

GUIDE FOR

HULL SURVEY FOR NEW CONSTRUCTION AUGUST 2007

Guide to Color Coding Used in Online Version of the Guide

The following summarizes the colors corresponding to Rule Changes, Corrigenda items and editorial changes in the Guide files which are available for download.

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GUIDE FOR

HULL SURVEY FOR NEW CONSTRUCTION

AUGUST 2007 (Updated February 2016 – see next page)

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Foreword

This Guide contains requirements obtained from IACS Unified Requirement, UR Z23 “Hull Survey for New Construction”. For the convenience of the users, the various cross-references to the relevant ABS Rules and Guides are provided in addition to those for IACS documents. These IACS documents, UR, UI (Unified Interpretation) and Recommendation, are available from www.iacs.org.uk.

(1 July 2010) The July 2010 update to this Guide incorporates the latest requirements of IACS UI SC234, UI LL76, and UI MPC96, regarding initial statutory surveys at new construction. Updates to IACS UR Z23 are also incorporated.

The effective date of this Guide is 1 January 2008 and it is applicable for vessels contracted for construction on or after 1 January 2008.

GUIDE FOR HULL SURVEY FOR NEW CONSTRUCTION

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1 Scope

The scope of this Guide includes the following:

- i) Examination of the parts of the vessel covered by the 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.
- ii) Appraisal of the manufacturing, construction, control and qualification procedures, including welding consumables, weld procedures, weld connections and assemblies, with indication of relevant approval tests.
- iii) Witnessing inspections and tests as required in the Rules applicable 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, nondestructive examination, verification of geometry) and by whom.

Appraisal of materials and equipment used for ship construction and their inspection at works is not included in this Guide. Details of requirements for hull and machinery steel forgings and castings and for normal and higher strength hull structural steel are given in Section 2-1-6, Section 2-1-5 and Sections 2-1-2 and 2-1-3, respectively, of the *ABS Rules for Materials and Welding (Part 2)*. Acceptance of these items is verified through the survey process carried out at the manufacturer's works and the issuing of the appropriate certificates.

2 Definitions

2.1 Hull Structure

The hull structure is defined as follows:

- i) Hull envelope including all internal and external structures
- ii) Superstructures, deckhouses and casings
- iii) Welded foundations (e.g., main engine seatings)
- iv) Hatch coamings, bulwarks
- v) All penetrations fitted and welded into bulkheads, decks and shell
- vi) The fittings of all connections to decks, bulkheads and shell, such as air pipes and ship side valves – all ILLC 1966, as amended, items
- vii) 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 Documents

Reference to documents also includes electronic transmission or storage.

2.3 Survey Methods

Definition of survey methods which the Surveyor is directly involved in: Patrol, Review and Witness:

2.3.1 Patrol (1 July 2010)

Patrol is 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 (1 July 2010)

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

2.3.3 Witness

Witness is attendance of scheduled survey items as defined within the shipbuilding functions.

3 Applications

3.1 Vessel Types

This Guide covers the survey of all new construction of steel vessels intended for classification and for international voyages except for:

- i) Those defined in SOLAS I/3
- ii) High speed craft as defined in Section 1-2-2 of the ABS Rules for Conditions of Classification – High-Speed Craft (Part 1)
- iii) Mobile Offshore Drilling Units as defined in Section 1-1-3 of the ABS Rules for Conditions of Classification – Offshore Units and Structures (Part 1)

3.2 Statutory Items (1 July 2010)

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

3.3 Equipment, Fittings and Appendages

This Guide does not cover the manufacture of equipment, fittings and appendages, regardless of 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:

- i) Hatch covers
- ii) Doors and ramps integral with the shell and bulkheads
- iii) Rudders and rudder stock
- iv) All forgings and castings integral to the hull

3.4 Installation and Testing

This Guide applies to the installation into the vessel, welding and testing of:

- i) The items listed in 3.3 above
- ii) Equipment forming part of the watertight and weathertight integrity of the vessel.

3.5 Locations of Construction (1 July 2010)

This Guide applies to the hull structures constructed and coatings applied at any of the following:

- i) Shipbuilder's facilities
- ii) Subcontractors at the shipbuilder's facilities
- iii) Subcontractors at their own facilities or at other remote locations

4 Qualification and Monitoring of Personnel (1 July 2010)

The Surveyors are to confirm through patrol, review and witness as defined in 2.3, that the vessels 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. (See Section 1-1-6 of the ABS Rules for Conditions of Classification (Part 1).)

5 Survey of the Hull Structure

5.1 Items to be Surveyed (1 July 2010)

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

- i) Description of the shipbuilding functions.
- ii) Classification and statutory survey requirements
- iii) Survey method required by the Rules for classification
- iv) Relevant IACS and statutory requirement references
- v) Documentation to be available for the Surveyor during construction.
 - The shipbuilder is to provide the Surveyors access to documentation required for classification. This includes documentation retained by the shipbuilder or other third parties.
 - The list of documents approved or reviewed by ABS for the 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 (See 2-4-3/7 of the *ABS Rules for Materials and Welding*)
 - h) NDE operator's qualification records (See Section 1, subsection 5 of *ABS Guide for Nondestructive Inspection of Hull Welds*)
- vi) Documents to be inserted into the ship construction file. Refer to Section 10 for details.
- vii) 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 vessel type.

5.2 Evidence of Survey of Materials and Equipment

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 vessel has been built or manufactured under survey relevant to the Rules and statutory requirements.

6 Review of the Construction Facility*

(1 July 2010) ABS is to familiarize itself with the yard's production facilities, management processes, and safety procedures for consideration in complying with the requirements of Table 1 prior to any steelwork or construction taking place in the following circumstances:

- i) Where ABS has no recent experience at the construction facilities (typically after a one year lapse) or when significant new infrastructure has been added
- ii) Where there has been a significant management or personnel restructuring having an impact on the ship construction process
- iii) Or where the shipbuilder contracts to construct a vessel of a different type or substantially different in design

* Note: Reference is made to Appendix 2, "Shipyard Review Record", as an example.

7 Newbuilding Survey Planning

7.1 Kick-off Meeting (1 July 2010)

Prior to **commencement of surveys** for any newbuilding project, ABS is to discuss with the shipbuilder at a kick-off meeting the items listed in Table 1. The purpose of the meeting is to 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 vessel type **including the list of proposed subcontractors**. A record of the meeting is to be made, based upon the contents of the Table (the Table can be used as the record with comments made into the appropriate column).

If ABS has nominated a Surveyor for a specific newbuilding project, then the Surveyor is to attend the kick-off meeting. The builder is to be asked to agree to undertake ad hoc investigations during construction where areas of concern arise and to keep ABS 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 Administration and Statutory Requirements

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

7.3 Update of Meeting Record (1 July 2010)

The shipyard shall be requested to advise of any changes to the activities agreed to at the kick off meeting and these are to be documented. (e.g., if the shipbuilder chooses to use or change subcontractors, 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 (1 July 2011)

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 **the latest version of IACS Recommendation No. 47 "Shipbuilding and Repair Quality Standard"**, or a recognized fabrication standard which has been accepted by ABS prior to the commencement of fabrication/construction. The work is to be carried out in accordance with the Rules and under ABS survey.

7.5 Attendance by Other Parties

The kick-off meeting may be attended by other parties, Owner, Administrations, etc., subject to agreement by the shipbuilder.

7.6 Series Ship Production (1 July 2010)

In the event of series ship production **consideration may be given to waiving the requirement for a kickoff meeting for the second and subsequent ships provided any changes are documented as required in 7.1.**

8 Examination and Test Plan for Newbuilding Activities (1 July 2010)

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:

- i) 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
- ii) Proposals for fit up examinations where necessary
- iii) Proposals for testing of the structure (leak and hydrostatic) as well as for all watertight and weathertight closing appliances

- iv) Proposals for nondestructive examination
- v) Any other proposals specific to the vessel type or to the statutory requirements.

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.

9 Proof of the Consistency of Surveys

9.1 Compliance with Newbuilding Survey Planning

ABS 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 Audit

For audit purposes, the information specified in 9.1 is to be made available.

10 Ship Construction File

10.1 Responsibility

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 Owner, and where separate arrangements have been made for document delivery which excludes the shipbuilder, that party has the responsibility.

10.2 Documents to be Included

It is recognized that the purpose of documents held in the Ship Construction File onboard the vessel, 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:

- i) 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 [Section 7-3-2 of the *ABS Rules for Survey After Construction (Part 7)* for Hull Surveys]
- ii) 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) [3-2-16/27 of the *ABS Rules for Building and Classing Steel Vessels*]
- iii) Ship structure access manual, as applicable
- iv) Copies of certificates of forgings and castings welded into the hull [Sections 2-1-6 and Section 2-1-5 of the *ABS Rules for Materials and Welding (Part 2)*]
- v) Details of equipment forming part of the watertight and weathertight integrity of the vessel
- vi) Tank testing plan including details of the test requirements [Section 3-7-1 of the *ABS Rules for Building and Classing Steel Vessels*]
- vii) Corrosion protection specifications [3-2-18/5 of the *ABS Rules for Building and Classing Steel Vessels*]
- viii) Details for the in-water survey, if applicable, information for divers, clearances measurements instructions, etc., tank and compartment boundaries [Appendix 7-A-1 of the *ABS Rules for Survey After Construction (Part 7)*]
- ix) Docking plan and details of all penetrations normally examined at drydocking [3-1-2/11 and 3-2-2/7 of the *ABS Rules for Building and Classing Steel Vessels* and Section 7-4-1 of the *ABS Rules for Survey After Construction (Part 7)*]
- x) Coating Technical File, for vessels subject to compliance with the IMO Coating Performance Standard (PSPC) as a class requirement under the IACS Common Structural Rules. [Section 6 of the *ABS Guide for the Class Notation Coating Performance Standard (CPS)*]

TABLE 1 (1 July 2011)

Reference	Shipbuilding Function	Survey Requirements for Classification	Survey Method Required for Classification	ABS Rules/Guide ⁽¹⁾ [IACS Reference ^(2, 3)]	Statutory Requirements and Relevant Reference	Documentation Available to Classification Surveyor during Construction	Documentation for Ship Construction File	Specific Activities	ABS Proposals for the Project
Shipbuilding Quality Control Function									
1	Welding								
1.1	Welding Consumables	Approved separately at the manufacturer	Review approval status and patrol, verify storage, handling and treatment in accordance with manufacturer's requirements	Appendix 2 of the <i>Rules for Materials and Welding (Part 2)</i> [UR W17]		Consumable specification and approval status	Not required	.1 Identify consumables against approved list	
								.2 Verify temporary and permanent storage facilities	e.g., kept dry, covered, and where applicable, heated
								.3 Verify traceability	e.g., random batch number checking
1.2	Welder Qualification	Qualified welders	Review of welder certification and patrol	[Recommendation 47]		Shipyards records with individual's identification	Not required	.1 Verify welder qualification standard, e.g., class or recognized standard approval	
								.2 Verify welder approved for weld position	
								.3 Verify validity of qualification certificate	

TABLE 1 (continued) (1 July 2011)

Reference	Shipbuilding Function	Survey Requirements for Classification	Survey Method Required for Classification	ABS Rules/Guide ⁽¹⁾ [IACS Reference ^(2, 3)]	Statutory Requirements and Relevant Reference	Documentation Available to Classification Surveyor during Construction	Documentation for Ship Construction File	Specific Activities	ABS Proposals for the Project
1.3	Welding – Mechanical Properties (Welding Procedures)	All weld joint configurations, positions and materials to be covered by weld procedures approved by ABS or by another IACS member available	Review and patrol	2-4-3/5 of the Rules for Materials and Welding (Part 2) [UR W28]		Approved weld procedure specification and welding plan relevant to the vessel project or process	Not required	.1 Verify weld procedures records have been approved and cover all weld processes and positions in accordance with classification or recognized standards.	
		ABS witnesses all new weld procedure qualification tests carried out in the shipyard whenever ABS is surveying in the shipyard						.2 Verify procedures are available at relevant workstations	
								.3 Verify weld procedures are available for the Surveyor's reference	
1.3a	Welding Equipment	Correctly calibrated and maintained	Patrol and review			Shipbuilder's maintenance and calibration records	Not required	.1 Verify condition of machinery and equipment.	
								.2 Verify machines are calibrated by appropriate staff	
								.3 Verify calibration carried out in accordance with manufacturer's recommendations	
								.4 Verify calibration in accordance with maintenance schedule	

TABLE 1 (continued) (1 July 2011)

Reference	Shipbuilding Function	Survey Requirements for Classification	Survey Method Required for Classification	ABS Rules/Guide ⁽¹⁾ [IACS Reference ^(2, 3)]	Statutory Requirements and Relevant Reference	Documentation Available to Classification Surveyor during Construction	Documentation for Ship Construction File	Specific Activities	ABS Proposals for the Project
1.3b	Welding Environment	Satisfactory environment	Patrol	[Recommendation 47]			Not required	.1 Verify welding areas clean, dry, well lit.	
								.2 Confirm relevant measures taken for any pre or post heat treatment, drying of surfaces prior to welding	
								.3 Confirm shielding gases, fluxes protected	
1.3c	Welding Supervision	Sufficient number of skilled supervisors	Patrol	Pub # 14: <i>Guide for Nondestructive Inspection of Hull Welds</i> [Recommendation 20 and 47]				.1 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	Pub # 14: <i>Guide for Nondestructive Inspection of Hull Welds</i> [Recommendation 20 and 47]		Shipbuilder's and recognized standards and Rules as applicable, welding and NDE plans, NDE reports, operator qualifications	Not required	.1 Identify workstations where NDE is carried out, e.g., panel line butt welds, castings into hull structure	
								.2 Verify NDE carried out in accordance with approved plans where applicable	

TABLE 1 (continued) (1 July 2011)

Reference	Shipbuilding Function	Survey Requirements for Classification	Survey Method Required for Classification	ABS Rules/Guide ⁽¹⁾ [IACS Reference ^(2, 3)]	Statutory Requirements and Relevant Reference	Documentation Available to Classification Surveyor during Construction	Documentation for Ship Construction File	Specific Activities	ABS Proposals for the Project
1.4	Welding – Surface Discontinuities (cont'd)	Substantially free from significant indications, satisfactory profile and size	Visual examination, surface detection techniques, review of documents and patrol of operator	Pub # 14: <i>Guide for Nondestructive Inspection of Hull Welds</i> [Recommendation 20 and 47]		Shipbuilder's and recognized standards and Rules as applicable, welding and NDE plans, NDE reports, operator qualifications	Not required	.3 Verify suitability of NDE methods	
								.4 Verify operators suitably qualified particularly where sub-contractors have been employed	
								.5 Verify NDE is carried out according to the acceptable process	
								.6 Review NDE records	
1.5	Welding – Embedded Discontinuities	NDE 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	Pub # 14: <i>Guide for Nondestructive Inspection of Hull Welds</i> [Recommendation 20 and 47]		Shipbuilder's and recognized standards and Rules as applicable, welding and NDE plans, NDE reports, operator qualifications	Not required	.1 Identify workstations where NDE is carried out, e.g. panel line butt welds, castings into hull structure	
								.2 Verify NDE carried out in accordance with approved plans where applicable	
								.3 Verify suitability of NDE methods	
								.4 Verify operators suitably qualified particularly where sub-contractors have been employed	

TABLE 1 (continued) (1 July 2011)

Reference	Shipbuilding Function	Survey Requirements for Classification	Survey Method Required for Classification	ABS Rules/Guide ⁽¹⁾ [IACS Reference ^(2, 3)]	Statutory Requirements and Relevant Reference	Documentation Available to Classification Surveyor during Construction	Documentation for Ship Construction File	Specific Activities	ABS Proposals for the Project
1.5 (cont'd.)	Welding – Embedded Discontinuities (cont'd.)	NDE 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	Pub # 14: <i>Guide for Nondestructive Inspection of Hull Welds</i> [Recommendation 20 and 47]		Shipbuilder's and recognized standards and Rules as applicable, welding and NDE plans, NDE reports, operator qualifications	Not required	.5 Verify that records have been completed and in accordance with recognized standards, e.g. IQI and sensitivity recorded	
								.6 Verify that reports and radiographs have been evaluated correctly by the shipbuilder. Systematic review of radiographs carried out by the Surveyor	
								.7 Verify equipment calibration satisfactory and in accordance with manufacturer's and recognized standards requirements	
								.8 Verify NDE is carried out according to the acceptable process	

TABLE 1 (continued) (1 July 2011)

Reference	Shipbuilding Function	Survey Requirements for Classification	Survey Method Required for Classification	ABS Rules/Guide ⁽¹⁾ [IACS Reference ^(2, 3)]	Statutory Requirements and Relevant Reference	Documentation Available to Classification Surveyor during Construction	Documentation for Ship Construction File	Specific Activities	ABS Proposals for the Project
2	Steel Preparation and Fit Up:								
2.1	Surface Preparation, Marking and Cutting	Traceability and acceptability of material, check of steel plates & profiles materials type, scantling identification, testing marks	Patrol	[Recommendation 47]		Material certificates, shipbuilder's marking/cutting production documents at the workstage - documents retained at the facility	Not required	.1 Verify stockyard storage satisfactory .2 Verify material traceability, e.g. stamping identification against material certification, archiving of records .3 Verify transfer marking after treatment line .4 Verify standard of shotblasting and priming .5 Verify suitability of primer .6 Verify that steel grades can be identified .7 Verify machinery adjusted to maintain within IACS or manufacturer's recommendations .8 Verify accuracy of marking and cutting .9 Verify storage of piece parts.	

TABLE 1 (continued) (1 July 2011)

Reference	Shipbuilding Function	Survey Requirements for Classification	Survey Method Required for Classification	ABS Rules/Guide ⁽¹⁾ [IACS Reference ^(2,3)]	Statutory Requirements and Relevant Reference	Documentation Available to Classification Surveyor during Construction	Documentation for Ship Construction File	Specific Activities	ABS Proposals for the Project
2.2	Straightening	Approval of straightening methods/ procedures against deformation	Patrol and review	[Recommendation 47]		Recognized standards, approved procedures	Not required	.1 Verify that straightening processes are approved for the grade and type of steel, e.g., tmcp, z-plate.	
								2. Verify that plates and sections are within recognized tolerances	
2.3	Forming	Maintain material properties. Acceptance of forming method against improper deformations	Patrol	[Recommendation 47]		Shipbuilder's procedure for hot forming	Not required	.1 Verify that temperature control is exercised by the operator	
								.2 Verify that suitable methods of temperature control are available when forming special steels and materials	
								.3 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]		Shipbuilder's and recognized standards and Rules as applicable	Not required	.1 Verify the processes to ensure satisfactory fit up and alignment at all workstations	

