

# Z23 Hull Survey for New Construction

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## 1. Scope

The scope of this UR includes the following main activities:

1.1 Examination of the parts of the ship covered by classification rules and by applicable statutory regulations for hull construction, to obtain appropriate evidence that they have been built in compliance with the rules and regulations, taking account of the relevant approved drawings.

1.2 Appraisal of the manufacturing, construction, control and qualification procedures, including welding consumables, weld procedures, weld connections and assemblies, with indication of relevant approval tests.

1.3 Witnessing inspections and tests as required in the classification rules used for ship construction including materials, welding and assembling, specifying the items to be examined and/or tested and how (e.g. by hydrostatic, hose or leak testing, non destructive examination, verification of geometry) and by whom.

1.4 Appraisal of material and equipment used for ship construction and their inspection at works is not included in this UR. Details of requirements for hull and machinery steel forgings and castings and for normal and higher strength hull structural steel are given in W7, W8 and W11 respectively. Acceptance of these items is verified through the survey process carried out at the manufacturer's works and the issuing of the appropriate certificates.

1.5 In addition to above, for Tankers and Bulk Carriers subject to SOLAS Chapter II-1 Part A-1 Regulation 3-10 (Goal-based ship construction standards for bulk carriers and oil tankers), see also Appendix 2 to this document.

### Note:

1. This UR is to be uniformly implemented by IACS Societies on ships contracted for construction on or after 1 January 2008.
2. The "contracted for construction" date means the date on which the contract to build the vessel is signed between the prospective owner and the shipbuilder. For further details regarding the date of "contract for construction", refer to IACS Procedural Requirement (PR) No. 29.
3. The changes introduced in Revision 2 of the UR are to be uniformly implemented by IACS Societies on ships contracted for construction (as defined in IACS PR 29) from 1 July 2010.
4. The changes introduced in Revision 3 of the UR are to be uniformly implemented by IACS Societies on ships contracted for construction (as defined in IACS PR 29) from 1 July 2016.
5. The changes introduced in Revision 4 of the UR are to be uniformly implemented by IACS Societies on ships contracted for construction (as defined in IACS PR 29) from 1 July 2016.
6. The changes introduced in Revision 5 of the UR are to be uniformly implemented by IACS Societies on ships contracted for construction (as defined in IACS PR 29) from 1 July 2016.

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(cont)**2. Definitions\***

2.1 The hull structure is defined as follows:

- a) hull envelope including all internal and external structures;
- b) superstructures, deckhouses and casings;
- c) welded foundations, e.g. main engine seatings;
- d) hatch coamings, bulwarks;
- e) all penetrations fitted and welded into bulkheads, decks and shell;
- f) the fittings of all connections to decks, bulkheads and shell, such as air pipes and ship side valves – all ILLC 1966, as amended, items;
- g) welded attachments to shell, decks and primary members, e.g. crane pedestals, bitts and bollards, but only as regards their interaction on the hull structure.

2.2 Reference to documents also includes electronic transmission or storage.

2.3 Definition of survey methods which the surveyor is directly involved in: Patrol, Review, Witness.

2.3.1 Patrol, the act of checking on an independent and unscheduled basis that the applicable processes, activities and associated documentation of the shipbuilding functions identified in Table 1 continue to conform to classification and statutory requirements.

2.3.2 Review, the act of examining documents in order to determine traceability, identification and to confirm that processes continue to conform to classification and statutory requirements.

2.3.3 Witness is the attendance at scheduled inspections in accordance with the agreed Inspection and Test Plans to the extent necessary to check compliance with the survey requirements.

**3. Applications**

3.1 This UR covers the survey of all new construction of steel ships intended for classification and for international voyages except for:

- a) those defined in SOLAS I/3;
- b) high speed craft as defined in I/1.3.1 of the 2000 High Speed Craft Code;
- c) Mobile Offshore Drilling Units as defined in I/1.2.1 of the MODU Code.

3.2 This UR covers all statutory items, relevant to the hull structure and coating, i.e. Load Line and SOLAS Safety Construction.

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\*Footnote: Terminology for hull terms and hull survey terms can be found in Recommendation 82.

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3.3 This UR does not cover the manufacture of equipment, fittings and appendages regardless whether they are made inside or outside of the shipyard, examples being as follows. Evidence of acceptance shall be provided by accompanying documentation from class surveyor at manufacturer and verified at the shipyard:

- a) hatch covers;
- b) doors and ramps integral with the shell and bulkheads;
- c) rudders and rudder stock;
- d) all forgings and castings integral to the hull.

3.4 This UR applies to the installation into the ship, welding and testing of:

3.4.1 the items listed in 3.3 above;

3.4.2 equipment forming part of the watertight and weather tight integrity of the ship.

3.5 This UR applies to the hull structures and coating constructed at any of the following:

3.5.1 shipbuilder's facilities;

3.5.2 sub-contractors at the shipbuilder's facilities;

3.5.3 sub-contractors at their own facilities or at other remote locations.

#### **4. Qualification and monitoring of personnel**

4.1 Exclusive surveyors of the classification society, as defined in PR5, are to confirm through patrol, review and witness as defined in para. 2.3, that the ships are built using approved plans in accordance with the relevant rules and statutory requirements. The surveyors are to be qualified to be able to carry out the tasks and procedures are to be in place to ensure that their activities are monitored. Details are specified in PR6 and PR7.

#### **5. Survey of the hull structure**

5.1 Table 1 provides a list of surveyable items for the hull structure and coating covered by this UR, including:

5.1.1 description of the shipbuilding functions;

5.1.2 classification and statutory survey requirements;

5.1.3 survey method required for classification;

5.1.4 relevant IACS and statutory requirement references;

5.1.5 documentation to be available for the classification surveyor during construction.

5.1.5.1 The shipbuilder is to provide the classification surveyors access to documentation required by classification, this includes documentation retained by the shipbuilder or other third parties.

5.1.5.2 The list of documents approved or reviewed by the classification society for the

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specific new construction are as follows:

- a) plans and supporting documents
- b) examination and testing plans
- c) NDE plans
- d) welding consumable details
- e) welding procedure specifications
- f) welding plan or details
- g) welder's qualification records
- h) NDE operator's qualification records

5.1.6 Documents to be inserted into the ship construction file. Refer to paragraph 10 for details.

5.1.7 A list of specific activities which are relevant to the shipbuilding functions. This list is not exhaustive and can be modified to reflect the construction facilities or specific ship type.

5.2 Evidence is also to be made available, as required, by the shipbuilder, to the surveyor whilst the construction process proceeds to prove that the material and equipment supplied to the ship has been built or manufactured under survey relevant to the classification rules and statutory requirements.

## **6. Review of the construction facility\***

6.1 The society is to familiarize themselves with the yard's production facilities, management processes, and Safety for consideration in complying with the requirements of Table 1 prior to any steelwork or construction taking place in the following circumstances:

6.1.1 where the society has none or no recent experience of the construction facilities – typically after a one year lapse - or when significant new infrastructure has been added;

6.1.2 where there has been a significant management or personnel re-structuring having an impact on the ship construction process;

6.1.3 or where the shipbuilder contracts to construct a vessel of a different type or substantially different in design.

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\*Footnote: Reference is made to Appendix 1 "Shipyard review record", as an example.

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(cont)**7. Newbuilding survey planning**

7.1 Prior to commencement of surveys for any newbuilding project, the society is to discuss with the shipbuilder at a kick off meeting the items listed in Table 1. The purpose of the meeting is to review and agree how the list of specific activities shown in Table 1 is to be addressed. The meeting is to take into account the shipbuilder's construction facilities and ship type including the list of proposed subcontractors. A record of the meeting is to be made, based upon the contents of the Table 1 – the Table can be used as the record with comments made into the appropriate column. If the society has nominated a surveyor for a specific newbuilding project then the surveyor is to attend the kick off meeting.

The builder should agree to undertake ad hoc investigations during construction as may be requested by Class where areas of concern arise and the builder to agree to keep the classification society advised of the progress of any investigation. Whenever an investigation is undertaken, the builder is to be requested, in principle, to agree to suspend relevant construction activities if warranted by the severity of the problem.

7.2 The records are to take note of specific published Administration requirements and interpretations of statutory requirements.

7.3 The shipyard shall be requested to advise of any changes to the activities agreed at the kick off meeting and these are to be documented in the survey plan. E.g. if the shipbuilder chooses to use or change sub-contractors, or to incorporate any modifications necessitated by changes in production or inspection methods, rules and regulations, structural modifications, or in the event where increased inspection requirements are deemed necessary as a result of a substantial non-conformance or otherwise.

7.4 Shipbuilding quality standards for the hull structure during new construction are to be reviewed and agreed during the kick-off meeting. Structural fabrication is to be carried out in accordance with IACS Recommendation 47, "Shipbuilding and Repair Quality Standard", or a recognized fabrication standard which has been accepted by the Classification Society prior to the commencement of fabrication/construction. The work is to be carried out in accordance with the Rules and under survey of the classification society.

7.5 The kick-off meeting may be attended by other parties as defined in PR3 (owner, administrations, etc.) subject to agreement by the shipbuilder.

7.6 In the event of series ship production\*, the requirement for a kick off meeting in paragraph 7.1 may be waived for the second and subsequent ships provided that no changes to the specific activities agreed in the kick off meeting for the first ship are introduced. If any changes are introduced, these are to be agreed in a new dedicated meeting and documented in a record of such meeting.

\*Series Ship Production: vessels in the series subsequent to the first one (prototype), i.e. sister ships built in the same shipyard.

**8. Examination and test plan for newbuilding activities**

8.1 The shipbuilder is to provide plans of the items which are intended to be examined and tested. These plans need not be submitted for approval and examination at the time of the kick off meeting. They are to include:

8.1.1 proposals for the examination of completed steelwork - generally referred to as the block plan and are to include details of joining blocks together at the pre-erection and erection stages or at other relevant stages;

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- 8.1.2 proposals for fit up examinations where necessary;
- 8.1.3 proposals for testing of the structure (leak and hydrostatic) as well as for all watertight and weathertight closing appliances;
- 8.1.4 proposals for non-destructive examination;
- 8.1.5 any other proposals specific to the ship type or to the statutory requirements.
- 8.2 The plans and any modifications to them are to be submitted to the surveyors in sufficient time to allow review before the relevant survey activity commences.
- 8.3 In addition to above, for Tankers and Bulk Carriers subject to SOLAS Chapter II-1 Part A-1 Regulation 3-10 see also Appendix 2 to this Unified Requirement.

### 9. Proof of the consistency of surveys

9.1 The classification society is to be able to provide evidence, e.g. through records, check lists, inspection and test records, etc. that its surveyors have complied with the requirements of the newbuilding survey planning and duly participated in the relevant activities shown in the shipbuilder's examination and test plans.

9.2 In addition, the classification society is to maintain records of deficiencies found during the patrolling activities required in Table 1 and described in paragraph 2.3.1. Records shall include the date when deficiency was found, description of the deficiency and the date the deficiency was cleared.

### 10. Ship Construction File

The purposes of this paragraph are applicable to all ships except the Tankers and Bulk Carriers subject to SOLAS Chapter II-1 Part A-1 Regulation 3-10 for which the paragraph 3 of Appendix 2 to this Unified Requirement is to be applied.

10.1 The shipbuilder is to deliver documents for the Ship Construction File. In the event that items have been provided by another party such as the shipowner and where separate arrangements have been made for document delivery which excludes the shipbuilder, that party has the responsibility.

The Ship Construction File shall be reviewed for content in accordance with the requirements of para 10.2.

10.2 It is recognised that the purpose of documents held in the Ship Construction File on board the ship, is to facilitate inspection (survey) and repair and maintenance, and, therefore, is to include in addition to documents listed in Table 1, but not be limited to:

10.2.1 as-built structural drawings including scantling details, material details, and, as applicable, wastage allowances, location of butts and seams, cross section details and locations of all partial and full penetration welds, areas identified for close attention and rudders (Z7.1, Z7.2, Z10.1, Z10.2, Z10.3, Z10.4, Z10.5);

10.2.2 manuals required for classification and statutory requirements, e.g. loading and stability, bow doors and inner doors and side shell doors and stern doors – operations and maintenance manuals (S8 and S9);

10.2.3 ship structure access manual, as applicable;

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- 10.2.4 copies of certificates of forgings and castings welded into the hull (W7 and W8);
- 10.2.5 details of equipment forming part of the watertight and weather tight integrity of the ship;
- 10.2.6 tank testing plan including details of the test requirements (S14);
- 10.2.7 corrosion protection specifications (Z8 and Z9);
- 10.2.8 details for the in-water survey, if applicable, information for divers, clearances measurements instructions etc., tank and compartment boundaries;
- 10.2.9 docking plan and details of all penetrations normally examined at drydocking;
- 10.2.10 Coating Technical File, for ships subject to compliance with the IMO Performance Standard for Protective Coatings (PSPC) as a class requirement under the IACS Common Structural Rules.

- Enclosures:**
- A. Table 1 - Hull Surveyable Items Activities Table**
  - B. Appendix 1 - Shipyard Review Record**
  - C. Appendix 2 - Requirements for Tankers and Bulk Carriers subject to SOLAS Chapter II-1 Part A-1 Regulation 3-10 *Goal-based ship construction standards for bulk carriers and oil tankers***

**Table 1, Hull Surveyable Items Activities Table, Rev45**

Reference	Shipbuilding function	Survey Requirements for Classification	Survey Method required for Classification	IACS reference*	statutory requirements and relevant reference	Documentation available to classification surveyor during construction	Documentation for ship construction file	Specific activities	Classification society proposals for the project
	shipbuilding quality control function								
<b>1</b>	<b>welding</b>								
<b>1.1</b>	<b>welding consumables</b>	Classification approved separately at the manufacturer	review approval status and patrol, verify storage, handling and treatment in accordance with manufacturer's requirements	UR W17		consumable specification and approval status	not required	Identify consumables against approved list	
								verify temporary and permanent storage facilities	e.g. kept dry, covered, where applicable heated
								verify traceability	e.g. random batch number checking
<b>1.2</b>	<b>welder qualification</b>	Qualified welders	review of welder certification and patrol	Recommendation 47		shipyards records with individual's identification	not required	verify welder qualification standard, e.g. class or recognised standard approval	
								verify welder approved for weld position	
								verify validity of qualification certificate	



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1.3	<b>Welding - mechanical properties (welding procedures)</b>	All weld joint configurations, positions and materials to be covered by weld procedures approved by the classification society or by another IACS member available	review and patrol	UR W28		Approved weld procedure specification and welding plan relevant to the ship project or process	not required	verify procedures are available at relevant workstations	
		the classification society witnesses all new weld procedure qualification tests carried out in the shipyard whenever the classification society is surveying in the shipyard	witness					verify weld procedures records have been approved and cover all weld processes and positions in accordance with classification or recognised standards and are available for the surveyors reference	
1.3a	<b>welding equipment</b>	correctly calibrated and maintained	patrol and review			shipbuilders maintenance and calibration records	not required	verify condition of machinery and equipment.	
								verify machines are calibrated by appropriate staff	
								verify calibration carried out in accordance with manufacturer's recommendations	
								verify calibration in accordance with maintenance schedule	

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1.3b	welding environment	satisfactory environment	patrol	Recommendation 47			not required	Verify welding areas clean, dry, well lit.	
								Confirm relevant measures taken for any pre or post heat treatment, drying of surfaces prior to welding	
								Confirm shielding gases, fluxes protected	
1.3c	welding supervision	sufficient number of skilled supervisors	Review and patrol	Recommendation 20 and 47				verify supervision is effective	
1.4	welding- surface discontinuities	Substantially free from significant indications, satisfactory profile and size	visual examination, surface detection techniques, review of documents and patrol of operator	Recommendation 20 and 47		Shipbuilders and recognised standards and Rules as applicable, welding and <u>NDENDT</u> plans, <u>NDENDT</u> reports, operator qualifications	not required	Identify workstations where <u>NDENDT</u> is carried out, e.g. panel line butt welds, castings into hull structure	
								Verify <u>NDENDT</u> carried out in accordance with approved plans where applicable	
								Verify suitability of <u>NDENDT</u> methods	
								Verify operators suitably qualified particularly where sub-contractors have been employed	
								Verify <u>NDENDT</u> is carried out according to the acceptable process	
								Review <u>NDENDT</u> records	

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Reference	Shipbuilding function	Survey Requirements for Classification	Survey Method required for Classification	IACS reference*	statutory requirements and relevant reference	Documentation available to classification surveyor during construction	Documentation for ship construction file	Specific activities	Classification society proposals for the project
1.5	Welding - embedded discontinuities	ND <del>E</del> NT is to be carried out by qualified operators capable of ensuring that welds are substantially free from significant indications	Radiography and ultrasonic testing, review of documents and patrol of operator, examination of films	Recommendation 20 and 47		Shipbuilders and recognised standards and Rules as applicable, welding and ND <del>E</del> NT plans, ND <del>E</del> NT reports, operator qualifications	not required	Identify workstations where ND <del>E</del> NT is carried out, e.g. panel line butt welds, castings into hull structure	
								Verify ND <del>E</del> NT carried out in accordance with approved plans where applicable	
								Verify suitability of ND <del>E</del> NT methods	
								Verify operators suitably qualified particularly where sub-contractors have been employed	
								Verify that records have been completed and in accordance with recognised standards, e.g. IQI and sensitivity recorded	
								Verify that reports and radiographs have been evaluated correctly by the shipbuilder. Systematic review of radiographs carried out by the surveyor	
								Verify equipment calibration satisfactory and in accordance with manufacturers and recognised standards requirements	
								Verify ND <del>E</del> NT is carried out according to the acceptable process	

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Reference	Shipbuilding function	Survey Requirements for Classification	Survey Method required for Classification	IACS reference*	statutory requirements and relevant reference	Documentation available to classification surveyor during construction	Documentation for ship construction file	Specific activities	Classification society proposals for the project
<b>2</b>	<b>Steel preparation and fit up:</b>								
<b>2.1</b>	<b>surface preparation, marking and cutting</b>	traceability and acceptability of material, check of steel plates & profiles materials type, scantling identification, testing marks	patrol	Recommen dation 47		material certificates, shipbuilder's marking/cutting production documents at the workstage - documents retained at the facility	not required	Verify stockyard storage satisfactory	
								Verify material traceability, e.g. stamping identification against material certification, archiving of records	
								Verify transfer marking after treatment line	
								Verify standard of shotblasting and priming	
								Verify suitability of primer	
								Verify that steel grades can be identified	
								Verify machinery adjusted to maintain within IACS or manufacturers recommendations.	
								Verify accuracy of marking and cutting	
								Verify storage of piece parts.	
<b>2.2</b>	<b>straightening</b>	Approval of straightening methods/ procedures against deformation	patrol and review	Recommen dation 47		recognised standards, approved procedures	not required	Verify that straightening processes are approved for the grade and type of steel, e.g. tmcp, z plate.	
								Verify that plates and sections are within recognised tolerances	

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Reference	Shipbuilding function	Survey Requirements for Classification	Survey Method required for Classification	IACS reference*	statutory requirements and relevant reference	Documentation available to classification surveyor during construction	Documentation for ship construction file	Specific activities	Classification society proposals for the project
2.3	forming	Maintain material properties. Acceptance of forming method against improper deformations	patrol	Recommendation 47		Shipbuilders procedure for hot forming	not required	Verify that temperature control is exercised by the operator.	
								Verify that suitable methods of temperature control are available when forming special steels and materials	
								Verify that forming processes are acceptable	
2.4	conformity with alignment/fit up/gap criteria	Check alignment/fit up/gap against reference standards	patrol	Recommendation 47		Shipbuilders and recognised standards and Rules as applicable,	not required	Verify the processes to ensure satisfactory fit up and alignment at all workstations	
								Verify that edge preparations are re-instated where lost during fitting operations	
								Verify remedial procedures are in place to compensate for wide gaps and alignment deviations	

**Table 1, Hull Surveyable Items Activities Table, Rev45**

Reference	Shipbuilding function	Survey Requirements for Classification	Survey Method required for Classification	IACS reference*	statutory requirements and relevant reference	Documentation available to classification surveyor during construction	Documentation for ship construction file	Specific activities	Classification society proposals for the project
2.5	conformity for critical areas with alignment/fit up or weld configuration	Check alignment/fit up/gap against approved drawings	patrol and review	Recommendation 47		Shipbuilders and recognised standards and Rules as applicable, approved plan or standard, builder's records	Approved plans of critical areas if applicable	Verify that the information relevant to the latest approved drawings is available at the workstations	
								Verify the processes to ensure satisfactory fit up and alignment at all workstations	
								Verify that edge preparations are re-instated where lost during fitting operations	
								Verify remedial procedures are in place to compensate for wide gaps and alignment deviations	

**Table 1, Hull Surveyable Items Activities Table, Rev45**

Reference	Shipbuilding function	Survey Requirements for Classification	Survey Method required for Classification	IACS reference*	statutory requirements and relevant reference	Documentation available to classification surveyor during construction	Documentation for ship construction file	Specific activities	Classification society proposals for the project
3	<b>Steelwork process, e.g. sub assembly, block, grand and mega block assembly, pre-erection and erection, closing plates</b>	compliance with approved drawings, visual examination of welding and material, check alignment and deformations	patrol of the process and witness of the completed item	Recommendation 47		approved plans, shipbuilders inspection records, Shipbuilders and recognised standards and Rules as applicable, construction plan (steelwork sub-division)		Verify that the information relevant to the latest approved drawings is available at the workstations	
								Verify that correct weld sizes have been adopted	
								Verify operation of the welding processes at the different work stages is satisfactory	
								<del>Verify that the information relevant to the latest approved drawings is available at the workstations</del>	
								Verify that piece parts are identifiable	
								Verify that fit ups are within recognised tolerances	
								Verify that correct welding requirements specified in reference 1 of this table have been adopted	
								Verify processes for closing plates etc. are acceptable	
								Confirm that steelwork is in accordance with the approved plan	

**Table 1, Hull Surveyable Items Activities Table, Rev45**

Reference	Shipbuilding function	Survey Requirements for Classification	Survey Method required for Classification	IACS reference*	statutory requirements and relevant reference	Documentation available to classification surveyor during construction	Documentation for ship construction file	Specific activities	Classification society proposals for the project
4	Remedial work and alteration	welding, check against deformation, alignment	review records and witness	Recommendation 47		permanent record of shipyard surveyable item		Verify that records have been maintained of significant deviations from the approved plans, for situations such as mis cut openings, re-routing outfit items	
								Verify that all deviations brought to the attention of the classification society by the shipbuilder are acceptable	
5	Tightness testing, including leak and hose testing, hydropneumatic testing	Absence of leaks	patrol of the process <u>Review</u> and witness of the test	UR S14	Reg. II-1/11 of SOLAS as amended;	approved tank testing plan, shipbuilders inspection records	approved tank testing plan	Confirm that tank testing is carried out in accordance with the approved plan	
								Confirm the methods used to carry out leak testing	
								Confirm that correct test pressures maintained for leak, hose and hydro and hydropneumatic testing is satisfactory	
								Verify that adequate records of the tank testing have been maintained	
6	Structural testing	structural adequacy of the design	patrol of the process <u>Review</u> and witness of the test	UR S14	Reg. II-1/11 of SOLAS as amended;	approved tank testing plan, shipbuilders inspection records	approved tank testing plan	Confirm that tank testing is carried out in accordance with the approved plan	
								Confirm that correct test pressures maintained for testing is satisfactory	
								Verify that adequate records of the tank testing have been maintained	



**Table 1, Hull Surveyable Items Activities Table, Rev45**

Reference	Shipbuilding function	Survey Requirements for Classification	Survey Method required for Classification	IACS reference*	statutory requirements and relevant reference	Documentation available to classification surveyor during construction	Documentation for ship construction file	Specific activities	Classification society proposals for the project
7	corrosion protection systems, e.g. coatings, cathodic protection, impressed current except for coating system subject to PSPC	Salt water ballast tanks with boundaries formed by the hull envelope, and also bulk carrier hold internal surfaces, coamings and hatch covers shall have an efficient protective coating. Safety aspects of cathodic systems to be dealt with separately.	Review and report on builder's & manufacturer's documentation	UR Z 8 and Z 9, UI SC122, UR F1	Reg. II-1/3-2 of SOLAS as amended;	manufacturer's and builder's specification	corrosion protection specifications	Verify that applied coatings are approved and review records of application	
								Verify that adequate records have been maintained and copied to the ship construction file	
	Application Antifouling Systems		Review		AFS Convention	Painting Specification	Paint Specification and Mfg Declaration	Verify that adequate records have been maintained and copied to the ship construction file	
7.1	Application of Protective Coatings for Dedicated Seawater Ballast Tanks in all Types of Ships and Double-Side Skin Spaces of Bulk Carriers subject to PSPC	monitor implementation of the coating inspection requirements	Patrolling and Review	UI SC223	Reg. II-1/3-2 of SOLAS as amended;	Signed and Verified Tripartite Agreement	Coating Technical File	Verify that applied coatings are approved and review records of application in accordance with Chapter 7 of Annex to MSC.215(82).	
8	Installation, welding and testing of the following:								
8.1	hatch covers	tightness and securing	witness	UR S14 & Rec 14	Reg. 13-14-15 and 16 of ILLC '66	approved tank testing plan, shipbuilders inspection records	details required, structural drawings	Confirm leak test of hatch covers	
								Confirm operation and securing test	

**Table 1, Hull Surveyable Items Activities Table, Rev45**

Reference	Shipbuilding function	Survey Requirements for Classification	Survey Method required for Classification	IACS reference*	statutory requirements and relevant reference	Documentation available to classification surveyor during construction	Documentation for ship construction file	Specific activities	Classification society proposals for the project
8.2	doors and ramps integral with the shell and bulkheads	tightness and securing	witness	UR S14	Reg. II-1/18 of SOLAS as amended; Reg. 12 and 21 of ILLC '66	approved tank testing plan, shipbuilders inspection records	details required	Confirm leak test	
								Confirm operation and securing test	
								Confirm safety device operation	
								Ensure correct maintenance logs/manuals supplied with the ship construction file	
8.3	rudders	fitting	witness	UR S14		approved plan, shipbuilders inspection records	details required, structural drawings	Confirm alignment and mounting and fitting up to the connection to the tiller	
								Confirm function test	
								Verify fitting of pintles and all securing bolts	
								Verify all fit up records including all clearances maintained and placed into ship construction file	

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8.4	forgings and castings	compliance with approved drawings, visual examination of welding and material, check alignment and deformations	patrol of the process and witness of the completed item	UR W7 & W8		approved plans, shipbuilders inspection records, Shipbuilders and recognised standards and Rules as applicable, construction plan (steelwork sub-division)	copies of certificates of forgings and castings	Verify casting and forgings against material certificate	
								Verify that correct welding and fit up requirements specified in reference 1, 2.4 and 2.5 of this table have been adopted	
								Verify that material certificates are included in the ship construction file	
	appendages							Verify that correct welding and fit up requirements specified in reference 1, 2.4 and 2.5 of this table have been adopted	

**Table 1, Hull Surveyable Items Activities Table, Rev45**

Reference	Shipbuilding function	Survey Requirements for Classification	Survey Method required for Classification	IACS reference*	statutory requirements and relevant reference	Documentation available to classification surveyor during construction	Documentation for ship construction file	Specific activities	Classification society proposals for the project	
8.5	equipment forming the watertight and weathertight integrity of the ship, e.g. overboard discharges, air pipes, ventilators	tightness and securing	witness		Reg. II-1/16 and Reg. II-1/16-1 of SOLAS as amended; Reg. 17-18-19-20-22-23 of ILLC '66	approved tank testing plan, shipbuilders inspection records	details required	Verify that correct welding and fit up requirements specified in reference 1, 2.4 and 2.5 of this table have been adopted		
								Verify Compliance with Load line Convention 1966 as amended - i.e. all fittings in accordance with the record of freeboard assignment		
				UR P3					Verify air pipes, vents etc closing device are approved type	
								Verify material certificates for overboard discharges where applicable		
								Verify record of freeboard assignment and all material certificates included in the ship construction file		
	Freeboard marks and draft marks	within allowable tolerances and in accordance with the freeboard assignment	witness	UI LL4	Reg. 4- 5- 6- 7 and 8 of ILLC '66		details required	Verify freeboard marks in accordance with load line assignment		
								Verify draft marks in accordance with the agreed tolerances specified by the builder unless more onerous flag state requirements		

**Table 1, Hull Surveyable Items Activities Table, Rev45**

Reference	Shipbuilding function	Survey Requirements for Classification	Survey Method required for Classification	IACS reference*	statutory requirements and relevant reference	Documentation available to classification surveyor during construction	Documentation for ship construction file	Specific activities	Classification society proposals for the project
	<b>Principal dimensions</b>	within allowable tolerances	review and witness	Recommendation 47			details required	Verify principal dimensions in accordance with recognised standard	
Verify dimensions included in ship construction file									
	<b>Safety Construction certification</b>	no outstanding imperfections or defects	witness		Reg. I/7 or Reg. I/10 of SOLAS as amended, as appropriate			Verify that Administration requirements have been incorporated into the hull structure	

<b>Shipbuilder's name</b>	
<b>project</b>	
<b>project duration</b>	
<b>kick off meeting date</b>	
<b>representing builder</b>	
<b>representing class society</b>	

\* IACS Recommendations are not mandatory requirements.

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**Appendix 1**

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(cont)

## Shipyard Review Record

Name of Shipyard	Date

### 1. Details of any Management Systems

Obtained approval	Certified by	Expiry Date	Remarks (scope, etc.)
ISO-9001			
ISO 14001			
ISO 18001			
Other:			

**2. Construction Facilities:** (Documents such as a brochure of shipyard can be attached in lieu of completing this section.)

#### 2.1 Building Berth (B) or Dock (D)

\*In case of berth, Depth is not applicable.

B / D	Name	Length (m)	Width (m)	Depth* (m)	Building Capacity (Gross Tonnage)	Crane (Ton x No.)

#### 2.2 Outfitting Quays

Name	Length (m)	Width (m)	Depth (m)	Berthing Capacity (Gross Tonnage)	Crane (Ton x No.)

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(cont)

## 2.3 Main Fabrication and Erection Facilities

(1) Marking and cutting of steel plates (including internal members)	
- Marking method	(Manual, Photo x ____, EPM x ____, NC x ____ others _____)
- NC cutting machine	(Gas x ____, Plasma x ____, Laser x ____)
	Control procedure of NC (On-line, other)
- Cutting equipment	(Edge planer x ____, Roll-shear x ____)
(2) Marking and cutting of section bar	
- Marking method	(Manual, NC)
- Marking of reference curved line	(Manual, NC)
- Cutting method	(Manual, NC)
- In case of NC	(Gas x ____, Plasma x ____)
(3) One-side automatic welding machine (Yes, No)	
- Type of welding machine	(Flux Backing x ____, Flux and Copper Backing x ____ other _____)
- Existence of special surface plate for plate welding	(Yes, No)
(4) Fillet welding machine (Gravity, Automatic) Percentage of automatization except gravity: about ____%	
- Line Welder	(No, Yes: submerged arc x ____ heads, CO <sub>2</sub> x ____ heads)
- Small automatic fillet welding machine	(No, Yes: Name: _____ x ____)
- Welding robot	(No, Yes: Portal x ____, Rectangular x ____, Articulated x ____)
(5) Painting equipment	
- Plate shot blasting/primer coating machine	(No, Yes: Max. Width ____ m, Length ____ m)
- Section bar shot blasting/primer coating machine	(No, Yes: Max. Length ____ m)
- Special coating factory	(No, Yes: ____ m x ____ m x ____ sections)
(6) Vertical automatic welding machine (No, Yes: EG x ____, SEG x ____, ES x ____)	
EG: Electrogas SEG: Simplified Electrogas ES: Electroslag	
(7) Other main fabrication facilities	



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(cont)

## 3. Shipyard Control of Qualified Welders

(1) Normal steel

		certification	traceability	supervision	maintenance of qualification
Shipyard workers	confirm system in place	Yes / No	Yes / No	Yes / No	Yes / No
Subcontracted workers	confirm system in place	Yes / No	Yes / No	Yes / No	Yes / No

## 4. Feature of Construction Procedure

<p>(1) Subcontract of hull blocks (weight)</p> <ul style="list-style-type: none"> <li>- Sub members (No, Yes: Ratio of subcontracted works ___ %, No., of subcontractors ___)</li> <li>- Blocks (No, Yes: Ratio of subcontracted works ___ %, No., of subcontractors ___)</li> </ul>
<p>(2) Method of plate block assembly</p> <ul style="list-style-type: none"> <li>- Method fitting and welding longitudinals and transverse webs on jointed panels</li> <li>- Method welding longitudinals on jointed panels prior to fitting and welding transverse webs</li> <li>- Method fitting and welding a frame consists of longitudinals and transverse webs on jointed panels</li> <li>- Method jointing panels with pre-assembled longitudinals by welding prior to fitting and welding transverse webs</li> <li>- Other (please specify in (5) below)</li> </ul>
<p>(3) - pre-erection outfitting carried out</p> <p>grand block/mega block adopted</p> <p>Method of erection at building berth/dock</p> <ul style="list-style-type: none"> <li>- Max. weight of loading block:      ton</li> <li>- Construction method in building dock/berth/land construction etc. (1 ship, 1.5 ships: Semi-tandem, dual entrance)</li> <li>- Block loading process (single starting block, multi starting blocks, inserting block: No, Yes)</li> </ul>
<p>(4) Final dock (No, Yes: In-house, Other place of the same company, Use other company)</p>
<p>(5) Other feature of construction procedure</p>

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(cont)

**5. Quality Control System:** (Refer to Quality Manual, if available.)

Item and description	Result	Remarks
(1) Existence of the organization chart including the departments of design, purchasing, manufacturing and quality assurance  - Are the function, responsibility and competence of the organization clear?		
(2) Quality control organization  - Existence of quality control organization - Number of employees in this organization - Existence of procedures or plans related to tests and inspections	_____ persons including the chief	
(3) Pre-inspection system of shipyard  - Is pre-inspection carried out prior to Class inspection? - Are pre-inspectors assigned? (Check the list.) - Number of pre-inspectors (related to hull only) - Are inspection results marked on the object and/or recorded in the checklist?	_____ persons	
(4) Records of inspections and tests  - Are records made and kept properly? - Does the responsible person verify the records? - Can the adoption of necessary corrective actions against non-conformity happened be checked?		
(5) Condition at the time of the surveys in the presence of class surveyors  - Is the schedule of the surveys changed often? - Are pre-inspection, shipyard inspection and repairs completed beforehand? - Are the sufficient preparations for surveys such as scaffoldings, lighting, cleaning made?		
Note: Above-mentioned (3) and (4) include the acceptance inspection of subcontracted items.		

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(cont)

### 6. Measures for Safety and Health

Item and description	Result	Remarks
(1) Are conditions of scaffolding, nets, safety belt, lighting and ventilation good?		
(2) Does sufficient attention paid for radiographic examination and operation of cherry picker?		
Note:		

### 7. Control System of Non-Destructive Examination (NDE)

Item and description	Result	Remarks
(1) Number of NDE supervisors in shipyard (including persons responsible for judging results)	_____ persons	
(2) Dependence on subcontracted NDE work <ul style="list-style-type: none"> <li>- Number of shipyard employees</li> <li>- Number of sub-contractors</li> </ul>	_____ persons _____ persons	
(3) NDE sub-contractor company's name and official technical qualifications	Name _____ (approved by) _____ Name _____ (approved by) _____	
(4) Grade and number of NDE employees with official technical qualifications in shipyard <ul style="list-style-type: none"> <li>Specialized in radiography</li> <li>Specialized in ultrasonic</li> <li>Specialized in surface detection</li> </ul>	_____ Grade _____ persons _____ Grade _____ persons _____ Grade _____ persons	
(5) If non-destructive examinations are subcontracted, the grade and number of officially qualified persons <ul style="list-style-type: none"> <li>Specialized in radiography</li> <li>Specialized in ultrasonic</li> <li>Specialized in surface detection</li> </ul>	_____ Grade _____ persons _____ Grade _____ persons _____ Grade _____ persons	
(6) Non-destructive examination equipment (in house) <ul style="list-style-type: none"> <li>- Number of radiographic equipment</li> <li>- Number of ultrasonic equipment</li> </ul>	_____ _____	
Note: Even if all works are subcontracted, it is recommendable to attach the qualified person(s) who can verify the works.		

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(cont)

## 8. Quality Control on Production Line

Item and description	Result	Remarks
<b>8.1 Preventative measures for misuse of materials</b>		
(1) Job title of supervisor and person in charge of collating ordered steel and received steel, and checking of mill sheet	Title of supervisor: _____  Title of person in charge: _____	
(2) Are means for checking the material grade in hand prescribed for high-grade steels		
(3) Are regulations prescribed for checking the material grade for high-tensile steel for low-temperature applications?  Are there regulations for inscribing high tensile steel on the surface of the high tensile steel and special indication for steel for low temperature applications?		
(4) Are procedures for re-using of remaining cut-off mild steel?		
(5) Are there procedures for re-using of remaining cut-off high-tensile steel?		
(6) In the case of (4) and (5) above, can a collation be made with the mill sheet?		
(7) Section of controlling the lists of remaining cut-off steel	Name of section: _____	
Note: - In case of high tensile steel, are means identifying different grades - In the case of (3) and (4) above, are the materials approved by other classes controlled similarly?		
<b>8.2 Shot blasting/Primer coating</b>		
(1) Existence of surface preparation standards		
(2) Existence of coating thickness control standards - Existence of thickness measurement records		
Note: - The standard is to include the description related traceability after shot blasting and primer coating.		
<b>8.3 Marking and cutting (Assembly work)</b>		
(1) Existence of standards for accuracy and periodical inspection of tape measures, tapes, stencils, etc.		
(2) Existence of standards for accuracy of cut dimensions and edge preparation		
(3) Existence of standards for finish of cutting face		
(4) What is the frequency and extent of maintenance and inspection carried out for ensuring accuracy of NC cutter and/or flame planer?		

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(cont)

Item and description	Result	Remarks
(5) In case of NC, are the disks, tapes etc. maintained in good condition?		
(6) What are the measures adopted and guidance given to make the worker fully conversant with cutting work standards for maintaining accuracy?		
Note: <ul style="list-style-type: none"> <li>- In case of (2) and (3) above, check items are to include confirmation of edge preparations free from piercing hole.</li> <li>- NC for section bars is also to be in accordance with the above.</li> </ul>		
<b>8.4 Bending and strain free</b>		
(1) Existence of standards for maximum heating temperatures during water cooling and at the time of bending and distortion removal of steel by quick heating and cooling		
(2) Existence of regulations for plate thickness and bending radius for flange processing		
(3) What are the measures adopted and guidance given to make the worker fully conversant with maintaining quality and accuracy during the bending process?		
Note:		
<b>8.5 Control of welding procedure</b>		
(1) Are all welding procedures applied to the ships approved by the Society or other IACS members?		
Note:		
<b>8.6 Treatment of serious non-conformities</b>		
(1) Are repair plans submitted to the Society when serious non-conformities happened?		
(2) Were the NDE (RT/UT) plans submitted at appropriate timing?		
(3) Was the extent of tests extended considering the results of the test?		
Note:		
<b>8.7 Hydrostatic and watertight tests</b>		
(1) Is the test plan submitted to the Society?		
(2) Are vacuum tests applied to?		
(3) Are local air injection tests during sub-assembly works applied to?		

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**(cont)**

Item and description	Result	Remarks
(4) If (2) or (3) above is applied to, are the test procedures approved by the Society?		
Note:		

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## **Appendix 2**

**Requirements for Tankers and Bulk Carriers subject to  
SOLAS Chapter II-1 Part A-1 Regulation 3-10  
*Goal-based ship construction standards for bulk carriers and oil tankers***

**Z23**  
(cont)**1. Examination and test plan for newbuilding activities**

1.1 The shipbuilder is to provide plans of the items which are intended to be examined and tested in accordance with the Society's Rules in a document known as the Survey Plan, taking into account the ship type and design. This Survey Plan shall be reviewed at the time of the kick off meeting, and must include:

1.1.1 a set of requirements, including specifying the extent and scope of the construction survey(s) and identifying areas that need special attention during the survey(s), to ensure compliance of construction with mandatory ship construction standards including

- .1. Types of surveys (visual, non-destructive examination, etc.) depending on location, materials, welding, casting, coatings, etc.
- .2. Establishment of a construction survey schedule for all assembly stages from the kick-off meeting, through all major construction phases, up to delivery.
- .3. Inspection/survey plan, including provisions for critical areas identified during design approval.
- .4. Inspection criteria for acceptance.
- .5. Interaction with shipyard, including notification and documentation of survey results.
- .6. Correction procedures to remedy construction defects.
- .7. List of items that would require scheduling or formal surveys.
- .8. Determination and documentation of areas that need special attention throughout ship's life, including criteria used in making the determination.

1.1.2 a description of the requirements for all types of testing during survey, including test criteria.

**2. Design Transparency**

2.1 For ships subject to compliance with IMO Res. MSC.287(87), IMO Res. MSC.290(87), IMO Res. MSC.296(87) and IMO MSC.1/Circ.1343, readily available documentation is to include the main goal-based parameters and all relevant design parameters that may limit the operation of the ship.

**3. Ship Construction File (SCF)**

3.1 A Ship Construction File (SCF) with specific information on how the functional requirements of the Goal-based Ship Construction Standards for Bulk Carriers and Oil Tankers have been applied in the ship design and construction is to be provided upon delivery of a new ship, and kept on board the ship and/or ashore and updated as appropriate throughout the ship's service. The contents of the Ship Construction File are to conform to the requirements below.



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(cont)

3.1.1 The following design specific information is to be included in the Ship Construction File (SCF):

- .1. Areas requiring special attention throughout the ship's life. (including critical structural areas).
- .2. All design parameters limiting the operation of a ship.
- .3. Any alternatives to the rules, including structural details and equivalency calculations.
- .4. "As built" drawings and information which are verified to incorporate all alterations approved by the recognized organization or flag State during the construction process including scantling details, material details, location of butts and seams, cross section details and locations of all partial and full penetration welds.
- .5. Net (renewal) scantlings for all the structural constituent parts, as built scantlings and voluntary addition thicknesses.
- .6. Minimum hull girder section modulus along the length of the ship which has to be maintained throughout the ship's life, including cross section details such as the value of the area of the deck zone and bottom zone, the renewal value for the neutral axis zone.
- .7. A listing of materials used for the construction of the hull structure, and provisions for documenting changes to any of the above during the ship's service life.
- .8. Copies of certificates of forgings and castings welded into the hull (UR W7 and UR W8).
- .9. Details of equipment forming part of the watertight and weather tight integrity of the ship.
- .10. Tank testing plan including details of the test requirements (UR S14).
- .11. Details for the in-water survey, when applicable, information for divers, clearances measurements instructions etc., tank and compartment boundaries.
- .12. Docking plan and details of all penetrations normally examined at drydocking.
- .13. Coating Technical File, for ships subject to compliance with the IMO Performance Standard for Protective Coatings (PSPC<sup>2</sup>).

3.1.2 Refer to Table A of this Appendix for details of information to be further included. This information has to be kept on board the ship and/or ashore and updated as appropriate throughout the ship's life in order to facilitate safe operation, maintenance, survey, repair and emergency measures.

3.1.3 It is to be noted that parts of the content of the SCF may be subject to various degrees of restricted access and that such documentation may be appropriately kept ashore.

3.1.4 The SCF has to include the list of documents constituting the SCF and all information listed in Table A of this Appendix, which is required for a ship's safe operation, maintenance, survey, repair and in emergency situations. Details of specific information that is not

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(cont)

considered to be critical to safety might be included directly or by reference to other documents.

3.1.5 When developing an SCF, all of the columns in Table A of this Appendix have to be reviewed to ensure that all necessary information has been provided.

3.1.6 It may be possible to provide information listed in the annex under more than one Tier II<sup>1</sup> functional requirement as a single item within the SCF, for example, the Coating Technical File required by the PSPC<sup>2</sup> is relevant for both "Coating life" and "Survey during construction".

3.1.7 The SCF has to remain with the ship and, in addition, be available to its classification society and flag State throughout the ship's life. Where information not considered necessary to be on board is stored ashore, procedures to access this information should be specified in the onboard SCF. The intellectual property provisions within the SCF should be duly complied with.

3.1.8 The SCF should be updated throughout the ship's life at any major event, including, but not limited to, substantial repair and conversion, or any modification to the ship structure.

#### **4. Determination of number of Surveyor(s)**

The Classification Society will assign adequate number of suitable qualified surveyor(s) for new building projects according to the construction progress of each ship to meet appropriate coverage of the examination and testing activities as agreed in the Survey Plan.

---

<sup>1</sup> Tier II items means the functional requirements included in the International Goal-based Ship Construction Standards for Bulk Carriers and Oil Tankers (GBS), adopted by IMO Res. MSC 287(87)

<sup>2</sup> Performance standard for protective coatings for dedicated seawater ballast tanks in all types of ships and double-side skin spaces of bulk carriers, adopted by IMO Res. MSC 215(82), as amended and Performance standard for protective coatings for cargo oil tanks of crude oil tankers, adopted by IMO Res. MSC 288(87), as amended

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(cont)

Table A - List of Information to be Included in the Ship Construction File (SCF)

Tier II items	Information to be included	Further explanation of the content	Example documents	Normal storage location	
<b>DESIGN</b>					
1	Design life	<ul style="list-style-type: none"> <li>assumed design life in years</li> </ul>	<ul style="list-style-type: none"> <li>statement or note on midship section</li> </ul>	<ul style="list-style-type: none"> <li>SCF-specific</li> </ul>	on board ship
			<ul style="list-style-type: none"> <li>midship section plan</li> </ul>	on board ship	
2	Environmental conditions	<ul style="list-style-type: none"> <li>assumed environmental conditions</li> </ul>	<ul style="list-style-type: none"> <li>statement referencing data source or Rule (specific rule and data) or;</li> <li>in accordance with Rule (date and revision)</li> </ul>	<ul style="list-style-type: none"> <li>SCF-specific</li> </ul>	on board ship
3	Structural strength				
3.1	General design	<ul style="list-style-type: none"> <li>applied Rule (date and revision)</li> <li>applied alternative to Rule</li> </ul>	<ul style="list-style-type: none"> <li>applied design method alternative to Rule and subject structure(s)</li> </ul>	<ul style="list-style-type: none"> <li>SCF-specific</li> <li>capacity plan</li> </ul>	<ul style="list-style-type: none"> <li>on board ship</li> <li>on board ship</li> </ul>
3.2	Deformation and failure modes	<ul style="list-style-type: none"> <li>calculating conditions and results;</li> <li>assumed loading conditions</li> </ul>	<ul style="list-style-type: none"> <li>allowable loading pattern</li> <li>maximum allowable hull girder bending moment and shear force</li> </ul>	<ul style="list-style-type: none"> <li>loading manual</li> <li>trim and stability booklet</li> </ul>	<ul style="list-style-type: none"> <li>on board ship</li> <li>on board ship</li> </ul>
3.3	Ultimate strength	<ul style="list-style-type: none"> <li>operational restrictions due to structural strength</li> </ul>	<ul style="list-style-type: none"> <li>maximum allowable cargo density or storage factor</li> </ul>	<ul style="list-style-type: none"> <li>loading instrument instruction manual</li> <li>operation and maintenance manuals</li> <li>strength calculation</li> </ul>	<ul style="list-style-type: none"> <li>on board ship</li> <li>on board ship</li> <li>on shore archive</li> </ul>
3.4	Safety margins	<ul style="list-style-type: none"> <li>strength calculation results</li> </ul>	<ul style="list-style-type: none"> <li>bulky output of strength calculation</li> <li>plan showing highly stressed areas (e.g. critical structural areas) prone to yielding and/or buckling</li> </ul>	<ul style="list-style-type: none"> <li>areas prone to yielding and/or buckling</li> <li>general arrangement plan</li> </ul>	<ul style="list-style-type: none"> <li>on board ship</li> <li>on board ship</li> </ul>
		<ul style="list-style-type: none"> <li>gross hull girder section modulus</li> <li>minimum hull girder section modulus along the length of the ship to be maintained throughout the ship's life, including cross</li> </ul>			on board ship

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(cont)

Tier II items	Information to be included	Further explanation of the content	Example documents	Normal storage location
	<p>section details such as the value of the area of the deck zone and bottom zone, the renewal value for the neutral axis zone</p> <ul style="list-style-type: none"> <li>• gross scantlings of structural constituent parts</li> <li>• net scantlings of structural constituent parts, as built scantlings and voluntary addition thicknesses</li> <li>• hull form</li> </ul>	<ul style="list-style-type: none"> <li>• structural drawings</li> <li>• rudder and stern frame</li> <li>• structural details of typical members</li> <li>• hull form information indicated in key construction plans</li> <li>• hull form data stored within an onboard computer necessary for trim and stability and longitudinal strength calculations</li> </ul>	<ul style="list-style-type: none"> <li>• key construction plans</li> <li>• rudder and rudder stock plans</li> <li>• structural details</li> <li>• yard plans</li> <li>• dangerous area plan</li> <li>• lines plan</li> </ul> <p>or</p> <p>equivalent</p>	<ul style="list-style-type: none"> <li>on board ship</li> <li>on board ship</li> <li>on board ship</li> <li>on shore archive</li> <li>on board ship</li> <li>on shore archive</li> <li>on board ship</li> </ul>
4	Fatigue life	<ul style="list-style-type: none"> <li>• applied Rule (date and revision)</li> <li>• applied alternative to Rule</li> <li>• calculating conditions and results;</li> <li>• assumed loading conditions</li> <li>• fatigue life calculation results</li> </ul>	<ul style="list-style-type: none"> <li>• applied design method alternative to Rule and subject structures</li> <li>• assumed loading conditions and rates</li> <li>• bulky output of fatigue life calculation</li> <li>• plan showing areas (e.g. critical</li> </ul>	<ul style="list-style-type: none"> <li>• SCF-specific</li> <li>• structural details</li> <li>• fatigue life calculation</li> <li>• areas prone to fatigue</li> </ul> <ul style="list-style-type: none"> <li>on board ship</li> <li>on board ship</li> <li>on shore archive</li> <li>on board ship</li> </ul>

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(cont)

Tier II items	Information to be included	Further explanation of the content	Example documents	Normal storage location	
			structural areas) prone to fatigue		
5	Residual strength	• applied Rule (date and revision)	• SCF-specific	on board ship	
6	Protection against corrosion				
6.1	Coating life	• coated areas and target coating life and other measures for corrosion protection in holds, cargo and ballast tanks, other structure-integrated deep tanks and void spaces	• plans showing areas (e.g. critical structural areas) prone to excessive corrosion	• SCF-specific	on board ship
6.2	Corrosion addition	• specification for coating and other measures for corrosion protection in holds, cargo and ballast tanks, other structure-integrated deep tanks and void spaces  • gross scantlings of structural constituent parts  • net scantlings of structural constituent parts, as built scantlings and voluntary addition thicknesses	• Coating Technical File required by PSPC <small>(Performance standard for protective coatings for dedicated seawater ballast tanks in all types of ships and double-side skin spaces of bulk carriers, adopted by IMO Resolution MSC.215(82), as amended and Performance standard for protective coatings for cargo oil tanks of crude oil tankers, adopted by IMO Resolution MSC.288(87), as amended)</small>	• areas prone to excessive corrosion	on board ship
			• key construction plans		on board ship
7	Structural redundancy	• applied Rule (date and revision)	• SCF-specific	on board ship	
8	Watertight and weathertight integrity	• applied Rule (date and revision)  • key factors for watertight and weathertight integrity	• details of equipment forming part of the watertight and weathertight integrity	• SCF-specific  • structural details of hatch covers, doors and other closings integral with the shell and bulkheads	on board ship  on board ship
9	Human element considerations	• list of ergonomic design principles applied to ship structure design to enhance safety during operations, inspections and maintenance of ship	• SCF-specific	on board ship	
10	Design transparency	• applied Rule (date and revision) • applicable industry standards for design transparency and IP protection	• intellectual property provisions	on board ship	

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(cont)

Tier II items		Information to be included	Further explanation of the content	Example documents	Normal storage location
		<ul style="list-style-type: none"> <li>reference to part of SCF information kept ashore</li> </ul>		<ul style="list-style-type: none"> <li>summary, location and access procedure for part of SCF information on shore</li> </ul>	on board ship
<b>CONSTRUCTION</b>					
11	Construction quality procedures	<ul style="list-style-type: none"> <li>applied construction quality standard</li> </ul>	<ul style="list-style-type: none"> <li>recognized national or international construction quality standard</li> </ul>	<ul style="list-style-type: none"> <li>SCF-specific</li> </ul>	on board ship
12	Survey during construction	<ul style="list-style-type: none"> <li>survey regime applied during construction (to include all owner and class scheduled inspections during construction)</li> <li>information on non-destructive examination</li> </ul>	<ul style="list-style-type: none"> <li>applied Rules (date and revision)</li> <li>copies of certificates of forgings and castings welded into the hull</li> </ul>	<ul style="list-style-type: none"> <li>SCF-specific</li> <li>tank testing plan</li> <li>non-destructive testing plan</li> <li>Coating Technical File required by PSPC</li> </ul>	<ul style="list-style-type: none"> <li>on board ship</li> <li>on board ship</li> <li>on board ship</li> <li>on board ship</li> </ul>
<b>IN-SERVICE CONSIDERATIONS</b>					
13	Survey and maintenance	<ul style="list-style-type: none"> <li>maintenance plans specific to the structure of the ship where higher attention is called for</li> <li>preparations for survey</li> <li>gross hull girder section modulus</li> <li>minimum hull girder section modulus along the length of the ship to be maintained throughout the ship's life, including cross section details such as the value of the area of the deck zone and bottom zone, the renewal value for the neutral axis zone</li> </ul>	<ul style="list-style-type: none"> <li>plan showing highly stressed areas (e.g. critical structural areas) prone to yielding, buckling, fatigue and/or excessive corrosion</li> <li>arrangement and details of all penetrations normally examined at dry-docking</li> <li>details for dry-docking</li> <li>details for in-water survey</li> </ul>	<ul style="list-style-type: none"> <li>SCF-specific</li> <li>operation and maintenance manuals (e.g. hatch covers and doors)</li> <li>docking plan</li> <li>dangerous area plan</li> <li>Ship Structure Access Manual</li> <li>Means of access to other structure-integrated deep tanks</li> <li>Coating Technical File required by PSPC</li> </ul>	<ul style="list-style-type: none"> <li>on board ship</li> <li>on board ship</li> <li>on board ship</li> <li>on board ship</li> <li>on board ship</li> <li>on board ship</li> <li>on board ship</li> </ul>

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Tier II items		Information to be included	Further explanation of the content	Example documents	Normal storage location
		<ul style="list-style-type: none"> <li>gross scantlings of structural constituent parts</li> <li>net scantlings of structural constituent parts, as built scantlings and voluntary addition thicknesses</li> <li>hull form</li> </ul>	<ul style="list-style-type: none"> <li>hull form information indicated in key construction plans</li> </ul>	<ul style="list-style-type: none"> <li>key construction plans</li> <li>rudder and rudder stock</li> <li>structural details</li> <li>yard plans</li> <li>lines plan</li> </ul> <p>or</p> <p>equivalent</p>	<ul style="list-style-type: none"> <li>on board ship</li> <li>on board ship</li> <li>on board ship</li> <li>on shore archive</li> <li>on shore archive</li> <li>on board ship</li> </ul>
14	Structural accessibility	<ul style="list-style-type: none"> <li>means of access to holds, cargo and ballast tanks and other structure-integrated deep tanks</li> </ul>	<ul style="list-style-type: none"> <li>plans showing arrangement and details of means of access</li> </ul>	<ul style="list-style-type: none"> <li>Ship Structure Access Manual</li> <li>means of access to other structure-integrated deep tanks</li> </ul>	<ul style="list-style-type: none"> <li>on board ship</li> <li>on board ship</li> </ul>
<b>RECYCLING CONSIDERATIONS</b>					
15	Recycling	<ul style="list-style-type: none"> <li>identification of all materials that were used in construction and may need special handling due to environmental and safety concerns</li> </ul>	<ul style="list-style-type: none"> <li>list of materials used for the construction of the hull structure</li> </ul>	<ul style="list-style-type: none"> <li>SCF-specific</li> </ul>	<ul style="list-style-type: none"> <li>on board ship</li> </ul>

## Notes:

- "SCF-specific" means documents to be developed especially to meet the requirements of these GBS guidelines (MSC.1/Circ.1343).
- "Key construction plans" means plans such as midship section, main O.T. and W.T. transverse bulkheads, construction profiles/plans, shell expansions, forward and aft sections in cargo tank (or hold) region, engine-room construction, forward construction and stern construction drawings.
- "Yard plans" means a full set of structural drawings, which include scantling information of all structural members.
- "Hull form" means a graphical or numerical representation of the geometry of the hull. Examples would include the graphical description provided by a lines plan and the numerical description provided by the hull form data stored within an onboard computer.

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- 5 "Lines plan" means a special drawing which is dedicated to show the entire hull form of a ship.
- 6 "Equivalent (to Lines plan)" means a set of information of hull form to be indicated in key construction plans for SCF purposes. Sufficient information should be included in the drawings to provide the geometric definition to facilitate the repair of any part of the hull structure.
- 7 "Normal storage location" means a standard location where each SCF information item should be stored. However, those items listed as being on board in the table above should be on board as a minimum to ensure that they are transferred with the ship on a change of owner.
- 8 "Shore archive" is to be operated in accordance with applicable international standards.

End of Document
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