



Subject: Instruction to Surveyors for the conduct of 10 yearly surveys of internal hull voids and cofferdams onboard Domestic Commercial Vessels (DCV) as required by the *Surveyor Accreditation Guidance Manual (SAGM) 2014 Part 2 Section 4.11 (2)(d) & (e)*.

General: This Instruction to Surveyors (ITS) provides advice and outlines the processes and acceptable options for internal hull, fuel tank cofferdam, and foam buoyancy inspections as required for a 10 yearly renewal survey in the *Surveyor Accreditation Guidance Manual (SAGM) 2014 Part 2 Section 4.11 (2)(d) & (e)*. This ITS does not cover the internal inspection of fuel tanks and their associated components.

Under a strict interpretation of the requirements for a 10-year renewal survey many vessels (particularly smaller vessels) with sealed underdeck spaces may require destructive work to inspect internal hull surfaces, voids and any foam buoyancy material fitted.

This ITS provides guidance on alternatives for meeting the requirements of *SAGM Section 4.11 (2)* without the need for destructive work to tank tops or watertight boundaries. Options are provided for both metallic and composite hulls, based on the risk and information available to determine vessel condition.

The options provided are based on the likelihood of hull or internal degradation based on vessel age and documented details of construction. The ITS is based on sealed underdeck chambers that are foam filled, such that a breach of the watertight envelope does not lead to complete flooding of the space, and ultimate loss of the vessel. Vessels using air chambers, as permitted in NSCV C6B, present a higher risk as breach of an air chamber will lead to vessel flooding.

Where an existing vessel is undergoing initial survey and using a 10 yearly renewal survey, in place of an initial hull inspection during build, only option 3 below may be used unless otherwise approved directly by the National Regulator.

It is expected that new vessels will be able to comply with the full build documentation requirements (as described below) and will therefore be eligible to use option 1 at their first 10-year renewal.

Definition: **Age:** Chronological age of the vessel hull measured from construction date.

AMS Accredited Marine Surveyor

SAGM: Surveyor Accreditation Guidance Manual 2014 Part 2

National Regulator: Australian Maritime Safety Authority

Build Documentation:

Full Initial build documentation, pressure test reports of fuel tank cofferdams, confirmation that buoyancy foam material is compliant with NSCV C6B Annex F, pressure tests of sealed hulls and air chambers. Provision of original build drawings. Copies of initial hull construction reports. Hull weight (option 4, composite vessels)

Partial Confirmation of buoyancy foam material fitted

Nil No construction data available.

Instruction: The alternatives outlined in this ITS are risk-based. They differ with vessel age and hull construction material. The table below defines the applicable options for inspection.

Composite:

Table 1 Composite Vessel internal hull inspection matrix

Age	Build Documentation		
	Full	Partial	Nil
10 years	Option 1 or 4	Option 1 or 4	Option 3 or 4
20 years	Option 3 or 4	Option 3 or 4	Option 3 or 4
30 Years	Option 3	Option 3	Option 3

Metallic:

Table 2 Metallic Vessel internal hull inspection matrix

Age	Build Documentation		
	Full	Partial	Nil
10 years	Option 1	Option 2	Option 2
20 years	Option 2	Option 2	Option 3
30 Years	Option 3	Option 3	Option 3

Note:

1. A vessel that has used option 3 and confirmed the internal hull arrangement and internal buoyancy material may use option 1 for the next 10-year renewal survey, only if internal buoyancy foam is replaced at the inspection. In other cases, the vessel is required to undergo option 3 at its subsequent inspection.
2. A vessel using air chambers may not use option 1, this is to be replaced with option 2 in Table 2.

NOTE: DCV-ITS-021 for thickness measurements of metallic hulls is also applicable. A vessel using options 1 or 2 of Table 2 must also undertake thickness measurements of inaccessible compartments. NOTE: DCV-ITS-021 is currently in draft and will be released for consultation soon.

Option 1: Documentation review and leak test

Prerequisites:

An AMS may conduct a documentation review and leak test of the condition of internal voids and cofferdams if:

- i. The vessel has a sealed deck; and,
- ii. Allowed by Table 1 & Table 2 above; and,
- iii. The vessel is not entering survey for the first time; and,
- iv. The AMS has access to build documentation including records of type and quantity of foam fitted during initial construction; and,
- v. If the vessel is metallic, supporting pressure test results from initial construction is provided (in accordance with the requirements below)
 - a. NSCV Part C Section 5A Clause 4.7.1.2 for fuel tank cofferdams; and,
 - b. NSCV Part C Section 6B Annex H Table H.1 for an Air Test for sealed hull sections or air chambers. (Non-sealed hulls are not required to be pressure tested); or,
 - c. Another standard as approved by the National Regulator.

This option may also be used if Option 3 was used at the previous renewal survey - See note (1) above.

Methodology:

Fuel tank cofferdams and internal hull voids are to be drained via drainage bungs. The presence of more than 250ml of water or any quantity of fuel requires further inspection, which can be the use of a borescope inspection as per Option 2: Borescope inspection.

Record Keeping:

The inspection is to be supported by the provision of all documentation relied upon, and a report detailing the inspections carried out including the presence of any water or fuel in the hull or cofferdams.

Option 2: Borescope Inspection & Pressure test (metallic hulls)

Prerequisites:

An AMS may conduct a borescope inspection to determine the condition of internal voids and cofferdams if:

- i. The AMS has access to partial build documentation; and,
- ii. The vessel has suitable inspection points (such as drains from internal hull voids and cofferdams) to allow for inspection using a borescope, to identify pitting or other structural degradation; and,
- iii. Allowed by Table 1 & Table 2 above.

Methodology:

Fuel tank cofferdams and internal hull voids are to be drained from drainage bungs. A pressure test should be conducted in accordance with:

- NSCV Part C Section 5A Clause 4.7.1.2 for fuel tank cofferdams; and,
- NSCV Part C Section 6B Annex H Table H.1 for an Air Test for sealed hull sections or air chambers. (Non-sealed hulls are not required to be pressure tested); or,
- Another standard as approved by the National Regulator.

A borescope is to be used to inspect the internal sections of the hull or cofferdam. These inspections should check the areas most likely to suffer from degradation such as, the lower points of the space typically the aft section bottom plating. Internal inspection should include, to the surveyor's satisfaction, survey of internal structure in high stress areas for; cracks, signs of fatigue or other structural degradation.

Failure of a pressure test or the presence of extensive corrosion (as defined in DCV-ITS-021) or structural degradation will require full inspection in accordance with Option 3: Invasive Internal Inspection.

The condition of foam buoyancy material is to be assessed to the professional judgment of the attending surveyor. In the case of doubt, the material should be replaced.

Record Keeping:

The inspection is to be supported by the provision of all documentation relied upon, and a report detailing the inspections carried out including the presence of any water or fuel in the hull or cofferdams.

A borescope inspection report must be provided. This must include details of inspections carried out, items inspected, condition of items inspected, and any defects found.

Pressure test results must be presented in a pressure test report. This report must include:

- i. Standard applied to the conduct of the test; and,
- ii. Persons present during the test; and,
- iii. Pressure used and time hold; and,
- iv. Photos of test setup.

Note: It is suggested that bungs, deck spin outs or other water-tight inspection ports are added to sealed spaces, this will assist in the detection of moisture or other degradation. These bungs can be added to the deck for inspection of underdeck spaces to prevent ingress from underwater openings.

Option 3: Invasive Internal Inspection

Prerequisites:

An AMS is to use an invasive internal inspection to determine the condition of internal hull voids and cofferdams when:

- i. No build documentation has been provided; and,
- ii. The vessel is at least 30 years old; and,
- iii. There is no record of the type and quantity of foam buoyancy used; and,
- iv. Internal foam buoyancy has been in place for 30 years or more; and,
- v. As required by Table 1 & Table 2 above.

Methodology:

The sections of the deck and fuel tanks of sufficient size are to be removed to permit the full internal

inspection of these items. This will often require the destructive lifting of decks and removal of fuel tanks.

Fuel tank cofferdams are subjected to pressure testing as per option 2 above.

Record Keeping:

Results of internal inspection are to include:

- i. Photos of internal hull voids and cofferdams showing the condition of the hull and internal structures; and,
- ii. Provision of pressure tests as required by option 2; and,
- iii. Records of type and location of any internal buoyancy material; and,
- iv. Be provided to the vessel owner to permit the use of option 1 for further internal hull inspections.

Option 4: Hull Weight

Composite vessels, weighing of the hull in lightship condition (or other known condition for comparison).

Prerequisites:

A composite vessel may undergo hull weighing in lieu of internal hull inspection if:

- i. An initial lightship comparison weight has been provided from the initial build process to allow for comparison; and,
- ii. The vessel has a sealed deck and/or cofferdams; and,
- iii. As allowed by the Table 1 & Table 2 above.

Methodology:

The vessel is to undergo a lightship verification (as per SAGM Section 4.9). The vessel is to be weighed, using either freeboard measurement or direct weight measurement (using a weighbridge). A lightship declaration cannot be accepted in lieu of a weight measurement for the purpose of this instruction. Direct weight comparison must be used. This is to detect the presence of water or fuel retained in the hull due to structural failure or degradation.

If water intrusion or fuel leakage has occurred into the foam the vessel weight will have increased. If an increase in weight greater than 4% has occurred further investigation should be undertaken either by borescope or destructive examination, as per Options 2 & 3 above.

Note:

1. *NSCV Part C Section 6C Chapter 3 and Annex A provides the requirements for the conduct of a lightship check. For vessel opting to use Option 4 clauses 3.3.4 & 3.3.5 of Section 6C Chapter 3 are not applicable. Only direct measurement of the vessel lightship is permitted.*

Record Keeping:

The result of hull weight measurement is to include:

- i. Confirmation of original vessel lightship; and,
- i. A lightship comparison report (on AMSA 653 form or surveyors equivalent). The comparison report is to compare the vessel weight to the initial vessel lightship (i.e. the initial lightship derived from build); and
- ii. Where a weighbridge is used for trailer boats a certificate for the combined vessel trailer and tow vehicle combination and the empty tow vehicle and trailer is to be provided.

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