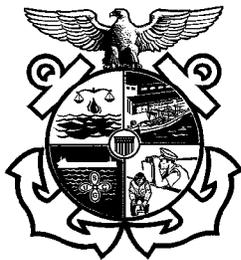


United States Coast Guard



**FOREIGN TANK VESSEL  
EXAMINATION BOOK**

<b>Name of Vessel</b>		<b>Flag</b>	
		No Change	
<b>IMO Number</b>		<b>Case Number</b>	
<b>Date Completed</b>	<b>Priority</b>	<b>Points</b>	
<b>Location</b>			
<b>Vessel Built in Compliance with SOLAS: 60 74 74/78 NA</b>			
<b>Exam Type</b>			
Annual		Reexamination	
<b>Senior Marine Inspectors / Port State Control Officers</b>			
1. _____		3. _____	
2. _____		4. _____	

**Total Time Spent Per Activity:**

<b>Regular Personnel (Active Duty)</b>			
ACTIVITY TYPE	ACTIVITY	TRAINING	(PERS) MI

TOTAL ADMIN HOURS	TOTAL TRAVEL HOURS
-------------------	--------------------

<b>Reserve Personnel</b>			
ACTIVITY TYPE	ACTIVITY	TRAINING	(PERS) MI

TOTAL ADMIN HOURS	TOTAL TRAVEL HOURS
-------------------	--------------------

<b>Auxiliary Resources</b>	
TOTAL BOAT HOURS	TOTAL AIRCRAFT HOURS

## **Use of Foreign Tank Vessel Examination Book:**

This examination book is intended to be used as a job aid by Coast Guard senior marine inspectors/port state control officers during boardings of foreign-flagged tank vessels receiving Tank Vessel Examination (TVE) letters. When issuing a Letter of Compliance (LOC) to a foreign tank vessel, the CG-840 LOC examination book should be used. This book contains an extensive list of possible examination items. It is not, however, the Coast Guard's intention to "inspect" all items listed. As a port state responsibility, senior marine inspectors/port state control officers must verify that the vessels and their crews are in substantial compliance with international conventions and applicable US laws. The depth and scope of the examination must be determined by the senior marine inspectors/port state control officers based on their observations.

This document does not establish or change Federal laws or regulations. References given are only general guides. Refer to IMO publications, CFR's, the Port State Control Job Aid, NVIC's or any locally produced cite guides for specific regulatory references. Although not all items in this book are applicable to all vessels, Section 1 should be filled out in its entirety at each examination and reexamination.

**NOTE:** Guidance on how to examine foreign tank vessels can be found in MSM Volume II, Chapter D6: Procedures Applicable to Foreign Tank Vessels.

## **Guide to Examinations:**

- Annual examination and reexamination
- Annual examination only
- Expanded examination as required

These three stages are only a general guide. Each senior marine inspector/port state control officer should determine the depth of the examination necessary. A checked box should be a running record of what has been examined by the senior marine inspector/port state control officer. It does not imply that the entire system has been examined or that all or any items are in full compliance.

**NOTE:** A reexamination normally includes an examination of the vessel's documents, certificates, and licenses, in addition to a "walk-through" of the vessel.

### **Pre-inspection Items**

- Review MSIS records.
  - PSVH
  - VFIP
- Obtain copies of forms to be issued.

### **Post-inspection Items**

- Issue letters/certificates to vessel.
  - Record of deficiencies
- Complete MSIS entries within 48 hours.
  - PSAR
  - MSDS
  - PSDR
  - VFLD
  - VFIP

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## Section 1: Administrative Items

### 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
<i>Various additional amendments to SOLAS</i>	
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
<i>Various additional amendments to COLREGS</i>	
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:**

Owner's Agent
Individual
Phone Number

Charterer's Agent
Individual
Phone Number Same as Owner's Agent

Owner—Listed on DOC or COFR
No Change

Operator
No Change

**Vessel Information:**

Classification Society			
ISM Issuer: Same as above?			
Yes		No If not the same, which Recognized Organization? _____	
<p><b>NOTE:</b> The period of validity for ISM documents should correspond to the following list. If they do NOT, ISM documents should be further investigated.</p> <input type="checkbox"/> 5 years = Full term (SMS and DOC) <input type="checkbox"/> 12 months = Interim (DOC) <input type="checkbox"/> 6 months = Interim (SMC) <input type="checkbox"/> 5 months = Short term (SMC)			
Last Drydocking Date		Next Drydocking Date	
Location of Last Drydocking			
Date of Last Class Survey			
Outstanding conditions of class or non-conformities			
Last Port of Call		Next Port of Call	
Cargo		Current Operations	
Does vessel meet double-hull requirements?			
Yes		No If not, vessel must meet requirements by _____ (date) in accordance with 33 CFR Part 157 Appendix G.	
Last Three Cargoes			
1. _____			
2. _____			
3. _____			
Is pumproom gas-free?		Yes	No      N/A

Call Sign	No Change (VFID)
Gross Tons	No Change (VFMD)
Built Date (use delivery date)	No Change (VFCD)
Overall Length (in feet)	No Change (VFMD)

**Vessel Description:**

Crude Carrier

Product Carrier

Combination

Oil / Bulk / Ore

Other

\_\_\_\_\_

## Section 2: Certificates and Documents

### International Certificates:

Name of Certificate	Issuing Agency	ID #	Port Issued/ Country	Issue Date	Exp. Date	Endors. Date
<b>Certificate of Registry</b> No Change						
<b>Classification Document</b> No Change						
<b>Certificate of Financial Responsibility (COFR)</b> No Change	USCG					
<b>Safety Construction (SLC)</b> No Change						
<b>Safety Equipment (SLE)</b> No Change						
<b>Safety Radio (SLT)</b> No Change						

<b>Name of Certificates</b>	<b>Issuing Agency</b>	<b>ID #</b>	<b>Port Issued/ Country</b>	<b>Issue Date</b>	<b>Exp. Date</b>	<b>Endors. Date</b>
<b>Cargo Ship Safety (CSS)</b> No Change						
<b>International Load Line (ILL)</b> No Change						
<b>International Oil Pollution Prevention w/Form B (IOPP)</b> No Change						
<b>International Tonnage (ITC)</b> No Change						
<b>Safety Management (SMC)</b> No Change						
<b>Document of Compliance (DOC)</b> No Change						

## Manning Certification:

- |                          |  |   |
|--------------------------|--|---|
| <input type="checkbox"/> | Safe Manning Document  | SOLAS 74/78 V/13<br>IMO Res.A.481(XII)                      |
|                          | <ul style="list-style-type: none"><li>Manning in accordance with document<br/><b>NOTE:</b> <i>If vessel does not have a Safe Manning Document or is not manned in accordance with Safe Manning Document, local Consulate must be contacted and the deficiency resolved prior to vessel's departure from port.</i></li><li>Review copy of crew list</li></ul> |   |
| <input type="checkbox"/> | Officers' certificates   | STCW 95 I/2<br>STCW 95 I/10<br>STCW 95 VI/1<br>STCW 95 VI/2 |
|                          | <ul style="list-style-type: none"><li>Master and chief engineer licenses current</li><li>Navigating and engineering officers' licenses current; <b>NOTE:</b> <i>3000 kW = 4023 HP</i></li><li>Flag endorsement</li><li>Medical certificates</li></ul>  |   |
| <input type="checkbox"/> | Crew documents   | STCW 95 VI/1  |
|                          | <ul style="list-style-type: none"><li>Documents current</li><li>Medical certificates valid (issued by flag state)</li><li>Minimum age 15</li></ul>   | ILO 147 Art. II   |
| <input type="checkbox"/> | Rest periods   | STCW 95 VIII/1  |
|                          | <ul style="list-style-type: none"><li>Review watch schedules</li></ul>   |   |

## Logs and Manuals:

- |                          |   |  |
|--------------------------|---|--|
| <input type="checkbox"/> | Lifesaving equipment maintenance record   | SOLAS 74/78 III/19                         |
|                          | <ul style="list-style-type: none"><li>Periodic checks as required</li><li>Visual inspection of survival craft / rescue boat and launching appliances</li><li>Operation of lifeboat / rescue boat engines</li><li>Lifesaving appliances, including lifeboat equipment examined</li></ul> |  |
| <input type="checkbox"/> | Emergency training and drills   | SOLAS 74/78 III/18                         |
|                          | <ul style="list-style-type: none"><li>Onboard training in use of lifesaving equipment (all crew members)</li><li>SOLAS training manual</li><li>Logbook records</li><li>Weekly and lifeboat drills</li></ul>   | SOLAS 74/78 III/18.5<br>SOLAS 74/78 III/25 |

Notes: \_\_\_\_\_

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- Bridge log
  - Pre-arrival tests conducted 33 CFR 164.25  
STCW 95 I/14
  - Casualties (navigation equipment and steering gear failures reported) 33 CFR 164.53
  - Steering gear drills
  - Emergency steering drills
- Exemptions to SOLAS certificates SOLAS 74/78 I/4
- Cargo and ballast information manual 33 CFR 157.23

**Pollution Prevention Records:**

- Current pollution prevention records
  - Person-in-charge 33 CFR 155.700
  - Transfer equipment tests and inspections 33 CFR 156.170
  - Declaration of Inspection 33 CFR 156.150

Proper endorsements for cargo carried

IF vessel carries:	THEN it must have:	
NLS cargo	<ul style="list-style-type: none"> <li>• An endorsement on TVE, AND</li> <li>• A list of authorized cargoes on TVE</li> </ul>	MARPOL Ax. II NVIC 5-87
Category D cargo	<ul style="list-style-type: none"> <li>• An NLS certificate, OR</li> <li>• An endorsement on TVE</li> </ul>	33 CFR 157.35(c)
Category C oil-like cargo	<ul style="list-style-type: none"> <li>• An attachment to IOPP certificate, OR</li> <li>• An endorsement on TVE</li> </ul>	33 CFR 157.33
Category D oil-like cargo	<ul style="list-style-type: none"> <li>• An attachment to IOPP certificate, OR</li> <li>• An NLS certificate, OR</li> <li>• An endorsement on TVE</li> </ul>	33 CFR 157.35(d)

Notes: \_\_\_\_\_  
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- Crude oil washing system
  - Required documents 33 CFR 157.118
  - Waiver 33 CFR 157.120
- Dedicated clean ballast tanks
  - Plans and documents 33 CFR 157.202
  - Operations manual 33 CFR 157.208
  - Required documents 33 CFR 157.216
- IOPP certificate items 33 CFR 157.15
  - Number of slop tanks \_\_\_\_\_
  - Total capacity of slop tanks \_\_\_\_\_
  - Oily residue tank 33 CFR 157.17
- ◇ Oil record book (spot-check) MARPOL Ax. I/20 33 CFR 151.25
  - Each operation signed by person-in-charge
  - Each complete page signed by master
  - Book maintained for 3 years
- ◇ Shipboard oil pollution emergency plan MARPOL Ax. I/26.1 33 CFR 151.26
  - Approved by flag state / class society
  - Contact numbers correct
  - Immediate Actions List
- ◇ Vessel response plan 33 CFR 155.1030 33 CFR 155.1035 33 CFR 155.1065 33 CFR 155.1070
  - Approved by Coast Guard
  - Annual review by owner / operator
- ◇ Oil transfer procedures 33 CFR 155.720
  - Posted / available in crew's language
  - List of products carried by vessel
  - Description of transfer system including a line diagram of piping
  - Number of persons required on duty
  - Duties by title of each person
  - Means of communication
  - Procedures to top off tanks
  - Procedures to report oil discharges

Notes: \_\_\_\_\_

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### Section 3: General Examination Items

#### Navigation Safety:

- Charts and publications for US waters/  
intended voyage 33 CFR 164.33
  - Current and corrected charts
  - US Coast Pilot
  - Sailing directions
  - Coast Guard Light List
  - Tide tables
  - Tidal current tables
  - International Rules of the Road
  - Inland Rules of the Road
  - International Code of Signals
  - Plotting equipment 33 CFR 164.35
- Radar(s) and ARPA 33 CFR 164.35
  - 2 required if over 10,000 GT 33 CFR 164.37
  - Operate independently 33 CFR 164.38
  - ARPA acquires targets
- Compasses 33 CFR 164.35
  - Illuminated gyrocompass with repeater at stand
  - Illuminated magnetic compass
  - Current deviation table
- Test electronic depth sounding device and recorder 33 CFR 164.35
  - Accurate readout
  - Test all transducers
  - Continuous recorder (chart)
- Electronic position fixing device 33 CFR 164.41
  - Location accurate

Notes: \_\_\_\_\_

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- Indicators 33 CFR 164.35
  - Illuminated rudder angle indicator
  - Centerline RPM indicator
  - Propeller pitch (CPP systems)
  - Speed and distance indicators 33 CFR 164.40
  - Lateral thrusters
  
- Communications SOLAS 74/78 IV/6.3  
33 CFR 26.03
  - VHF radio
  
- Steering gear instructions 33 CFR 164.35
  - Instructions
  - Emergency instructions
  - Block diagram
  
- Maneuvering facts sheet with warning statement 33 CFR 164.35
  
- Radiotelephone (VHF-FM) SOLAS 74/78 IV/7  
33 CFR 26.03  
33 CFR 26.04
  
- EPIRB (406 MHz) SOLAS 74/78 IV/7.1.6
  - Float-free amount
  - Battery date current
  - Hydrostatic release
  
- GMDSS SOLAS 74/78 IV/8  
SOLAS 74/78 IV/9  
SOLAS 74/78 IV/10  
SOLAS 74/78 IV/11
  - Additional radio equipment for area of operation
  
- Operationally test bridge steering SOLAS 74/78 II/1-29
  - Test power/control pumps independently
  - Test follow-up and non-follow-up controls
  - Rudder angle indicator accurate
  - Activate loss of power alarm
  
- GMDSS lifeboat radios (VHF) SOLAS 74/78 III/6.2
  - 3 if over 500 GT
  - Operable condition

Notes: \_\_\_\_\_

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- ◇ 9 GHz radar transponder (SART) SOLAS 74/78 III/6.2  
NVIC 9-93
  - Vessels > 300 GT and < 500 require 1
  - Vessels > 500 GT require 2
  - Stowed so to be rapidly placed in survival craft, or stowed in survival craft
- ◇ Emergency source of power (radio) SOLAS 74/78 IV/13
  - Independent of ship's power system
  - 1 or 6 hour time duration
  - Battery system
  - Battery charger
- ◇ NAVTEX SOLAS 74/78 IV/7.1.4
- ◇ Radio installation SOLAS 74/78 IV/6.2
  - Safe installation
  - Independent lighting
  - Marked with call sign

## **General Health and Safety**

- Accident Prevention and Occupational Health COMDTINST 16711.12A  
ILO 147
  - Rails, guards, protective clothing and equipment, warning signs posted in crew work areas
- Crew accommodations COMDTINST 16711.12A  
ILO 147
  - Habitable conditions
  - Adequate lighting and ventilation
  - Free of cargo and stores
  - Individual berths
- Hospital space COMDTINST 16711.12A  
ILO 147
  - Designated for ships  $\geq$  500 GT with 15 or more crew on voyage of more than 3 days
  - Not used for stowage or berthing
  - Properly operating toilet

Notes: \_\_\_\_\_

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- Galley
  - Sanitary conditions
  - Hot and cold-running water
  - Adequately equipped to prepare food
  - Mess hall provided for crew
 COMDTINST 16711.12A  
ILO 147
  
- Refrigerator and stores spaces
  - Storage free of insects
 COMDTINST 16711.12A  
ILO 147
  
- Sanitation
  - Toilets operate (1/8 crew)
  - Showers operate (1/8 crew)
  - Wash basins
  - Lighted / heated / ventilated
  - Reasonably clean
 COMDTINST 16711.12A  
ILO 147
  
- General safety
  - Safe access to all spaces
  - Spaces adequately lighted
  - No electrical hazards
  - Warning notices posted as necessary
 COMDTINST 16711.12A  
ILO 147
  
- Muster lists and emergency instructions
  - Available for each person
  - Posted in conspicuous places
  - Language understood by crew
  - Shows crew member duties
 SOLAS 74/78 III/8  
  
SOLAS 74/78 III/53
  
- Safe access to tanker bows  
 (vessels built prior to 1 JUL 98 not required to comply until 1 JUL 2001)
 SOLAS 74/78 II-1/3-3

Notes: \_\_\_\_\_

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## **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. Conditions may also identify ships overdue for drydocking, repair or other required service.

- Hull structure ICLL 66 Reg. 1
  - Frame pulling away
  - Fractures in corners
  - Holes in main decks
  - Leaks / patching on ballast tanks
  - Bulkheads / decks warped
  - Excessive wastage
  
- Side shell, accessible structural members, decks, and superstructure ICLL 66 Reg. 1
  - Fractures, corrosion, wastage, pitting or damage to the extent that it may impair ship's seaworthiness
  - Excessive doublers, postage stamp inserts, cement boxes or soft patches
  - Welding burn marks or other evidence of recent repair work
  - Load line marked in accordance with certificates ICLL 66 Regs. 4 - 9
    - Hailing port
    - Name
  - Railings
  
- Watertight/weathertight openings
  - Watertight doors, gaskets, dogs ICLL 66 Reg. 12
  - Other openings (means of securing) ICLL 66 Regs. 13 - 18
  - Vents, air pipes and closing appliances ICLL 66 Regs. 19 & 20
  
- Mid-body ballast tank externally examined MSM Vol. II D2

## **Ground Tackle:**

- Emergency towing arrangements SOLAS 74/78 II-1/3-4  
(vessels  $\geq$  20,000 DWT only)
  - Approved by Administration

Notes: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

◇ Anchor and windlass (spot-check)

- Foundations
- Drive units
- Guards
- Covers for moving parts
- Brake pads
- Deck fittings
- Electrical (wiring) or hydraulic piping

◇ Mooring winches / capstans

- Foundations
- Cables / hooks
- Boom
- Brake
- Electrical (wiring) or hydraulic piping
- Ladders / rails

**Cargo Operations:**

□ Pumprooms

**NOTE:** *If pumproom is not gas-free, issue requirement to make it available at next U.S. port.*

MSM Vol. I Ch.10  
Appendix A  
MSM Vol. II Ch. A5.H

- Marine Chemist Certificate
  - Chemist No. \_\_\_\_\_
  - Certificate No. \_\_\_\_\_
  - Date issued \_\_\_\_\_
- Ventilation
- Electrical installation
- Fire extinguishing system
- Potential sources of ignition (gear adrift, product in bilges, rags, paint, cleaning solvents, vapors, etc.)

SOLAS 74/78 II-2/59.3

SOLAS 74/78 II-2/63

□ External examination of inert gas system

46 CFR 32.53  
MSM Vol. II Ch. C5

- Piping and components
- Scrubber
- Fans
- Valves
- Expansion joints
- Free of corrosion or leakage

Notes: \_\_\_\_\_

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- Piping systems
  - Connections 33 CFR 156.130
  - Equipment tests and inspections 33 CFR 156.170
  - Date of last cargo piping hydrostatic test
- Bulk hazardous solids operations
  - Stowage conditions observed 46 CFR 148.03-11
  - Special additional requirements 46 CFR 148.04
  - Additional requirements of special permit 46 CFR 148.01-11
- Vapor control system
  - Vessel TVE endorsed for specific cargoes 33 CFR 156.120(aa)  
46 CFR 39.10-13(d)
- Pumping, piping, and discharge arrangement 33 CFR 157.11
- Designated observation area 33 CFR 157.13
- Cargo tank ventilation SOLAS 74/78 II-2/59.1

**Lifesaving Equipment:**

- Lifeboats / rescue boats
  - Required number SOLAS 74/78 III/26
  - Hull integrity and fittings SOLAS 74/78 III/19.2
  - Engine starts

<b><u>Stbd Lifeboat</u></b>	<b><u>Port Lifeboat</u></b>	<b><u>Lifeboats</u></b>
Engine equipped	Engine equipped	Wooden
Engine tested	Engine tested	Fiberglass
Lifeboat lowered	Lifeboat lowered	Steel
		Covered
Free fall lifeboat with rescue boat		

- Davit system SOLAS 74/78 III/19.2  
SOLAS 74/78 III/48
  - Structure and foundation
  - Roller tracks
  - Lubrication (evidence of use)
  - Falls; end for end / renew (2.5 / 5 years)
  - No obstructions to lowering

Notes: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

- Embarkation area
  - No obstructions
  - Embarkation ladder
  - Launching instructions
  - Emergency lighting
  
- Liferafts
  - Required number
  - Stowage
  - Float-free arrangement
    - Hydrostatic release / weak link
  - Annual servicing (hydrostatic release and inflatable liferaft)
    - 17 months, if Administration-approved
  - Launching instructions posted
  - Bow / stern station
    - Lashed down on deck or in marked location
    - Lifejackets available
  
- Lifebuoys (spot-check)
  - Condition
  - Bridge location
    - Quick release system
    - Smoke and light float
  - Deck location
    - 50% with waterlights
  - Retro-reflective tape
  
- Lifejackets—watchstanders and crew (spot-check)
  - Condition
  - Stowage
  - Retro-reflective material
  - Lights
  - Whistles
  
- Line-throwing appliances (spot-check)
  - 4 charges

SOLAS 74/78 III/11.7

SOLAS 74/78 III/9

SOLAS 74/78 III/19

SOLAS 74/78 III/26

SOLAS 74/78 III/29

SOLAS 74/78 III/19.8.1

SOLAS 74/78 III/19.9.1

SOLAS 74/78 III/9

SOLAS 74/78 III/19.2

SOLAS 74/78 III/7.1

SOLAS 74/78 III/30.2.7

SOLAS 74/78 III/19.2

SOLAS 74/78 III/7.2.2

SOLAS 74/78 III/30.2.7

SOLAS 74/78 III/27.2

SOLAS 74/78 III/32.1.6

SOLAS 74/78 III/17

Notes: \_\_\_\_\_

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- Pyrotechnics (spot-check) SOLAS 74/78 III/6.3
  - 12 distress flares
- Immersion suits and thermal protective aids (spot-check) SOLAS 74/78 III/27.3
  - Condition SOLAS 74/78 III/19.2
  - Retro-reflective material SOLAS 74/78 III/30.2.7

**Fire Protection:**

- Fire control plan SOLAS 74/78 II-2/20
  - Permanently exhibited
  - Language of flag state
  - Copy permanently stored in weathertight container outside deckhouse
- Fire doors (spot-check) SOLAS 74/78 II-2/46  
SOLAS 74/78 II-2/47
  - Machinery space and stair towers
  - Not tied or blocked open
  - Installed closure devices working
- Fire detection systems (spot-check)
  - Smoke / fire alarms SOLAS 74/78 II-2/13
  - Remote pull stations SOLAS 74/78 II-2/11.8
  - Smoke / flame / heat detectors and sensors SOLAS 74/78 II-2/53
- International shore connection SOLAS 74/78 II-2/19
- Means of escape from accommodation, machinery, and other spaces SOLAS 74/78 II-2/45
  - Two required (some exceptions)
  - Dead end corridors
- Portable fire extinguishers (spot-check)
  - Good condition / available for immediate use SOLAS 74/78 II-2/21
  - Located on stations
  - Serviced at periodic intervals SOLAS 74/78 II-2/6.5

Notes: \_\_\_\_\_

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- ◇ Test operation of fire main system
  - Required number of fire pumps SOLAS 74/78 II-2/3
  - Location of pumps SOLAS 74/78 II-2/4
  - Pumps, hydrants, piping, hoses, and nozzles in good condition and available for immediate use SOLAS 74/78 II-2/21
- ◇ Structural fire protection (spot-check) SOLAS 74/78 II-2/42
  - Bulkheads
  - Insulation
  - Ventilation
  - Penetrations
- ◇ Fixed fire extinguishing systems: cargo, machinery, and other spaces SOLAS 74/78 II-2/21  
46 CFR 34.05-5(a)(2)
  - Tanks, cylinders, piping, controls, alarms, and release mechanisms in good condition and available for immediate use

<b>Type of system:</b> (circle appropriate type)			
Low Pressure CO <sub>2</sub>	High Pressure CO <sub>2</sub>	Halon	Foam

**Pollution Prevention:** (spot-check at reexaminations)

- Pollution placard posted 33 CFR 155.450
- MARPOL V placard posted MARPOL Ax. V/9
- Garbage
  - Shipboard garbage properly disposed MARPOL Ax. V/3
  - Incinerator 33 CFR 151.63
    - Evidence of use (clinkers)
    - Safety of burner assembly
    - Electrical controls
  - Garbage Management Plan MARPOL Ax. V/9
- Oil and hazmat
  - Fuel oil and bulk lubricating oil discharge containment 33 CFR 155.320
  - Prohibited oil spaces 33 CFR 155.470

Notes: \_\_\_\_\_  
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- Oily-water separating equipment, bilge alarm, and bilge monitor
  - Alarm, recorder MARPOL Ax. I/16
  - Standard Discharge Connection 33 CFR 155.380
  - Coast Guard approval number 162.050, or meets IMO Resolution A.393(X) 33 CFR 155.430
  
- Cargo monitor and control MARPOL Ax.I/16
  - Operation (automatic and manual) 33 CFR 157.12
  - Means to stop discharge
  - Indicators
  - Recording devices
  
- Marine sanitation device
  - Type (I, II, or III) 33 CFR 159.7
  - Nameplate 33 CFR 159.55
  - Placard 33 CFR 159.59

**Machinery Spaces:**

- Main and auxiliary machinery installations
  - General housekeeping SOLAS 74/78 I/11(a)
  - Fire hazards
  - Shock and electrical hazards SOLAS 74/78 II-1/45.1
  - Personnel hazards (moving parts not protected, hot surfaces, etc.) SOLAS 74/78 II-1/26
    - Leaking fuel oil piping or fittings
    - Sea chests, sea valves / spool pieces in good condition
  - Tank tops and bilges free of oil SOLAS 74/78 II-2/15
  - Watertight doors SOLAS 74/78 II-1/23
    - Hand / power operation
    - Local / remote control
    - Alarm
  
- Steering gear machinery SOLAS 74/78 II-1/29
  - Linkages
  - Hydraulic leaks
  - Ram guides
  - Lubrication

Notes: \_\_\_\_\_

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- ◇ Operationally test main and auxiliary steering gear SOLAS 74/78 II-1/29.15 through 29.20
  - 28-second operation
  - Systems operate independently
  - Unusual vibrations / leaks
  - Ram hunting
  - Limit switches
  - Communications with bridge
  - Steering gear instructions (block diagram)
  
- ◇ Main ship service generators SOLAS 74/78 II-1/41
 

*NOTE: Two independent sources of power require.*

  - F/O piping
  - Cooling lines
  - Controls
  
- ◇ Emergency generator room SOLAS 74/78 II-1/43
  - Test operation of prime mover
  - Personnel safety
  - Ventilation adequate
  - Electrical switchboard
    - Grounds
  
- ◇ Bilge pumps SOLAS 74/78 II-1/21
  - Two required

Notes: \_\_\_\_\_

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## Section 5: Expanded Examination Items

### Manuals and Instructions:

- Check for presence (in appropriate language) of the following documents
  - Instructions for maintenance and operation of all installations / equipment for fighting and containing a fire SOLAS 74/78 II-2/20
  - Training manual for lifesaving appliances SOLAS 74/78 III/18.2
  - Instructions for onboard maintenance of lifesaving appliances SOLAS 74/78 III/51  
SOLAS 74/78 III/19.3  
SOLAS 74/78 III/52
  - Stability booklet, associated stability plans and information SOLAS 74/78 II-1/22  
ICLL 66 Reg. 10
- Cargo gear certificate
- Grain loading manual SOLAS 74/78 VI/9.1
  - Bulk vessel (stability and grain manuals often combined)
- Human Factors STCW Code
  - Determine if the appropriate crew members are able to understand the information given in manuals, instructions, etc., relevant to the safe condition of the ship and its equipment, and that they are aware of the requirements for maintenance, periodical testing, training, drills, and recording of logbook entries.

### Safety Management System (SMS):

*NOTE: Requirements and guidance for inspecting vessel Safety Management Systems are detailed in SOLAS 74/78, Chapter IX and NVIC 4-98.*

- Documentation (may be in the form of a Safety Management Manual)
  - Controlled documents
  - Safety and Environmental policy
  - Master of vessel familiar with SMS
  - Language understood by crew
  - Documentation identifies:
    - Written procedures kept on board vessel
    - Essential or critical equipment identified (or a separate manual containing this information)
    - Procedures for reporting non-conformities
    - Company's designated person(s) (name or title, and address)

Notes: \_\_\_\_\_

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○ Company's training program conducted in accordance with STCW STCW I/14

**NOTE:** Documented procedures established to ensure new personnel and personnel transferred to new assignments are given proper familiarization with their duties.

- Proper documentation
- Training conducted before crew is assigned shipboard duties
- Essential instructions are documented and provided before sailing

○ Crew familiar with SMS issues

- Ship's officers
  - Documented procedures
  - Preventative procedures for essential equipment
  - Reporting requirements for non-conformities and able to identify typical scenarios that may result in a documented non-conformity
- Master and chief engineer familiar with internal audit procedures (e.g., know how many audits required per year and have participated in at least one) in addition to requirement's for ship's officers

○ Documented maintenance system

- Documented in writing and computerized versions
- Readily available and in language understood by those who use them
- Procedures are followed
- Records maintained

○ Vessel-specific procedures are documented in writing and address the following areas:

**NOTE:** Not mandatory that they follow the exact format listed below.

- Preventative maintenance
- Navigation
- Bunkering operations
- Emergency preparedness
- Pollution prevention
- Technical procedures
- Communications

Notes: \_\_\_\_\_

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- Audits
  - Internal audits conducted as specified by SMS  
*NOTE: Do NOT examine internal audit records.*
  - External audit results reviewed
    - Status of open non-conformities relevant to deficiencies leading to detention
    - Status of implementation of corrective and preventative measure
- SMS review conducted by Master in accordance with procedures in SMS
  - Non-conformities identified
  - Report of non-conformity prepared and sent in accordance with procedures established by SMS

**Navigation Safety:**

- Test navigation equipment listed in Section 3 to the extent necessary to determine if equipment is operating properly.
  - Human Factors (spot-check): determine if deck officers are familiar with the following items:
    - Operation of bridge control and navigational equipment
    - Use of nautical publications and charts
    - Ship maneuvering characteristics
    - Lifesaving signals
    - Bridge procedures, instructions, manuals, etc.
    - Changing steering from automatic to manual and vice versa
    - Preparations for arrival and departure
    - Communications with engine room
    - Use of VHF
    - Raising the alarm
    - Abandon ship drill and fire drill
- STCW Table A-II  
NVIC 3-98

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- Lights, shapes, and sound signals 72 COLREGS
  - Navigation lights
  - Sound signals
  - Distress signals
  
- Radio log SOLAS 74/78 IV/17
  
- Radio operation SOLAS 74/78 IV/7
  - Transmit on 2182 MHz and Ch. 6, 13, 16, 70
  
- INMARSAT communications SOLAS 74/78 IV/7.1.5

**Cargo Operations:**

- Human Factors: determine if personnel are familiar with the following items: STCW Table A-II/III
  - Hazardous material regulations 49 CFR 176.57
  - Special requirements (e.g., loading, segregation, firefighting equipment, etc.) for particular cargoes
  - Dangers posed by the cargo
  - Measures to be taken for cargo emergencies

**Lifesaving Equipment:**

- Lifeboats/liferafts/rescue boats
  - Ensure effective operation of winches, davits, falls, sheaves, etc. (Lower at least one lifeboat to the water.) SOLAS 74/78 III/19
  - Test lifeboat and rescue boat flemming gear and/or engines
  - Verify presence/condition of lifeboat equipment SOLAS 74/78 III/41
  - Retro-reflective tape SOLAS 74/78 III/11.4
  - Lighting

Notes: \_\_\_\_\_

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- Emergency communication equipment
  - 2-way VHF radiotelephone apparatus SOLAS 74/78 III/6.2
  - Radar transponders
  - Survival craft EPIRBs
  - Onboard communication and alarm system SOLAS 74/78 III/6.4
- Line-throwing appliance SOLAS 74/78 III/17.49
  - Specifications and equipment
- Pilot ladders and hoists in good condition SOLAS 74/78 V/17
- Distress signals SOLAS 74/78 III/6.3
  - 12 red rocket parachute flares

**Fire Protection:**

- Structural fire protection SOLAS 74/78 II-2/42, 43, 44, 46, 47, 49, & 50
  - Bulkheads and decks meet applicable fire integrity requirements
  - Openings (e.g., doors, ductwork, electrical wires, piping, etc.) constructed so that they do not destroy fire resistance of bulkheads
  - Manual and automatic fire doors examined / tested
- Fire detection, fire alarm, and automatic sprinkler systems fitted where required and operating properly SOLAS 74/78 II-2/52
- Ventilation systems SOLAS 74/78 II-2/48
  - Main inlets and outlets of all ventilation spaces can be closed from outside ventilated space
  - Power ventilation capable of being shutdown from outside ventilated space
- Fire pumps SOLAS 74/78 II-2/4
  - Fire main activated; water pressure satisfactory (energize forward-most and highest hydrants)

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- Paint lockers and flammable liquid lockers protected by an appropriate fire extinguishing arrangement SOLAS 74/78 II-2/18.7
- Fixed fire extinguishing arrangements in cargo spaces for vessels  $\geq 2000$  GT SOLAS 74/78 II-2/53.1
- Special arrangements in machinery spaces SOLAS 74/78 II-2/11
  - Machinery space ventilating fans can be shut down from outside spaces
  - All openings capable of being closed from outside machinery spaces
  - Machinery driving forced / induced draft fans, oil fuel transfer pumps, and other fuel pumps fitted with remote shutdowns located outside space concerned
- Firemen's outfits (spot-check) SOLAS 74/78 II-2/17.3
  - Two lockers
  - Four outfits
  - Protective clothing
  - Helmet, boots, and gloves
  - Lamp
  - Axe
  - Breathing apparatus and lifeline

**Pollution Prevention:**

- Equipment
  - Test automatic stopping device required for discharge MARPOL Ax. I/10
  - Segregation of oil fuel and water ballast systems MARPOL Ax. I/14
  - Oily residue tank (discharge arrangements, homogenizers, incinerators, etc.) MARPOL Ax. I/17  
33 CFR 155.780
  - Witness operational test of emergency shutdown

Notes: \_\_\_\_\_  
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- Human Factors STCW Table A-III
  - Oil and oily mixtures MARPOL Ax. I
    - Responsible officer familiar with handling of sludge and bilge water
    - Quantity of residues generated
    - Capacity of holding tanks
    - Capacity of oil water separator
    - Note any inadequacies in reception facilities used; advise master to report these to flag state
  - Garbage MARPOL Ax. V
    - Note any inadequacies in reception facilities used; advise master to report these to flag state
    - Crew familiar with Annex V requirements

**Machinery Spaces:**

- Test communication between navigating bridge and machinery space SOLAS 74/78 II-1/37
  - Two means, one of which must be an engine order telegraph
- Emergency source of electrical power SOLAS 74/78 II-1/43  
SOLAS 74/78 II-1/44
  - Location
  - Generator and/or batteries tested under load
  - Emergency lighting
- Main engine / vital auxiliaries (spot-check) SOLAS 74/78 II-1/27
  - F/O pumps / piping
  - S/W pumps / piping
  - J/W pumps / piping
  - L/O pumps / piping
  - Piston cooling pumps / piping
  - Air compressors / receivers
  - Fuel / oil purifiers
  - H/O heaters / transfer pump

Notes: \_\_\_\_\_  
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○ Steering gear alarms SOLAS 74/78 II-1/29

- Low hydraulic oil
- Loss of power
- Loss of phrase
- Overload

○ Human Factors: determine if personnel are familiar with the operation of the following items STCW Table A-III

- Emergency generator:
  - Actions necessary before engine can be started
  - Different methods by which generator may be started
- Stand-by generator engine:
  - Methods to start engine automatically or manually
  - Blackout procedures
  - Load-sharing system
- Steering gear:
  - Action needed to bring main and auxiliary into operation
  - Changing steering from automatic to manual and vice versa
- Bilge pumps:
  - Starting procedures for main and emergency bilge pump
  - Appropriate valves to operate
- Fire pumps:
  - Starting procedures for main and emergency fire pumps
  - Appropriate valves to operate

Notes: \_\_\_\_\_

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**Inert Gas Systems (IGS):**

*NOTE: Requirements and guidance on inert gas systems is detailed in 46 CFR 32.53, SOLAS 74/78 II-2/62, and MSM Volume II, Chapter C5 and D.6.B.1.*

○ Type of system installed

- Flue gas
- Gas generator
- Nitrogen bottles

○ Sampling / testing of gas pad

Tank Number	% Oxygen	OR	% Nitrogen
		⋮	
		⋮	
		⋮	
Vessel is gas-free or not carrying cargoes required to be inerted			

○ Proper operation of IGS components

- Blowers
  - Free from excessive bearing noise and vibration
  - Remote shutdown for IGS blower
- Scrubber room ventilation
- Primary and alternate saltwater scrubber pumps
- Deck seal
  - Water level
  - Automatic filling
  - Open drain cocks on IG main
- Remote operated / automatic control valves
  - Open or closed indicator
- Gauges
  - Calibration of inline O<sub>2</sub> analyzing equipment
  - Check O<sub>2</sub> and pressure level recordings
- Portable instruments calibrated
- IG generator
  - Combustion control system and fuel supply
  - Interlocking of soot blowers (IGS automatically shuts down when soot blowers engaged)

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○ Proper operation of IGS audible and visual alarms

- High O<sub>2</sub> content of gas in IGS main
  - Activated at 8% concentration
- Low gas pressure in IGS main downstream of all non-return devices
  - Activated at 100mm (4 inches) water
- High gas pressure in IGS main downstream of all non-return devices
  - Blowers automatically shut down
  - Gas-regulating valves close
- Low / high water level or low flow to deck seal
  - Blowers automatically shut down
- Blowers discharge high temperature
  - Alarms activated at 150°F (65.6°C) or lower
  - Blowers automatically shut down
  - Gas-regulating valves close
- Failure of IGS blowers
  - Gas-regulating valves close
- Low water pressure or flow to flue gas scrubber
  - Blowers automatically shut down
  - Gas-regulating valves close
- High water level in flue gas scrubber
  - Blowers automatically shut down
  - Gas-regulating valves close
- Failure of power supply to automatic control system for gas-regulation valve and indicating devices for IG supply
- IG generator
  - Insufficient fuel supply
  - Failure of power supply to generator or control system for generator

Notes: \_\_\_\_\_  
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**Ventilation:**

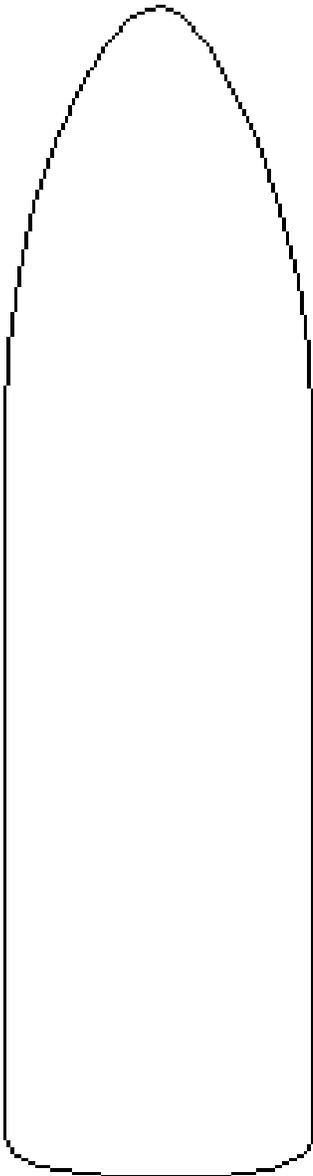
- Proper machinery for cargo carried 46 CFR 32.55-20

<b>IF vessel carries:</b>	<b>THEN it must have:</b>
Grades A-E liquid cargoes	<ul style="list-style-type: none"><li>• P/V valves</li><li>• Flame screens</li><li>• Corrosion-free properties</li><li>• Proper valve material</li><li>• Proper vent header height above deck</li><li>• Proper vent header distance from nearest living / work spaces, ventilation inlet, or source of ignition</li></ul>
Grades B - E liquid cargoes	<ul style="list-style-type: none"><li>• Cargo tanks fitted with individual P/V valves or vent header</li></ul>
Grades D - E liquid cargoes	<ul style="list-style-type: none"><li>• Goosenecks</li><li>• Flame screens</li></ul>

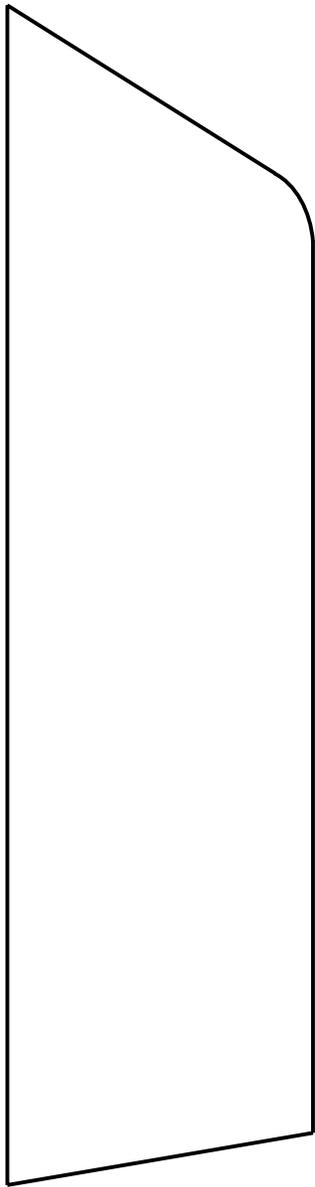
Notes: \_\_\_\_\_  
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## Section 6: Appendices

### Vessel Layout:



- Double hull / bottom / sides
- Ballast tanks (SBT/CBT)
- Tank arrangement
- Deckhouse location
- External / internal framing
- Layout of pumps – type



**Cargoes Requiring a Response Plan:**

Type of Cargo	Name of Cargo		
Asphalt Solution	<ul style="list-style-type: none"> <li>• Blending stocks</li> </ul>	<ul style="list-style-type: none"> <li>• Roofers stock</li> </ul>	<ul style="list-style-type: none"> <li>• Straight run residue</li> </ul>
Animal Oils	<ul style="list-style-type: none"> <li>• Tallow</li> <li>• Lard</li> <li>• Stearic acid</li> </ul>	<ul style="list-style-type: none"> <li>• Olive acid</li> <li>• Sperm oil</li> </ul>	<ul style="list-style-type: none"> <li>• Fish oil</li> <li>• Fish liver</li> </ul>
Distillates	<ul style="list-style-type: none"> <li>• Flashed feed stocks</li> </ul>	<ul style="list-style-type: none"> <li>• Straight run</li> </ul>	
Easenal Oils	<ul style="list-style-type: none"> <li>• Pinene</li> </ul>	<ul style="list-style-type: none"> <li>• Turpentine</li> </ul>	<ul style="list-style-type: none"> <li>• Dipentine</li> </ul>
Edible Oils	<ul style="list-style-type: none"> <li>• Corn</li> <li>• Coconut</li> </ul>	<ul style="list-style-type: none"> <li>• Soybean</li> <li>• Olive</li> </ul>	<ul style="list-style-type: none"> <li>• Cotton seed</li> </ul>
Gasolines	<ul style="list-style-type: none"> <li>• Automotive</li> <li>• Aviation</li> <li>• Casinghead</li> </ul>	<ul style="list-style-type: none"> <li>• Polymer</li> <li>• Straight run</li> <li>• Gas, oil cracked</li> </ul>	<ul style="list-style-type: none"> <li>• Akylates</li> <li>• Reformates</li> </ul>
Naptha	<ul style="list-style-type: none"> <li>• Aromatic</li> <li>• Cracking fraction</li> <li>• Heavy</li> </ul>	<ul style="list-style-type: none"> <li>• Paraffinic</li> <li>• Petroleum</li> <li>• Solvent</li> </ul>	<ul style="list-style-type: none"> <li>• Stoddard solvent</li> <li>• Varnish makers</li> </ul>
Oils	<ul style="list-style-type: none"> <li>• Clarified oil</li> <li>• Crude oil</li> <li>• Fuel oils [# 1 (Kerosene), # 2, # 2D, # 4, # 5, # 6]</li> <li>• Residual fuel oil</li> <li>• Transformer oil</li> <li>• Lube oil and blending stock</li> </ul>	<ul style="list-style-type: none"> <li>• Aromatic oil (excluding vegetable oil)</li> <li>• Mineral oil</li> <li>• Motor oil</li> <li>• Penetrating oil</li> <li>• Spindle oil</li> <li>• Turbine oil</li> <li>• Octene</li> </ul>	<ul style="list-style-type: none"> <li>• Olefin</li> <li>• Animal</li> <li>• Range</li> <li>• Residual</li> <li>• Resin</li> <li>• Road</li> <li>• White (mineral)</li> </ul>

## **Recommended Port State Control Procedures:**

The following flowcharts contain information gleaned from the Marine Safety Manual Volume II, Chapter D2. The senior marine inspector/port state control officer should be familiar with this chapter as well as the information pertaining to Port State Control examinations contained in MSM Volume II, Chapters D1—Foreign Vessel Exams (General), D6—Foreign Vessel Exams (Tanker), and D4—Targeting of Foreign Vessel Boardings.

Considering the seriousness of the deficiencies, the OCMI or COTP must determine the appropriate control action to impose on these vessels to ensure the safety of the vessel, the port, and the environment. The degree of control imposed, as well as the authority used to exercise control, must be consistent with the nature of the deficiencies.

The following definitions and terms of reference are used in the MSM to describe key elements of Port State Control enforcement:

**Clear Grounds.** Evidence that the vessel, its equipment, or crew do not correspond substantially to the requirements of the relevant conventions or that the master or crew members are not familiar with essential shipboard procedures relating to the safety of vessels or the prevention of pollution.

**Control.** Control is the process of imposing a port state's or flag state's authority over a vessel to ensure that its structure, equipment, operation and crew meet applicable standards. The process is affected by any verbal or written directives from the OCMI/COTPs or their representatives, which require action or compliance by the vessel.

**Detention.** Detention is a control action that restricts a vessel's right of free movement. The imposition of a restriction on the movement of a vessel constitutes a detention regardless of whether or not a delay from a vessel's normal or expected itinerary occurs. Detentions may be carried out under the authority of the applicable international convention, the Ports and Waterways Safety Act (PWSA) or a Customs hold.

**Intervention.** An intervention is a control action taken by a port state, which interposes the port state's authority over a foreign flag vessel in order to cause the vessel to be brought into compliance with an applicable international convention. Interventions are undertaken by a port state when a vessel's flag state has not, can not, or will not exercise its obligations under an international convention to which it is a party. This may include requesting appropriate information, requiring the immediate or future rectification of deficiencies, detaining the vessel, or allowing the vessel to proceed to another port for repairs.

**Nonconforming Vessel.** Any vessel failing to comply with one or more applicable requirements of U.S. law or international conventions is a nonconforming vessel. A nonconforming vessel is not necessarily a substandard vessel unless the discrepancies endanger the vessel, persons on board, or present an unreasonable risk to the marine environment.

**Substandard Vessel.** In general, a vessel is regarded as substandard if the hull, machinery, or equipment, such as lifesaving, firefighting and pollution prevention, are substantially below the standards required by U.S. laws or international conventions, owing to:

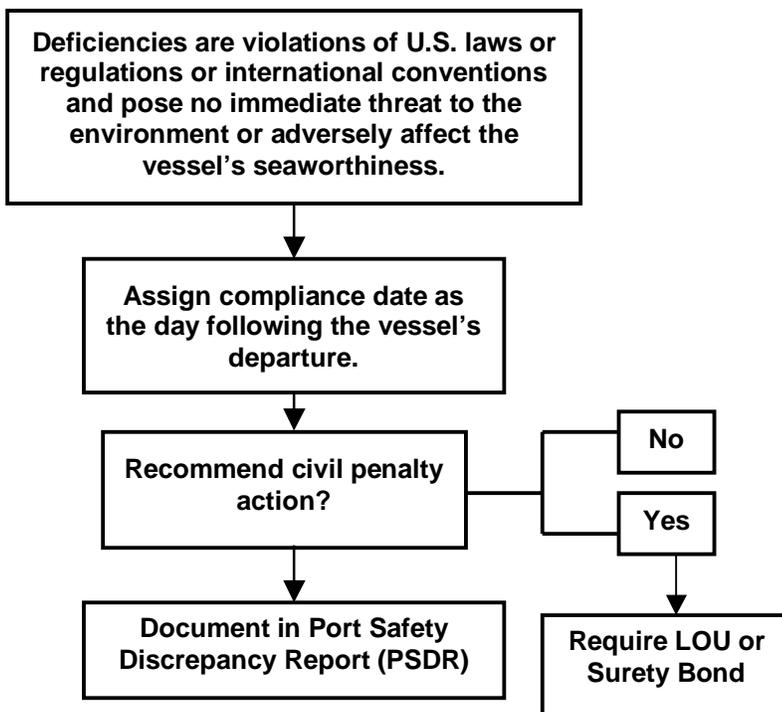
- The absence of required principal equipment or arrangement;
- Gross noncompliance of equipment or arrangement with required specifications;
- Substantial deterioration of the vessel structure or its essential equipment;
- Noncompliance with applicable operational and/or manning standards; or
- Clear lack of appropriate certification, or demonstrated lack of competence on the part of the crew.

If these evident factors as a whole or individually endanger the vessel, persons on board, or present an unreasonable risk to the marine environment, the vessel should be regarded as a substandard vessel.

**Valid Certificates.** A certificate that has been issued directly by a contracting government or party to a convention, or on the behalf of the government or party by a recognized organization, and contains accurate and effective dates, meets the provisions of the relevant convention, and corresponds to the particulars of the vessel and its equipment.

**Requiring Corrective Measures Prior to Return to U.S.**

**(NO DETENTION)**

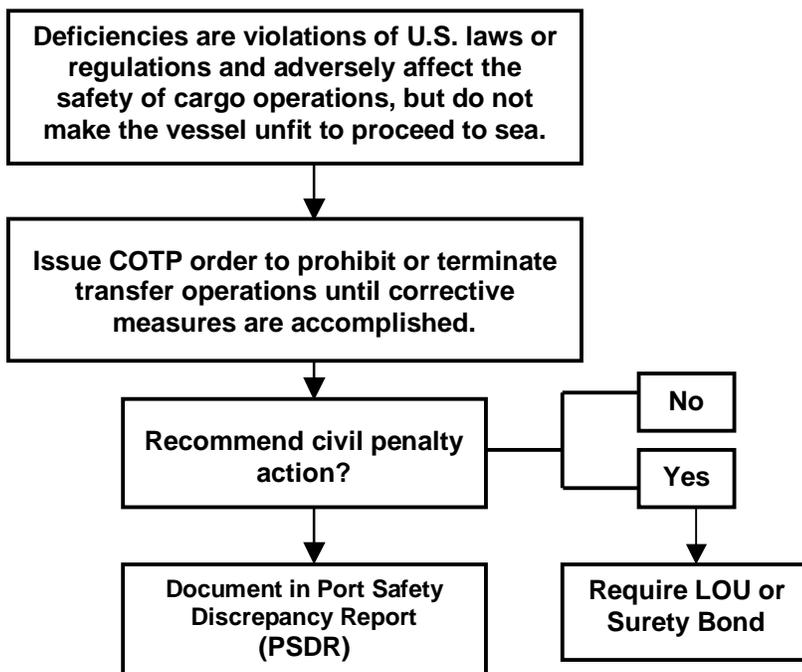


Examples include the following:

- Charts or nautical publications not currently corrected.
- Portable hoses have not been tested but appear in good condition.
- Actual location of safety equipment deviates from the vessel safety plan.
- Electrical fixtures in paint locker not appropriately certified for safe usage in hazardous location. (Operational controls, such as disconnecting the electrical power source or removing flammables from the space, may satisfactorily remove risk to vessel.)

**Requiring Corrective Measures Prior to Cargo, Bunkering or Lightering Operations**

**(NO DETENTION)**

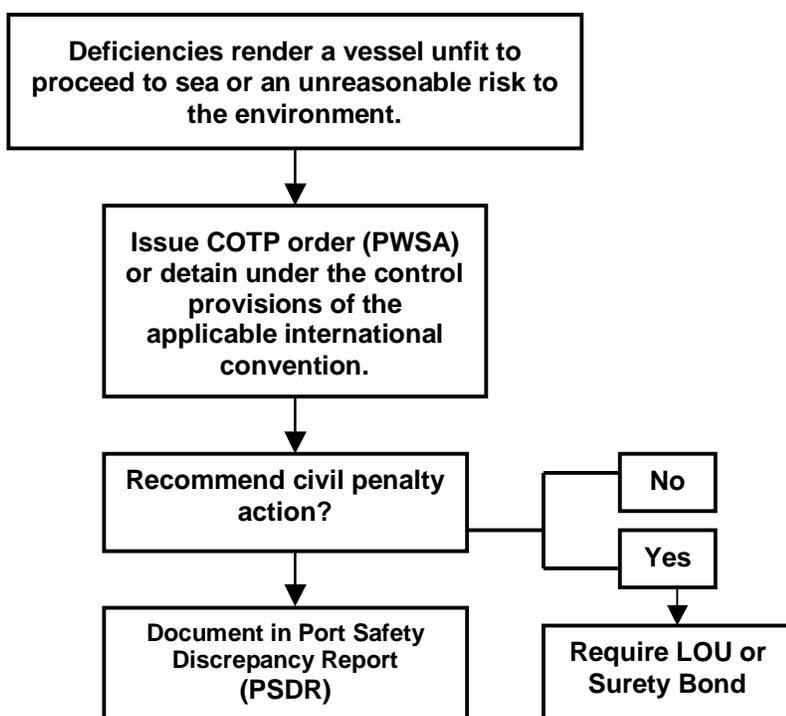


Examples include the following:

- Oil transfer procedures incomplete.
- Information on properties and hazards of cargoes not on board.
- High and low level alarms inoperative.

## Requiring Corrective Measures Prior to Departure

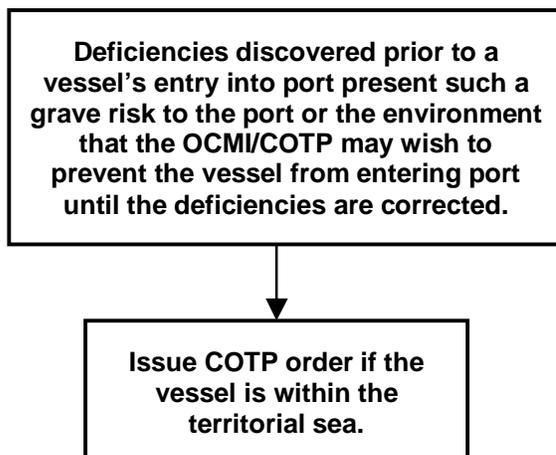
### (DETENTION)



Examples include the following:

- Excessive wastage, corrosion, pitting, holes, or damage to the hull, cargo hatches, fire main, or other vital system.
- Inoperable emergency fire pump or emergency generator.
- Inability to lower lifeboats.
- Inoperable lifeboat motors (i.e., will not start).
- Crew incompetent to carry out duties (e.g., fire or boat drills, cargo transfer, stability calculations, etc.).
- Licenses invalid.
- Safe Manning Document not on board.

### Requiring Corrective Measures Prior to Entry



Examples include the following:

- Leaking tanks.
- Carrying dangerous cargoes with expired documents.
- Carrying incompatible cargoes.
- Invalid ISM certificates.
- COFR not on board.

**Detention Information:**

*NOTE: Complete prior to recommendation.*

Verify owner (from DOC or COFR), operator, and mailing address.

Verify owner's agent.

Verify last and future drydock dates and locations.

If dual classed, who will respond? \_\_\_\_\_

Which agency issued the documents that have major problems?

What is the date of the last survey conducted for those items that have problems?

What are the vessel's plans to deal with the problems?

What is the crew's attitude toward the problems?

Is the detention ISM related? If so, include ISM certification information in the Detention Report to G-MOC-2.

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## Conversions:

<b>Distance and Energy</b>					
Kilowatts (kW)	X	1.341	=	Horsepower (hp)	
Feet (ft)	X	3.281	=	Meters (m)	
Long Ton (LT)	X	.98421	=	Metric Ton (t)	
<b>Liquid</b> (NOTE: Values are approximate.)					
Liquid	bbbl/LT	m <sup>3</sup> /t	bbbl/m <sup>3</sup>	bbbl/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	
<b>Weight</b>					
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 <sup>3</sup>	1 psi	= .06895 Bar = 2.3106 ft of water		
<b>Temperature: Fahrenheit = Celsius</b> ( $^{\circ}\text{F} = 9/5\ ^{\circ}\text{C} + 32$ and $^{\circ}\text{C} = 5/9 (^{\circ}\text{F} - 32)$ )					
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
<b>Pressure: Bars = Pounds per square inch</b>					
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		