Guideline No.: A-04(202204)

A-04

MARINE RUBBER FLOORING

Issued date: April 24,2022

Foreword

China Classification Society (hereinafter referred to as CCS)~~CCS~~ Product Inspection and Testing Guideline (hereinafter referred to as this Guideline) contains the technical requirements, inspection and testing criteria related to classification and statutory survey of marine products to be applied for CCS approval/inspection.

This Guideline frees the users to adopt other test methods and requirements which are equivalent to or are stricter than this Guideline.

This Guideline is published and updated by CCS, and is released at http://www.ccs.org.cn. Your comments or suggestions are welcomed and may be sent to our email addressed mp@ccs.org.cn.

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Main change:

Update the standards used in the test methods.

Update the contents of Unit/batch inspection.~~New Release:~~

CONTENTS

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1 Application~~Application~~

The Guideline apply to the approval and inspection of low flame spread marine rubber flooring used on ships and offshore installations.

2 Normative references~~Normative references~~

Regulations 3, 5 and 6, Chapter II-2, SOLAS 1974 and Amendments thereto

PART TWO and PART FIVE of IMO FTP Code 2010

Annex 2 of IMO FTP Code 2010

In case of any change to IMO Conventions and the relevant standards of this Guideline, will follow the latest valid provisions.

3 Terms and definitions~~Terms and definitions~~

3.1 The terms and definitions given in SOLAS apply to this guideline.

3.2 For the purpose of this guideline , the following additional definition has been included:

(1) Residual indentation: the difference between the flooring's initial thickness and its thickness 150min after the recovery from static load extrusion.

4 Drawings and documents~~Drawings and documentation to be submitted~~

4.1 The applicant is to submit the following documents and information to CCS for review when applying for works approval by CCS:

(1) Basic information of the manufacturer: history and current status of the manufacturer, production history and application of related products, the designation, intended purpose, specifications and capacity of main production and testing equipment, technical and inspection personnel, product trademark, etc.;

(2) Details of products for which the approval is being applied, including product name,

specifications/model, etc.;

(3) List of (qualified) raw material suppliers, including, the name, model/specifications, acceptance method and source of the materials;

(4) Brief illustration of production process: production process flow chart indicating the inspection/test control points;

(5) Documents related to quality assurance system.

4.2 The type test plan, technical specifications for delivery and acceptance and/or enterprise standards are to be submitted to CCS for approval.

5 Technical requirements

5.1 See table 5.1 for the basic design and technical requirements of marine rubber flooring.

Table 5.1

No.	Test item		Technical requirements
1	Appearance quality		The surface of marine rubber flooring is to be neat, aesthetic and free of apparent colour difference. Defects such as cracks, penetrating holes and air pockets are not allowed.
2	Dimension		Permissible thickness tolerance: 0-0.2; width and length tolerance of bulk materials: ±0.5mm; rolled materials width tolerance: ±0.5mm, length tolerance: ±0.2%; the length difference between the two diagonal lines is to be no greater than 0.5mm
3	Hardness		86~92 degrees
4	Tensile strength		≥8MPa
5	Wear resistance		≤250mm3
6	Hot air ageing	Change rate of tensile strength	-20%~10%

	70 ℃×24h	Hardness change	≤5 degrees
7	Low temperature resistance (-20 ℃×24h)		Free from cracks.
8	Oxygen index		①
9	Residual indentation	Thickness of test specimen ＜ 3mm	≤0.20
		Thickness of test specimen ≥3mm	≤0.25
10	Resistance to cigarette burns		≥3 grade
11	Tear strength		≥20KN/m
12	Flammability test of surface material		PART 5 of IMO FTP Code 2010
13	Smoke and toxicity test②		PART 2 of IMO FTP Code 2010

Note:

①Oxygen index value is to be no less than the measured oxygen index of the test specimen which satisfies the surface material flammability test and the fume and toxicity test of the surface material simultaneously.

② According to the regulations in Annex 2 of IMO FTP Code 2010, when both the conditions, i.e. the total thermal release Qt is not in excess of 0.2MJ and the thermal release rate peak Qp is not in excess of 1.0kW (these two values are to be determined in accordance with Part 5, Annex 1 of IMO FTP Code 2010), are satisfied simultaneously, the marine rubber flooring may be considered compliant with the requirements on fume and toxicity test as specified in Part 2 of IMO FTP Code 2010 and further tests are not required.

5.2 See table 5.2 for the technical requirements of flooring with special properties such as oil, acid and alkali resistance, insulation or electrical conductivity, etc.

Table 5.2

No.	Test item		Technical requirements
1	Resistance to oil, 15＃engine oil, 23 ℃×24h	Mass change rate	-2%~5%
		Volume change rate	0~10
2	Resistance to acid and alkali, ageing factor Calculated by tensile product, 23 ℃×24h	Sulfuric acid (volumetric concentration, 20%)	≥0.8
		Hydrochloric acid (volumetric concentration, 20%)	
		Sodium hydroxide (volumetric concentration, 20%)	
3	Resistance to seawater, mass concentration of sodium chloride: 3%, 23 ℃×24h	Mass change	≤5%
		Volume change	≤10%
4	Insulation	Electric strength	≥2000 V/mm
		Insulation resistivity	$\geq 10^{10}\Omega \cdot cm$
5	Electrical conductivity	Surface resistivity	$\leq 10^{8}\Omega$

~~Selection of marine rubber flooring for type test~~

~~Each type of the marine rubber flooring that the applicant applies for approval by CCS is to be type tested. Difference in formula, process, color and/or kind is to be considered as difference in type. For marine rubber floorings of the same type and of different thicknesses, the products of maximum thickness may be selected as the specimens for type test and the test results may cover the products of smaller thickness.~~

6 Materials and components~~Type test~~

6.1 The list of qualified main raw material suppliers should be submitted to CCS for information, which should specify the name, model/specification, control method and supplier name of main raw material affecting the main performance of the product.

6.2 Any change to the main raw material involved in the list of qualified suppliers should be informed to CCS, and the manufacturer should guarantee the formula of the product produced currently is the same with that produced after the approval certificate is obtained; otherwise, the certificate will be revoked.

7 Type test

7.1 Each type of the marine rubber flooring that the applicant applies for approval by CCS is to be type tested. Difference in formula, process, color and/or kind is to be considered as difference in type. For marine rubber flooring of the same type and of different thicknesses, the products of maximum thickness may be selected as the specimens for type test and the test results may cover the products of smaller thickness.

76.21 Type testis to generally include the following items:

(1) Basic performance test

(2) Special performance test

(3) Asbestos testing

76.32 See Table 76.32 for basic performance type tests.

Table 76.32

No.	Test item	Technical requirements	Test method
1	Appearance quality	The surface of marine rubber flooring is to be neat, aesthetic and free of apparent colour difference. Defects such as cracks, penetrating holes and air pockets are not allowed.	Visual inspection

2	Dimension		Permissible thickness tolerance: 0-0.2; width and length tolerance of bulk materials: ±0.5mm; rolled materials width tolerance: ±0.5mm, length tolerance: ±0.2%; the length difference between the two diagonal lines is to be no greater than 0.5mm	GB/T 6342 or ISO 24340 and ISO 24341
3	Hardness		86~92 degrees	GB/T 531
4	Tensile strength		≥8MPa	GB/T 528
5	Wear resistance		≤250mm3	GB/T 9867
6	Hot air ageing 70 ℃×24h	Change rate of tensile strength	-20%~10%	GB/T 528
		Hardness change	≤5 degrees	GB/T 531
7	Low temperature resistance (-20 ℃×24h)		Free from cracks.	GB/T1682 or GB/T15256
8	Oxygen index		①	GB/T 10707
9	Residual indentation	Thickness of test specimen ＜ 3mm	≤0.20	EN 433
		Thickness of test specimen ≥3mm	≤0.25	
10	Resistance to cigarette burns		≥3 grade	EN 1399
11	Tear strength		≥20KN/m	GB/T 529
12	Flammability test of surface material		PART 5 of IMO FTP Code 2010	PART 2 and PART 5 of IMOFTP Code 2010
13	Smoke and toxicity test②		PART 2 of IMO FTP Code 2010	

~~Continued Table 6.2~~

~~Continued Table 6.2~~

~~12~~	~~Flammability test of surface material~~	~~PART 5 of IMO FTP Code 2010~~	~~PART 2 and PART 5 of IMOFTP Code 2010~~

Note:

①Oxygen index value is to be no less than the measured oxygen index of the test specimen which satisfies the surface material flammability test and the fume and toxicity test of the surface material simultaneously.

② According to the regulations in Annex 2 of IMO FTP Code 2010, when both the conditions, i.e. the total thermal release Qt is not in excess of 0.2MJ and the thermal release rate peak Qp is not in excess of 1.0kW (these two values are to be determined in accordance with Part 5, Annex 1 of IMO FTP Code 2010), are satisfied simultaneously, the marine rubber flooring may be considered compliant with the requirements on fume and toxicity test as specified in Part 2 of IMO FTP Code 2010 and further tests are not required.

76~~6~~.43~~3~~ The information of type test of flooring~~s~~ with requirements on special properties such as oil, acid and alkali resistance, insulation or electrical conductivity, etc. is given in Table 67~~6~~.43~~3~~.

Table 76~~6~~.43~~3~~

No.	**Test item**		**Technical requirements**	**Test method**
1	Resistance to oil, 15＃engine oil, 23 ℃×24h	Mass change rate	-2%~5%	GB/T 1690
		Volume change rate	0~10	
2	Resistance to acid and alkali, ageing factor	Sulfuric acid (volumetric concentration, 20%)	≥0.8	CB3951~~GB/T 528~~

	Calculated by tensile product, 23 ℃×24h	Hydrochloric acid (volumetric concentration, 20%)		
		Sodium hydroxide (volumetric concentration, 20%)		
3	Resistance to seawater, mass concentration of sodium chloride: 3%, 23 ℃×24h	Mass change	≤5%	GB/T 1690
		Volume change	≤10%	
4	Insulation	Electric strength	≥2000 V/mm	GB/T 1695
		Insulation resistivity	$\geq 10^{10}\Omega \cdot cm$	GB/T 1692
5	Electrical conductivity	Surface resistivity	$\leq 10^{8}\Omega$	GB/T 1692

~~**Continued Table 6.3**~~

~~No.~~	~~Test item~~		~~Technical requirements~~	~~Test method~~
~~3~~	~~Resistance to seawater, mass concentration of sodium chloride: 3%, 23 ℃×24h~~	~~Mass change~~	~~≤5%~~	~~GB/T 1690~~
		~~Volume change~~	~~≤10%~~	
~~4~~	~~Insulation~~	~~Electric strength~~	~~≥2000 V/mm~~	~~GB/T 1695~~
		~~Insulation resistivity~~	~~≥1010Ω·cm~~	~~GB/T 1692~~
~~5~~	~~Electrical conductivity~~	~~Surface resistivity~~	~~≤108Ω~~	~~GB/T 1692~~

76.54 Asbestos testing

Marine rubber flooring~~s~~ of different models intended to be approved are to comply with asbestos-free requirements; an Asbestos-free Declaration is to be provided and asbestos testing is to be carried out in accordance with ISO 22262-1:2012.

8~~7~~ Unit/batch inspection

8.1 The quality and consistence with that at initial approval of the approved product will be confirmed by CCS via regular review, and no product unit/batch inspection will be conducted or certificate issued. The manufacturer can deliver goods as per the copy of the approval certificate or manufacturer's quality proof document. If it is necessary or the user requires the product certificate, the product to be approved will be inspected and certificate issued as per the inspection plan confirmed during approval after the manufacturer submits the inspection application.

8.2 For unapproved marine rubber flooring products, CCS will not conduct the unit/batch inspection unless the unit/batch inspection is subject to process confirmation, site supervision, and process record review, and the type test items are passed.~~7.1 The unit/batch inspection unit/batch inspection of marine rubber floorings after approval is to be carried out in the sequence from item 1 to item 11 in Table 6.2. The raw material suppliers are to be checked prior to the inspection to confirm they are approved suppliers.~~

~~7.2 The dimensional and visual inspection of each piece or roll of products is to be carried out batch by batch; when performance tests are carried out, the products of the same formula, process and kind of each 10000m ²are to be grouped into the one same batch and the test specimens are to be randomly sampled from each batch of products. The test specimens for all test items are to be sampled from the same piece or roll.~~

~~7.3 All products qualified through inspection or external packages of such products are to be clearly identified with CCS marks on at least one location.~~

~~7.4 Upon completion of unit/batch inspection, CCS product certificates or equivalent documents may be issued for the qualified products.~~