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LH_2CRAFT - Safe and Efficient Marine Transportation of Liquid Hydrogen

Call: HORIZON-JTI-CLEANH2-2022-2

Project Number: 101111972

Deliverable D9.1

AiP of the LH2 CCS

Work package	Related task(s)	Dissemination level	Document nature	Estimated delivery date
WP9	T9.1	Public	Document, report	12.12.2025

Lead author(s)	Contributing partner(s)	Reviewer(s)
Maria Sokou (ABS)	(RINA), (UOS)	Alexandros Giannakis (HYD) Nikoletta Trivyza (RINA)

DOCUMENT HISTORY

Version	Date	Author|Editor|Reviewer	Description
V0.1	09/12/2025	Maria Sokou (ABS)	Initial version
V0.2	05/12/2025	Alexandros Giannakis (HYD)	Review of document from HYDRUS
V0.2	02/12/2025	Nikoletta Trivyza	Review of document from RINA
V1.0	12/12/2025	Maria Sokou (ABS)	Incorporation of reviewers' comments – Final version of deliverable

EXECUTIVE SUMMARY

This report contains the review letter issued following the review of the submitted documentation for the LH2 Cargo Containment System Concept (CCS). At this stage, the AIP letter is issued upon receipt of some basic drawings, and we have concluded that the design is, in principle, feasible. Upon receipt of the testing reports and provided that the tests are satisfactory an updated AIP letter will be issued.

Due to confidentiality matters, the comment sheets are not included in this report but are only shared with the involved partners / designers of the systems.

Clean Hydrogen Partnership
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1 INTRODUCTION

LH2CRAFT aims to develop next-generation, sustainable, and safe solutions for large-scale liquid hydrogen (LH_2) storage and long-distance transport for commercial vessels. As part of the LH2CRAFT project, ABS has reviewed drawings and documentation from the designers of the LH2 Cargo Containment System Concept, in accordance with the ABS Rules and Requirements, and relevant international regulations, as specified in the Review Letter included in Section 2.

The documentation received and reviewed includes the System Description, Provisional General Arrangement of the CCS, Operating Principle of Insulation Spaces, Structural Analysis of Standard Insulation Panels, Fatigue Analysis of Primary and Secondary Barriers, and the Test Plan for CCS Materials.

The purpose of the review for "Approval in Principle" is to investigate the feasibility of the conceptual design and identify any major deficiencies that would prove problematic in a full ABS review of the design for classification.

2 REVIEW LETTER

Electronically published by ABS Piraeus.
Reference WO0361208, dated 08-Dec-2025

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Work Order – WO0361208
Engineering Design Process for the LH2 CCS Concept
Approval in Principle for LH2CRAFT Project

Attention: HD KSOE (HD KOREA SHIPBUILDING & OFFSHORE ENGINEERING) (WCN: 491131)

The documents shown in the attached list are reviewed in accordance with the applicable requirements of the following:

- ABS Requirements for Liquefied Hydrogen Carriers, 2023
- ABS Rules for Building and Classing Marine Vessel Rules, 2023
- International Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk, as amended (IGC Code)
- IMO Resolution MSC.565(108) – Revised Interim Recommendations for Carriage of Liquified Hydrogen in Bulk

Please note our review is based on the following conditions:

1. Our review of the drawings in the attached list is for "Approval in Principle". The purpose of the review for "Approval in Principle" is to investigate the feasibility of the conceptual design and identify any major deficiencies that would prove problematic in a full ABS review of the design for classification. The proposed design concept is in principle feasible.

2. Please be advised that our review is based on a general overview of the concept design rather than a detailed analysis and note that the final detailed design will need to be verified against the Rules, Guides and statutory Guidelines or Regulations at the time of construction.

3. It should also be noted that our review at this time in no way precludes any further amendments and comments which may be deemed necessary during the review for the final approval.

4. Please note that in this instance ABS is not acting on behalf of any Flag State or Coastal State Authority since there is no specific agreement or delegation in place.

5. The actual performance of the new technology should be evaluated during prototype testing and compared against existing designs.

Based on our review, a list of comments generated during the review has been compiled and is enclosed herewith as Appendix 2 for your information. This document suggests areas

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Figure 1. ABS review letter for the approval in principle of the LH2 CCS Concept (1/3)

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of further engineering that we would expect to be addressed during the next design stage and do not require response in this stage.

For any clarifications, contact Mrs. Maria Sokou at +30 210 9441141 or MSokou@eagle.org.

Very truly yours,

Pier Carazzai
Vice President of Engineering

Electronically Signed by: Anastasios Dionysatos

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Figure 2. ABS review letter for the approval in principle of the LH2 CCS Concept (2/3)

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Appendix I: Drawing List

Drawing No.	Rev. No.	Title	Status
LH2CRAFT-CCS-01	1.1	System Description	Reviewed
LH2CRAFT-CCS-02	1.0	Provisional General Arrangement of CCS	Reviewed
LH2CRAFT-CCS-03	1.1	Operation Principle of Insulation Spaces	Reviewed
LH2CRAFT-CCS-04	1.3	Structural Analysis of Standard Insulation Panels	Reviewed
LH2CRAFT-CCS-05	1.0	Fatigue Analysis of Primary & Secondary Barrier	Reviewed
LH2CRAFT-CCS-06	2.0	Test Plan for CCS Materials	Reviewed

Electronic copies of the documents, appropriately stamped, are available in the ABS MyFreedom™ Client Portal

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Figure 3. ABS review letter for the approval in principle of the LH2 CCS Concept (3/3)

3 CONCLUSION

Upon completion of the review the submitted documentation relevant to the CCS concept, submitted by Messrs HD KSOE (HD KOREA SHIPBUILDING & OFFSHORE ENGINEERING), the ABS letter with Work Order No: **WO0361208 dated 08 December 2025** was issued. This includes the list of submitted drawings as well as their stamping status and the list of conditions.

The proposed design concept is in principle feasible. For the next stage, outstanding comments indicated on our ABS letter with Ref WO0361208 dated 08 December are to be resolved, also the additional documentation received together with the test results are to be reviewed and evaluated. Partners are to advise the documentation intended to be submitted for the new review task.