Economic Commission for Europe
Inland Transport Committee

Working Party on Inland Water Transport
Working Party on the Standardization of Technical and Safety Requirements in Inland Navigation

Forty-third session
Geneva, 26–28 June 2013

Item 5 of the provisional agenda

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

Amendments to chapters 15a, "Specific requirements for passenger sailing vessels", and 22a, "Specific requirements applicable to craft longer than 110 m"

Note by the Group of Volunteer Experts

I. Mandate

1. At its fifty-third session, the Working Party on Inland Water Transport (SC.3) asked its Group of Volunteer Experts on Resolution No. 61, "Recommendations on Harmonized Europe-Wide Technical Requirements for Inland Navigation Vessels" (ECE/TRANS/SC.3/172/Rev.1), to continue preparing amendment proposals to Resolution No. 61 with due regard to the latest amendments to the European Union Directive 2006/87/EC laying down technical requirements for inland waterway vessels (ECE/TRANS/SC.3/183, para. 18).

2. At its sixth meeting in The Hague (Netherlands, 23–25 October 2012) the Group of Volunteer Experts proposed to consider, at its forthcoming meeting, the inclusion of provisions of chapters 15a, "Specific requirements for passenger sailing vessels", and 22a, "Specific requirements applicable to craft longer than 110 m", of Directive 2006/87/EC into Resolution No. 61. At its forty-second session, SC.3/WP.3 approved the provisional agenda of the forthcoming meeting of the Group of Volunteer Experts on Resolution No. 61 (ECE/TRANS/SC.3/WP.3/84, para. 48).
3. The Working Party may wish to consider the provisions laid down in chapters 15a and 22a of Directive 2006/87/EC, reproduced below and provide any guidance to the Group of Volunteers, as appropriate.

II. Chapter 15a

Specific requirements for passenger sailing vessels

Article 15a.01

Application of Part II

In addition to the provisions of Part II, the requirements in this Chapter shall apply to passenger sailing vessels.

Article 15a.02

Exceptions for certain passenger sailing vessels

1. For passenger sailing vessels having an \( L_{WL} \) not exceeding 45 m and a maximum permissible number of passengers not exceeding \( L_{WL} \) in whole meters, the following provisions shall not apply:

   (a) Article 3.03(7), provided that anchors are not transported in hawse pipes;
   (b) Article 10.02(2)(d), with regard to length;
   (c) Article 15.08(3)(a);
   (d) Article 15.15(9)(a).

2. By way of derogation from paragraph 1, the number of passengers may be raised to 1.5 times the \( L_{WL} \) in whole metres, if sails, rigging and deck fittings so permit.

Article 15a.03

Stability requirements for vessels under sail

1. For the calculation of the heeling moment according to Article 15.03(3), the furled sails shall be taken into account when determining the centre of gravity of the vessel.

2. Taking into consideration all load conditions according to Article 15.03(2), and using a standard arrangement of sails, the heeling moment caused by wind pressure shall not be so high as to exceed a heeling angle of 20°. At the same time:

   (a) a constant wind pressure of 0.07 kN/m² shall be applied for the calculation;
   (b) the residual safety clearance shall be at least 100 mm; and
   (c) the residual freeboard shall not be negative.

3. The righting lever of static stability shall:

   (a) reach its maximum value at a heeling angle of 25° or over;
   (b) amount to at least 200 mm at a heeling angle of 30° or over;
   (c) be positive at a heeling angle of up to 60°.
4. The area under the righting lever curve shall not be less than:
   (a) 0.055 mrad up to 30°;
   (b) 0.09 mrad up to 40° or at the angle at which an unprotected opening reaches the water surface and which is less than 40°.

Between:
   (c) 30° and 40°; or
   (d) 30° and the angle at which an unprotected opening reaches the water surface and which is less than 40°.

This area shall not be less than 0.03 mrad.

Article 15a.04

Shipbuilding and mechanical requirements

1. By way of derogation from Article 6.01(3), and Article 9.01(3), the equipment must be designed for permanent lists of up to 20°.

2. By way of derogation from Article 15.06(5)(a) and Article 15.06(9)(b), the inspection body may, in the case of passenger sailing vessels not more than 25 m long, authorise a clear width of less than 800 mm for connecting corridors and companionways. However, the clear width shall be at least 600 mm.

3. By way of derogation from Article 15.06(10)(a), the inspection body may, in specific cases, authorise the use of removable guard rails in areas where this is necessary for controlling the sails.

4. Within the meaning of Article 15.07, sails rank as a main propulsion system.

5. By way of derogation from Article 15.15(7)(c), the height of the lower edge of the door opening may be reduced to 200 mm above the floor of the passenger area. Once opened, the door shall close and lock automatically.

6. If there is a possibility of the propeller idling while the vessel is under sail, any endangered parts of the propulsion system shall be protected against potential damage.

Article 15a.05

Rigging in general

1. The parts of the rigging shall be arranged in such a way as to prevent unacceptable chafing.

2. If a material other than wood is used or if special types of rigging are used, such a design shall guarantee equivalent levels of safety with the dimensions and strength values laid down in this Chapter. As evidence of the strength:
   (a) a strength calculation shall be carried out; or
   (b) confirmation of sufficient strength shall have been obtained from an approved classification society; or
   (c) dimensioning shall be based on the procedures set out in a recognised regulatory framework (e.g. Middendorf, Kusk-Jensen).

The evidence shall be presented to the inspection body.
Article 15a.06

Masts and spars in general

1. All spars shall be made of high-quality material.

2. Wood for masts shall:
   (a) be free of knot concentrations;
   (b) be free of sapwood within the required dimensions;
   (c) as far as possible be straight-grained;
   (d) contain as little as possible twisted growth.

3. If the chosen timber is either pitch pine or Oregon pine of quality level "clear and better" the diameters in the tables reproduced in Articles 15a.07 to 15a.12 can be reduced by 5%.

4. If the timbers used for masts, topmasts, yardarms, booms and bowsprits are not round in cross-section, such timbers must be of equivalent strength.

5. Mast pedestals, mast trunks and fastenings on deck, on floor-plates and on stem or stern shall be constructed in such a way that they can either absorb the forces they are subjected to or transfer them to other connected parts of the structure.

6. Depending on the stability of the vessel and the external forces it is subjected to and also the distribution of the available sail area, the inspection body may, on the basis of the dimensions laid down in Articles 15a.07 to 15a.12, allow reductions in the cross-sections of the spars and, where appropriate, of the rigging. Evidence shall be submitted in accordance with Article 15a.05(2).

7. If the vessel's period of oscillation/period of roll, in seconds, is less than three quarters of its breadth, in metres, the dimensions set out in Articles 15a.07 to 15a.12 shall be increased. Evidence shall be submitted in accordance with Article 15a.05(2).

8. In the tables reproduced in Articles 15a.07 to 15a.12 and 15a.14, possible intermediate values shall be interpolated.

Article 15a.07

Special provisions for masts

1. Wooden masts shall meet the following minimum requirements:

<table>
<thead>
<tr>
<th>Length* (m)</th>
<th>Diameter on deck (cm)</th>
<th>Diameter on the cross-tree (cm)</th>
<th>Diameter on the mast cap (cm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>20</td>
<td>17</td>
<td>15</td>
</tr>
<tr>
<td>11</td>
<td>22</td>
<td>17</td>
<td>15</td>
</tr>
<tr>
<td>12</td>
<td>24</td>
<td>19</td>
<td>17</td>
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<tr>
<td>13</td>
<td>26</td>
<td>21</td>
<td>18</td>
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<td>14</td>
<td>28</td>
<td>23</td>
<td>19</td>
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<tr>
<td>15</td>
<td>30</td>
<td>25</td>
<td>21</td>
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<td>16</td>
<td>32</td>
<td>26</td>
<td>22</td>
</tr>
<tr>
<td>17</td>
<td>34</td>
<td>28</td>
<td>23</td>
</tr>
<tr>
<td>18</td>
<td>36</td>
<td>29</td>
<td>24</td>
</tr>
</tbody>
</table>
Length* (m)  Diameter on deck (cm)  Diameter on the cross-tree (cm)  Diameter on the mast cap (cm)
19         39            31            25
20         41            33            26
21         43            34            28
22         44            35            29
23         46            37            30
24         49            39            32
25         51            41            33

* Distance from the cross-tree to the deck.

If a mast has two yards, the diameters shall be increased by at least 10 %.
If a mast has more than two yards, the diameters shall be increased by at least 15 %.
In the case of masts fitted through the deck, the diameter at the mast foot shall be at least 75 % of the diameter of the mast at deck level.

2. Mast fittings, mast bands, cross-trees and mast caps shall be sufficiently strongly dimensioned and attached.

**Article 15a.08**

**Special provisions for topmasts**

1. Wooden topmasts shall meet the following minimum requirements:

<table>
<thead>
<tr>
<th>Length* (m)</th>
<th>Diameter at the foot (cm)</th>
<th>Half-length diameter (cm)</th>
<th>Diameter at fitting (**) (cm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>8</td>
<td>7</td>
<td>6</td>
</tr>
<tr>
<td>5</td>
<td>10</td>
<td>9</td>
<td>7</td>
</tr>
<tr>
<td>6</td>
<td>13</td>
<td>11</td>
<td>8</td>
</tr>
<tr>
<td>7</td>
<td>14</td>
<td>13</td>
<td>10</td>
</tr>
<tr>
<td>8</td>
<td>16</td>
<td>15</td>
<td>11</td>
</tr>
<tr>
<td>9</td>
<td>18</td>
<td>16</td>
<td>13</td>
</tr>
<tr>
<td>10</td>
<td>20</td>
<td>18</td>
<td>15</td>
</tr>
<tr>
<td>11</td>
<td>23</td>
<td>20</td>
<td>16</td>
</tr>
<tr>
<td>12</td>
<td>25</td>
<td>22</td>
<td>17</td>
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<tr>
<td>13</td>
<td>26</td>
<td>24</td>
<td>18</td>
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<tr>
<td>14</td>
<td>28</td>
<td>25</td>
<td>20</td>
</tr>
<tr>
<td>15</td>
<td>31</td>
<td>27</td>
<td>21</td>
</tr>
</tbody>
</table>

* Total length of the topmast, without the masthead.

** Diameter of the topmast at the level of the masthead fitting.

If square sails are attached to a topmast, the dimensions set out in the table shall be increased by 10 %.

2. The overlap between the topmast and the mast shall be at least 10 times the required foot diameter of the topmast.
Article 15a.09

Special provisions for bowsprits

1. Wooden bowsprits shall meet the following minimum requirements:

<table>
<thead>
<tr>
<th>Length* (m)</th>
<th>Diameter at stem (cm)</th>
<th>Half-length diameter (cm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>14,5</td>
<td>12,5</td>
</tr>
<tr>
<td>5</td>
<td>18</td>
<td>16</td>
</tr>
<tr>
<td>6</td>
<td>22</td>
<td>19</td>
</tr>
<tr>
<td>7</td>
<td>25</td>
<td>23</td>
</tr>
<tr>
<td>8</td>
<td>29</td>
<td>25</td>
</tr>
<tr>
<td>9</td>
<td>32</td>
<td>29</td>
</tr>
<tr>
<td>10</td>
<td>36</td>
<td>32</td>
</tr>
<tr>
<td>11</td>
<td>39</td>
<td>35</td>
</tr>
<tr>
<td>12</td>
<td>43</td>
<td>39</td>
</tr>
</tbody>
</table>

* Total length of the bowsprit.

2. The inboard section of the bowsprit shall have a length of at least four times the diameter of the bowsprit at the stem.

3. The diameter of the bowsprit at its head shall be at least 60% of the diameter of the bowsprit at the stem.

Article 15a.10

Special provisions for jib-booms

1. Wooden jib-booms shall meet the following minimum requirements:

<table>
<thead>
<tr>
<th>Length* (m)</th>
<th>Diameter at the stem (cm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>7</td>
</tr>
<tr>
<td>3</td>
<td>10</td>
</tr>
<tr>
<td>4</td>
<td>14</td>
</tr>
<tr>
<td>5</td>
<td>17</td>
</tr>
<tr>
<td>6</td>
<td>21</td>
</tr>
<tr>
<td>7</td>
<td>24</td>
</tr>
<tr>
<td>8</td>
<td>28</td>
</tr>
<tr>
<td>9</td>
<td>31</td>
</tr>
<tr>
<td>10</td>
<td>35</td>
</tr>
</tbody>
</table>

* Total length of the jib-boom.

2. The diameter of the jib-boom at its head shall be at least 60% of the diameter at the stem.

Article 15a.11

Special provisions for main booms

1. Wooden main booms shall meet the following minimum requirements:

<table>
<thead>
<tr>
<th>Length* (m)</th>
<th>Diameter (cm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>14</td>
</tr>
<tr>
<td>6</td>
<td>15</td>
</tr>
<tr>
<td>7</td>
<td>16</td>
</tr>
<tr>
<td>8</td>
<td>17</td>
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<td>9</td>
<td>18</td>
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<td>24</td>
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<tr>
<td>14</td>
<td>25</td>
</tr>
<tr>
<td>15</td>
<td>26</td>
</tr>
<tr>
<td>16</td>
<td>27</td>
</tr>
</tbody>
</table>

* Total length of the main boom.

2. The diameter at the swivel pin shall be at least 72% of the diameter specified in the table.

3. The diameter at the clew shall be at least 85% of the diameter specified in the table.

4. Measured from the mast, the greatest diameter shall be at two thirds of the length.
5. Where:
   (a) there is an angle of less than 65° between the main boom and the after leech and the main sheet is attached to the end of the boom; or
   (b) the attachment point of the sheet is not abreast of the clew;
the inspection body may, according to Article 15a.05(2), require a greater diameter.
6. For sail areas of less than 50 m², the inspection body may authorise reductions in the dimensions set out in the table.

**Article 15a.12**

*Special provisions for gaffs*

1. Wooden gaffs shall meet the following minimum requirements:

<table>
<thead>
<tr>
<th>Length* (m)</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diameter (cm)</td>
<td>10</td>
<td>12</td>
<td>14</td>
<td>16</td>
<td>17</td>
<td>18</td>
<td>20</td>
</tr>
</tbody>
</table>

* Total length of the gaff.

2. The unsupported length of the gaff shall be not more than 75%.
3. The breaking strength of the crowfoot shall be at least equal to 1.2 times the breaking strength of the peak halyard.
4. The top angle of the crowfoot shall be a maximum of 60°.
5. If, by way of derogation from paragraph 4, the top angle of the crowfoot is greater than 60°, the tensile strength shall be adjusted to accommodate the forces that will then occur.
6. For sail areas of less than 50 m², the inspection body may authorise reductions in the dimensions set out in the table.

**Article 15a.13**

*General provisions for standing and running rigging*

1. Standing and running rigging shall comply with the strength requirements set out in Articles 15a.14 and 15a.15.
2. Wire cable connections may take the form of:
   (a) splicings;
   (b) compression sleeves; or
   (c) sealing sleeves.
   Splicings shall be marled and ends shall be whipped.
3. Eye splices shall be provided with thimbles.
4. Ropes shall be routed in such a way as not to obstruct entrances and companionways.
Article 15a.14

Special provisions for standing rigging

1. Forestays and shrouds shall meet the following minimum requirements:

<table>
<thead>
<tr>
<th>Mast length* (m)</th>
<th>11</th>
<th>12</th>
<th>13</th>
<th>14</th>
<th>15</th>
<th>16</th>
<th>17</th>
<th>18</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tensile strength of the forestay (kN)</td>
<td>160</td>
<td>172</td>
<td>185</td>
<td>200</td>
<td>220</td>
<td>244</td>
<td>269</td>
<td>294</td>
</tr>
<tr>
<td>Tensile strength of the shrouds (kN)</td>
<td>355</td>
<td>415</td>
<td>450</td>
<td>485</td>
<td>525</td>
<td>540</td>
<td>630</td>
<td>720</td>
</tr>
<tr>
<td>Number of shroud cables and ropes per side</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>4</td>
</tr>
</tbody>
</table>

* Distance from the top or cross-tree to the deck.

2. Backstays, topmasts, flying jib-stays, jib-booms and bowsprit shrouds shall meet the following minimum requirements:

<table>
<thead>
<tr>
<th>Mast length* (m)</th>
<th>&lt; 13</th>
<th>13–18</th>
<th>&gt; 18</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tensile strength of the backstay (kN)</td>
<td>89</td>
<td>119</td>
<td>159</td>
</tr>
<tr>
<td>Tensile strength of the topmast (kN)</td>
<td>89</td>
<td>119</td>
<td>159</td>
</tr>
<tr>
<td>Length of topmast (m)</td>
<td>&lt; 6</td>
<td>6–8</td>
<td>&gt; 8</td>
</tr>
<tr>
<td>Tensile strength of the flying jib-stay (kN)</td>
<td>58</td>
<td>89</td>
<td>119</td>
</tr>
<tr>
<td>Length of jib-boom (m)</td>
<td>&lt; 5</td>
<td>5–7</td>
<td>&gt; 7</td>
</tr>
<tr>
<td>Tensile strength of the bowsprit shrouds (kN)</td>
<td>58</td>
<td>89</td>
<td>119</td>
</tr>
</tbody>
</table>

* Distance from the top or cross-tree to the deck.

3. The preferred rope design shall be based on Rope Construction Method 6 × 7 FE in the strength class 1 550 N/mm². Alternatively, at the same strength class, Construction Method 6 × 36 SE or 6 × 19 FE may be used. Because of the higher elasticity of Construction Method 6 × 19, the tensile strengths given in the table shall be increased by 10 %. Use of a different rope design shall be permitted provided it has comparable properties.

4. If rigid rigging is used, the tensile strengths shown in the table shall be increased by 30 %.

5. For rigging, only approved forks, round eyes and bolts may be used.

6. Bolts, forks, round eyes and turnbuckles shall be capable of being properly secured.

7. The tensile strength of the bobstay shall be at least 1.2 times the tensile strength of the respective jib-stay and flying jib-stay.

8. For vessels with less than 30 m³ water displacement, the inspection body may permit the reductions in tensile strengths shown in the table set out below:

<table>
<thead>
<tr>
<th>Water displacement divided by the number of masts (m³)</th>
<th>Reduction (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt; 20 to 30</td>
<td>20</td>
</tr>
<tr>
<td>10 to 20</td>
<td>35</td>
</tr>
<tr>
<td>&lt; 10</td>
<td>60</td>
</tr>
</tbody>
</table>
Article 15a.15

**Special provisions for running rigging**

1. For running rigging, fibre ropes or steel wire ropes shall be used. The minimum tensile strength and the diameter for running rigging shall, in relation to the sail area, meet the following minimum requirements:

<table>
<thead>
<tr>
<th>Type of running rigging</th>
<th>Rope material</th>
<th>Sail area (m²)</th>
<th>Minimum tensile strength (KN)</th>
<th>Diameter of rope (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Steel wire</td>
<td>up to 35</td>
<td>20</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>&gt; 35</td>
<td>38</td>
<td>8</td>
</tr>
<tr>
<td>Staysail halyards</td>
<td>Fibre (polypropylene-PP)</td>
<td>up to 50</td>
<td>20</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>&gt; 50 to 80</td>
<td>30</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>Steel wire</td>
<td>&gt; 80 to 120</td>
<td>60</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>&gt; 120 to 160</td>
<td>80</td>
<td>12</td>
</tr>
<tr>
<td>Gaff sail halyards</td>
<td>Fibre (PP)</td>
<td>up to 40</td>
<td>14</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>&gt; 40</td>
<td>18</td>
<td></td>
</tr>
<tr>
<td>Top sail halyards</td>
<td>Fibre (PP)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Staysail sheets</td>
<td></td>
<td>For sail areas of more than 30 m², the sheet shall take the form of a tackle or shall be capable of being operated by a winch</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Steel wire</td>
<td>&lt; 100</td>
<td>60</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>100 to 150</td>
<td>85</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td></td>
<td>&gt; 150</td>
<td>116</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>Fibre (PP)</td>
<td>For top sail sheets, elastic connection elements (fore runners) are necessary</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Rope diameter of at least 18 mm and at least three rope sheaves. Where the sail area is greater than 60 m², one rope sheave per 20 m²</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2. Running rigging forming part of the staying shall have a tensile strength which corresponds to that of the respective stay or shrouds.

3. If materials other than those stated in paragraph 1 are used, the strength values given in the table in paragraph 1 shall be complied with.

Fibre ropes of polyethylene shall not be used.

Article 15a.16

**Fittings and parts of the rigging**

1. If steel wire ropes or fibre ropes are used, the diameters of the rope sheaves (measured from centre of rope to centre of rope) shall meet the following minimum requirements:
2. By way of derogation from paragraph 1, the diameter of the rope sheaves may be equal to six times the diameter of the steel wire, provided that the steel wire does not constantly run over sheaves.

3. The tensile strength of the fittings (e.g. forks, round eyes, turnbuckles, eye-plates, bolts, rings and shackles) shall be compatible with the tensile strength of the standing or running rigging that is attached to them.

4. The fastenings of stay and shroud futtocks shall be designed to take up the forces they are subjected to.

5. Only one shackle, along with the relevant stay or shroud, may be attached to each eye.

6. Blocks of halyards and topping lifts shall be securely fastened to the mast, and the revolving crowfeet used for this purpose shall be in good condition.

7. Attachments of eye-bolts, cleats, belaying pins and fife-rails shall be designed to cope with the forces they are subjected to.

**Article 15a.17**

**Sails**

1. It shall be ensured that sails can be taken in simply, swiftly and safely.

2. The sail area shall be appropriate for the type of vessel and the water displacement.

**Article 15a.18**

**Equipment**

1. Vessels that are fitted with a jib-boom or a bowsprit shall have a jib-net and an adequate number of appropriate holding and tensioning devices.

2. The equipment according to paragraph 1 may be dispensed with if the jib-boom or bowsprit is equipped with a hand becket and a foot rope adequately dimensioned to allow for the attachment of a safety harness to be carried on board.

3. For work on the rigging, a boatswain's chair shall be provided.

**Article 15a.19**

**Testing**

1. The rigging shall be tested by the inspection body every 2.5 years. As a minimum, the test shall cover the following:

   (a) the sails, including leeches, clews and reef eyes;

   (b) the state of the masts and spars;

   (c) the state of the standing and running rigging together with cable wire connections;
(d) facilities for taking in the sail swiftly and safely;
(e) the secure fastening of blocks of halyards and topping lifts;
(f) the fastening of mast trunks and other fastening points for standing and running rigging that are attached to the vessel;
(g) the winches for operating the sails;
(h) other facilities fitted for the purposes of sailing, such as lee-boards and the fittings for operating them;
(i) the measures taken to prevent the chafing of the spars, the running and standing rigging and the sails;
(j) the equipment according to Article 15a.18.

2. That part of the wooden mast passing through the deck and located below the deck shall be re-examined at intervals to be determined by the inspection body, but at the very least on the occasion of each periodical inspection according to Article 2.09. The mast shall be extracted for this purpose.

3. A certificate of the last inspection carried out in accordance with paragraph 1 and issued, dated and signed by the inspection body, shall be carried on board.

Chapter 22a

Specific requirements applicable to craft longer than 110 m

Article 22a.01

Application of Part I

In addition to the requirements set out in Article 2.03(3), the inspection body which is subsequently to issue the Community certificate shall be informed by the owner or his representative before building of craft longer than 110 m, except sea-going ships, begins (building of a new vessel or extension of a vessel already in service). That inspection body shall conduct inspections during the building stage. It may dispense with inspections during the building stage if a certificate is produced before building begins to show that an approved classification society declares that it is to supervise that building.

Article 22a.02

Application of Part II

In addition to Part II, Articles 22a.03 to 22a.05 shall apply to craft that are longer than 110 m.

Article 22a.03

Strength

Sufficient hull strength in accordance with Article 3.02(1)(a) (longitudinal, lateral and local strength) shall be verified by a certificate issued by an approved classification society.
Article 22a.04

Buoyancy and stability

1. Paragraphs 2 to 9 shall apply to craft that are longer than 110 m, with the exception of passenger vessels.

2. The proof of sufficient stability, including stability after damage, shall be verified for the most unfavourable loading condition.

   The basic values for the stability calculation, the vessel's lightweight and the location of the centre of gravity, shall be determined:
   
   • either by means of a heeling experiment, or
   • by detailed mass and moment calculation, in which case the lightweight of the vessel shall be verified by checking the draught, with a tolerance limit of +/- 5 % between the mass determined by calculation and the displacement determined by the draught readings.

3. The proof of buoyancy after damage shall be verified for the fully laden craft.

   For this purpose, calculated proof of sufficient stability shall be established for the critical intermediate stages of flooding and for the final stage of flooding. Negative values of stability in intermediate stages of flooding may be accepted by the competent authority if sufficient stability in subsequent intermediate stages is verified.

4. The following assumptions shall be taken into consideration for the damaged condition:

   (a) Extent of side damage:
   
   longitudinal extent: at least 0.10 L;
   transverse extent: 0.59 m;
   vertical extent: from the base line upwards without limit.

   (b) Extent of bottom damage:
   
   longitudinal extent: at least 0.10 L;
   transverse extent: 3.00 m;
   vertical extent: from the base 0.39 m upwards, the sump excepted.

   (c) Any bulkheads within the damaged area shall be assumed damaged, which means that the subdivision shall be chosen so that the vessel remains afloat after the flooding of two or more adjacent compartments in the longitudinal direction.

   For the main engine room only the one-compartment standard need be taken into account, i.e. the end bulkheads of the engine room shall be assumed as not damaged.

   For bottom damage, adjacent athwartship compartments shall also be assumed as flooded.

   (d) Permeability

   Permeability shall be assumed to be 95 %.

   By way of derogation from this assumption, the following permeability may be assumed:

   • engine and operation rooms: 85 %;
• double bottoms, fuel tanks, ballast tanks, etc. depending on whether, according to their function, they have to be assumed as full or empty for the vessel floating at the maximum permissible draught: 0 or 95%.

If a calculation proves that the average permeability of any compartment is lower, the calculated value may be used.

(e) The lower edge of any non-watertight openings (e.g. doors, windows, access hatches) shall, at the final stage of flooding, be not less than 100 mm above the damaged waterline.

5. The stability after damage shall be sufficient if, on the basis of the assumptions in paragraph 4:

(a) at the final stage of flooding a safety clearance of not less than 100 mm remains and the heeling angle of the craft does not exceed 5°; or

(b) calculations in accordance with the procedure for calculation of damaged stability specified in Part 9 of the ADNR produce a positive result.

6. When cross- or down-flooding openings are provided for reduction of asymmetrical flooding, the time for equalisation shall not exceed 15 minutes, if during the intermediate stages of flooding sufficient damaged stability has been verified.

7. If openings through which undamaged compartments may additionally become flooded are capable of being closed watertight, the closing appliances shall be marked according to their operating instructions.

8. The proof by calculation in accordance with paragraphs 2 to 5 shall be considered to have been provided if damaged stability calculations in accordance with Part 9 of the ADNR, are produced with a positive result.

9. Where necessary in order to meet the requirements in paragraphs 2 or 3, the plane of maximum draught shall be re-established.

Article 22a.05

Additional requirements

1. Craft longer than 110 m shall:
   
   (a) be fitted with a multi-propeller propulsion system, with at least two independent engines of equal power and a bow thruster that is controlled from the wheelhouse and is also effective when the craft is in an unladen state; or have a single-propeller propulsion system and a bow thruster that is controlled from the wheelhouse with its own power supply and which is also effective when the craft is in an unladen state and makes it possible for the craft to proceed under its own power in the event of a breakdown of the main propulsion system;
   
   (b) be fitted with a radar navigation system, together with a rate-of-turn indicator in accordance with Article 7.06(1);
   
   (c) have a permanently-installed bilge pumping system in accordance with Article 8.08;
   
   (d) meet the requirements of Article 23.09(1)(1).

2. For craft, except passenger ships, with a length of more than 110 m, which in addition to paragraph 1:
(a) are capable of being separated, in the event of an accident, in the middle third of the vessel without the use of heavy salvage equipment while the separated parts of the vessel shall remain afloat after separation;

(b) are provided with a certificate that shall be carried on board and which is issued by an approved classification society regarding the buoyancy, trim position and stability of the separate parts of the vessel, indicating the degree of loading above which buoyancy of the two parts is no longer ensured;

(c) are built as double-hull vessels in accordance with the ADNR, where for motor vessels sections 9.1.0.91 to 9.1.0.95, and for tank vessels sections 9.3.2.11.7 and 9.3.2.13 to 9.3.2.15 of Part 9 of the ADNR shall apply;

(d) are fitted with a multi-screw propulsion system in accordance with paragraph 1(a), first half sentence.

It shall be entered in item 52 of the Community certificate that they comply with all the requirements of points (a) to (d).

3. For passenger vessels with a length of more than 110 m which in addition to paragraph 1:

(a) are built or converted for their highest class under the supervision of an approved classification society, in which case compliance shall be confirmed by means of a certificate issued by the classification society while current class is not necessary;

(b) either have a double bottom with a height of at least 600 mm and subdivision to ensure that, in the event of flooding of any two adjacent watertight compartments, the vessel does not immerse lower than the margin line and a residual safety clearance of 100 mm remains, or have a double bottom with a height of at least 600 mm and a double hull with a distance of at least 800 mm between the side wall of the vessel and the longitudinal bulkhead;

(c) be fitted with a multi-screw propulsion system with at least two independent engines of equal power and a bow thruster system which can be operated from the wheelhouse and which operates longitudinally as well as transversely;

(d) allow the stern anchor to be operated directly from the wheelhouse.

It shall be entered in item 52 of the Community certificate that they comply with all the requirements of points (a) to (d).

Article 22a.06

Application of Part IV in the event of conversion

The inspection body may apply Chapter 24 to craft converted to a length of more than 110 m only on the basis of specific recommendations by the Committee.