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**□** ARM **X** ENG **□** PAP **X** Input

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Information from China transportation industry standard: Navigation radar on inland waterway vessels

# Summary

To response the requirements from the members of ENG15 WG3 TG 3.3 racon and radar positioning, this paper share some information from *China transportation industry standard: Navigation radar on inland waterway vessels*.

## Purpose of the document

Sharing standard information of navigation radar on inland waterway vessels in China.

## Related documents

G1147 THE USE OF ENHANCED RADAR POSITIONING SYSTEMS.

# Background

According to the WG3 TG3.3 discussion on ENG15, interested parties are welcomed to involve in racon development issues as to strengthen the cooperation and information sharing. Meanwhile, to response the requirements from the members of ENG15 WG3 TG 3.3, CHINA MSA share some information from *China transportation industry standard: Navigation radar on inland waterway vessels* through this paper.

The *China transportation industry standard: Navigation radar on inland waterway vessels*, issued on 2007 and still in effect today, consists of *part 1: performance requirements* and *part 2: performance testing methods*. Information in this paper all from part 1.

Since there are no English version of the standard, for reference only, this paper shared and translated some key parts and important parameters in the standard as follow.

# Overall performance of RACON

## Working environment conditions

1. Radar working environment conditions:

The environment temperature is – 10℃ - + 55℃ (the outdoor part is - 25℃ - + 70℃);

When the environment temperature is 40℃, the relative humidity is not more than 93%.

## Power supply

1. The radar shall have DC 24V or 36V power interface and AC 110V or 220V power interface
2. Under the following power supply changes, the radar shall be able to work normally:

AC: 220V, 50Hz, deviation from rated voltage ±10%, deviation from rated frequency ±6%;

DC: the grid power supply deviates from the rated voltage by -20% ~ +10%;

The battery power supply deviates from the rated voltage by -10% ~ +30%.

1. The radar shall be equipped with protection devices to prevent over-current, over-voltage, overload and instantaneous or accidental reverse connection of power polarity without damage

## Ranging accuracy

In the range of 3km or less than 3km, the ranging accuracy of the light ship within the range of 500m ~ 2000m or the target equivalent to the reflection area of 10m2 shall be better than 15m.

## Range resolution

On the range of 0.5km ~ 1km, within the range of 50% - 100% of the range used, two targets with the same azimuth and adjacent distance equal to or greater than 18m shall be able to be displayed separately.

## Azimuth accuracy

For targets within the range of 50% - 100% of the range below 3km, the azimuth accuracy shall be better than ±1 °

## Heading line accuracy

When the heading line is displayed upward, the zero pointing error of the heading line shall be equal to or less than ±1 °

## Azimuth resolution

On the range of 1km ~ 2km, within the range of 50% - 100% of the range used, two targets at the same range and with 1.5 ° adjacent to each other shall be able to be displayed separately.

## Minimum operating distance

In 1km ~ 2km range, except range selection, other controllers stay unchanged. When the height of the antenna from the water surface is 10m, the light ship target or the small target equivalent to the reflection area of 10m2, located between the minimum operating distance and 1.5km, shall be displayed on the radar display at the same time, and the minimum operating distance shall not be greater than 23m.

## Shore suction phenomenon

When the ship is sailing close to the shoreline, use the movable distance gauge to measure the shoreline and the protruding part of the central bright area, and the value shall not be greater than 10m

## Continuous working time of radar

1. When the radar is working in the transmitting state, the continuous working time shall not be less than 144h.
2. Mean time between failures (MTBF) of radar shall not be less than 1500h.

## Anti-clutter interference

The radar shall have the ability to resist wave, rain, snow, clutter and asynchronous interference of the same frequency, and the functions of anti-rain, snow and wave interference shall be continuously adjustable. When these functions are not required, they shall be able to be turned off.

## Performance inspection

The radar shall be equipped with main electrical performance detection devices and corresponding buttons on the panel.

# Component device requirements

## Antenna

1. The length shall be less than 2m.
2. The speed range is 15r / min ~ 50r / min.
3. A control switch for stopping antenna rotation shall be provided, and the radar shall be equipped with a heading line adjustable device.
4. Grounding device shall be provided.
5. No damage when the wind speed is 35m/s; It can work normally when the wind speed is 25m/s.

## Transmitter and receiver

1. The transmission frequency works in the microwave X-band.
2. The noise factor of the receiver shall be less than 10dB.
3. The transceiver shall be easily disassembled and equipped with an interface directly connected to the display.

## Display

1. The display shall be a plane position display, and shall have a heading up display mode.
2. The TV display effective screen of the display shall not be less than 18cm.
3. The effective diameter of the display refers to the diameter of the radar echo image area, and the range, fixed range, movable range, electronic azimuth and other data display shall be outside this area.
4. The range shall be in KM system or compatible with nautical mile system. The range grade is 1km, 2km, 4km, 8km, 16km, 32km or 0.75km, 1.5km, 3km, 6km, 12km, 24km and 48km. A range smaller than 0.75km is also allowed.
5. The fixed distance mark shall be at least 2 in the range below 1km and at least 4 in other ranges.
6. The movable distance marker shall be able to cover the minimum (23m) to the maximum operating distance.
7. Digital distance reading shall be provided. TV scanning display shall provide digital display of distance and azimuth and functional character display.
8. The brightness of fixed distance marker, movable distance marker and lighting can be adjusted and can be turned off separately.
9. A straight line shall be used for heading direction indication. The heading line width is not more than 0.5°, The bow line shall extend from the scanning origin (the position of the ship) to the edge of the display, and shall have a device to control and temporarily turn off the brightness of the bow line.
10. Electronic azimuth line and its data display shall be provided.
11. The TV scanning display shall have a warning area that can be set in the range, and can give an audible and visual alarm when the target intrudes.

# References

1. Transportation industry standard of China： Navigation radar on inland waterway vessels, Part 1 Performance requirements.

1. Input document number, to be assigned by the Committee Secretary [↑](#footnote-ref-2)
2. Leave open if uncertain [↑](#footnote-ref-3)