



Acceptance and adoption of new and advanced NDE in maritime - A perspective from Lloyd's Register (LR) as a Class society.

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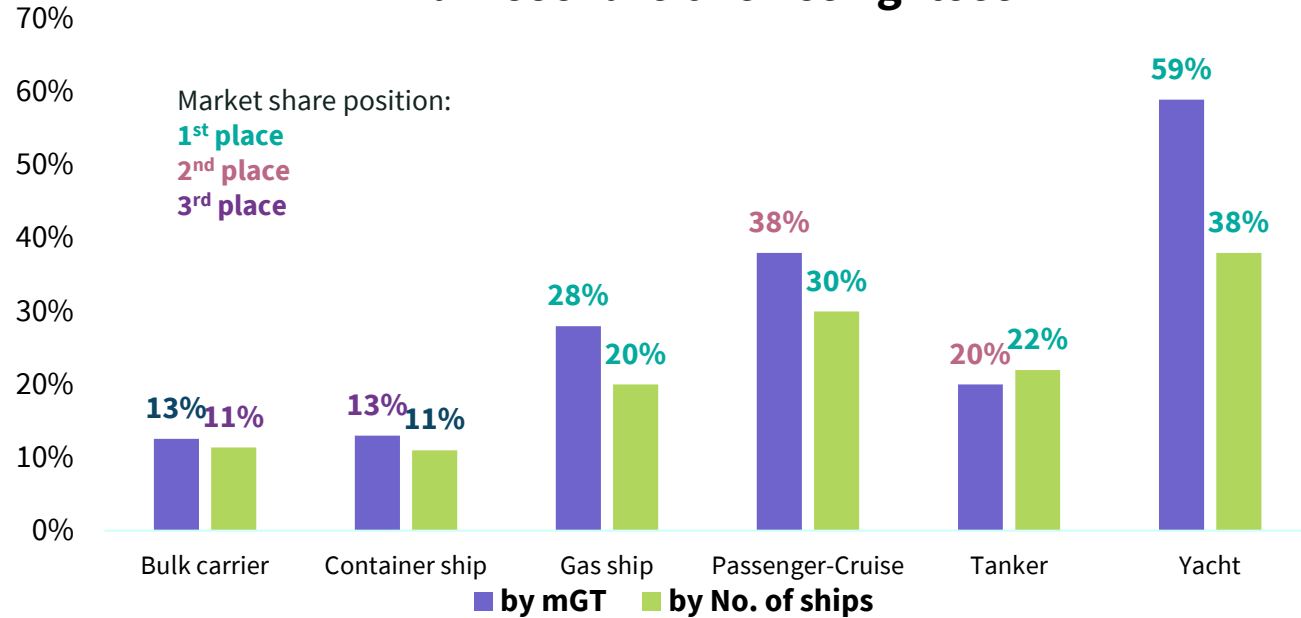
Lloyd's Register in Maritime

Our global maritime expertise, innovation and experience across

22,000+

vessels through our trusted digital platform

LR market share of existing fleet



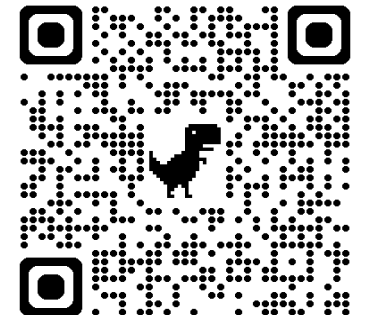
Source: IHS, October 2024. Data of all vessels in the IHS database, excluding naval vessels, inland waterway vessels, non-ship shaped, non-merchant vessels and vessels <100GT.

Working together for a Safer world.

- **118 flag states** (The flag state has significant authority over the ship, including the responsibility for enforcing international maritime regulations and ensuring the ship's compliance with those rules)
- **International Association of Classification Societies (IACS) committee member**

World's first classification society - The Society for the Registry of Shipping was set up in 1760 by customers of Edward Lloyd's Coffee House in Lombard Street, London.

Lloyd's Register and Lloyd's Register Foundation work together to fund research, foster industry collaboration and develop action-oriented Solutions.





Maritime Classification

is the development, publication and global implementation of rules that define standards of quality, safety and reliability of ships. "



How maritime requirements are defined ..

IACS – International Association of Classification Societies

- **IACS Unified Requirement W34 - Advanced non-destructive testing of materials and welds**
- This UR is to be uniformly implemented by IACS Societies to ships contracted for construction on or after 01 July 2021.
 - PAUT - Phased Array Ultrasonic Testing
 - TOFD - Time of Flight Diffraction
 - RT-D - Digital Radiography
 - RT-S - Radioscopic testing with digital image acquisition(dynamic $\geq$ 12bit)
 - RT-CR - Testing with computed radiography using storage phosphor imaging plates

The process of validation



W34

Ensure compliance with IACS requirements

- There are multiple factors that needs to be considered.
 - The basic requirements are laid out by IACS.
- Different bodies may have different approaches for validation.
 - Its up to the experience and expertise of each society.
- Why go for the validation process?
 - Standardization
 - Enhanced safety and structural integrity
 - Reliability
 - *Building Confidence*

W34

(Dec 2019)

Advanced non-destructive testing of materials and welds

1. General

1.1 This document gives minimum requirements on the methods and quality levels that are to be adopted for the advanced non-destructive testing (ANDT) of materials and welds during new building of ships. The advanced methods intended for use under this UR are listed in Section 2.

1.2 The ANDT is to be performed by the shipbuilder, manufacturer or its subcontractors in accordance with these requirements. The Classification Society's surveyor may require witnessing testing.

1.3 It is the shipbuilder's or manufacturer's responsibility to ensure that testing specifications and procedures are adhered to during the construction, and the report is to be made available to the Classification Society on the findings made by the ANDT.

1.4 The extent and method of testing, and the number of checkpoints are normally agreed between the shipyard and the Classification Society.

1.5 Terms and definitions

The following terms and definitions apply for this document.

ANDT	Advanced non-destructive testing
RT-D	Digital Radiography
RT-S	Radioscopic testing with digital image acquisition(dynamic≥12bit)
RT-CR	Testing with computed radiography using storage phosphor imaging plates
PAUT	Phased Array Ultrasonic Testing
TOFD	Time of Flight Diffraction
AUT	Automated Ultrasonic Examinations. A technique of ultrasonic examination performed with equipment and search units that are mechanically mounted and guided, remotely operated, and motor-controlled (driven) without adjustments by the technician. The equipment used to perform the examinations is capable of recording the ultrasonic response data, including the scanning positions, by means of integral encoding devices such that imaging of the acquired data can be performed.

Note:

1. This UR is to be uniformly implemented by IACS Societies to ships contracted for construction on or after 1 July 2021.
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.

Lloyd's Register Rules and Procedures



Materials and Qualification Procedures for Ships (MQPS) – Book N

- LR Rules & Regulations, Rules for the Manufacture, Testing and Certification of Materials. 5.1 Advanced NDE methods & 5.15 ANDE method and procedure qualification.

All ANDE is to undergo a qualification and demonstration program to determine the suitability and the effectiveness of the proposed method, for the detection and sizing of discontinuities. The intent of this program is to determine the general capability of the ANDE methods, in demonstrating reasonable equivalence to the existing NDE methods.

- Procedure 17-3 – Validation of advanced NDE methods

CHAPTER	1	PROCEDURE 17-1 - APPROVAL FOR THICKNESS MEASUREMENT OF HULL STRUCTURE OF SHIPS AND OFFSHORE UNITS
CHAPTER	2	PROCEDURE 17-2 - RECOGNITION OF FIRMS FOR PERFORMING NDE
CHAPTER	3	PROCEDURE 17-3 – VALIDATION OF ADVANCED NDE METHODS
	SECTION 1	GENERAL INFORMATION
	SECTION 2	RELATED STANDARDS AND RULES
	SECTION 3	VALIDATION PROCESS
	SECTION 4	VALIDATION SUBMISSION
	SECTION 5	ON-SITE VALIDATION
	SECTION 6	RECORDS OF VALIDATION



Materials and Qualification Procedures for Ships

Book N

Procedures for Approval and Validation of NDT Methods

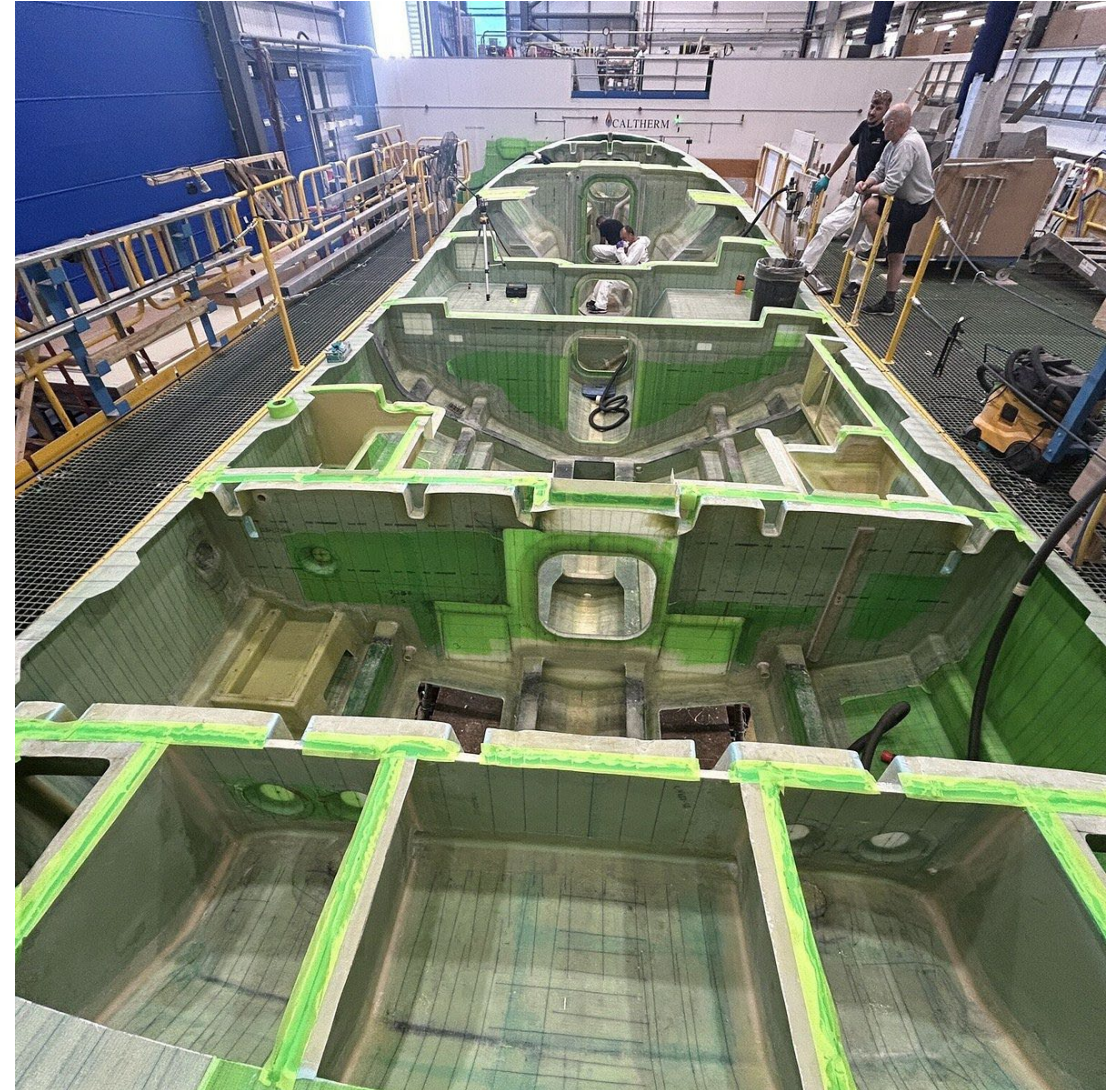
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Maritime issues



Manufacturing Vs inspection

- Designs for manufacturability, and not for inspection.
- Defects are not well established and recognised for severity.
- Sometimes, repair cause more damage



Lloyd's Register Procedures



Materials and Qualification Procedures for Ships (MQPS) – Book N

Materials and Qualification Procedures for Ships

Book N

Procedures for Approval and Validation of NDT Methods

July 2025



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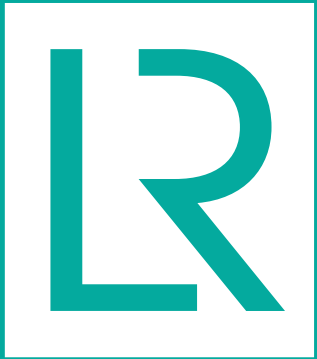
Marine & Offshore Documents Centre -
Guidance Notes - All Documents

Guidance Notes for Non-Destructive Examination of Composites

April 2025







Thank you

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