hr

Engine speed during the measurements: 5500 r/min

Original No.	1	2	3	4	5	6	7	8
shipboard	Port	Star	Port	Star	Port	Star	Port	Star
Craft speed (km/hr)	29.28	29.24	29.22	29.20	28.80	29.00	29.18	29.12
Engine speed (r/min)	5520	5515	5505	5510	5480	5495	5505	5500
Measurement distance (m)	25	25	25	25	25	25	25	25
$L_{'pAS\,max}$ (dB)	65.9	66.2	65.8	66.1	65.7	66.0	65.8	66.1
$L_{''pAS}$ (dB)	53.7	54.2	53.5	53.6	53.5	53.9	53.6	53.8
Back-ground noise correction (dB)	0	0	0	0	0	0	0	0
Distance correction (dB)	0	0	0	0	0	0	0	0
$L_{pAS\,max}$ (dB)	65.9	66.2	65.8	66.1	65.7	66.0	65.8	66.1

Port (average) $L_{'pAS\,max}$ 65.85 dB Starboard (average) $L_{'pAS\,max}$ 66.15 dB

Max AS sound pressure level $L_{pAS\,max}$ 66.15 dB Noise limit value (2013/53/EU) 72 dB

Verdict Pass

PHOTOGRAPHS -STRUCTURE OF PRODUCTS

F15

Test scene

PHOTOGRAPH OF F15 TESTING SETUP