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## **Economic Commission for Europe**

Inland Transport Committee

### **Working Party on Inland Water Transport**

#### **Fifty-fourth session**

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Item 6 (c) of the provisional agenda

#### **Standardization of Technical and Safety Requirements in Inland**

**Navigation: Recommendations on Harmonized Europe-Wide Technical  
Requirements for Inland Navigation Vessels (Resolution No. 61)**

### **General technical specifications applicable to radar equipment**

**Submitted by the Russian Federation**

*Note by the secretariat*

Reproduced in this document is the proposal by the Russian Federation with respect to Part III of the draft Appendix 7 to Resolution No. 61 (ECE/TRANS/SC.3/2010/8, page 36). The new text is highlighted in bold and the source of the text is indicated in the footnotes.

The Working Party may wish to consider bringing this modification to the draft Resolution on amendment to Resolution No.61.

## General technical specifications applicable to radar equipment

1. The technical parameters of radar installations must satisfy the following requirements:

Minimum range of detection	15 m
Maximum range of detection of shore 60 m high (at height of installation 10 m)	32,000 m <sup>1</sup>
Distance resolution	15 m at scales 0.5–1.6 km; 1 per cent of the scale value at other scales
Angular resolution	1.2°
Accuracy of measurement: range	10 m for variable range circles; 1 per cent of fixed range circles at scales 0.5–2.0 km; 0.8 per cent of the value of the selected scale.
Accuracy of measurement: bearings line:	± 1°
Heading Width	0.5°
Deviation	0.5°
Effective diameter of screen indicator	270 mm
Range scales	0.5; 1; 1.6; 2; 3.2; 4; 8; 16; 32 km: not less than 4 fixed range circles within each scale
Off-centring	1/4–1/3 of the effective diameter of the image
Bearing facilities:	
Timing	Up to 5 seconds
Error	± 1°
Transmission frequency	9.3–9.5 GHz (3.2 cm)
Warm-up time	4 minutes
Minimum antenna speed	24 revolutions per minute

2. The requirements contained in IEC publication 945 “Marine Navigational Equipment General Requirements” shall apply to power supply, safety, mutual interference of shipborne equipment, compass safe distance, resistance to climatic influences, mechanical strength, environmental influences, audible noise emission and equipment markings of radar installations. Additionally, the requirements of the ITU Radio Regulations shall apply. The equipment shall satisfy all requirements of these

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<sup>1</sup> Maximum range of detection is only required to be ensured for radar equipment installed on vessels operated on large lakes, reservoirs and in coastal waters.

provisions for radar display ambient temperatures between 0 and - 55 °C in doors and between -30 and +55 °C on the open desk.<sup>2</sup>

**3. Controls of radar installations**

**3.1 All controls shall be so arranged that during their operation no information is concealed from view and radar navigation remains unimpaired.<sup>3</sup>**

**3.2 Controls which can be used to switch off the equipment or, if activated, could lead to malfunction must be protected against accidental operation.<sup>4</sup>**

**3.3 The following functions must have their own controls with direct access:**

- (a) Stand-by/on;
- (b) Range;
- (c) Tuning;
- (d) Gain;
- (e) Seaclutter (STC);
- (f) Rainclutter (FTC);
- (g) Variable range marker (VRM);
- (h) Cursor or electronic bearing line (EBL) (if fitted);
- (i) Ship's heading marker suppression (SHM).

**If rotary controls are used for the abovementioned functions, concentric arrangement of the controls one above the other shall be prohibited.<sup>5</sup>**

**3.4 At least the controls for gain, sea clutter and rain clutter must be adjustable by means of a rotary control with an effect proportional to the angle of rotation.<sup>6</sup>**

**3.5 Adjustment of controls shall be such that movements to the right or upwards have a positive effect on the variable and movements to the left or downwards a negative effect.<sup>7</sup>**

**3.6 If push-buttons are used, it shall be possible to locate and operate them by touch. They shall also have clearly perceptible contact release.<sup>8</sup>**

**3.7 It must be possible to adjust the brightness of the following variables separately from zero to the value required for operational purposes:**

- (a) radar picture;
- (b) fixed range circles;
- (c) variable range circles;
- (d) bearing scale;
- (e) bearing line;
- (f) rate of turn;
- (g) speed of the vessel;
- (h) rudder position.
- (i) water depth;
- (j) compass course.<sup>9</sup>

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<sup>2</sup> Text is based on Art.2.01 para.3 of Chapter 2 on General minimum requirements for radar equipment of Part III of Annex IX to directive 2006/87/EC. However, in the directive the last sentence refers only to the ambient temperature of between 0 and 40 °C.

<sup>3</sup> Text is based on Art.4.01 para.1 of Chapter 2, Annex IX to directive 2006/87/EC.

<sup>4</sup> Text is based on Art.4.01 para.2 of Chapter 2, Annex IX to directive 2006/87/EC.

<sup>5</sup> Text is based on Art.4.01 para.4 of Chapter 2, Annex IX to directive 2006/87/EC.

<sup>6</sup> Text is based on Art.4.01 para.5 of Chapter 2, Annex IX to directive 2006/87/EC.

<sup>7</sup> Text is based on Art.4.01 para.6 of Chapter 2, Annex IX to directive 2006/87/EC.

<sup>8</sup> Text is based on Art.4.01 para.7 and 3.14 of Chapter 2, Annex IX to directive 2006/87/EC.

**3.8** Provided that the difference in brightness of some of the displayed values is only slight and the fixed range circle, the variable range circle and the bearing line can be switched off independently of each other, there may be four brightness controls, one for each of the following groups of values:<sup>10</sup>

- (a) radar picture and lubber line;
- (b) fixed range circles;
- (c) variable range circles;
- (d) bearing line and bearing scale and nautical information (e) rate of turn;
- (f) speed of the vessel;
- (g) rudder position;
- (h) water depth;
- (i) compass course.<sup>11</sup>

**3.9** The brightness of the lubber line shall be adjustable but shall not be reducible to zero.<sup>12</sup>

**3.10** To switch off the lubber line, there shall be a control with automatic reset.<sup>13</sup>

**3.11** From zero, the anti-clutter devices shall be continuously adjustable.<sup>14</sup>

#### **4. Radar picture characteristics**

**4.1** The diameter of the outer range circle in the range scales specified in paragraph 1 shall be at least 90 % of the effective radar picture diameter.<sup>15</sup>

**4.2** The width of the range circles and the variable range marker shall, at the normal brightness setting, be inferior to 1 % of the effective radar screen but not exceed 1 mm.<sup>16</sup>

**4.3** For all range scales, the antenna position shall be visible in the radar picture.<sup>17</sup>

**4.4** The display colour shall be chosen on the basis of physiological factors. If various colours can be reproduced on the screen, the actual radar picture shall be monochrome. The reproduction of different colours shall not result in mixed colours, by superimposition, on any part of the screen.<sup>18</sup>

#### **5. Antenna characteristics and emission spectrum<sup>19</sup>**

**5.1** The antenna drive system and the antenna shall be such as to allow correct operation at wind speeds of up to 100 km per hour.

**5.2** The antenna drive system shall have a safety switch by means of which the transmitter and the rotator drive can be switched off.

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<sup>9</sup> Text is based on Art.4.01 para.4 of Chapter 2, Annex IX to directive 2006/87/EC.

<sup>10</sup> Text is based on Art.4.01 para.9 of Chapter 2, Annex IX to directive 2006/87/EC.

<sup>11</sup> Text is based on Art.3.14 para.2 of Chapter 2, Annex IX to directive 2006/87/EC.

<sup>12</sup> Text is based on Art.4.01 para.10 of Chapter 2, Annex IX to directive 2006/87/EC.

<sup>13</sup> Text is based on Art.4.01 para.11 of Chapter 2, Annex IX to directive 2006/87/EC.

<sup>14</sup> Text is based on Art.4.01 para.12 of Chapter 2, Annex IX to directive 2006/87/EC.

<sup>15</sup> Text is based on Art.4.03 para. 2 of Chapter 2, Annex IX to directive 2006/87/EC.

<sup>16</sup> Text is based on Art.3.03 para. 4 of Chapter 2, Annex IX to directive 2006/87/EC. However, the exact text of the directive is as follows: The width of the range circles and the variable range marker shall, at the normal brightness setting, not exceed 2 mm.

<sup>17</sup> Text is based on Art.4.03 para. 3 of Chapter 2, Annex IX to directive 2006/87/EC.

<sup>18</sup> Text is based on Art.4.04 para. 1 of Chapter 2, Annex IX to directive 2006/87/EC.

<sup>19</sup> Text of this section is based on Art.4.08 of Chapter 2, Annex IX to directive 2006/87/EC.

**5.3** The horizontal radiation pattern of the antenna, measured in one direction, shall meet the following requirements:

- (a) - 3 dB, width of the main lobe: maximum 1,2 degrees;
- (b) - 20 dB, width of the main lobe: maximum 3,0 degrees;
- (c) side-lobe attenuation within  $\pm 10$  degrees around the main lobe: at least — 25 dB;
- (d) side-lobe attenuation outside  $\pm 10$  degrees around the main lobe: at least — 32 dB.

**5.4** The vertical radiation pattern of the antenna, measured in one direction, shall meet the following requirements:

- (a) - 3 dB, width of the main lobe: maximum 30 degrees;
- (b) the maximum of the main lobe shall be in the horizontal axis;
- (c) side-lobe attenuation: at least — 25 dB.

**5.5** The radiated high-frequency energy shall be horizontally polarized.

**5.6** The operating frequency of the equipment shall be in a range above 9 GHz which is allocated under prevailing ITU Radio Regulations to navigational radar equipment.

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