



Economic and Social Council

Distr.: General
25 July 2018

Original: English

Economic Commission for Europe

Inland Transport Committee

Working Party on Inland Water Transport

Sixty-second session

Geneva, 3-5 October 2018

Item 6 (c) of the provisional agenda

Recommendations on Harmonized Europe-Wide Technical

Requirements for Inland Navigation Vessels (Resolution No. 61, revised)

Aligning of the Annex to Resolution No. 61, revised, with the European Standard laying down Technical Requirements for Inland Navigation Vessels Edition 2017

Note by the secretariat

Mandate

1. This document is submitted in line with cluster 5: Inland Waterway Transport, paragraph (a) 5.2 of the Transport subprogramme of work 2018-2019 (ECE/TRANS/2018/21/Add.1) adopted by the Inland Transport Committee at its eightieth session (23 February 2018).
2. It is recalled that the Working Party on Inland Water Transport (SC.3) at its sixtieth session had decided to align the Annex to Resolution No. 61 with the European Standard laying down Technical Requirements for Inland Navigation vessels (ES-TRIN) (ECE/TRANS/SC.3/203, para. 67) adopted by the European committee for drawing up common standards in the field of inland navigation (CESNI). On 6 July 2017, the European Committee for drawing up Standards in the field of Inland Navigation (CESNI) had adopted ES-TRIN Edition 2017, which replaced 2015 Edition (available at www.cesni.eu/documents/es-trin-2017/).
3. The present document reproduces the text of the Instructions for the application of the technical standard ES-TRIN 2017: Part I, "General" (ESI-I-1 and ESI-I-2), and Part II (ESI-II-1 to ESI-II-6) (without annexes). SC.3 may wish to develop a new appendix to the annex to resolution No. 61, using them as a basis.

Annex

Proposal for a new appendix of the Annex to Resolution No. 61, revised “Instructions for the application of the technical standard

PART I GENERAL

ESI-I-1 Completion of the inland navigation vessel certificates

1. General

1.1 Forms

For completion of the inland navigation vessel certificate only forms authorised by the competent authority shall be used. Forms shall be filled in on one side only.

When issuing a new inland navigation vessel certificate, all pages 1 to 13 shall be included, even if some pages have no entries.

1.2 Method of entry

Entries on the inland navigation vessel certificate shall be typewritten or computer-printed. Hand written entries may only be made in exceptional cases. The entries shall be indelible. Font colours shall be black or blue only. Deletions shall be made in red.

2. Entries

2.1 Deletion of alternatives

Where entries are marked with (*) those which are not applicable shall be deleted.

2.2 Items without entry

If, for any of the items 1 to 48, no entry is either necessary or possible, a line shall be drawn across the entire field.

2.3 Final page of the inland navigation vessel certificate

If no additional pages are required after page 13 (see (3.2.3)), the words ‘continued on page’ (*) at the bottom of page 13 shall be deleted.

2.4 Amendments

2.4.1 First handwritten amendment on a page

A page can be amended once only, however, several amendments may be made at that time. A red line shall be drawn through any details to be amended. A previously deleted alternative (see (2.1)) or an item previously without entry (see (2.3)) shall be underlined in red. The new details shall not be entered in the amended field, but on the same page under the heading ‘Amendments’, the line ‘This page has been replaced’ shall be deleted.

(*) Delete as appropriate.

2.4.2 Further handwritten amendments on a page

For further amendments the page shall be replaced and the necessary amendments as well as any earlier amendments shall be entered directly under the appropriate items. Under the heading 'Amendments' the line 'amendments to item(s)' shall be deleted.

The old page shall be retained by the inspection body which originally issued the inland navigation vessel certificate.

2.4.3 Amendments by electronic data processing

In case of amendments by electronic data processing, the page shall be replaced and the necessary amendments as well as any earlier amendments shall be entered directly under the appropriate items. Under the heading 'Amendments' the line 'amendments to item(s)' shall be deleted.

The old page shall be retained by the inspection body which originally issued the inland navigation vessel certificate.

2.5 Corrections by pasting over

Pasting over of entries or pasting in further details added to an item is not allowed.

3. Replacing and adding pages

3.1 Replacing pages

Page 1 of the inland navigation vessel certificate shall never be replaced. For replacing other pages the procedures outlined in (2.4.2) or (2.4.3) shall be applied.

3.2 Adding pages

If there is insufficient space for further entries on pages 10, 12 or 13 of the inland navigation vessel certificate, additional pages may be attached.

3.2.1 Extension/Confirmation of validity

If further extension is necessary when the certificate has already been extended six times, the words 'Continued on page 10a' shall be added at the bottom of page 10, and a further page 10 shall be marked as page 10a and inserted after page 10. The respective entry is then made under item 49 at the top of page 10a. At the bottom of page 10a the entry 'Continued on page 11' shall be made.

3.2.2 Extension of the liquefied gas installation certificate

A similar procedure to (3.2.1) shall be applied, with page 12a inserted after page 12.

3.2.3 Annex to the inland navigation vessel certificate

At the bottom of page 13 the words 'End of the inland navigation vessel certificate' shall be deleted in red, the deleted words 'Continued on page(*)' shall be underlined in red and behind that the page number 13a shall be entered. This amendment shall carry an official stamp. A further page 13 shall be marked as page 13a and inserted after page 13. The provisions of (2.2) and (2.3) apply to page 13a mutatis mutandis.

The same procedure shall be applied for any further annexes (pages 13b, 13c, etc.).

4. Explanations of individual items

Self-explanatory items are not mentioned below.

2. If applicable, insert terms as per Article 1.01. Other vessel types shall be entered with their commonly accepted designation.

3. When inland navigation vessel certificate is extended the wording “official number” as well as this number shall be deleted, and in case of amendment, the wording “3. unique European vessel identification number” as well as that number shall be entered.

10. In respect of vessels with Union inland navigation certificate allowed to navigate on the Rhine, i.e.

a) those which comply fully with requirements of this Standard including the transitional provisions of Chapter 32, and

b) those which make no use of the transitional provisions of Chapter 33 or the reductions provided for zone 4,

the following is to be added to the indent '- on EU waterways in zone(s)':

a) Rhine or

b) zone R.

12. When inland navigation vessel certificate is extended the wording “official number” shall be deleted, and in case of amendment, the wording “12. Unique European vessel identification number” as well as that number shall be entered.

15. This section shall only be completed for craft for which at least one of the properties 1.1 or 1.2 or 3 in item 14 is not deleted, otherwise the entire table shall be deleted.

15.1 In the column ‘formation figure’ of the table the number(s) of the formations depicted shall be entered. Lines without entry shall be struck through.

Further formations may be drawn under ‘Other formations’ and shall be designated 18, 19, 20, etc.

If it is not apparent from the property ‘fit to push’ in the previous ship certificate which formations are authorised, the entry from the previous inland navigation vessel certificate may be transferred to item 52. ‘See item 52’ shall be entered in line 1 of the table ‘Authorised formations’.

15.2 Couplings

Only the details of the coupling between the pushing craft and the pushed section of the convoy shall be entered.

17-20. Details according to the tonnage certificate items 17-19 to two decimal places and item 20 without decimal places. Length overall and breadth overall give the maximum dimensions of the craft, including all projecting fixed parts. Length L and Breadth B give the maximum hull dimensions (see also Article 1.01 Definitions).

21. Dead weight tonnage for cargo vessels in t according to the measurement certificate for the maximum draught according to item 19.

Displacement for all other craft in m³. If no measurement certificate is available, calculate the displacement from the product of the block coefficient and length L_{WL} , breadth B_{WL} and mean draught at maximum immersion.

23. Number of passenger berths available (including folding beds and similar).

24. Only watertight transverse bulkheads extending from one side of the vessel to the other shall be taken into consideration.

26. If applicable, the following terms shall be used:

- manually operated hatch covers,
- manually operated rolling hatch covers,

- manually operated sliding hatch covers,
- mechanically operated sliding hatch covers,
- mechanically operated hatch covers.

Other types of hatch covers shall be entered with their commonly accepted designation.

Any holds which do not have a hatch cover shall be listed, e.g. under item 52.

28. Figure without decimal place.

30, 31 and 33. Every winch housing shall be counted as one winch, regardless of the number of anchors or towing cables connected to it.

34. Under 'Other installations' systems which do not use rudder blades (e.g. rudder-propeller, cycloidal-propeller, bow-thruster systems) shall be entered.

Enter also any electrical auxiliary engines for manual actuation.

With bow-thruster systems, 'remotely-controlled' refers only to remote controls operated from the steering position in the wheelhouse.

35. Only the theoretical values according to Article 8.08(2) and (3), Article 19.01(1)(c), and Article 19.08(5) shall be entered. For craft whose keels were laid on or before 1.4.1976, the first section is only to be completed in the event of the bilge pumps being replaced and in the event of the inland navigation vessel certificate being extended after 1.1.2015. For craft whose keels were laid down on or before 31.12.1984 and only operated outside zone R, the section can be left void.

36. A sketch may be necessary for clarification.

37. Only the theoretical values without reduction according to Article 13.01(1) to (4) shall be entered.

38. Only the minimum lengths according to Article 13.01(10) and the minimum breaking load according to Article 13.01(11) shall be entered.

39 and 40. Only the minimum lengths and minimum breaking load values recalculated according to Article 13.02(3) shall be entered.

42. The inspection body may add items to the list of necessary equipment. These shall be justified as essential to ship safety for the respective vessel type or its operational area. Additions shall be entered under item 52.

Left column, row 3 to 5: for passenger vessels the first mentioned item shall be crossed out and for all other vessels the second mentioned item shall be crossed out. The length of the gangway shall be entered if the inspection body has allowed a shorter length than what is foreseen by Article 13.02(3)(d) or by Article 19.06(12).

Left column, row 7: here the number of the prescribed first aid kits according to Article 13.02(3)(f) and Article 19.08(9) shall be entered.

Left column, row 11: here the number of the prescribed fire proof receptacles according to Article 13.02(2) shall be entered.

43. Portable fire extinguishers required by other safety regulations, e.g. and regulation, are not included here.

44. Row 3: in inland navigation vessel certificates to be renewed before 1.1.2025 (Chapter 33), the item 'according to Article 13.08(2)' shall be crossed if no life vests according to this Standard are onboard.

Row 4: in inland navigation vessel certificates to be renewed after 1.1.2015, or if a new dinghy is taken onboard, or for newly-built craft, the item 'with a set of oars, one mooring line and a baler' shall be crossed. In inland navigation vessel certificates to be renewed after 1.1.2030 (Chapter 33), and if no dinghy according to this Standard is onboard, the item 'according to Standard EN 1914 : 2016' shall be crossed. In the inland navigation vessel certificate to be renewed before 1.9.2036, if compliance to Standard EN 1994 : 1997 is proven, the item '2016' could be crossed.

46. As a general rule, continuous operation shall not be inserted if there is a lack of berths or if there are excessive noise levels.

50. The expert shall sign only if he has completed page 11 himself.

52. Here any additional restrictions, exemptions and explanations, or similar, applying to entries under individual items can be given.

5. Transitional provisions for Union inland navigation vessel certificates

5.1 Existing Community certificates

With the exception of the exceptional 6 months extension, no further extensions to existing community certificates shall be granted.

5.2 Replacement after a periodical inspection

After a periodical inspection of a vessel which does not yet have a Union inland navigation certificate in line with the model in Annex 4, a Union inland navigation certificate shall be issued.

ESI-I-2

Experts and Competent Persons (Article 1.01, 10.3 and 10.4)

Experts

Experts are required to carry out acceptance tests which call for specialist knowledge either on account of the complexity of the systems or on account of the safety level required. The following persons or institutions are among those authorised to carry out such acceptance tests:

- Classification societies which have the necessary in-house expertise or which bear responsibility, on the basis of their authorisation, for calling in external persons or institutions and have the necessary quality control systems in place in respect of the selection of these persons or institutions;
- Members of the inspection bodies or employees of the relevant authorities;
- Officially approved persons or institutions with recognised expertise for the scope of inspection in the relevant subject area, whereby the vessel inspection bodies can also issue this approval in their capacity as public agencies, ideally on the basis of a quality assurance system. A person or institution is also deemed to be approved if the latter has passed an official selection procedure which specifically assesses the possession of the required expertise and experience.

Traditional craft expert

A person appointed by the competent authority or by an authorised institution of a Member State, who possesses special knowledge in the field of traditional craft due to his or her

training and experience in the subject, and who is familiar with the relevant technical requirements and rules, also from the time period of the traditional craft.

Competent persons

Competent persons are required, for example, to conduct regular visual checks and operating checks on safety equipment. The following may be classed as competent persons:

- Persons who, on the basis of their professional training and experience, have sufficient expertise to be able to assess specific situations and circumstances, e.g. ship's masters, safety officers in shipping companies, crew members with relevant experience;
- Companies which have acquired sufficient specialist knowledge on the basis of their regular work, e.g. shipyards or installation firms;
- Manufacturers of special-purpose systems (e.g. fire extinguishing systems, control equipment).

...

Acceptance tests

The table below summarises the schedule of acceptance tests, including their frequency and the type of inspector required to conduct them. This table is for information purposes only.

<i>Requirement</i>	<i>Subject matter</i>	<i>Maximum test interval</i>	<i>Inspector</i>
Article 6.03(5)	Hydraulic cylinders, pumps and motors	8 years	Competent firm
Article 6.09(3)	Motor-driven control equipment	3 years	Competent person
Article 7.12(11)	Elevating wheelhouses and their appliances	1 year	Competent person
Article 7.12(12)	Elevating wheelhouses and their appliances	5 years	Expert
Article 8.01(2)	Pressure vessels	5 years	Expert
Article 13.03(5)	Portable fire extinguishers	2 years	Competent person
Article 13.04(6)(a) to (c)	Permanently installed firefighting systems		Expert
Article 13.04(6)(d)	Permanently installed firefighting systems	2 years	Competent person or competent firm
Article 13.05(9)(b) (aa) to (cc)	Permanently installed firefighting systems		Expert
Article 13.05(9)(b) (dd)	Permanently installed firefighting systems	2 years	Competent person or competent firm
Article 13.07(3)	Inflatable ship's boats	As specified by the manufacturer	
Article 13.08(3)	Lifejackets	As specified by the manufacturer	

<i>Requirement</i>	<i>Subject matter</i>	<i>Maximum test interval</i>	<i>Inspector</i>
Article 14.12(6)	Cranes	10 years	Expert
Article 14.12(7)	Cranes	1 year	Competent person
Article 17.13	Liquefied gas installations	3 years	Expert
Article 19.09(9)	Life-saving equipment	As specified by the manufacturer	
Article 19.10(9)	Insulating resistance, earthing	before expiry of validity of the inland navigation vessel certificate	
Instruction ESI-II-13 section 3.1(a) and (b)	Fire alarm systems		Expert
Instruction ESI-II-13 section 3.1 (c)	Fire alarm systems	2 years	Expert or competent person
Instruction ESI-III-4 section 8.1 (a) and (b)	Safety guidance systems		Expert
Instruction ESI-III-4 section 8.1 (c)	Safety guidance systems	5 years	Expert or competent person
Instruction ESI-III-5	Gas warning equipment	As specified by the manufacturer	Expert or competent person

PART II PROVISIONS REGARDING SHIPBUILDING, FITTING OUT AND EQUIPMENT

ESI-II-1 Minimum hull thickness of barges (Article 3.02(1))

During periodical inspections of barges which are exclusively towed, the inspection body may allow minor deviations from Article 3.02(1)(b) with respect to the minimum thickness of the shell plating of the hull. The deviation shall not be more than 10 %, and the minimum hull thickness shall not be less than 3 mm.

The deviations shall be entered in the inland navigation vessel certificate.

Under item 14 of the inland navigation vessel certificate, only property under item 6.2 'Towed as a craft with no motive power of its own' shall apply.

Properties under items 1 to 5.3 and 6.1 shall be deleted.

ESI-II-2 Installation of doubler plates to the hull (Article 3.02(1) and Article 19.02(1)(d))

1. Purpose of the instruction

These instructions have been drawn up for the sake of clarity in the rules for maintaining the strength of the hull (Article 3.02(1)) and for replacing and repairing hull plating (Article 3.02(1)(c), last sentence and Article 19.02(1)(d)). This instruction is applicable for installation of new doubler plates.

2. Principals

There are two different types of doubler plates:

1. Doubler plates installed during newbuilding or conversion in accordance with good shipbuilding practice,
2. Doubler plates intended to delay wear or renewal of hull plating. Generally, these plates should be avoided or they should be installed only in particular cases.

3. Doubler plates installed during newbuilding or conversion

3.1 Doubler plates installed during newbuilding

Doubler plates installed during newbuilding are mainly in the following places:

- a) Reinforcing plates around openings and penetrations on the hull and deck plating (manholes, passages for pipes, scuppers, etc.),
- b) Plates at the corners of large hatches,
- c) Longitudinal plate strips at sheer strake level,
- d) Plate strips to protect against wear due to abrasion of the hull plating (at bow and stern and possibly on the bilge plating and the side plating at some height above the bottom),
- e) Reinforcing plates at particular points of the structure under special equipment (for example: anchor windlasses, pumps, masts, cranes, winches, anchors, etc.).

3.2 Doubler plates installed as part of a conversion

If these doubler plates are installed as part of a conversion, they can be mounted only on plates which have not yet reached the minimum thickness, after conversion, and have a corrosion allowance of at least 0,7 mm remaining. Otherwise, the plates that are to carry the doubler plates must be renewed beforehand.

In particular, the plate strips for reinforcing the longitudinal hull girder of the vessel in the case of lengthening must extend at least along the length of the cargo section except in case of justification supported by a calculations note.

4. Doubler plates intended to delay wear or renewal of hull plating

4.1 Places, where the installation of doubler plates is permitted

These plates may be installed in the following places:

- a) In case of damage (temporary repair – validity as per certificate),
- b) In case of pitting corrosion, eventually with piercing, not affecting the structural strength (ie: below an engine room, in way of wind/water strake), excepted in way of bottom and bilge plates in cargo zones,

c) In case of surfaces exposed to abrasion, in order to stop wear of hull plates (may be mounted only on plates that have not yet reached the minimum thickness),

d) On bilge plating, the doubler plating will be, preferably, continuous for at least 70 % of the vessel length. Otherwise, doubler plates will have a minimum length and a minimum distance in between not less than $(2,5 + L/40)$ m or extend at least along the length of three times the frame spacing for vessels with L not more than 45 m. They shall be extended at least along the length of twice the frame spacing forward of and behind the affected zone,

e) On riveted seams to assure watertightness,

f) Fore and aft of a vessel's outside cargo zone.

4.2 Places, where the installation of doubler plates is not permitted

These plates cannot be installed at the following locations:

a) On plates the thickness of which is under the minimum allowable thickness,

b) On holes in plates due to corrosion on elements ensuring the watertightness of vessel,

c) Over large areas in cargo zone,

d) To cover transverse overlap weld seams,

e) On the bottom between fore bulkhead of fore hold and after bulkhead of after hold,

f) In the cargo area of motor tankers, tank lighters and tank barges for the transport of dangerous goods according to ADN,

g) Over bunkers containing flammable products except in abrasion areas,

h) On plates or seams showing buckling or fatigue phenomenon,

i) On existing doubler plates.

5. Installation of doubler plates

a) Doubler plates must be installed and welded in accordance with good shipbuilding practice.

b) Wear plates will have a width ranging between 200 and 300 mm-

c) Reinforcing plates of the longitudinal hull girder should not be more than 600 mm wide.

d) The thickness of the doubler plates shall be between 1 and 1,5 times the thickness of the plate on which it is mounted.

e) Doubler plates fitted to delay the wear or replacement of hull plates have to be replaced, when their thickness is less than 3 mm.

The presence of doubler plates must be stated on the thickness measurements report. When renewing the certificate, vessel areas where doubler plates are installed must be thoroughly examined in order to determine whether they can be kept in this state.

ESI-II-3**Minimum prescribed forward speed, stopping capacity and capacity for going astern****(Articles 5.06, 5.07 and 5.08****in conjunction with Articles 5.02(1), 5.03(1), 5.04 and 21.06)****1. Minimum prescribed (forward) speed in accordance with article 5.06**

The speed in relation to the water is satisfactory in accordance with Article 5.06(1) when it reaches at least 13 km/h. During tests, the following conditions shall be met in the same way as for the stopping test:

- a) the keel clearance set out in (2.1) shall be complied with;
- b) the measuring, recording, registration and evaluation of test data shall be carried out according to the procedure described in Annex 1.

2. Stopping capacity and capacity for going astern prescribed in accordance with articles 5.07 and 5.08

2.1 Vessels and convoys are deemed able to stop facing downstream in good time in accordance with Article 5.07(1) when this is proved during a test of stopping in relation to the ground facing downstream at an initial speed in relation to the water of 13 km/h, with a keel clearance equal to at least 20 % of the draught but not less than 0,50 m.

a) In flowing water (current velocity of 1,5 m/s), stopping in relation to the water shall be demonstrated over a maximum distance measured in relation to the ground of:

550 m for vessels and convoys of:

- length $L > 110\text{ m}$ or
- width $B > 11,45\text{ m}$,

or

480 m for vessels and convoys of:

- length $L \leq 110\text{ m}$ and
- width $B \leq 11,45\text{ m}$.

The stopping manoeuvre is completed on coming to a stop in relation to the ground.

b) In standing water (current velocity of less than 0,2 m/s), stopping in relation to the water shall be demonstrated over a maximum distance, measured in relation to the ground of:

350 m for vessels and convoys of:

- length $L > 110\text{ m}$ or
- width $B > 11,45\text{ m}$,

or

305 m for vessels and convoys of:

- length $L \leq 110\text{ m}$ and
- width $B \leq 11,45\text{ m}$.

In standing water, a test shall also be performed to demonstrate that a speed of not less than 6,5 km/h can be reached when going astern.

The measuring, recording and registration of the test data referred to in (a) or (b) shall be carried out in accordance with the procedure set out in Annex 1.

Throughout the entire test, the vessel or the convoy shall have adequate manoeuvrability.

2.2 In accordance with Article 5.04, during the test, vessels shall be loaded as far as possible to 70 – 100 % of their deadweight. This loading condition shall be evaluated in accordance with Annex 2. When the vessel or the convoy is loaded to less than 70 % at the time of the test, the permitted maximum displacement in downstream navigation shall be set in accordance with the actual load, provided that the limit values of (2.1) are complied with.

2.3 If the actual values of the initial speed and current velocity at the time of the test do not meet the conditions set out in (2.1), the results obtained shall be evaluated according to the procedure described in Annex 2.

The permitted deviation of the initial speed of 13 km/h shall be not more than ± 1 km/h, and the current velocity in flowing water shall be between 1,3 and 2,2 m/s, otherwise the tests shall be repeated.

2.4 The permitted maximum displacement or the respective maximum load or the maximum immersed cross-section for vessels and convoys in downstream navigation shall be determined on the basis of the tests and entered in the inland navigation vessel certificate.

...

ESI-II-4

Capacity for taking evasive action and turning capacity

(Articles 5.09 and 5.10 in conjunction with Articles 5.02(1), 5.03(1), 5.04 and 21.06)

1. General conditions and boundary conditions relating to the evasive action test

1.1 According to Article 5.09, vessels and convoys shall be able to take evasive action in good time and the capacity for such action shall be proved by evasive action manoeuvres in the test area in accordance with Article 5.03. This shall be proved by simulated evasive action manoeuvres to port and starboard with prescribed values whereby for specific turning speeds of the vessel in response to putting across and then checking the helm a certain time limit shall be complied with.

During tests the requirements of Section 2 shall be complied with keeping a keel clearance of at least 20 % of the draught, but not less than 0,50 m.

2. Evasive action test procedure and recording of data

(Diagram in Annex 1)

2.1 Evasive action manoeuvres shall be performed as follows:

With the vessel or convoy under way at a constant speed of $V_0 = 13$ km/h in relation to the water, at the start of the manoeuvre (time $t_0 = 0$ s, turning speed $r = 0^\circ/\text{min}$, rudder angle $\delta_0 = 0^\circ$, engine speed kept constant), evasive action to port or starboard is to be initiated by putting across the helm. The rudder shall be set to an angle δ , or the steering unit to an angle δ_a in the case of an active steering device, at the start of the manoeuvre, in accordance with the indications given in (2.3). The rudder angle δ (e.g. 20° to starboard)

shall be maintained until the value r_1 of the turning speed referred to in (2.2) for the corresponding dimensions of the vessel or convoy is reached. When the turning speed r_1 is reached, the time t_1 shall be recorded and the rudder set to the same angle on the opposite side (e.g. 20° to port) so as to stop the turn and commence turning in the opposite direction, i.e., to reduce the turning speed to $r_2 = 0$ and let it to rise again to the value given in (2.2). When the turning speed $r_2 = 0$ is reached, the time t_2 shall be recorded. When the turning speed r_3 given in (2.2) is reached, the rudder shall be set in the opposite direction to the same angle δ , so as to stop the turning movement. The time t_3 shall be recorded. When the turning speed $r_4 = 0$ is reached, the time t_4 shall be recorded and the vessel or convoy shall be returned to its original course.

2.2 The following limit values shall be complied with to reach turning speed r_4 depending on the dimensions of the vessels or the convoys and on the water depth h :

Dimensions of vessels or convoys $L \times B$	Required turning speed $r_1 = r_3$ [°/min]		Limit values for the time t_4 (s) in shallow and deep water		
	$\delta = 20^\circ$	$\delta = 45^\circ$	$1,2 \leq h/T \leq 1,4$	$1,4 < h/T \leq 2$	$h/T > 2$
1 All motor vessels; single-in-line convoys $\leq 110 \times 11,45$	20°/min	28°/min	150 s	110 s	110 s
2 Single-in-line convoys up to $193 \times 11,45$ or two-abreast convoys up to $110 \times 22,90$	12°/min	18°/min	180 s	130 s	110 s
3 Two-abreast convoys $\leq 193 \times 22,90$	8°/min	12°/min	180 s	130 s	110 s
4 Two-abreast convoys up to $270 \times 22,90$ or three-abreast convoys up to $193 \times 34,35$	6°/min	8°/min	*)	*)	*)
*) In accordance with the decision of the nautical expert.					

The times t_1 , t_2 , t_3 and t_4 required to reach turning speeds r_1 , r_2 , r_3 and r_4 shall be recorded in the measurements report in Annex 2. The t_4 values shall not exceed the limits given in the table.

2.3 At least four evasive action manoeuvres shall be carried out, namely:

- one to starboard with a rudder angle $\delta = 20^\circ$
- one to port with a rudder angle $\delta = 20^\circ$
- one to starboard with a rudder angle $\delta = 45^\circ$
- one to port with a rudder angle $\delta = 45^\circ$.

If necessary (e.g. in the case of uncertainty about the values measured or of unsatisfactory manoeuvres), the evasive action manoeuvres shall be repeated. The turning speeds given in (2.2) and the time limits shall be complied with. For active steering devices or special types of rudder, a position δ_a of the steering unit or rudder angle δ_a other than $\delta = 20^\circ$ and $\delta = 45^\circ$ may be selected, according to the expert's assessment, depending on the type of steering system.

2.4 In order to determine the turning speed, a rate-of-turn indicator in accordance with Article 7.06(1) shall be on board.

2.5 In accordance with Article 5.04, the loading condition during the evasive action manoeuvre shall be between 70 % and 100 % of the maximum deadweight. If the test is carried out with a smaller load, approval for downstream and upstream navigation shall be restricted to that load limit.

The procedure for evasive action manoeuvres and the terms used are shown in a diagram in Annex 1.

3. Turning capacity

The turning capacity of vessels and convoys whose length (L) does not exceed 86 m and width (B) does not exceed 22,90 m shall be considered sufficient under Article 5.10, in conjunction with Article 5.02(1) when during an upstream turning manoeuvre with an initial speed in relation to the water of 13 km/h, the limit values for stopping facing downstream established in instruction ESI-II-3 are complied with. The keel clearance conditions according to Section 1.1 shall be complied with.

4. Other requirements

4.1 Notwithstanding (1) to (3), the following requirements shall be met:

a) for manually controlled steering systems, a single turn of the wheel shall correspond to a rudder angle of at least 3°;

b) for powered steering systems, when the rudder is at maximum immersion, it shall be possible to achieve an average angular velocity of 4°/s over the rudder's entire turning range.

This requirement shall also be checked, with the vessel at full speed, for moving the rudder over a range from 35° port to 35° starboard. In addition, it shall be checked whether the rudder keeps the position of maximum angle at maximum propulsion power. For active steering systems or special types of rudder, this provision applies mutatis mutandis.

4.2 If any of the additional equipment referred to in Article 5.05 is needed in order to reach the required manoeuvring capacities, it shall comply with the requirements of chapter 6, and the following particulars shall be entered under item 52 of the inland navigation vessel certificate:

'Flanking rudders^{*)}/ bow steering systems^{*)}/ other equipment* referred to under item 34 is^{*)}/are^{*)} necessary to comply with the manoeuvrability requirements of chapter 5.'

5. Recording of data and reports

The measurements, reports and recording of data shall be carried out according to the procedure set out in Annex 2.

...

ESI-II-5

Noise measurements

(Article 3.04(7), Article 7.01(2), Article 7.03(6), Article 7.09(3), Article 8.08, Article 14.09(3), Article 15.02(5), Article 22.02(3)(b), and Article 22.03(1))

1. General

In order to check the maximum sound pressure levels given in the Standard, measured values, measurement procedures and conditions for the quantitative, reproducible recording of sound pressure levels in accordance with (2) and (3) shall be established.

2. Measuring instruments

The measuring instrument shall meet the requirements of class 1 according to European Standard EN 61672-1 : 2003.

^{*)} Delete as appropriate

Before and after each set of measurements, a class 1 calibrator according to European Standard EN 60942 : 2003 shall be placed on the microphone in order to calibrate the measurement system. The compliance of the calibrator with the requirements of European Standard EN 60942 : 2003 shall be checked once per year. The compliance of the measuring equipment with the requirements of EN 61672-1 : 2003 shall be checked every two years.

3. Noise measurements

3.1 On board craft

Measurements shall be carried out in accordance with International Standard ISO 2923 : 2003 Sections 5 to 8 measuring only A-weighted sound pressure levels.

3.2 Air noise emitted from craft

Noise emissions from craft on inland waterways and in ports are determined by means of measurements in accordance with European Standard EN ISO 22922 : 2013, Sections 7 to 11. Doors and windows of engine rooms shall be closed during measurements.

4. Documentation

Measurements shall be recorded according to the ‘Noise Measurement Report’ (Annex).

...

F.1 Measurement results

Noise measurements on board craft

<i>Number</i>	<i>Measurement point</i>	<i>Doors</i>		<i>Windows</i>		<i>Measured value in dB(A)</i>	<i>Observations</i>
		<i>open</i>	<i>closed</i>	<i>open</i>	<i>closed</i>		

F.2 Measurement results

Measurement of air noise emitted from craft:

<i>Number</i>	<i>Measurement point</i>	<i>Measured values in dB(A)</i>	<i>Observations</i>

ESI-II-6

Appropriate auxiliary means for observing the area of obstructed vision
(Article 7.02)

1. Introduction

For a number of reasons, whether as a result of the vessel's construction or the cargo, unobstructed all-round vision from the wheelhouse is unavoidably restricted to a greater or lesser degree. The restrictions affect sectors in the horizontal plane (angle of azimuth between 0 and 360° relative to the forward axis of the vessel and in the vertical plane (angle of elevation between -90 and + 90°, relative to the horizontal plane at the eye level of the helmsman).

Depending on whether people are embarking or disembarking, whether the vessel is docking or casting off, whether it is manoeuvring or underway, the helmsman needs to be able to see different sectors of his field of vision. For example, before casting off it is important to be able to check whether there is anyone remaining on the side deck or whether the area immediately abaft the stern is clear. While underway a higher priority is accorded to being able to see the area in front of the vessel owing to the rapidly changing position of one's own vessel in forward motion.

Technical auxiliary means afford an indirect view of sectors that cannot be seen directly. Although many of their capabilities surpass those of the human eye, they are not a complete substitute for a direct view. Nevertheless, they are sometimes also used as a supplement in sectors that can be seen directly.

Concerning the required information on areas of obstructed vision, it is necessary to differentiate whether the information of interest is purely the presence of an object, its visual characteristics (silhouette, colour) or its identity, or whether it is important from a navigational perspective to determine an object's range, course and speed. This question influences the selection of the type of technical auxiliary means.

Given the lower purchase and installation cost, superior performance, versatility and customisation potential of video systems compared with periscopes, periscopes are eliminated as technical auxiliary means.

2. Overview of appropriate auxiliary means

The following auxiliary means are fundamentally suited to observing areas of obstructed vision:

- mirrors,
- video systems and
- radar systems.

Auxiliary means that satisfy Part 4 of this administrative instruction are suitable for observing areas of obstructed vision provided they comply with the specific conditions of use. The inspection commission will only permit other auxiliary means if it is of the view that they provide a comparable degree of safety.

3. Characteristics of technical auxiliary means

3.1 Characteristics of mirrors

In principle, mirrors are sensor and display system in one. They reflect the incident light according to the law: “angle of incidence = angle of reflection” and afford indirect observation of the desired sector by deflecting the helmsman’s field of view. They are used mainly for viewing side deck areas.

With plane mirrors the angle at the centre of the field of view remains unchanged, convex mirrors increase it. Mirrors do not work in the dark and may dazzle in direct sunlight.

Generally speaking the mirrors used for inland navigation are mass produced products designed for buses and HGVs, the characteristics of which are suitable for navigation purposes.

Under ideal conditions (high quality, no fouling) the resolution of an image provided by a mirror is limited by the resolution of the eye of the observer.

3.2 Characteristics of video systems

With a high repetition rate, video systems provide a current image of the environment such as an observer would see were he to be where the camera is located. They comprise a video camera as the image sensor and a raster screen for displaying the recorded image (video monitor).

A simple electrical connection suffices for transmitting the signal between the camera and monitor. The power supply can also be provided via the signal cable.

Cameras can operate with either a fixed or variable focal length (zoom) and be installed either in a fixed position or on a swivelling and tilting head.

The images obtained by the (single lens) cameras are captured and displayed centrally on screens in the same way as perceived by the human eye. A major weakness of the central perspective is that it does not enable the range of the images displayed to be determined. This effect is very apparent with images captured using telephoto lenses (long focal length).

That is why the viewing direction and field of observation have to be well matched with the required use.

Video systems depend on the presence of low ambient brightness. Strong reflections on the water surface and direct sunlight can render the image unusable.

The technical characteristics of the monitor (image size, resolution, brightness) depend on the required use.

The resolution of the image is determined by the number of pixels of the image sensor in the camera and the number of pixels (and bandwidth of the video signal) of the monitor. Even a good commercial video system does not quite match the maximum resolution of the human eye.

3.3 Characteristics of radar systems

Radar systems feature a sensor (revolving antenna with transmitter and receiver) and a display device. The sensor uses a horizontally rotating antenna to “illuminate” narrow radial sectors with microwave pulses, captures the echoes returned by reflecting objects then displays them on a screen indicating range and bearing. This creates a scaled image of the environment relative to the vessel’s heading. This image enables objects at a range of 15 m and more to be determined with a resolution of approximately 5 m and their bearing to within around 0.5 °.

As radar impulses operate with their own transmission impulses, unlike the other technical auxiliary means mentioned above, they do not depend on the existence of ambient brightness.

However, they can only detect and determine the position of reflecting objects and generate an image of the environment resembling a map, faithfully depicting bearing and range. Radar systems are also unable to identify and depict object details which would make identification possible.

4. Appropriate auxiliary means for observing the area of obstructed vision

4.1 Mirrors

1. Shape

The shape of the mirror depends on the shape of the area to be observed. Rectangular mirrors lend themselves to observing side decks.

2. Size

The mirror’s surface area depends on the width of the sector one wishes to observe and the distance between the helmsman and the mirror.

3. Quality

Tried and tested mass produced products such as those for road vehicles (HGVs, buses) are to be used.

4. Curvature

Plane mirrors are to be used, not curved ones. When deemed useful, slightly curved mirrors may also be used.

5. Mounting bracket

The mounting bracket must ensure the mirror remains in a permanent and rigid position (free of vibration).

6. Protection against rain

The mirror is to be fitted such that it is protected against rain.

7. Frost protection

The build-up of hoar frost on the mirror is to be prevented.

8. Installation position

It must be possible for the helmsman to use the mirror without leaving his post; it must be sufficient for him to glance at or turn his head towards the mirror. That is why the upper edges of the outer bulkheads (and outer doors as well) of the wheelhouse are well suited as attachment points. The helmsman must have an unobstructed view of the mirror.

9. Adjustment

The direction of the parts of the vessel depicted (edges, walkways) must correspond to reality as closely as possible.

4.2 Video systems

4.2.1 Cameras

1. Camera type

Raster scan colour video camera with automatic black and white switching, image format, e.g. 4:3 (“landscape”), appropriate to the monitor being used.

2. Resolution

Equally good resolution in both the horizontal and vertical axes, preferably a minimum of 576 pixels on the narrow edge of the image, square pixels.

3. Light sensitivity

0.6 Lux in colour mode, 0.1 Lux in black and white mode (in accordance with standard EN 61146-1 with the corresponding lens without image integration).

4. Image repetition frequency

Image repetition frequency of 25 images/s or more.

5. Viewing angle

The camera viewing angle is determined by selecting the appropriate focal length. To avoid irritating the user further with an unnatural perspective, it is recommended that the viewing angle be aligned with that of the human eye (approx. 30° to 45°). The horizontal viewing angle should not therefore be less than 30°.

6. Zoom lenses and slewing mechanisms

When using slewing and zoom cameras to assist forward vision there should be a basic setting for optimal focal length and forward pointing orientation that can be achieved at the press of a button.

7. Camera position

The camera position depends on the zone to be observed.

8. Camera mounting

The mounting bracket must ensure the camera remains in a permanent and rigid position (free of vibration). The mounting bracket can also comprise a protective heated enclosure.

4.2.2 Monitors

1. Monitor type

Raster screen (preferably TFT flat screen), minimum 30 cm screen diagonal.

2. Monitor location

a) All monitors displaying images from cameras predominantly pointing forward must be within the helmsman's field of vision so that he can see them without excessive movement of the head. They must be sited laterally to coincide with the cameras (port, amidships, starboard).

b) Monitors corresponding to cameras pointed aft can also, for example, be located in a second bank, centrally and on the correct side, below or above the aforementioned monitors. The image display is then consistent with that of the mirrors. If these images are only required when docking or casting off it is useful to locate these monitors on the after wheelhouse bulkhead as the helmsman is in any event looking aft or turning around when performing these manoeuvres. The images then no longer correspond to the mirror image.

3. Use of several monitors

The use of a single monitor to display a number of camera images (either simultaneously by splitting the screen into two or more zones or sequentially switching to the next camera) is not appropriate when looking forward.

4. Resolution

A minimum of 800 x 600 pixels.

5. Brightness

Minimum brightness: $FG \leq 15 \text{ cd/m}^2$; $BG \leq 5 \text{ cd/m}^2$. Maximum brightness $VG \geq 5000 \text{ cd/m}^2$

(FG = foreground; BG = background).

4.3 Radar systems

1. Radar systems

In addition to the minimum requirements and test conditions for navigational radar installations in inland navigation (ES-TRIN, Annex 5, Section I) the radar system must comply with the following requirements.

2. Antenna length

Minimum 1.80 m.

3. Near-field resolution

$\leq 15 \text{ m}$.

4. Radial resolution

Pulse duration $\leq 5 \text{ m}$; pulse separation $\leq 15 \text{ m}$.

5. Azimuth resolution

$\leq 1.2^\circ$.

6. Antenna height

The antenna height depends on the vessel's height and cargo. The antenna must be located at least 3 m above deck height to prevent accidents caused by rotation of the antenna.

7. Monitor type

A TFT flat panel monitor in portrait format must be used.

8. Image dimensions

The length of the shortest side of the screen must be a minimum of 270 mm.

9. Resolution

The resolution of the monitor must be identical in both directions and the pixels must be square. The narrow side must feature at least 1024 pixels (typically 1024 x 1280 pixels).

10. Brightness

Minimum brightness: $FG \leq 15 \text{ cd/m}^2$; $BG \leq 5 \text{ cd/m}^2$.

11. Monitor location/operation

The radar screen and its controls must be installed in accordance with the requirements for installation and performance tests for navigational radar installations and rate-of-turn indicators in inland navigation (ES-TRIN, Annex 5, Section III, Article 5).”
