United States Coast Guard

DRYDOCK INSPECTION AND UNDERWATER SURVEY BOOK

Name of Vessel	
Official Number	**Class**
Date Completed	**Location**
Vessel Built in Compliance with SOLAS: **60 74 74/78 N/A**	

Inspection Type

- ❑ Drydock Inspection
- ❑ Underwater Survey in Lieu of Drydock (UWILD)
- ❑ Internal Structural Examination (ISE)
- ❑ Cargo Tank Internal Examination (CTIE)

Inspectors

1. _____ **3.** _____

2. _____ **4.** _____

Total Time Spent Per Activity:

Regular Personnel (Active Duty)			
ACTIVITY TYPE	ACTIVITY	TRAINING	(PERS) MI

TOTAL ADMIN HOURS	TOTAL TRAVEL HOURS

Reserve Personnel			
ACTIVITY TYPE	ACTIVITY	TRAINING	(PERS) MI

TOTAL ADMIN HOURS	TOTAL TRAVEL HOURS

Auxiliary Resources	
TOTAL BOAT HOURS	TOTAL AIRCRAFT HOURS

Conversions:

Distance and Energy				
Kilowatts (kW)	X	1.341	=	Horsepower (hp)
Feet (ft)	X	3.281	=	Meters (m)
Long Ton (LT)	X	.98421	=	Metric Ton (t)

Liquid (***NOTE:*** *Values are approximate.)*

Liquid	bbl/LT	m^3/t	bbl/m^3	bbl/t
Freshwater	6.40	1.00	6.29	6.29
Saltwater	6.24	.975	6.13	5.98
Heavy Oil	6.77	1.06	6.66	7.06
DFM	6.60	1.19	7.48	8.91
Lube Oil	7.66	1.20	7.54	9.05

Weight

1 Long Ton	=	2240 lbs	1 Metric Ton	=	2204 lbs
1 Short Ton	=	2000 lbs	1 Cubic Foot	=	7.48 gal
1 Barrel (oil)	=	5.61 ft = 42 gal = 6.29 m^3	1 psi	=	.06895 Bar = 2.3106 ft of water

Temperature: Fahrenheit = Celsius (°F = 9/5 °C + 32 and °C = 5/9 (°F – 32))

0	=	-17.8	80	=	26.7	200	=	93.3
32	=	0	90	=	32.2	250	=	121.1
40	=	4.4	100	=	37.8	300	=	148.9
50	=	10.0	110	=	43.3	400	=	204.4
60	=	15.6	120	=	48.9	500	=	260
70	=	21.1	150	=	65.6	1000	=	537.8

Pressure: Bars = Pounds per square inch

1 Bar	=	14.5 psi	5 Bars	=	72.5 psi	9 Bars	=	130.5 psi
2 bars	=	29.0 psi	6 Bars	=	87.0 psi	10 Bars	=	145.0 psi
3 Bars	=	43.5 psi	7 Bars	=	101.5 psi			
4 Bars	=	58.0 psi	8 Bars	=	116.0 psi			

Notes:

Use of Drydock Inspection Book:

This inspection book is intended to be used as a job aid by Coast Guard marine inspectors during drydock inspections, underwater surveys in lieu of drydock inspections, internal structural examinations, and cargo tank internal examinations of U.S. flagged vessels. The lists contained within this book are not intended to limit the inspection. Each marine inspector should determine the depth of inspection necessary. A checked box should be a running record of what has been inspected. It does not imply that the entire system has been inspected or that all or any items are in full compliance. This job aid does not constitute part of the official inspection record.

This document does not establish or change Federal laws or regulations. References given are only general guides. Refer to IMO publications, CFRs, NVICs, or any locally produced cite guides for specific regulatory references. Not all items in this book are applicable to all vessels.

NOTE*: Guidance on how to conduct drydock inspections*, *internal structural examinations, and cargo tank internal examinations of U.S. flagged vessels can be found in the Marine Safety Manual (MSM) Volume II, Chapter B3: Hull Examinations. Guidance on underwater surveys in lieu of drydock inspections can be found in NVIC 1-89. All MSM cites listed refer to MSM Volume II unless otherwise indicated.*

Pre-inspection Items:

- Review MSIS records.
  - MIPIP
  - MICOI

Post-inspection Items:

- Complete MSIS entries.
  - MIAR
  - MSDS
  - MIDR
  - VFLD
  - VFEI
- Initiate Report of Violation (ROV) if necessary.

Table of Contents

Notes:

Deficiency	MSIS Code	Req't. Issued/ Date Completed

Deficiencies identified should be listed with MSIS codes. At completion of inspection/examination, any outstanding deficiencies shall be entered in MIDR or PSDR as appropriate. All deficiencies found (outstanding and completed) shall be entered in the Deficiency Summary. Worklist items, which serve only as memory joggers to complete inspection/examination (e.g., test emergency fire pump), should not be coded as deficiencies.

MSIS Codes for Deficiencies:

BS	Ballast	**DC**	Dry Cargo	**IC**	I/C Engine
BI	Bilge	**ES**	Electrical	**LS**	Lifesaving
BA	Boiler, Aux.	**FF**	Firefighting	**MI**	Miscellaneous
BM	Boiler, Main	**FL**	Fuel	**NS**	Navigation
CS	Cargo	**GS**	General Safety	**PP**	Propulsion
DM	Deck Machinery	**HA**	Habitation	**SS**	Steering
DL	Doc., Lics., Pmts.	**HU**	Hull		

IMO Applicability Dates:

Reference	Date
SOLAS 1960	26 MAY 65
SOLAS 1974	25 MAY 80
1978 Protocol to SOLAS 1974	01 MAY 81
1981 Amendments (II-1 & II-2)	01 SEP 84
1983 Amendments (III)	01 JUL 86
Various additional amendments to SOLAS	
MARPOL 73/78 Annex I	02 OCT 83
MARPOL 73/78 Annex II	06 APR 87
MARPOL 73/78 Annex III	01 JUL 92
MARPOL 73/78 Annex V	31 DEC 88
IBC Code	After 01 JUL 86
BCH Code	Prior to 01 JUL 86
COLREGS 1972	15 JUL 77
Various additional amendments to COLREGS	
Load Line 1966	21 JUL 68
STCW 1978	28 APR 84
1991 Amendments	01 DEC 92
1994 Amendments	01 JAN 96
1995 Amendments	01 FEB 97

Involved Parties & General Information:

Vessel's Representatives
_____
_____
Phone Numbers

Owner—Listed on DOC (if applicable), or COFR
❑ No Change

Operator
❑ No Change

Deficiency Summary Worksheet:

Name of Vessel _____ **VIN** _____

Deficiency	MSIS Code	Req't. Issued/ Date Completed

Recommended U.S. Vessel Deficiency Procedures:

Step	Action
1	Identify deficiency.
2	Inform vessel representative.
3	Record on the *Deficiency Summary Worksheet* (next page).
4	If deficiency is corrected prior to end of inspection, go to **Step 7.**
5	If deficiency is unable to be corrected prior to end of inspection, issue CG-835 in accordance with table below.
6	Enter CG-835 data in MIDR.
7	Enter deficiency data in MSDS.
8	Initiate a Report of Violation (ROV) if necessary.

IF deficiency:	**THEN issue CG-835:**
Does NOT immediately impact crew/passenger safety, hull seaworthiness, or the environment, e.g., • Underwater survey video not immediately available	That provides a specific time for correcting deficiency, e.g., • "X" number of days
Allows vessel operations to be MODIFIED to meet less stringent requirements, e.g., • Deteriorated PV valves	That restricts operation of vessel to meet current vessel conditions, e.g., • Carriage restricted to Class E cargoes
DOES immediately impact crew/passenger safety, hull seaworthiness, or the environment, and cannot be modified to meet less stringent requirements, e.g., • Structural defect or damage	That requires the deficiency to be corrected prior to operating vessel ("NO SAIL" item), e.g., • Prior to carrying passengers

Vessel Information:

Last Drydocking Date	Next Drydocking Date
Date of Last Class Survey	
❑ Outstanding conditions of class or nonconformities	

Vessel Description:

- ❑ Container Vessel
- ❑ Vehicle Carrier
- ❑ Bulk Carrier
- ❑ Oil Tanker
- ❑ Chemical Tanker
- ❑ Passenger Vessel
- ❑ Research Vessel
- ❑ School Ship
- ❑ Other
- ❑

Certificates and Documents:

❑ Marine Chemist Certificate — MSM Ch. A5.H
- Marine Chemist No. _____
- Certificate No. _____
- Date issued _____

❑ Gauging Report — ABS Steel Rules 1/3
- Date issued _____

Notes:_____

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Section 2: Drydock Inspection Items

External Structural Integrity:

NOTE: Request records of Outstanding Conditions of Class. (Form or format may vary depending on classification society.) Conditions of Class may identify structural defects, wastage, etc.

- ❑ Vessel plans available

46 CFR 31.10-22
46 CFR 71.50-5
46 CFR 91.40-5

- ❑ External structural members

46 CFR 71.50-3
46 CFR 91.40-3
NVIC 7-68

  - Plating
  - Planking
  - Caulking
  - Reinforcing straps
  - Stem
  - Sternpost
  - Bilge keels
  - Keel
  - Welds
  - Pitting
  - Signs of electrolysis

Overall Steel Wastage:

Poor	Good

Areas of particular interest:_____

_____

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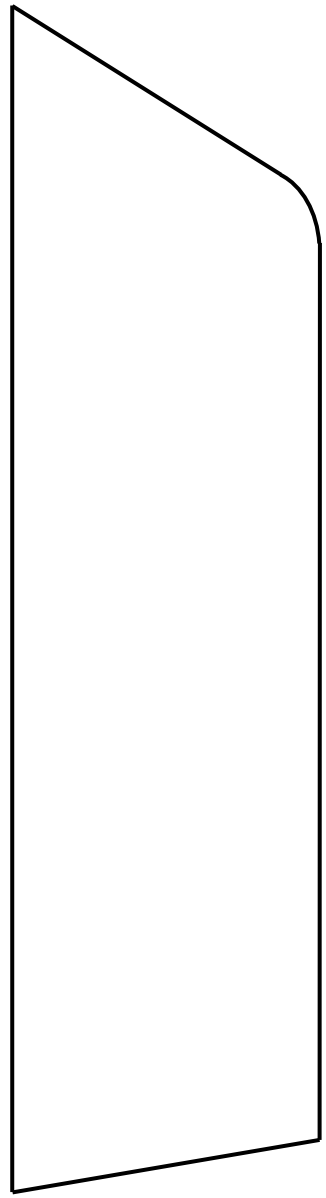
Bow

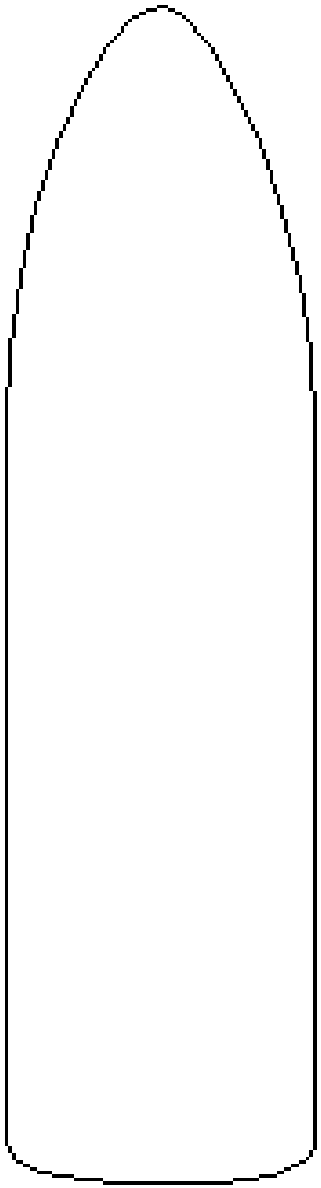


Stern

Section 4: Appendices

Vessel Layout:

Bow



Stern

- Double hull / bottom / sides
- Ballast tanks
- Chemical tank type: I II III
- Deck tanks
- Deckhouse location
- Deck cranes
- External/internal framing
- Layout of pumps – type
- Tank material construction
- Cargoes carried

- ❑ Hull and/or structural members gauged for material thickness (check appropriate choice)

  46 CFR 31.10-21
  ABS Steel Rules 1/3

- ❑ Yes (attach gauging report)
- ❑ Transverse belt of deck plating
  - o Transverse belt of bottom and sideshell
  - o Wind-and-water strakes
  - o Keel plates
  - o Bulkhead plating and stiffeners
  - o Suspect areas
  - o Other _____
- ❑ No
- ❑ Vessel carefully examined for fractures and previous fracture repairs

  MSM Ch. B3.B.6.a
  NVIC 15-91, Change 1

- ❑ Vessel structurally reinforced in accordance with approved plans
- ❑ Fastenings

  MSM Vol. IV Ch. 6.H
  NVIC 3-68

  - Rivets
  - Welding
  - Nails, screws, bolts

Internal Structural Examination:

- ❑ Internal structural members

  46 CFR 31.10-21
  46 CFR 71.50-3
  46 CFR 91.40-3
  MSM Ch. B3.B.6
  NVIC 7-68
  NVIC 15-91, Change 1

  - Bulkheads
  - Decks
  - Tank tops
  - Longitudinals
  - Floors
  - Frames
  - Intercostals
  - Stiffeners
  - Beams
  - Connections
  - Signs of electrolysis

Notes:_____

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- ❑ Vessel carefully examined for fractures and previous fracture repairs

  MSM Ch. B3.B.6.a
  NVIC 15-91, Change 1

- ❑ Fastenings

  MSM Vol. IV Ch. 6.H
  NVIC 3-68

  - Rivets
  - Welding
  - Nails, screws, bolts

- ❑ Cargo holds entered

_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

- ❑ Integral fuel oil tank internal examination

  46 CFR 31.10-24
  46 CFR 71.53
  46 CFR 91.43
  MSM Ch. B3.B.5

  - Fuel tanks entered

_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Overall Condition of Coatings:

Poor	Good

❑ N/A

Notes: _____

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Special Criteria for Passenger Vessels:

NOTE: *Passenger vessels may request drydock extensions up to 30 months in some cases, which will require an underwater examination of the hull. Guidance for this process is found in MSM Ch. B3.A.4.d.*

WARNING: *ALL passengers must be removed from vessel prior to removal of sea valves.*

- ❑ Hull Maintenance and Condition Assessment Program
  - Preventative maintenance plan
  - Annual hull condition assessment
- ❑ Site selection
  - Sufficient water depth
  - Underwater hazards
  - "Clear box"
- ❑ Preliminary examination
  - Third party
  - Divers
- ❑ Underwater hull exam
  - Third party supervised
  - Ultrasonic gaugings

Notes:_____

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- ❑ Additional personnel to assist
- ❑ Duration of underwater survey _____
- ❑ Plans or drawings
  - Shell openings
  - Docking plugs
  - Bilge keels
  - Welded seams and butts
  - Appendages
  - Anodes
  - Rudder
  - Propeller
  - Reference points
  - Watertight and oiltight bulkheads
- ❑ On-site survey
- ❑ Preparatory meeting
- ❑ Diving personnel/equipment
  - NDT qualifications
  - Repair qualifications
  - Video / audio equipment
  - Coast Guard and OSHA safety regulations
- ❑ Hull preparation
  - Cleaning method _____
  - Hull openings permanently marked

Notes: _____

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- ❑ Ballast tanks entered

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_____	_____	_____
_____	_____	_____
_____	_____	_____

Overall Condition of Coatings:

Poor	Good

❑ N/A

- ❑ Forward peak
- ❑ Aft peak
- ❑ Reduced scantlings

MSM Ch. B3.B.6.c

<u>Cargo Tank Internal Examination</u>:

- ❑ Internal structural members
  - Bulkheads
  - Decks
  - Tank tops
  - Longitudinals
  - Floors
  - Frames
  - Intercostals
  - Stiffeners
  - Beams
  - Connections

46 CFR 31.10-21
46 CFR 91.40-3
MSM Ch. B3.B.6
NVIC 7-68
NVIC 15-91, Change 1

- ❑ Vessel carefully examined for fractures and previous fracture repairs

MSM Ch. B3.B.6.a
NVIC 15-91, Change 1

Notes:_____

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- ❑ Fastenings — MSM Vol. IV Ch. 6.H, NVIC 3-68
  - Rivets
  - Welding
  - Nails, screws, bolts
- ❑ Cargo tank internal examination — 46 CFR 31.10-21, 46 CFR 91.40-3, MSM Ch. B3.B.4, MSM Ch. B3.B.6
  - Cargo tanks entered

_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Overall Condition of Coatings:

Poor	Good

❑ N/A

Watertight Integrity:

NOTE: Guidance on watertight and weathertight inspections can be found in MSM Volume II, Chapter B1.E.5

- ❑ Cargo hatches — MSM Vol. IV Ch. 6.I.5
  - Dogs or other securing appliances
  - Covers
  - Gaskets
  - Coamings
- ❑ Airports below weatherdecks — MSM Vol. IV Ch. 6.I.4
  - Dogs or other securing appliances
  - Rims or seats
  - Glass
  - Dead covers
  - Hinges and lugs

Notes: _____

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Section 3: Underwater Survey

NOTE: *Guidance for conducting underwater surveys in lieu of alternate drydock examinations is detailed in MSM Volume II, Chapter B3.C and NVIC 1-89.*

Underwater Survey Program:

- ❑ Date of Pre-Survey Drydocking
- ❑ Vessel over 15 years old
- ❑ Hull marking system used — MSM Ch. B3.A.4.d
  - Weld bead grid
  - Contrasting color coating
  - Movable grid with acoustic "pinger"
  - Other _____
- ❑ Reference video available

Review of Application for Underwater Survey:

- ❑ Submitted 90 days before survey date
- ❑ Identify diving contractor
  - Number of divers
  - Type of diving equipment
  - NDT and repair capabilities
- ❑ Copy of diving operations manual
  - Means of waterborne diver support
- ❑ Means of taking rudder bearing clearances
- ❑ Sea chest blanks
- ❑ Letter from master/chief engineer/person-in-charge

Notes:_____

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- ❑ Sea valves — 46 CFR 42.09-25, 46 CFR 56.50-95
  - Fitted where required
  - Opened for examination
  - Body
  - Guides
  - Threads
  - Seat
  - Stems
  - Discs
  - Plug cocks
  - Holding down bolts
  - Closure tested (local and/or remote)
- ❑ Bilge injection valves — 46 CFR 42.09-25, 46 CFR 56.50-95
  - Non-return operation
  - Operated
  - Inspected
- ❑ Nonmetallic expansion joint — 46 CFR 56.35-10, 46 CFR 61.15-12
  - Year installed _____ (10 years maximum)
  - External exam
  - Internal exam
  - New non-metallic expansion joint installed

Ground Tackle:

- ❑ Proper ground tackle — 46 CFR 32.15-15, 46 CFR 77.07, 46 CFR 96.07-5
  - Anchor cables ranged
    - ❑ Yes
    - ❑ No
  - Cable shackles and pins
  - Anchors
  - Hawse pipes and covers
  - Chain pipes and covers
  - Chain lockers
  - Cables properly marked

Notes: _____

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- ❑ Sideports
  - Dogs or other securing appliances
  - Frames
  - Doors
  - Hinges
  - Gaskets
  - Operating equipment
- ❑ Ash and rubbish chutes
  - Watertight cover and means of securing
  - Non-return valve
- ❑ Self-bailers and cockpit freeing ports
  - Check valves
  - Positive closing valve
- ❑ Compartment or inner bottom drains (drydocking drains)
  - Secure plugs
- ❑ Scuppers, soil lines, tank overflows
  - Valves
- ❑ Draft marks and load lines — MSM Ch. B3.B.6.c
  - Proper locations
  - Legibly inscribed
  - Proper spacing and size
  - Load line markings verified

Notes: _____

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Rudders, Propellers, and Tailshafts:

❑ Rudder(s) MSM Ch. B3.E

- Number of rudders _____
- Pintles
- Gudgeons
- Skeg
- Stock
- Intermediate stock
- Steadiment bearings
- Carrier
- Rudder trunk
- Plating
- Fastenings
- Palm and palm bolts
- Fairwater
- Bushings
- Air or hydrostatic test
- Rudder bearing clearances

❑ Propeller(s) 46 CFR 58.03-1

- Locknuts
- Cap
- Rope guard
- Propeller fitted to shaft

Date Drawn	Number of Blades	Material

Notes:_____

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❑ Tailshaft(s) MSM Ch. B3.D

- Stern tube and gland
- Key and keyway
- Retaining rings
- Shaft sleeve or liner
- Struts and strut bearings
- Tapered shaft
- Flanged shaft
- Evaluation of oil reservoir for oil lubricated bearings
- Bushing and gearing clearances within manufacturer's limits

Date Drawn	Size	Type of Stern Tube Bushings or Bearings	Weardown

❑ Bow thruster MSM Ch. B3.D.2.c

❑ Stern thruster MSM Ch. B3.D.2.c

Valves and Through-Hull Fittings:

NOTE: *Guidance on valves and through-hull fittings can be found in MSM Volume II, Chapter B3.F.*

❑ Sea chests, spool pieces, through-hull fittings 46 CFR 56.50-95

- Strainers removed
- Welds
- Baffles
- Strainer fastenings
- Fastenings
- Branch connections

Notes:_____

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