



**MACHINERY  
INSPECTION BOOK**

<b>Name of Vessel</b>	
<b>Official Number</b>	<b>Class</b>
<b>Date Completed</b>	
<b>Location</b>	
<b>Vessel Built in Compliance with SOLAS: 60 74 74/78 NA</b>	
<b>Inspection Type</b> <input type="checkbox"/> Inspection for Certification (COI) <input type="checkbox"/> Reinspection <input type="checkbox"/> Annual <input type="radio"/> First } Passenger vessels only <input type="checkbox"/> Periodic <input type="radio"/> Second } <input type="checkbox"/> Other _____ <input type="radio"/> Third }	
<b>Inspectors</b>	
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
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Reserve Personnel			
ACTIVITY TYPE	ACTIVITY	TRAINING	(PERS) MI

TOTAL ADMIN HOURS	TOTAL TRAVEL HOURS
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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 <sup>3</sup> /t	bbl/m <sup>3</sup>	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 <sup>3</sup>	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
32	=	0	90	= 32.2
40	=	4.4	100	= 37.8
50	=	10.0	110	= 43.3
60	=	15.6	120	= 48.9
70	=	21.1	150	= 65.6
200	=	93.3	250	= 121.1
300	=	148.9	300	= 148.9
400	=	204.4	400	= 204.4
500	=	260	500	= 260
1000	=	537.8	1000	= 537.8
Pressure: Bars = Pounds per square inch				
1 Bar	=	14.5 psi	5 Bars	= 72.5 psi
2 bars	=	29.0 psi	6 Bars	= 87.0 psi
3 Bars	=	43.5 psi	7 Bars	= 101.5 psi
4 Bars	=	58.0 psi	8 Bars	= 116.0 psi
9 Bars	=	130.5 psi	10 Bars	= 145.0 psi







## Testing of Boiler Safety Valve

46 CFR 52.01-120

Step	Action	D/S	S/S	S/P
1	Determine MAWP of boiler. _____ psi			
2	Record pressure setting stamped on each valve.	_____ psi	_____ psi	_____ psi
3	Observe opening and closing of valves and record lift and seating pressures of each valve.  <b>3a.</b> Lift pressure <b>3b.</b> Seating pressure	_____ psi _____ psi	_____ psi _____ psi	_____ psi _____ psi
<p><b>WARNING:</b> NEVER allow test pressure to be greater than MAWP during test. If lift pressure is above MAWP, the valve must be adjusted or replaced before test continues.</p> <p><b>NOTE:</b> Safety valves must be tested in highest-to-lowest pressure order; typically D/S-S/S-S/P. This avoids the risk of damaging a valve or changing its setting by placing a gag on it after it has been tested.</p>				
4	Ensure <b>Step 3</b> pressures are within acceptable limits ( $\pm 5\%$ ) of stamped pressure. Use the following calculations.  <b>4a.</b> <b>Step 2</b> (stamped pressure) x .05 <b>4b.</b> <b>Step 2</b> (stamped pressure) – <b>4a</b> (-5%) <b>4c.</b> <b>Step 2</b> (stamped pressure) + <b>4a</b> (+5%)	_____ psi _____ psi _____ psi	_____ psi _____ psi _____ psi	_____ psi _____ psi _____ psi
<p><b>IMPORTANT:</b> <b>Step 3</b> (lift pressure) must be between pressures recorded in <b>4b</b> and <b>4c</b>. If NOT, safety valve lift pressure MUST be adjusted within specified limits.</p>				
5	Record superheater pressure drop value from boiler manual.		_____ psi	_____ psi
6	Ensure S/S and S/P lift pressures (from <b>Step 3</b> ) are $\leq$ pressures recorded in <b>6b</b> .  <b>6a.</b> <b>Step 5</b> (superheater pressure drop) + 5 psi <b>6b.</b> <b>Step 3a</b> (D/S pressure) – <b>6a</b> pressure		_____ psi _____ psi	_____ psi _____ psi
<p><b>IMPORTANT:</b> If <b>Step 3a</b> (S/S and S/P) is NOT <math>\leq</math> <b>6b</b>, S/S and S/P lift pressures MUST be adjusted.</p>				
7	Determine blowdown and ensure it is between 2% and 4% of lift pressure for each valve. Use the following calculations.  <b>7a.</b> <b>3a</b> pressure – <b>3b</b> pressure = blowdown <b>7b.</b> <b>3a</b> pressure x .02 (2%) <b>7c.</b> <b>3a</b> pressure x .04 (4%)	_____ psi _____ psi _____ psi	_____ psi _____ psi _____ psi	_____ psi _____ psi _____ psi
<p><b>IMPORTANT:</b> If <b>7a</b> (blowdown) is not between <b>7b</b> and <b>7c</b>, blowdown setting MUST be adjusted within specified limits.</p>				
8	After hand-relieving gear is reinstalled, observe each valve as it is hand-relieved from the fireroom or engineroom floor (46 CFR 52.01-120(d)(2)).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

D/S = Drum Safety Valve    S/S = Superheater Safety Valve    S/P = Superheater Pilot Valve

## Section 2: Appendices

### Recommended US Vessel Deficiency Procedures:

Step	Action								
1	Identify deficiency.								
2	Inform vessel representative.								
3	Record on the <i>Deficiency Summary Worksheet</i> (next page).								
4	If deficiency is corrected prior to end of inspection, go to <b>Step 7</b> .								
5	<p>If deficiency is unable to be corrected prior to end of inspection, issue CG-835 in accordance with table below.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%;">IF deficiency:</th> <th style="width: 50%;">THEN issue CG-835:</th> </tr> </thead> <tbody> <tr> <td> <p>Does NOT immediately impact crew/passenger safety, hull seaworthiness, or the environment, e.g.,</p> <ul style="list-style-type: none"> <li>• Missing placards</li> </ul> </td> <td> <p>That provides a specific time for correcting deficiency, e.g.,</p> <ul style="list-style-type: none"> <li>• "X" number of days</li> </ul> </td> </tr> <tr> <td> <p>Allows vessel operations to be MODIFIED to meet less stringent requirements, e.g.,</p> <ul style="list-style-type: none"> <li>• Automation defect</li> </ul> </td> <td> <p>That restricts operation of vessel to meet current vessel conditions, e.g.,</p> <ul style="list-style-type: none"> <li>• Increased crew</li> </ul> </td> </tr> <tr> <td> <p>DOES immediately impact crew/passenger safety, hull seaworthiness, or the environment, and cannot be modified to meet less stringent requirements, e.g.,</p> <ul style="list-style-type: none"> <li>• Missing or defective firefighting equipment</li> </ul> </td> <td> <p>That requires the deficiency to be corrected prior to operating vessel ("NO SAIL" item), e.g.,</p> <ul style="list-style-type: none"> <li>• Prior to carrying passengers</li> <li>• Prior to carrying cargo</li> </ul> </td> </tr> </tbody> </table>	IF deficiency:	THEN issue CG-835:	<p>Does NOT immediately impact crew/passenger safety, hull seaworthiness, or the environment, e.g.,</p> <ul style="list-style-type: none"> <li>• Missing placards</li> </ul>	<p>That provides a specific time for correcting deficiency, e.g.,</p> <ul style="list-style-type: none"> <li>• "X" number of days</li> </ul>	<p>Allows vessel operations to be MODIFIED to meet less stringent requirements, e.g.,</p> <ul style="list-style-type: none"> <li>• Automation defect</li> </ul>	<p>That restricts operation of vessel to meet current vessel conditions, e.g.,</p> <ul style="list-style-type: none"> <li>• Increased crew</li> </ul>	<p>DOES immediately impact crew/passenger safety, hull seaworthiness, or the environment, and cannot be modified to meet less stringent requirements, e.g.,</p> <ul style="list-style-type: none"> <li>• Missing or defective firefighting equipment</li> </ul>	<p>That requires the deficiency to be corrected prior to operating vessel ("NO SAIL" item), e.g.,</p> <ul style="list-style-type: none"> <li>• Prior to carrying passengers</li> <li>• Prior to carrying cargo</li> </ul>
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6	Enter CG-835 data in MISLE.								
7	Initiate Report of Violation (ROV) if necessary.								

- Installation
  - Operation
  - Ventilation
  - Wiring and piping
  - Maintenance
  - Placard posted
  - Safety
  - Accessibility to parts requiring routine servicing
  - Manufacturer's instructions available

33 CFR 159.57  
MSM Vol. IV

33 CFR 159.59

**Miscellaneous:**

- Liquefied petroleum gases for cooking and heating
  - Approved type
  - Cylinder
    - Test dates
    - Stowage
  - Safety relief device
  - Regulators
  - Piping and fittings
  - Location
- Tank tops, bilges, cofferdams, and bilge wells
- Sea suctions and overboard discharges
- Nonmetallic expansion joints
  - External exam
  - 10-year service replacement
- Means of escape
  - Accessibility
  - Absence of locks
- ISM
  - Machinery space maintenance
  - Non-conformity record keeping
  - Documents and reports

46 CFR 61.15-10

MSM Vol. II

46 CFR 61.15-12  
MSM Vol. II

46 CFR 32.01-1  
46 CFR 72.10-5  
46 CFR 92.10-5

33 CFR Part 96

Notes: \_\_\_\_\_  
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- Safety valves
  - Relieving gear
  - Escape pipes
  - Drains

46 CFR 52.01-120  
MSM Vol. IV

46 CFR 56.50-25

Boiler	Date Set and Sealed	Pressure Setting

- Superheater safety valves

46 CFR 52.01-120

Boiler	Date Set and Sealed	Pressure Setting

- Automation
  - Reduced manning
    - Yes
    - No
  - Approved test procedure
  - Satisfactory test
  - Reviewed logs/records
  - Interviewed personnel

46 CFR Part 62  
SOLAS 74/78 II-1/46-54  
MSM Vol. IV  
NVIC 1-69  
NVIC 7-73  
NVIC 6-84  
46 CFR 62.50  
46 CFR 62.30-10

Notes: \_\_\_\_\_  
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- Fusible plugs
  - Examined 46 CFR 52.01-50
  - Renewed at this inspection 46 CFR Table 61.05-10  
MSM Vol. IV
  
- High pressure steam piping
  - Steam piping > 3 inches subject to boiler pressure hydrostatically tested (46 CFR 61.05-10) 46 CFR 52.01-105  
46 CFR 56.50-15  
SOLAS 74/78 II-1/33
  - Lagging or insulation
  - Hangers or supports
  
- Fuel systems
  - Service and transfer pumps 46 CFR 56.50-65
  - Remote shutoff valves
  - Remote cutouts
  - Reliefs and bypass valves
  - Strainers
  - Drip pans
  - Torch pots
  - Piping
  - Heaters
  
- Feedwater system (including condensate)
  - Pumps 46 CFR 52.01-115
  - Injectors 46 CFR 56.50-35  
46 CFR 56.50-45
  - Valves and controls
  - Water heaters (including deaerator)
  - Water regulators
  - Water level indicators
  - Grease extractors
  - Piping 46 CFR 56.50-30
  - Gauges and thermometers
  - Air ejectors
  - Condensers

Notes: \_\_\_\_\_  
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### Pollution Prevention:

**NOTE:** Guidance for inspecting pollution prevention items is detailed in MSM Volume II, Chapter 31.

- Oil record book maintained and submitted 33 CFR 151.25  
MARPOL Ax. I/20
  
- Oily water separating equipment
  - Approved equipment 33 CFR 155.380  
MARPOL Ax. I/6  
MSM Vol. IV  
MSM Vol. II
  - Operationally tested
  - Alarms
  - Shutdowns
  
- Ballast discharge
  - Piping system 33 CFR 155.330  
33 CFR 155.350  
33 CFR 155.360  
33 CFR 155.370  
MSM Vol. II
  - Outlet
  - Stop valve
  - Acceptable processing equipment
  
- Pollution placard posted 33 CFR 155.450  
MSM Vol. II
  
- Oily waste retention MSM Vol. II
  - Bilge
  - Tank
  
- Emission Controls
  - NOx Requirements MARPOL VI  
CG-543 Policy Ltr 09-01
  - EPA engine emission stds for vsls on intl' voyages; 40 CFR 94 or 1042  
46 CFR 63.25-9
  - EIAPP Cert. issued by the EPA for vsls on intl' voyages
  - IAPP Cert.
  - Fuel and SOx Requirements
  - Incinerator
  - Ozone Depleting Substance

### Marine Sanitation Devices:

**NOTE:** Guidance for inspecting marine sanitation devices is detailed in MSM Volume II, Chapter 18.K.

- Marine sanitation device
  - Type I 33 CFR 159.55  
MSM Vol. II
  - Type II
  - Type III
  
- Certified for inspected vessels MSM Vol. II
  
- Capacity satisfactory MSM Vol. II



- Fixed fire extinguishing system (machinery spaces) (System servicing is recorded in Hull Inspection 840 Book.)
  - Piping/flexible loops
  - Heads
  - Alarms
  - Markings
- Fire main systems and stations (machinery spaces)
  - Required number and type, proper threads
  - Nozzles (combination, etc.)
  - Applicators
  - Spanners
  - Markings
- Pumps tested
  - Controls and gauges
  - Relief valves
  - Markings
- Paint locker

46 CFR 34.15  
 46 CFR 34.17  
 46 CFR 76.15  
 46 CFR 76.17  
 46 CFR 95.05-10  
 SOLAS 74/78 II-2/11

46 CFR 34.10-10  
 46 CFR 76.10-10  
 46 CFR 95.10-10

46 CFR 34.10-5  
 46 CFR 76.10-5  
 46 CFR 95.10-5  
 SOLAS 74/78 II-2/4

46 CFR 34.05-5  
 46 CFR Table 76.05-1(a)  
 46 CFR 95.05-10(c)  
 SOLAS 74/78 II-2/18.7

**Watertight Integrity:**

- Watertight integrity of machinery spaces
  - Watertight doors
  - Alarms
  - Controls
  - Bulkheads (penetrations)
  - Markings

46 CFR 170.270  
 MSM Vol. II  
 ASTM F-1197

Notes: \_\_\_\_\_  
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- Automatic auxiliary boilers
  - Controls and safety devices
  - Fuel systems
  - Alarms
  - Inspections/test
- Boiler repairs in accordance with 46 CFR Part 59
- Low pressure heating boilers
  - Safety or relief valves
  - Gauges
  - Thermometers
  - Automatic controls
  - Bottom blow off
  - Water level indicator
  - Connections
  - Refractory
- Periodic test and inspection of low pressure heating boilers in accordance with 46 CFR Table 61.05-10

46 CFR 63.15-1  
 46 CFR 63.20  
 46 CFR 63.15-3  
 46 CFR 63.15-7  
 46 CFR 63.15-9

46 CFR 53.01  
 46 CFR 53.05  
 46 CFR 53.12

Boiler Number	Date Hydrostatically Tested	Fireside	Waterside	External

Notes: \_\_\_\_\_  
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## Diesels:

- Propulsion machinery
  - Safety devices
  - Foundations
  - Guards
  - Controls
- Main propulsion diesels
  - Fuel lines
  - Air starting lines
  - Exhaust system
    - Manifold
    - Exhaust pipe
    - Protective devices
  - Lube oil system
    - Coolers
    - Standby L/O pump
  - Engine protection
    - Remote shutdowns
    - Overspeed protection
    - Low lube oil
    - High temperature
    - Crank case
  - Explosion covers
- Gas Turbine Installations
  - Design, construction, and materials
  - Exhaust system
  - Cooling and ventilation
  - Automatic shutdowns
  - Fuel systems
  - Fire extinguishing systems
- Automation
  - Reduced manning
    - Yes
    - No
  - Approved test procedure
  - Satisfactory test
  - Reviewed logs/records
  - Interviewed personnel
  - Verify programmable systems/devices

46 CFR 58.05  
SOLAS 74/78 II-1/27

46 CFR 58.05  
46 CFR 58.10  
SOLAS 74/78 II-1/27

46 CFR 58.10-15

46 CFR Part 62  
SOLAS 74/78 II-1/46-54  
MSM Vol. IV  
NVIC 1-69  
NVIC 6-84

46 CFR 62.50

46 CFR 62.30-10

46 CFR 62.25-25

- General electrical installation
  - Jury rigs
  - Connection boxes
  - Dead-end cables
  - Splices
  - Grounding
  - Personnel safeguards (guards, rails, etc.)
  - Hazardous locations
  - Portable electrical equipment

46 CFR 111.01-1  
SOLAS 74/78 II-1/40  
46 CFR 111.60  
46 CFR 111.60-17  
46 CFR 111.60-19  
46 CFR 111.05  
46 CFR 111.30-11  
46 CFR 111.105  
MSM Vol. IV  
MSM Vol II

## Firefighting Equipment:

- Portable extinguishers (machinery spaces)
  - Required number, type, and class
  - Annually serviced
  - Bottles hydrostatically tested (every 5 years)
  - Markings (weight and hydrostatic test date)
  - Spare charges, spare extinguishers
- Semiportable extinguishers (machinery spaces)
  - Required number, type, and class
  - Annually serviced
  - Bottles hydrostatically tested (every 12 years)
  - Controls, instructions, markings
  - Hose and diffuser
  - Flexible loops tested or replaced (same as bottle)
- Sprinkler system tested
  - Type
  - Pumps
  - Manifold
  - Controls
  - System diagram posted

46 CFR 34.50  
46 CFR 76.50  
46 CFR 95.50  
SOLAS 74/78 II-2/6  
SOLAS 74/78 II-2/11  
MSM Vol. II  
NVIC 7-70  
NVIC 13-86

46 CFR 34.50  
46 CFR 76.50  
46 CFR 95.50  
SOLAS 74/78 II-2/6  
SOLAS 74/78 II-2/21  
MSM Vol. II

46 CFR 34.30  
46 CFR 76.25  
46 CFR 95.30  
MSM Vol II  
NFPA 13-1996

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

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- Emergency generator tested
  - Starting system
  - Fuel system
  - Overspeed trip (> 110% < 115%)
  - Low oil pressure alarm / shutdown
  - High jacket water temperature alarm
  - Fixed firefighting system shutdown
- Emergency batteries tested
  - Protection
  - Charger
  - Ventilation
- Adequate emergency power and lighting
- Internal communications and control system
  - General alarms
  - Engine order telegraph
    - Failure alarms
  - Telephones
  - Voice tubes
  - Public address system
  - Pilothouse controls
  - Fire detection and alarm systems
  - Steering gear alarm and indicator
- Lifeboat electrical installation
  - Winches and controls tested
  - Master switch opened
  - Limit switches opened
  - Emergency disconnect switch opened
- Emergency Loads
  - Temporary loads
  - Final loads

46 CFR 112.25  
 46 CFR 112.50  
 SOLAS 74/78 II-1/42-44

46 CFR 112.55

46 CFR 112.43  
 MSM Vol. II

46 CFR 113.25  
 46 CFR 113.35  
 46 CFR 113.30  
 46 CFR 113.50  
 46 CFR 113.10  
 46 CFR 113.43

46 CFR 111.95  
 MSM Vol. II

46 CFR 112.15  
 SOLAS II-1

**Pressure Vessels:**

- Pressure vessels hydrostatically tested or internally examined
  - 46 CFR 61.10
  - MSM Vol. II
  - MSM Vol. IV

Service	MAWP	Date Tested or Examined Internally	Relief Valve Tested
			<input type="checkbox"/>
			<input type="checkbox"/>
			<input type="checkbox"/>
			<input type="checkbox"/>

- Relief valves springs set within range
  - 46 CFR 54.15-10(g)

**Auxiliary Machinery:**

- Bilge and ballast systems
  - Pumps
  - Eductors
  - Emergency bilge pump
  - Manifold, valves, and piping
  - Remote controls (hydraulic, pneumatic, manual, electric)
  - Strainers
  - Sounding and vent piping
  - Markings and indicators
- Compressed air system
  - Compressor
  - Controls and gauges
  - Relief valves

46 CFR 56.50-50  
 46 CFR 56.50-55  
 46 CFR 56.50-57

46 CFR 58.30

Notes: \_\_\_\_\_  
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Notes: \_\_\_\_\_  
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- ❑ Lubrication systems 46 CFR 56.50-80
  - Pumps
  - Heat exchangers
  - Valves and controls
  - Piping
  - Gauges, thermometers, and alarms
  - Tanks, vents, and strainers
- ❑ Refrigeration and air conditioning systems 46 CFR 58.20
  - Compressors
  - Valves and controls
  - Spare refrigerant stowage
  - Gas mask (ammonia) with spare charges
  - Ventilation
  - Alarms
- ❑ Evaporators 46 CFR 54.01-10
  - Pumps
  - Valves and controls
- ❑ Freshwater systems (potable and domestic)
  - Pumps
  - Valves and controls
  - Sump tanks
  - Tank pressure
  - Air cushion supply line
- ❑ Steering gear systems tested 46 CFR 58.25
  - Motors and pumps 46 CFR 61.20
  - Telemotor or other control 46 CFR 58.25-70
  - Indicators and alarms 46 CFR 58.25-25
  - Instructions and markings 33 CFR 164.34
  - Final emergency power source 46 CFR 58.25-65

**Electrical Systems:**

*NOTE: Guidance for inspecting electrical systems is detailed in NVIC 2-89.*

- ❑ Ship's service generators 46 CFR 110.10
  - Protective guards 46 CFR 111.12
  - Reverse power relay SOLAS 74/78 II-1/41
  - Overspeed trip (> 110% < 115%) MSM Vol. II
  - Low oil pressure alarm / shutdown MSM Vol. IV

Notes: \_\_\_\_\_  
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- ❑ Switchboards (including emergency) 46 CFR 111.30
  - Automatic bus transfer MSM Vol. II
  - Ground detectors MSM Vol. II
  - Personnel safeguards (guards, rails, mats, etc.)
  - Drip shields
  - Nameplates
  - Warning notices posted
  - Fuse/circuit breaker ratings
- ❑ Panel boards 46 CFR 111.40
  - Overcurrent devices
  - Circuit directory 46 CFR 111.40-11
  - Locking device
- ❑ Motor controllers 46 CFR 111.70
  - Drip shields MSM Vol. II
  - Disconnect switch
  - Wiring diagram posted
  - Remote shutdowns tested
- ❑ Ventilation systems 46 CFR 111.103
  - Remote shutdown tested SOLAS 74/78 II-1/48
  - Cargo fans
  - Machinery space fans
  - Accommodation fans
- ❑ Ship's service lighting systems 46 CFR 111.75
  - Panelboards 46 CFR 111.40
  - Circuit directory
  - Fuses
  - Circuit breakers
  - Berth lights
  - Globes and guards
  - Explosion-proof or watertight (where required)

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