

Economic Commission for Europe

Inland Transport Committee

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Working Party on the Transport of Dangerous Goods

**Joint Meeting of Experts on the Regulations annexed to the
European Agreement concerning the International Carriage
of Dangerous Goods by Inland Waterways (ADN)
(ADN Safety Committee)**

Thirty-third session

Geneva, 27–31 August 2018

Item 3 (e) of the provisional agenda

**Implementation of the European Agreement concerning
the International Carriage of Dangerous Goods
by Inland Waterways (ADN):
Matters related to classification societies**

Addendum to ECE/TRANS/WP.15/AC.2/2018/36

Transmitted by the Russian Maritime Register of Shipping

Request to the Recommended ADN Classification Societies Source : Doc WP15-AC2-25-inf12		Reference to the Russian Maritime Register of Shipping Rules and Regulations
INF-12/Item 8 : References to class approval based on class rules	Do you have Class Rules? “The proposers of the document <INF-12> would like to request the Recommended ADN Classification Societies to verify whether the different classification societies do indeed have class rules for the ADN provisions mentioned under paragraph. In case these are not available, they are requested to provide the ADN Committee with a timeframe within which they will be developed.”	YES Rules for the Classification and Construction of Inland Navigation Ships (for European Inland Waterways), 2017
INF-12/Item 9 : References to class approval based on requirements other than class rules	Which standards/regulations are used? “For the provisions where reference is made to class approval based on requirements other than class rules they are requested to specify which standards or regulations are used to determine whether arrangements are acceptable to the classification.”	Directive 2006/87/EC of the European Parliament and of the Council of 12 December 2006 as amended: 1. RS Rules for the Classification and Construction of High-Speed Crafts as regards inland navigation high speed crafts considering provisions of Chapter 2b of Directive 2006/87/EC 2. RS Rules for the Classification and Construction of Pleasure Craft as regards inland navigation on recreational crafts considering the provisions of Chapter 21 of Directive 2006/87/EC
ADN		
1.2.1. Highest class	may be assigned to a vessel when: – the hull, inclusive of rudder and steering gear and equipment of anchors and chains, complies with the rules and regulations of a recognized classification society and has been built and tested under its supervision; – the propulsion plant, together with the essential auxiliary engines, mechanical and electrical installations, have been made and tested in conformity with the rules and regulations of this classification society, and the installation has been carried out under its supervision, and the complete plant was tested to its satisfaction on completion;	To be noted in current amendments to the “Rules for the classification and construction of inland navigation ships (for European Inland Waterways)”. Class notations are included in Part I, ch. 2.2 of “Rules for the classification and construction of inland and navigation ship (for European Inland Waterways)”, 2017.
1.2.1. Opening pressure	Opening pressure means the pressure referred to in a list of substances in Chapter 3.2, Table C at which the high velocity vent valves open. For pressure tanks the opening pressure of the safety valve shall be established in accordance with the requirements of the competent authority or a recognized classification society;	Chapter VII “Rules for the classification and construction of inland and navigation ship (for European Inland Waterways)”, 2012.
PART 7		

<p>REQUIREMENTS CONCERNING LOADING, CARRIAGE, UNLOADING AND HANDLING OF CARGO</p> <p>Chapter 7.2 Tank vessels</p>		
7.2.2.0	NOTE 2: The design pressure and the test pressure of cargo tanks shall be indicated in the certificate of the recognised classification society prescribed in 9.3.1.8.1 or 9.3.2.8.1 or 9.3.3.8.1.	The design pressure and the test pressure of cargo tanks are indicated in the Classification certificate
7.2.2.0	NOTE 3: Where a vessel carries cargo tanks with different valve-relief pressures, the relief pressure of each tank shall be indicated in the certificate of approval and the design and test pressures of each tank shall be indicated in the certificate of the recognised classification society.	see above – for 7.2.2.0 Note 2
7.2.2.0.1	NOTE: The substances accepted for carriage in the individual vessel are listed in the vessel substance list to be drawn up by the recognised classification society (see 1.16.1.2.5).	Vessel substance list (p. 1.16.1.2.5) is attached to the ADN certificate
7.2.2.6 Gas detection system	The system shall have been approved by the competent authority or a recognized classification society.	Chapter VII “Rules for the classification and construction of inland and navigation ship (for European Inland Waterways)”, 2017.
<p>PART 8 PROVISIONS FOR VESSEL CREWS, EQUIPMENT, OPERATION AND DOCUMENTATION</p> <p>Chapter 8.1 General requirements applicable to vessels and equipment</p>		
8.1.2.3 c)	the stability booklet and the proof of the loading instrument having been approved by the recognized classification society;	Chapter IV Rules for the Classification and Construction of Inland Navigation Ships (for European Inland Waterways)
<p>PART 9 RULES FOR CONSTRUCTION</p> <p>Chapter 9.1 Rules for construction of dry cargo vessels</p>		
9.1.0.88.1	Double-hull vessels intended to carry dangerous goods of Classes 2, 3, 4.1, 4.2, 4.3, 5.1, 5.2, 6.1, 7, 8 or 9 except those for which label No. 1 is	ch. 2 of Part XIV of the Rules, compliance to ADN is indicate in Classification certificate

	prescribed in column (5) of Table A of Chapter 3.2, in quantities exceeding those referred to in 7.1.4.1.1 shall be built or transformed under survey of a recognised classification society in accordance with the rules established by that classification society to its highest class. This shall be confirmed by the classification society by the issue of an appropriate certificate.	
9.1.0.88.3	Future conversions and major repairs to the hull shall be carried out under survey of this classification society.	Part I of Rules for classification and Annex 3 to the Rules for ships in service
9.1.0.91.2	The distance between the sides of the vessel and the longitudinal bulkheads of the hold shall be not less than 0.80 m. Regardless of the requirements relating to the width of walkways on deck, a reduction of this distance to 0.60 m is permitted, provided that, compared with the scantlings specified in the rules for construction published by a recognised classification society, the following reinforcements have been made:	Chapter II Rules for the Classification and Construction of Inland Navigation Ships (for European Inland Waterways)
9.1.0.91.2	(c) The gangboards shall be supported by transverse bulkheads or cross-ties spaced not more than 32 m apart. As an alternative to compliance with the requirements of (c) above, a proof by calculation, issued by a recognised classification society confirming that additional reinforcements have been fitted in the double-hull spaces and that the vessel's transverse strength may be regarded as satisfactory.	Chapter II Rules for the Classification and Construction of Inland Navigation Ships (for European Inland Waterways)
9.2.0.88.1	Classification 9.2.0.88.1 Double-hull vessels intended to carry dangerous goods of Classes 2, 3, 4.1, 4.2, 4.3, 5.1, 5.2,6.1, 7, 8 or 9 except those for which label No. 1 is prescribed in column (5) of Table A of Chapter 3.2, in quantities exceeding those referred to in 7.1.4.1, shall be built under survey of a recognised classification society in accordance with the rules established by that classification society to its highest class. This shall be confirmed by the classification society by the issue of an appropriate certificate.	See 9.1.0.88.1
9.3.1 Rules for construction of type G tank vessels		
9.3.1.8.1	The tank vessel shall be built under survey of a recognised classification society in accordance with the rules	see above 9.1.0.88.1 The design pressure and the test pressure of cargo tanks are indicated in the Classification certificate

	<p>established by that classification society for its highest class, and the tank vessel shall be classed accordingly.</p> <p>The vessel's highest class shall be continued.</p> <p>The classification society shall issue a certificate certifying that the vessel is in conformity with the rules of this section (classification certificate).</p> <p>The design pressure and the test pressure of cargo tanks shall be entered in the certificate.</p> <p>If a vessel has cargo tanks with different valve opening pressures, the design and test pressures of each tank shall be entered in the certificate.</p> <p>The classification society shall draw up a vessel substance list mentioning all the dangerous goods accepted for carriage by the tank vessel (see also 1.16.1.2.5).</p>	<p>Vessel substance list (p. 1.16.1.2.5) is attached to the ADN certificate</p>
9.3.1.8.2	<p>The cargo pump-rooms shall be inspected by a recognised classification society whenever the certificate of approval has to be renewed as well as during the third year of validity of the certificate of approval. The inspection shall comprise at least:</p> <ul style="list-style-type: none"> – an inspection of the whole system for its condition, for corrosion, leakage or conversion works which have not been approved; – a checking of the condition of the gas detection system in the cargo pump-rooms. <p>Inspection certificates signed by the recognised classification society with respect to the inspection of the cargo pump-rooms shall be kept on board. The inspection certificates shall at least include particulars of the above inspection and the results obtained as well as the date of the inspection.</p>	<p>Part II of Rules for ships in service, ADN certificate of approval</p>
9.3.1.8.3	<p>The condition of the gas detection system referred to in 9.3.1.52.3 shall be checked by a recognised classification society whenever the certificate of approval has to be renewed and during the third year of validity of the certificate of approval. A certificate signed by the recognised classification society shall be kept on board.</p>	<p>Part II of Rules for ships in service</p>
9.3.1.11.2	<p>(a) In the cargo area, the hull shall be designed as follows:1</p> <ul style="list-style-type: none"> – as a double-hull and double bottom vessel. The internal distance between the sideplatings of the vessel and the longitudinal bulkheads shall not be less 	<p>Chapter II Rules for the Classification and Construction of Inland Navigation Ships (for European Inland Waterways)</p>

	<p>than 0.80 m, the height of the double bottom shall be not less than 0.60 m, the cargo tanks shall be supported by saddles extending between the tanks to not less than 20° below the horizontal centreline of the cargo tanks.</p> <p>Refrigerated cargo tanks shall be installed only in hold spaces bounded by double-hull spaces and double-bottom.</p> <p>Cargo tank fastenings shall meet the requirements of a recognised classification society; or</p>	
9.3.1.13.3	<p>..... The proof of sufficient stability shall be shown for every operating, loading and ballast condition in the stability booklet, to be approved by the relevant classification society, which classes the vessel. If it is unpractical to pre-calculate the operating, loading and ballast conditions, a loading instrument approved by the recognised classification society which classes the vessel shall be installed and used which contains the contents of the stability booklet.</p>	Chapter IV Rules for the Classification and Construction of Inland Navigation Ships (for European Inland Waterways)
9.3.1.17.5	<p>(b) The penetration of the shaft [Driving shafts of the bilge or ballast pumps]through the bulkhead shall be gastight and shall have been approved by a recognised classification society.</p>	Part XIV, ch. 2.3 of “Rules for the classification and construction of inland and navigation ship (for European Inland Waterways)”, 2017.
9.3.1.17.5	<p>(d) Penetrations through the bulkhead between the engine room and the service space in the cargo area, and the bulkhead between the engine room and the hold spaces may be provided for electrical cables, hydraulic lines and piping for measuring, control and alarm systems, provided that the penetrations have been approved by a recognised classification society. The penetrations shall be gastight. Penetrations through a bulkhead with an “A-60»fire protection insulation according to SOLAS 74, Chapter II-2, Regulation 3, shall have an equivalent fire protection.</p>	Part XIV, ch. 2.3 of “Rules for the classification and construction of inland and navigation ship (for European Inland Waterways)”, 2017.
9.3.1.23.1	<p>Cargo tanks and piping for loading and unloading shall comply with the provisions concerning pressure vessels which have been established by the competent authority or a recognised classification society for the substances carried.</p>	Part VII “Rules for the classification and construction of inland and navigation ship (for European Inland Waterways)”, 2017.
9.3.1.24.1	<p>Unless the entire cargo system is designed to resist the full effective vapour pressure of the cargo at the</p>	Chapter VII “Rules for the classification and construction of inland navigation ships (for European Inland Waterways)”

	<p>upper limits of the ambient design temperatures, the pressure of the tanks shall be kept below the permissible maximum set pressure of the safety valves, by one or more of the following means:</p> <p>(a);</p> <p>(b) a system ensuring safety in the event of the heating or increase in pressure of the cargo. The insulation or the design pressure of the cargo tank, or the combination of these two elements, shall be such as to leave an adequate margin for the operating period and the temperatures expected; in each case the system shall be deemed acceptable by a recognized classification society and shall ensure safety for a minimum time of three times the operation period;</p> <p>(c) other systems deemed acceptable by a recognized classification society.</p>	<p>Chapter VI “Rules for the classification and construction of chemical tankers”</p>
<p>9.3.1.24.2</p>	<p>The systems prescribed in 9.3.1.24.1 shall be constructed, installed and tested to the satisfaction of the recognized classification society. The materials used in their construction shall be compatible with the cargoes to be carried. For normal service, the upper ambient design temperature limits shall be: air: +30° C; water: +20° C.</p>	<p>Chapter VII “Rules for the classification and construction of inland navigation ships (for European Inland Waterways)” Chapter VI “Rules for the classification and construction of chemical tankers”</p>
<p>9.3.1.27.1</p>	<p>The refrigeration system referred to in 9.3.1.24.1 (a) shall be composed of one or more units capable of keeping the pressure and temperature of the cargo at the upper limits of the ambient design temperatures at the prescribed level. Unless another means of regulating cargo pressure and temperature deemed satisfactory by a recognized classification society is provided, provision shall be made for one or more stand-by units with an output at least equal to that of the largest prescribed unit. A stand-by unit shall include a compressor, its engine, its control system and all necessary accessories to enable it to operate independently of the units normally used. Provision shall be made for a stand-by heat-exchanger unless the system’s normal heat-exchanger has a surplus capacity equal to at least 25% of the largest prescribed capacity. It is</p>	<p>Chapter VII “Rules for the classification and construction of inland navigation ships (for European Inland Waterways)” Chapter VI “Rules for the classification and construction of chemical tankers”</p>

	<p>not necessary to make provision for separate piping.</p> <p>Cargo tanks, piping and accessories shall be insulated so that, in the event of a failure of all cargo refrigeration systems, the entire cargo remains for at least 52 hours in a condition not causing the safety valves to open.</p>	
9.3.1.27.9	<p>For all cargo systems, the heat transmission coefficient shall be determined by calculation.</p> <p>The correctness of the calculation shall be checked by means of a refrigeration test (heat balance test).</p> <p>This test shall be performed in accordance with the rules set up by a recognised classification society.</p>	<p>Chapter VII “Rules for the classification and construction of inland navigation ships (for European Inland Waterways)”</p> <p>Chapter VI “Rules for the classification and construction of chemical tankers”</p>
9.3.1.27.10	<p>A certificate from a recognized classification society stating that 9.3.1.24.1 to 9.3.1.24.3, 9.2.1.27.1 and 9.3.1.27.4 above have been complied with shall be submitted together with the application for issue or renewal of the certificate of approval.</p>	<p>Statement of compliance can be issued</p>
9.3.2 Rules for construction of type C tank vessels		
9.3.2.8.1	<p>The tank vessel shall be built under survey of a recognised classification society in accordance with the rules established by that classification society for its highest class, and the tank vessel shall be classed accordingly.</p> <p>The vessel’s highest class shall be continued.</p> <p>The classification society shall issue a certificate certifying that the vessel is in conformity with the rules of this section (classification certificate).</p> <p>The design pressure and the test pressure of cargo tanks shall be entered in the certificate.</p> <p>If a vessel has cargo tanks with different valve opening pressures, the design and test pressures of each tank shall be entered in the certificate.</p> <p>The classification society shall draw up a vessel substance list mentioning all the dangerous goods accepted for carriage by the tank vessel (see also 1.16.1.2.5).</p>	<p>see above 9.1.0.88.1</p> <p>The design pressure and the test pressure of cargo tanks are indicated in the Classification certificate</p> <p>Vessel substance list (p. 1.16.1.2.5) is attached to the ADN certificate</p>
9.3.2.8.2	<p>The cargo pump-rooms shall be inspected by a recognised classification society whenever the certificate of approval has to be renewed as well as during the third year of validity of the</p>	<p>Part II of Rules for ships in service, ADN certificate of approval</p>

	<p>certificate of approval. The inspection shall comprise at least:</p> <ul style="list-style-type: none"> – an inspection of the whole system for its condition, for corrosion, leakage or conversion works which have not been approved; – a checking of the condition of the gas detection system in the cargo pump-rooms. <p>Inspection certificates signed by the recognised classification society with respect to the inspection of the cargo pump-rooms shall be kept on board. The inspection certificates shall at least include particulars of the above inspection and the results obtained as well as the date of the inspection.</p>	
9.3.2.8.3	<p>The condition of the gas detection system referred to in 9.3.2.52.3 shall be checked by a recognised classification society whenever the certificate of approval has to be renewed and during the third year of validity of the certificate of approval. A certificate signed by the recognised classification society shall be kept on board.</p>	Part II of Rules for ships in service
9.3.2.11.7	<p>For double-hull construction with the cargo tanks integrated in the vessel's structure, the distance between the side wall of the vessel and the longitudinal bulkhead of the cargo tanks shall be not less than 1.00 m. A distance of 0.80 m may however be permitted, provided that, compared with the scantling requirements specified in the rules for construction of a recognised classification society, the following reinforcements have been made:</p> <ul style="list-style-type: none"> (a) 25% increase in the thickness of the deck stringer plate; (b) 15% increase in the side plating thickness; (c) Arrangement of a longitudinal framing system at the vessel's side, where depth of the longitudinals shall be not less than 0.15 m and the longitudinals shall have a face plate with the cross-sectional area of at least 7.0 cm². (d) The stringer or longitudinal framing systems shall be supported by web frames, and like bottom girders fitted with lightening holes, at a maximum spacing of 1.80 m. <p>These distances may be increased if the longitudinals are strengthened accordingly.</p>	Chapter II Rules for the Classification and Construction of Inland Navigation Ships (for European Inland Waterways)

9.3.2.13.3	<p>...</p> <p>The proof of sufficient stability shall be shown for every operating, loading and ballast condition in the stability booklet, to be approved by the relevant classification society, which classes the vessel. If it is unpractical to pre-calculate the operating, loading and ballast conditions, a loading instrument approved by the recognised classification society which classes the vessel shall be installed and used which contains the contents of the stability booklet.</p>	Chapter IV Rules for the Classification and Construction of Inland Navigation Ships (for European Inland Waterways)
9.3.2.17.5	(b) The penetration of the shaft through the bulkhead shall be gastight and shall have been approved by a recognised classification society.	Part XIV, ch. 2.4 of “Rules for the classification and construction of inland and navigation ship (for European Inland Waterways)”, 2017.
9.3.2.17.5	(d) Penetrations through the bulkhead between the engine room and the service space in the cargo area and the bulkhead between the engine room and the hold spaces may be provided for electrical cables, hydraulic and piping for measuring, control and alarm systems, provided that the penetration have been approved by a recognized classification society. The penetrations shall be gastight. Penetrations through a bulkhead with an “A-60»fire protection insulation according to SOLAS 74, Chapter II-2, Regulation 3, shall have an equivalent fire protection.	Part XIV, ch. 2.4 of “Rules for the classification and construction of inland and navigation ship (for European Inland Waterways)”, 2017.
9.3.2.23.5	The procedure for pressure tests shall comply with the provisions established by the competent authority or a recognised classification society.	Chapter II Rules for the Classification and Construction of Inland Navigation Ships (for European Inland Waterways)
9.3.3 Rules for construction of type N tank vessels		
9.3.3.8.1	<p>The tank vessel shall be built under survey of a recognised classification society in accordance with the rules established by that classification society for its highest class, and the tank vessel shall be classed accordingly.</p> <p>The vessel’s class shall be continued.</p> <p>The classification society shall issue a certificate certifying that the vessel is in conformity with the rules of this section (classification certificate).</p> <p>The design pressure and the test pressure of cargo tanks shall be entered in the certificate.</p>	<p>see above 9.1.0.88.1</p> <p>The design pressure and the test pressure of cargo tanks are indicated in the Classification certificate</p> <p>Vessel substance list (p. 1.16.1.2.5) is attached to the ADN certificate</p>

	<p>If a vessel has cargo tanks with different valve opening pressures, the design and test pressures of each tank shall be entered in the certificate.</p> <p>The classification society shall draw up a vessel substance list mentioning all the dangerous goods accepted for carriage by the tank vessel (see also 1.16.1.2.5).</p>	
9.3.3.8.2	<p>The cargo pump-rooms shall be inspected by a recognised classification society whenever the certificate of approval has to be renewed as well as during the third year of validity of the certificate of approval. The inspection shall comprise at least:</p> <ul style="list-style-type: none"> – an inspection of the whole system for its condition, for corrosion, leakage or conversion works which have not been approved; – a checking of the condition of the gas detection system in the cargo pump-rooms. <p>Inspection certificates signed by the recognised classification society with respect to the inspection of the cargo pump-rooms shall be kept on board. The inspection certificates shall at least include particulars of the above inspection and the results obtained as well as the date of the inspection.</p>	Part II of Rules for ships in service, ADN certificate of approval
9.3.3.8.3	<p>The condition of the gas detection system referred to in 9.3.3.52.3 shall be checked by a recognised classification society whenever the certificate of approval has to be renewed and during the third year of validity of the certificate of approval. A certificate signed by the recognised classification society shall be kept on board.</p>	Part II of Rules for ships in service
9.3.3.13.3	<p>...</p> <p>The proof of sufficient stability shall be shown for every operating, loading and ballast condition in the stability booklet, to be approved by the relevant classification society, which classes the vessel. If it is unpractical to pre-calculate the operating, loading and ballast conditions, a loading instrument approved by the recognised classification society which classes the vessel shall be installed and used which contains the contents of the stability booklet.</p>	Chapter IV Rules for the Classification and Construction of Inland Navigation Ships (for European Inland Waterways)
9.3.3.17.5	<p>(b) The penetration of the shaft through the bulkhead shall be gastight and shall have been approved by a recognised classification society.</p>	Chapter XIV, ch. 2.5 of “Rules for the classification and construction of inland and navigation ship (for European Inland Waterways)”, 2017.

9.3.3.17.5	(d) Penetrations through the bulkhead between the engine room and the service space in the cargo area and the bulkhead between the engine room and the hold spaces may be provided for electrical cables, hydraulic lines and piping for measuring, control and alarm systems, provided that the penetrations have been approved by a recognised classification society. The penetrations shall be gastight. Penetrations through a bulkhead with an “A-60»fire protection insulation according to SOLAS 74, Chapter II-2, Regulation 3, shall have an equivalent fire protection.	Chapter XIV, ch. 2.5 of “Rules for the classification and construction of inland and navigation ship (for European Inland Waterways)”, 2017.
9.3.3.23.5	The procedure for pressure tests shall comply with the provisions established by the competent authority or a recognised classification society.	Chapter II Rules for the Classification and Construction of Inland Navigation Ships (for European Inland Waterways)
9.3.4 Alternative constructions		
9.3.4.1.4	When a vessel is built in compliance with this section, a recognised classification society shall document the application of the calculation procedure in accordance with 9.3.4.3 and shall submit its conclusions to the competent authority for approval. The competent authority may request additional calculations and proof.	According to “Rules for the classification and construction of inland navigation ships (for European Inland Waterways)” vessels are to be designed in compliance with ADN.
9.3.4.3.1.1	Step 1 Besides the alternative design, which is used for cargo tanks exceeding the maximum allowable capacity or a reduced distance between the side wall and the cargo tank as well as a more crashworthy side structure, a reference design with at least the same dimensions (length, width, depth, displacement) shall be drawn up. This reference design shall fulfil the requirements specified in section 9.3.1 (Type G), 9.3.2 (Type C) or 9.3.3 (Type N) and shall comply with the minimum requirements of a recognised classification society.	<same as above>
9.3.4.3.1.2.1	The relevant typical collision locations $i=1$ through n shall be determined. The table in 9.3.4.3.1 depicts the general case where there are 'n' typical collision locations. The number of typical collision locations depends on the vessel design. The choice of the collision locations shall be accepted by the recognised classification society.	<same as above>

9.3.4.3.1.2.2.1.5	Depending on the vessel design, the recognised classification society may require additional collision locations.	<same as above>
9.3.4.3.1.2.2.2	Tank vessel type G For a tank vessel type G a collision at half tank height shall be assumed. The recognized classification society may require additional collision locations at other heights. This shall be agreed with the recognised classification society.	<same as above>
9.3.4.3.1.2.4.3	Additional examinations for tank vessels type G, C and N with independent cargo tanks As proof that the tank seatings and the buoyancy restraints do not cause any premature tank rupture, additional calculations shall be carried out. The additional collision locations for this purpose shall be agreed with the recognised classification society.	<same as above>
9.3.4.3.1.3.1	For each typical collision location a weighting factor which indicates the relative probability that such a typical collision location will be struck shall be determined. In the table in 9.3.4.3.1 these factors are named wfloc(i) (column J). The assumptions shall be agreed with the recognised classification society.	<same as above>
9.3.4.4.1.2	The program actually used and the level of detail of the calculations shall be agreed upon with a recognised classification society.	<same as above>
9.3.4.4.2.1	First of all, FE models for the more crashworthy design and one for the reference design shall be generated. Each FE model shall describe all plastic deformations relevant for all collision cases considered. The section of the cargo area to be modelled shall be agreed upon with a recognised classification society.	<same as above>
9.3.4.4.2.4	The calculation of rupture initiation must be based on fracture criteria which are suitable for the elements used. The maximum element size shall be less than 200 mm in the collision areas. The ratio between the longer and the shorter shell element edge shall not exceed the value of three. The element length L for a shell element is defined as the longer length of both sides of the element. The ratio between element length and element thickness shall be larger than five.	<same as above>

	Other values shall be agreed upon with the recognised classification society.	
9.3.4.4.3.4	If the material properties from tensile tests are not available when starting the calculations, minimum values of A_g and R_m , as defined in the rules of the recognised classification society, shall be used instead. For shipbuilding steel with a yield stress higher than 355 N/mm ² or materials other than shipbuilding steel, material properties shall be agreed upon with a recognised classification society.	<same as above>
9.3.4.4.4.4	Other σ_g and σ_e values taken from thickness measurements of exemplary damage cases and experiments may be used in agreement with the recognised classification society.	<same as above>
9.3.4.4.4.5	Other rupture criteria may be accepted by the recognised classification society if proof from adequate tests is provided.	<same as above>
9.3.4.4.4.6	Tank vessel type G For a tank vessel type G the rupture criterion for the pressure tank shall be based on equivalent plastic strain. The value to be used while applying the rupture criterion shall be agreed upon with the recognised classification society. Equivalent plastic strains associated with compressions shall be ignored.	<same as above>
9.3.4.4.5.2	The force penetration curves resulting from the FE model calculation shall be submitted to the recognised classification society.	<same as above>
9.3.4.4.6.2	Because in most collision cases the bow of the striking vessel shows only slight deformations compared to the side structure of the struck vessel, a striking bow will be defined as rigid. Only for special situations, where the struck vessel has an extremely strong side structure compared to the striking bow and the structural behaviour of the struck vessel is influenced by the plastic deformation of the striking bow, the striking bow shall be considered as deformable. In this case the structure of the striking bow should also be modelled. This shall be agreed upon with the recognised classification society.	<same as above>
ADN 2015		
1.2.1.	SAFE HAVEN means a designated, recognisable, readily accessible module (fixed or floating) capable of protecting all persons on board against the identified hazards of the cargo for at	Noted in current amendments to the “Rules for the classification and construction of inland navigation ships (for European Inland Waterways)”.

	<p>least sixty minutes during which communication to the emergency and rescue services is possible. A safe haven can be integrated into the wheelhouse or into the accommodation. A safe haven can be evacuated during an incident. A safe haven on board is not acceptable when the identified danger is explosion. A safe haven on board and a floating safe haven outside the ship are certified by a recognized classification society. A safe haven on land is constructed according to local law;»</p>	
9.3.1.27.9	<p>"For all cargo systems, the heat transmission coefficient as used for the determination of the holding time (7.2.4.16.16 and 7.2.4.16.17) shall be determined by calculation. Upon completion of the vessel, the correctness of the calculation shall be checked by means of a heat balance test. The calculation and test shall be performed under supervision by the recognized classification society which classified the vessel.</p> <p>The heat transmission coefficient shall be documented and kept on board. The heat transmission coefficient shall be verified at every renewal of the certificate of approval."</p>	<same as above>
9.3.2.11.2 a)	<p>"Refrigerated cargo tank fastenings shall meet the requirements of a recognised classification society."</p>	<same as above>
9.3.x.24.3	<p>9.3.x.24.3 The cargo storage system shall be capable of resisting the full vapour pressure of the cargo at the upper limits of the ambient design temperatures, whatever the system adopted to deal with the boil-off gas. This requirement is indicated by remark 37 in column (20) of Table C of Chapter 3.2."</p>	<p>Part VII "Rules for the classification and construction of inland and navigation ship (for European Inland Waterways)", 2017.</p>