



GUIDE FOR

ENHANCED FIRE PROTECTION ARRANGEMENTS

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Foreword

This Guide introduces optional Enhanced Fire Protection notations for the accommodation areas and machinery spaces of vessels, mobile offshore drilling units, mobile offshore units and offshore installations; for the cargo areas of selected types of cargo vessels, and for the industrial areas of mobile offshore drilling units and offshore installations. The Enhanced Fire Protection notations available are **EFP-A** and **EFP-A+** for accommodation areas, **EFP-M** for machinery spaces; **EFP-C** for cargo areas, and **EFP-IA** for the industrial areas. Individual or combinations of the above notations can be provided.

This Guide becomes effective on the first day of the month of publication.

Users are advised to periodically check the ABS website at www.eagle.org to verify the most current and applicable version of this Guide.

We welcome your feedback. Comments or suggestions can be sent electronically by email to rsd@eagle.org.



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CHAPTER 1 General Requirements

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CHAPTER 1 General Requirements

SECTION 1 Classification

1 General

This Guide provides the criteria for notations that are intended to increase the level of protection against fires onboard vessels, mobile offshore drilling units (MODUs), mobile offshore units (MOUs) and offshore installations as well as the reduction of the consequences should a fire occur through the addition of certain prevention, detection and extinguishment measures. The requirements and notations identified in this Guide are optional for classification.

The enhanced fire protection notations **EFP-A** for accommodation areas and **EFP-M** for machinery spaces provide criteria for additional fire protection arrangements in accommodation and machinery areas, respectively, of vessels, MODUs, MOUs and offshore installations identified in 1-1/3 below.

The enhanced fire protection notation **EFP-A+** provides criteria for additional fire protection arrangements beyond the **EFP-A** notation for the accommodations of MODUs and offshore installations identified in 1-1/3 below.

The enhanced fire protection notation **EFP-C** provides criteria for additional fire protection arrangements in the cargo area of those cargo vessels identified in Chapter 4 of this Guide.

The enhanced fire protection notation **EFP-IA** provides criteria for additional fire protection arrangements in the industrial areas of MODUs as well as fixed and floating offshore installations identified in 1-1/3 below.

Combinations of the above notations may also be granted. For example, where a cargo vessel complies with the requirements in this Guide for the accommodation areas, the machinery spaces and the cargo area, a combined notation of **EFP-AMC** may be granted.

Where a notation identified in this Guide is requested, the requirements herein are in addition to any and all applicable fire safety and protection requirements in the relevant ABS Rules and Guides as well as those in all applicable national or international regulations.

3 Application

3.1 Vessels

- i) Self-propelled vessels classed in accordance with the *ABS Rules for Building and Classing Steel Vessels (Steel Vessel Rules)*, the *ABS Rules for Building and Classing Steel Vessels Under 90 Meters (Under 90m Rules)* or the *ABS Rules for Building and Classing Offshore Support Vessels (OSV Rules)* for Unrestricted Service are eligible for the **EFP-A** and **EFP-M** notations, except for vessels carrying passengers as defined by SOLAS Ch. 1/Reg. 2(e) and for those which fall under the IMO definition for Special Purpose Vessels.
- ii) Non-self-propelled vessels may be considered subject to special consideration, but as a minimum would require verification of compliance with all fire safety and protection requirements in the ABS Rules and SOLAS Regulations applicable to a similar sized self-propelled cargo vessel.
- iii) The cargo vessels specifically addressed in Chapter 4 of this Guide are eligible for the notation **EFP-C**.

3.3 Mobile Offshore Drilling Units

Mobile Offshore Drilling Units (i.e., MODUs) being classed in accordance with the *ABS Rules for Building and Classing Mobile Offshore Drilling Units (MODU Rules)* for Unrestricted Service are eligible for the optional notations **EFP-A**, **EFP-A+**, **EFP-M**, and **EFP-IA**. MODUs being classed in accordance with the *MODU Rules* for a particular Restricted Service may be specially considered.

3.5 Mobile Offshore Units

Mobile Offshore Units (i.e., MOUs) being classed in accordance with the *ABS Guide for Building and Classing Mobile Offshore Units (MOU Guide)* for Unrestricted Service are eligible for the optional notations **EFP-A** and **EFP-M**. MOUs being classed in accordance with the *MOU Guide* for a particular Restricted Service may be specially considered.

3.7 Floating and Fixed Offshore Installations

- i) A floating offshore installation must be classed in accordance with the *ABS Rules for Building and Classing Floating Production Installations (FPI Rules)* in order to be eligible for the optional enhanced fire protection notations **EFP-A** and **EFP-A+** for the accommodation areas and **EFP-M** for the machinery spaces.
- ii) A fixed offshore installation must be classed in accordance with the *ABS Rules for Building and Classing Offshore Installations (Offshore Installations Rules)* and also comply with all requirements in the *FPI Rules* for the accommodation areas, as defined in 2-1/5.1 of this Guide, in order to be eligible for the optional enhanced fire protection notations **EFP-A** and **EFP-A+**.
- iii) A fixed offshore installation must be classed in accordance with the *Offshore Installations Rules* and also comply with all requirements in the *FPI Rules* for machinery spaces in order to be eligible for the optional enhanced fire protection notation **EFP-M**.
- iv) A floating or fixed offshore installation must be classed in accordance with the *ABS Rules for Building and Classing Facilities on Offshore Installations (Facilities Rules)* and not be involved in the liquefaction or onboard storage of gaseous hydrocarbons in order to be eligible for the optional notation **EFP-IA** for the industrial area.

3.9 Regulatory Requirements

Compliance with Regulatory requirements is considered a prerequisite for these optional notations. Therefore:

3.9.1 Vessels

Vessels are to comply with all applicable IMO fire safety and fire protection requirements for the type of vessel involved. This may be established by the submittal of the appropriate IMO certificates or through independent verification by ABS.

Vessels exempted from the IMO requirements due to size or tonnage are not eligible to receive these optional notations unless it has been determined that all requirements which would normally be applicable to a similar type of non-exempt vessel have been met.

3.9.2 Mobile Offshore Drilling Units

MODUs are to comply with all applicable fire safety requirements in the 2009 IMO MODU Code. This may be established by the submittal of the appropriate IMO certificates or through independent verification by ABS.

MODUs exempted from the 2009 IMO MODU Code are not eligible unless it has been determined that all requirements which would normally be applicable to a similar non-exempt unit have been met.

3.9.3 Mobile Offshore Units

MOUs are to comply with all applicable Flag and Regulatory requirements. This may be established by the submittal of the appropriate documentation or through independent verification by ABS.

3.9.4 Offshore Installations

Offshore installations are to comply with all applicable Flag and Regulatory requirements. This may be established by the submittal of the appropriate documentation or through independent verification by ABS.

5 Class Notations

5.1 EFP-A Notation

Vessels, MODUs, MOUs and offshore installations that meet the criteria in 1-1/3 above and have accommodation areas designed, constructed and equipped in accordance with the requirements in Chapter 1 as well as Chapter 2, Sections 1 through 5 of this Guide will be eligible to receive the optional enhanced fire protection notation **EFP-A**.

5.3 EFP-A+ Notation

MODUs and offshore installations that meet the criteria in 1-1/5.1 above and also comply with the additional requirements for accommodation areas in Chapter 2, Section 6 of this Guide will be eligible to receive the optional enhanced fire protection notation **EFP-A+**.

5.5 EFP-M Notation

Vessels, MODUs, MOUs and offshore installations that meet the criteria in 1-1/3 above and have the machinery spaces designed, constructed and equipped in accordance with the requirements in Chapters 1 and 3 of this Guide will be eligible to receive the optional enhanced fire protection notation **EFP-M**.

5.7 EFP-C Notation

Vessels identified in Chapter 4 of this Guide that meet the criteria in 1-1/3 above and have the cargo areas designed, constructed and equipped in accordance with Chapters 1 and 4 of this Guide will be eligible to receive the optional enhanced fire protection notation **EFP-C**.

5.9 EFP-IA Notation

MODUs as well as floating and fixed offshore installations that meet the criteria in 1-1/3 above and have the industrial area designed, constructed and equipped in accordance with all the requirements of Chapters 1 and 5 of this Guide will be eligible to receive the optional enhanced fire protection notation **EFP-IA**.

7 Alternative Design and Arrangements

When the proposed fire safety design or arrangement deviates from the prescriptive provisions of this Guide, alternative designs or arrangements providing an equivalent level of safety may be specially considered based on an engineering analysis and evaluation carried out in accordance with SOLAS Regulation II-2/17 and the *ABS Guidance Notes on Alternative Design and Arrangements for Fire Safety*.

9 Definitions

9.1 Accommodation Areas

Accommodation Areas as used in this Guide refers to and includes the “accommodation spaces”, the “public areas” and the “service spaces” that are within or directly adjacent to the “accommodation spaces” or “public spaces”.

9.3 Accommodation Spaces

Accommodation Spaces as used in this Guide are those spaces used for corridors, lavatories, cabins, offices, hospitals, cinemas, game and hobby rooms, barber shops, pantries containing no cooking appliances and similar spaces.

9.5 Chemical Carrier

A ship constructed or adapted for the carriage in bulk of any liquid product listed in Chapter 17 of the IMO International Bulk Chemical Code (*IBC Code*).

9.7 Classified Area

A location in which flammable gases or vapors are or may be present in the air in quantities sufficient to produce explosive or ignitable mixtures (see 4-8-4/27.3 of the ABS *Steel Vessel Rules*, the ABS *MODU Rules*, API RP 500, or API RP 505 for additional details). See also “Hazardous Area”.

9.9 Container Carrier

A vessel designed primarily for the carriage of containers in holds or on deck or both, with structures for that purpose, such as cell guides, pedestals, etc.

9.11 Dry Bulk Cargo Carrier

A ship that is constructed generally with single deck, topside tanks and hopper side tanks in cargo spaces, and is intended primarily to carry dry cargo in bulk. It includes a vessel of such type as ore carrier or combination carrier.

9.13 Escape Route

This is a designated path used by personnel to evade an immediate danger and ultimately leads to a temporary refuge or muster station.

9.15 Fixed Installation

A bottom-fixed offshore facility permanently affixed to the sea floor. The term includes, but is not limited to, fixed platforms, guyed towers, jack-ups elevated at same location longer than five (5) years, converted fixed installations, etc.

9.17 Flammable Fluid

Any fluid, regardless of its flash point, capable of feeding a fire is to be treated as a flammable fluid. Aviation fuel, diesel fuel, hydraulic oil (oil based), lubricating oil, crude oil and hydrocarbons are to be considered flammable fluids.

9.19 Flash Point

The minimum temperature at which a combustible liquid gives off vapor in sufficient concentration to form an ignitable mixture with air near the surface of the liquid or within the vessel used, as determined by the test procedure and apparatus specified in NFPA 30. Ignitable mixture means a mixture that is within the flammable range (between the upper and lower limits) and is therefore capable of propagation of flame away from the source of ignition.

9.21 Floating Installation

An offshore facility designed to provide hydrocarbon processing and/or hydrocarbon storage, and offloading of hydrocarbons. The term Floating Installation is used to generically identify a buoyant facility that is site-specific. This installation is securely and substantially moored so that it cannot be moved without a special effort. The term includes, but is not limited to, Tension Leg Platforms (TLP), Spar Buoys, Permanently Moored Shipshape Hulls and Semisubmersibles.

9.23 General Cargo Carrier

A vessel constructed for the transportation of suitable cargoes in compatible combinations and packaging, such as boxes, bales, barrels, drums, etc.

9.25 Hazardous Area

A location in which flammable gases or vapors are or may be present in the air in quantities sufficient to produce explosive or ignitable mixtures (see 4-8-4/27.3 of the ABS *Steel Vessel Rules*, the ABS *MODU Rules*, API RP 500, or API RP 505 for additional details). See also “Classified Area”.

9.27 Industrial Area

An area that is intended to primarily serve the industrial function and operation of a MODU or offshore installation. This includes the drilling area for MODUs and the areas containing the process and process support systems on offshore installations.

9.29 Jet Fire

A fire resulting from the combustion of a flammable liquid or gas that is being continuously released with some significant momentum in a particular direction or directions.

9.31 Liquefied Gas Carrier

A vessel designed and constructed for the transportation in bulk of liquefied gas or other products listed in Section 5C-8-19 of the *Steel Vessel Rules*, or Chapter 19 of the *IMO International Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk (International Gas Carrier Code)*, or Chapter XIX of the *IMO Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk (Gas Carrier Code)*.

9.33 Local Fixed Fire Extinguishing System

The fixed fire extinguishing system installed to protect a particular piece of equipment.

9.35 Lower Explosive Limit (L.E.L.)

The lowest concentration of combustible vapors or gases, by volume in mixture with air, which can be ignited at ambient conditions.

9.37 Machinery Spaces

Machinery Spaces are all "Machinery Spaces of Category A" as well as all other machinery spaces containing propulsion machinery, boilers, oil fuel units, steam and internal combustion engines, generators and major electrical machinery, oil filling stations, refrigerating, stabilizing, ventilation and air conditioning machinery, and similar spaces and trunks to such spaces.

9.39 Machinery Spaces of Category A

Machinery Spaces of Category A are those spaces and trunks to such spaces which contain either:

- i) Internal combustion machinery used for main propulsion;
- ii) Internal combustion machinery used for purposes other than main propulsion where such machinery has an aggregate total power output of not less than 375 kW (500 hp);
- iii) Any oil-fired boiler, oil fuel unit, or any oil-fired equipment other than boiler, such as inert gas generator, incinerator, waste disposal unit, etc.

9.41 Main Fixed Fire Extinguishing System

The fixed fire extinguishing system installed to protect the entire machinery space.

9.43 Mobile Offshore Drilling Unit (MODU)

A mobile offshore unit of the self-elevating or column-stabilized type, that is fitted with drilling equipment and utilized to carry out drilling operations.

9.45 Mobile Offshore Unit (MOU)

A mobile offshore unit of self-elevating or column-stabilized type, not fitted with drilling equipment, production facilities, hydrocarbon storage, or any other system onboard handling hydrocarbons.

9.47 Mud Gas Separator Unit

A *Mud Gas Separator Unit* is intended to separate large volumes of free gas from within the drilling fluid. Also referred to as a gas-buster.

9.49 Oil Carrier

A ship constructed or adapted primarily to carry oil and/or oil product in bulk and includes combination carriers.

9.51 Oil Fuel Unit

An *Oil Fuel Unit* is defined as any equipment, such as pumps, filters and heaters, used for the preparation and delivery of fuel oil to oil-fired boilers (including incinerators and inert gas generators), internal combustion engines or gas turbines at a pressure of more than 1.8 kgf/cm² (0.18 N/mm², 26 psi).

9.53 Passenger

Every person other than:

- i) The master and the members of the crew or other persons employed or engaged in any capacity on board a ship on the business of that ship; and
- ii) A child under one year of age.

9.55 Oil Systems, Systems Containing Oil

As used in this Chapter, the terms *Oil Systems* or *Systems Containing Oil* refer to any piping system or equipment that contains or transfers flammable fluids.

9.57 Pool Fire

A fire resulting from the combustion of the vapors above a horizontal body of a flammable fluid that has zero or low initial momentum and is typically contained by some surrounding structure.

9.59 Process Area

Area where processing equipment is located. This includes wellhead/manifold areas.

9.61 Process Support Systems

Utility and auxiliary systems that complement the hydrocarbon production and process systems. These systems do not directly handle hydrocarbons.

9.63 Public Spaces

Portions of the accommodations which are used for halls, dining rooms, lounges, and similar permanently enclosed spaces.

9.65 Ro-Ro Cargo Spaces

Spaces not normally subdivided in any way and extending to either a substantial length or the entire length of the vessel in which goods [packaged or in bulk, in or on road cars, vehicles (including road tankers), trailer containers, pallets, demountable tanks or in or on similar stowage units or other receptacles] can be loaded and unloaded normally in a horizontal direction.

9.67 Service Spaces

Spaces used for galleys, pantries containing cooking appliances, lockers, mail and specie rooms, store-rooms, workshops other than those forming part of the machinery spaces, and similar spaces and trunks to such spaces.

9.69 Special Personnel

All persons who are not passengers or members of the crew or children of under one year of age and who are carried on board in connection with the special purpose of that vessel or because of special work being carried out aboard that vessel.

9.71 Special Purpose Vessel

A vessel which by reason of its function carries on board more than twelve (12) special personnel.

9.73 Vehicle Carrier

A vessel designed and constructed for the carriage of vehicles only.

11 Reference Documents

11.1 ABS

ABS Rules for Building and Classing Steel Vessels (Steel Vessel Rules)
ABS Rules for Building and Classing Steel Vessels Under 90 Meters (Under 90m Rules)
ABS Rules for Building and Classing Offshore Support Vessels (OSV Rules)
ABS Rules for Building and Classing Mobile Offshore Drilling Units (MODU Rules)
ABS Rules for Building and Classing Floating Production Installations (FPI Rules)
ABS Rules for Building and Classing Offshore Installations (Offshore Installations Rules)
ABS Rules for Building and Classing Facilities on Offshore Installations (Facilities Rules)
ABS Guide for Building and Classing Mobile Offshore Units (MOU Guide)
ABS Guidance Notes on Alternative Design and Arrangements for Fire Safety

11.3 American Petroleum Institute (API)

American Petroleum Institute (API) RP 500, Recommended Practice for Classification of Locations for Electrical Installations at Petroleum Facilities Classified as Class I, Division I and Division 2
American Petroleum Institute (API) RP 505, Classification of Locations for Electrical Installations in Petroleum Facilities Classified as Class I, Zone 0, Zone 1 and Zone 2
API Publication 2030 Application of Fixed Water Spray Systems for Fire Protection in the Petroleum and Petrochemical Industries or an equivalent standard.

11.5 International Maritime Organization (IMO)

International Maritime Organization (IMO) International Convention for the Safety of Life at Sea, 1974, as amended, (SOLAS)
IMO Code for the Construction and Equipment of Mobile Offshore Drilling Units, 2009 (IMO MODU Code)
IMO International Code for Fire Safety Systems (FSS Code)
IMO International Code for Application of Fire Test Procedures (FTP Code)
IMO International Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk (International Gas Carrier Code)
IMO Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk (Gas Carrier Code)
IMO MSC/Circ. 848, Revised Guidelines for the Approval of Equivalent Fixed Gas Fire-Extinguishing Systems as referred to in SOLAS 74, as amended, for Machinery Spaces
IMO MSC.1/Circ.1318, Guidelines for the Maintenance and Inspections of Fixed Carbon Dioxide Fire Extinguishing Systems
IMO MSC/Circ.1387, Revised Guidelines for the Approval of Fixed Water-Based Local Application Fire-Fighting Systems for use in Category A Machinery Spaces
IMO MSC.1/Circ.1432 Revised Guidelines for the Maintenance and Inspection of Fire Protection and Appliances

11.7 NFPA

NFPA Standard 15, Standard for Water Spray Fixed Systems for Fire Protection
NFPA Standard 30, Flammable and Combustible Liquids Code

CHAPTER 1 General Requirements

SECTION 2 Documentation

1 Plans and Details to be Submitted

Below is a generic list of plans and data to be submitted for each notation.

1.1 General (for all notations)

- Safety and Fire Control Plans
- Fire-fighter outfit details
- Number, locations and details of portable and semi-portable fire extinguishers
- Locations and details of fire-fighter outfits
- Location of Information on air compressor for breathing apparatus
- Information on air compressor for breathing apparatus

1.3 For Class Notation EFP-A

- Arrangement drawings for accommodation areas
- Structural Fire Protection plans and details for accommodation areas
- Documentation on combustible materials (test reports and other reference material) used in accommodation areas
- Egress plan and details from accommodation areas
- Fire detection and alarm system – schematics and layout
- Fire main system with accommodations – plans and details
- Water spray system – plans and details (for Offshore Installations)
- Calculations verifying compliance with firefighting system requirements (as applicable)
- Results of “H60/J30” fire testing (as applicable)

1.5 For Class Notation EFP-A+

Plans and details required above as well as:

- Industrial area equipment arrangements and locations
- Additional details of Structural Fire Protection arrangements
- Water spray system drawings
- Calculations verifying compliance with firefighting system requirements (as applicable)
- Fire test data results

1.7 For Class Notation EFP-M

- Arrangement drawings for the machinery spaces w/locations of any oil system piping over 15 bar
- Insulation and shielding arrangement details for hot surfaces
- Shielding arrangements for flammable fluid piping systems
- Thermo scanning report, with corrective measures (for information)
- Color TV monitoring system – arrangements and details
- Egress plan and details from machinery spaces
- Fire detection and alarm system – schematic and layout
- Fire main and emergency fire pump – plans and details
- Main fixed fire extinguishing system – plans and details
- Local fixed fire extinguishing system – plans and details
- Machinery space fire control station – arrangements and details
- Ventilation and ventilation shutdown – details and locations
- Calculations verifying compliance with firefighting system requirements

1.9 For Class Notation EFP-C

- Fire main system – plans and details
- Fixed fire extinguishing systems for cargo area – plans and details (as applicable)
- Details for fixed fire extinguishing system for venting mast risers of cargo tank venting systems (as applicable)
- Details of water spray protection for lifeboats (as applicable)
- Fire detection and alarm system – schematics and layout (as applicable)
- Smoke detection system – schematics and layout (as applicable)
- Gas detection system – schematics and layout (as applicable)
- Inert gas system – plans and details (as applicable)
- Color television monitoring system arrangements and details (as applicable)
- Details of cargo area communications arrangements (as applicable)
- Calculations verifying compliance with firefighting system requirements

1.11 For Class Notation EFP-IA

- General arrangements of industrial areas
- Area classification drawings
- Egress plan and details from industrial areas
- Fire main system – plans and details
- Fixed fire extinguishing systems – plans and details
- Centralized fire control station – arrangements and details
- Arrangements and details of portable and semi-portable fire extinguishers
- Fire detection and alarm systems – schematic and layout

- Insulation and shielding arrangements and details for hot surfaces
- Spray shielding arrangements for flammable fluid piping systems
- Calculations verifying compliance with firefighting system requirements



CHAPTER 1 Scope and Conditions of Classification

SECTION 3 Manuals

1 General

Manuals for the fire protection systems installed are to be provided in a common location onboard that is readily accessible to the crew and as a minimum contain the below information.

- Description of the fire protection system and components
- Standard operation procedures
- Piping and/or electrical schematics
- Maintenance requirements
- Periodic testing requirements and procedures
- Troubleshooting procedures

The manuals for the maintenance, inspection and periodic testing of the fire-fighting, fire detection and alarm systems are to be consistent with the guidelines contained in IMO MSC.1/Circ.1318 “Guidelines for the Maintenance and Inspections of Fixed Carbon Dioxide Fire Extinguishing Systems” and IMO MSC.1/Circ.1432 “Revised Guidelines for the Maintenance and Inspection of Fire Protection and Appliances”, as applicable.

CHAPTER 1 Scope and Conditions of Classification

SECTION 4 Fire-fighter's Outfit

1 General

A vessel, MODU, MOU or offshore installation with one or more of the class notations **EFP-A**, **EFP-A+**, **EFP-M**, **EFP-C**, and **EFP-IA** is to be provided with fire-fighter's outfits complying with this Section.

3 Number of Outfits

At least four (4) sets of fire-fighter's outfits complying with the below requirements are to be provided onboard. Additional fire-fighter's outfits may be required in Chapters 4 and 5 of this Guide. These fire-fighter's outfits may be considered in determining compliance with the number of fire-fighter outfits required by the applicable Rules and IMO regulations.

5 Fire-fighter's Outfit

Each fire-fighter's outfit is to consist of the equipment outlined below.

5.1 Personal Equipment

Personal equipment as identified in Chapter 3 of the IMO International Code for Fire Safety Systems Code (*FSS Code*).

5.3 Breathing Apparatus

- i) The breathing apparatus is to be a self-contained compressed air-operated unit. The volume of the air contained in the cylinders is to be at least 1,800 liters (475.5 gal), unless otherwise determined to be capable of supplying the fire fighter with sufficient air for at least forty five (45) minutes.
- ii) The breathing apparatus is to be fitted with an audible alarm and a visual or other device which will alert the user before the volume of the air in the cylinder has been reduced to no less than 200 liters (52.8 gal) at atmospheric pressure.
- iii) Two spare charges are to be provided for each required breathing apparatus. All air cylinders for breathing apparatus are to be interchangeable.
- iv) The total weight of one apparatus (including cylinder filled with air, valves, and mask) is not to exceed 12.0 kg (26.4 lbs).
- v) All cylinders, apparatus, and valves are to be of the same type.
- vi) An apparatus with less capacity and less weight may be accepted if it is deemed to be more suitable for the intended service and more spares are provided.

5.5 Lifeline

Each breathing apparatus is to be provided with a lifeline complying with Chapter 3 of the IMO Fire Safety Systems (FSS) Code.

5.7 Fire-fighters Communications

At least two (2) two-way portable radiotelephone apparatus for fire-fighter's communications are to be available for each fire party.

Where it is possible that hazardous areas (see 1-1/9.25 for definition) may be encountered, the two-way portable radiotelephone apparatus are to be the explosion-proof type.

5.9 Standards

The components of the fire-fighter's outfit are to comply with appropriate recognized standards.

7 Air Compressor for Breathing Apparatus

7.1 Capacity

A compressor that is suitable to fill the cylinders for the breathing apparatus is to be provided on board. The compressor is to be driven by a separate diesel engine or from the emergency power plant. The compressor is to have a capacity of at least 75 liters/minute (19.8 gpm).

7.3 Location

The compressor and associated equipment for recharging the breathing cylinders are to be suitably located in a sheltered space above main deck level of the vessel or unit.

7.5 Air Intakes

The intake for the air compressor is to be located so that it will draw from a source of clean air at all times, including during a fire event. The air is to be filtered after compression to eliminate compressor oil contamination.

9 Storage of Fire-fighter's Outfits

9.1 Location

The firemen's outfits are to be evenly distributed between two storage lockers that are widely separated from each other. The storage lockers are to be clearly marked and are to have access from the open deck. The boundaries of each locker are to have at least an "A-0" fire integrity rating separating it from other spaces.

9.3 Arrangement

The arrangements of the storage lockers for the fire-fighter's outfits are to provide easy access to the equipment and be such that each piece of equipment has its own location to be stowed to the Surveyor's satisfaction. The protective clothing is to be hung up and stored in a suspended position.

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CHAPTER 2 Accommodations

SECTION 1 General

1 Application

1.1 General

Vessels, MODUs, MOUs and offshore installations complying with Chapter 1 of this Guide and having accommodation areas (i.e., accommodation spaces, public spaces and service spaces within or directly adjacent to accommodation or public spaces) designed, constructed and equipped in accordance with this Chapter will be eligible to receive the class notation **EFP-A**.

1.3 Rules and Regulatory Requirements

In addition to complying with all requirements identified in Chapters 1 and 2 of this Guide, all fire safety systems and arrangements must also comply fully with all applicable Rules and Regulatory requirements (see 1-1/3.9 of this Guide).

3 Basic Principles

The fire safety requirements identified in this chapter are based on the following principles:

- To limit the potential of a fire through limiting combustible materials
- To provide a means to detect and quickly identify the location of a fire within the accommodation areas
- To provide a safe means of egress from any location within the accommodation areas for personnel in the event of a fire
- To limit the spread of any fire in the accommodations by appropriate fire boundaries
- To provide appropriate means to extinguish a fire of the type and scale that is likely to occur in the accommodation areas



CHAPTER 2 Accommodations

SECTION 2 Fire Safety Arrangements

1 General

The fire safety arrangements for the accommodation areas (i.e., accommodation spaces, public spaces and service spaces within or directly adjacent to accommodation or public spaces) are to comply with the following requirements in addition to all applicable Rule and Regulatory requirements.

3 Structural Fire Protection – Method of Construction

3.1 Vessels

For vessels, the method of construction and arrangements for the accommodation areas are, as a minimum, to comply with requirements identified in the *International Convention for the Safety of Life at Sea, 1974, as amended*, (SOLAS) Ch. II-2, as amended, for a “Method IC” level of protection.

3.3 Mobile Offshore Drilling Units and Mobile Offshore Units

For Mobile Offshore Drilling Units (i.e., MODUs) and Mobile Offshore Units (i.e., MOUs), the method of construction and structural fire protection arrangements for the accommodation areas are, as a minimum, to comply with the most stringent of the individual requirements identified in:

- i) SOLAS Ch. II-2, as amended, for a “Method IC” level of protection for a cargo vessel
- ii) The *ABS Rules for Building and Classing Mobile Offshore Drilling Units (MODU Rules)*
- iii) The *IMO Code for the Construction and Equipment of Mobile Offshore Drilling Units, 2009 (IMO MODU Code)*

3.5 Offshore Installations

For offshore installations, the method of construction and structural fire protection arrangements for the accommodation areas are, as a minimum, to comply with the most stringent of the individual requirements identified in:

- i) SOLAS Ch. II-2, as amended, for a “Method IC” level of protection for a cargo vessel
- ii) 3-8/9 or 4-8/9 of the *ABS Rules for Building and Classing Facilities on Offshore Installations (Facilities Rules)*

5 Materials

5.1 General

As a minimum, the materials used are to comply with SOLAS Regulations II-2/5.3 and II-2/6, as amended, for a cargo vessel having an “IC” method of construction.

5.3 Textile Materials

Vertically supported textiles and films (e.g. curtains) are to be tested in accordance with the testing procedures identified in Annex 1, Part 7 of the IMO Fire Test Procedures (FTP) Code and comply with the criteria specified therein.

5.5 Furniture and Other Items in Stairways and Corridors

Furniture in stairway enclosures are to comply with the requirements identified in SOLAS Ch. II-2/Reg. 5.3.3.

5.7 Bedding Components

Bedding components are to be resistant to ignition and the propagation of flame. Therefore, bedding components are to be tested in accordance with the testing procedures identified in Annex 1, Part 9 of the IMO FTP Code and are to comply with the criteria specified therein.

7 Arrangements

7.1 Protection of Accommodation Areas

Where a machinery space, cargo hold, ballast pump room, cargo pump room or an industrial area is located immediately adjacent to, above or below a portion of the Accommodations Area, the bulkheads and/or decks separating the spaces are to have at least an “A-60” fire integrity rating. However, this requirement need not be applied to a Category 7 machinery space (such as air conditioning machinery spaces and service trunks serving only cabins and similar spaces) that is located within the accommodation areas and only serving accommodation and service spaces within the accommodations area.

7.3 B-15 Bulkheads, Linings, and Ceilings

Bulkheads, linings, and ceilings in accommodation areas are to have at least a “B-15” fire integrity rating. However, the space containing the individual sanitary facilities (i.e., water closet, shower, etc.) in a cabin can be accepted as part of the cabin. Further, boundaries with an “A-0” fire integrity rating may, in this context, be considered equivalent to “B-15” for application of this requirement.

7.5 Laundries, Drying Rooms and Similar Spaces

Bulkheads enclosing laundries, drying rooms and similar spaces are to have at least an “A-0” fire integrity rating. Openings such as doors and ventilation ducts are to be of an A-class standard (see Annex 1, Part 3, Appendix 2 of the FTP Code). Exhaust ducts are to have access arrangements for cleaning and are to serve no other spaces. However, such ducts can be connected to the common accommodations air conditioning unit.

7.7 Decks

All decks are to have a minimum fire integrity rating of “A-0”.

7.9 Stairways and Lifts

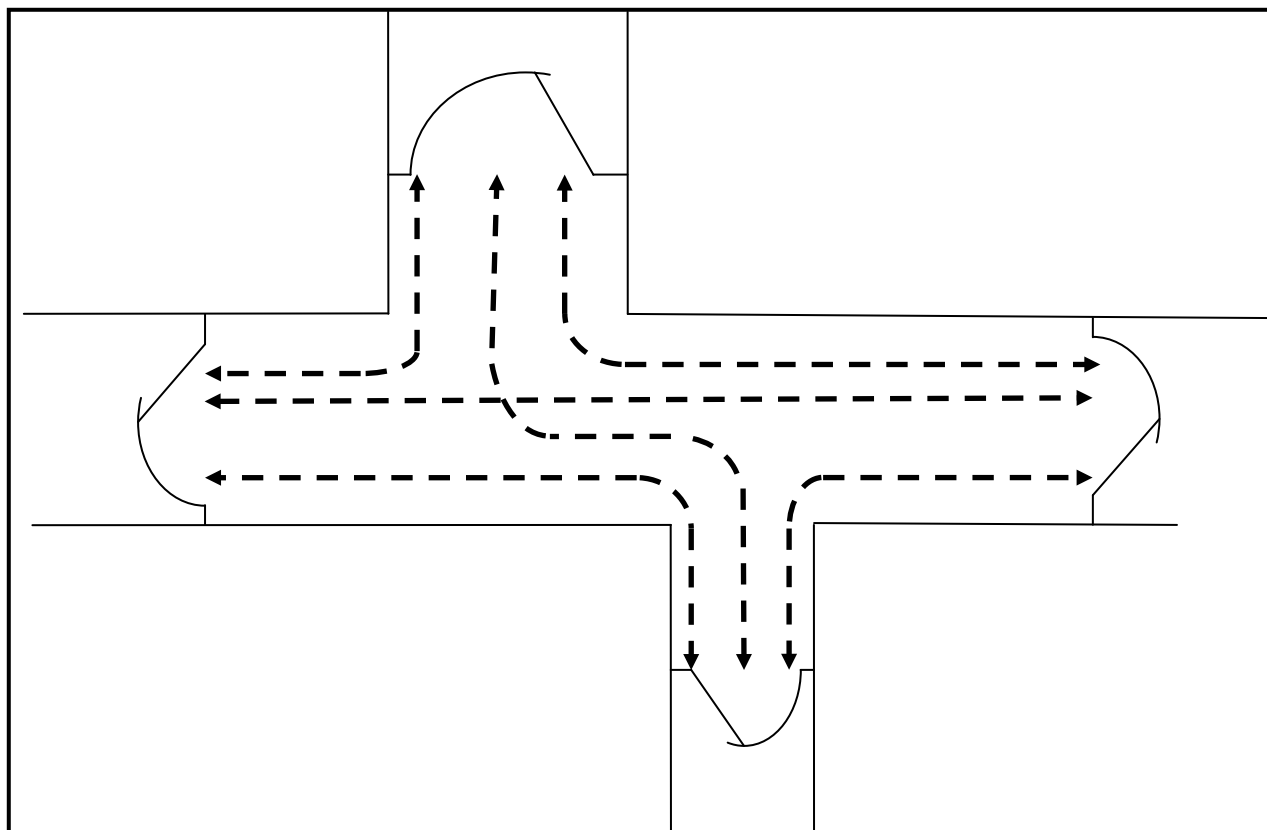
Stairways and lifts penetrating one (1) or more decks are to be protected by divisions and self-closing doors at all levels that have at least an “A-0” fire integrity rating.

7.11 Corridor Length

All passageways in the accommodations area are to be fitted with intervening self-closing doors to limit the potential spread of a fire. The self-closing doors are to be located no more than 20 m (65.6 ft) apart and are to have a minimum “B-15” fire integrity rating. These doors may have a holdback device so long as the door is automatically released upon activation of the fire alarm.

Where transverse corridors intersect longitudinal corridors, the spacing is to be measured as shown in 2-2/Figure 1.

FIGURE 1
Distances for Intersecting Corridors



* Note: Maximum distance of 20 m (65.6 ft) along any one path.

7.13 Access to Cabins and Public Spaces

Doors in the bulkhead of corridors within the accommodation areas are to be of the self-closing type. These doors may have a holdback device so long as the door is automatically released upon activation of the fire alarm.

Doors leading to small, service type spaces may be exempted from the above requirement where the contents of that space are determined not to present a fire hazard.

7.15 Cabin Balconies

Where cabin balconies are provided, they are to comply with SOLAS Ch. II-2/Reg. 5.3.4.

7.17 Floating and Fixed Offshore Installations

The structural fire protection arrangements between the accommodations areas and the industrial area are to comply with the requirements identified in 3-3/5.3 of the *Facilities Rules*.

9 Means of Egress

9.1 General

Spaces within the accommodation areas that are larger than thirty (30) m² (323 ft²) or may accommodate more than fifteen (15) persons at any one time are to have at least two (2) separate and independent means of egress that comply with the following.

- i) The primary means of egress is to be through a door that opens directly into a corridor or onto an open deck.
- ii) The secondary means of egress is to be one of the following:
 - a) Through a door that opens directly into a corridor or onto an open deck,
 - b) Through doors, corridors and stairways that pass through separate spaces, other than galleys, or
 - c) For spaces less than 50 m² (538 ft²), the secondary means of egress may be through a window that is determined to be of adequate size and has fixed step rails installed.

9.3 Marking and Lighting of Escape Routes

9.3.1 Identification and Lighting

Escape route paths are to be properly identified and provided with adequate lighting.

9.3.2 Marking

In addition to the emergency lighting, the means of escape in accommodation areas, including stairways and exits, are to be marked by lighting or photoluminescent strip indicators placed not more than 300 mm (11.8 in.) above the deck at all points of the escape route, including angles and intersections. The marking is to enable personnel to identify the routes of escape and readily identify the escape exits. If electric illumination is used, it is to be supplied by the emergency source of power and it is to be so arranged that the failure of any single light or cut in a lighting strip will not result in the marking being ineffective. Additionally, escape route signs and fire equipment location markings are to be of photoluminescent material or marked by lighting. The lighting or photoluminescent equipment are to be evaluated, tested and applied in accordance with the IMO *International Code for Fire Safety Systems (Resolution MSC.98(73)) (FSS Code)*.

9.5 Escape Route Plan

An escape route plan is to be prominently displayed at various points onboard as well as on the fire control plan.



CHAPTER 2 Accommodations

SECTION 3 Fire Detection and Alarm System

1 General

1.1 Location

An approved automatic fire detection and alarm system is to be installed in all accommodation areas (i.e., accommodation spaces, public spaces and service spaces within or directly adjacent to accommodation or public spaces).

1.3 Design, Arrangements and Installation

The design, arrangements and installation of the automatic fire detection and alarm system are to comply with Chapter 9 of the IMO *FSS Code* as well as any additional or more stringent requirements in 4-7-3/11 of the ABS *Steel Vessel Rules* or in 5-2-5/1.1 of the ABS *MODU Rules*.

1.5 Fire Detectors

Unless specifically approved otherwise, smoke detectors incorporating both photoelectric and ionization smoke detection sensors are to be utilized. However, heat detectors may be used where the above smoke detectors are determined not to be effective or would result in nuisance alarms.

1.7 Addressable Type

The fire detection system is to be of the type and design that is capable of identifying the current state or condition of each detector as well as the ability to identify the precise location of an activated detector.

1.9 Cables

All cables associated with the fire detection and alarm systems are to be of the fire-resistant type and are to comply with 4-8-3/9.7 of the *Steel Vessel Rules*.

CHAPTER 2 Accommodations

SECTION 4 Fire Main System

1 General

1.1 System

In addition to complying with all applicable Rules and Regulations, the fire main and hydrant arrangements serving accommodation areas are to also comply with the following requirements.

1.3 Fire-fighting Water Supply Arrangements

The fire-fighting water supply arrangements within the accommodation areas are to comply with one of the two arrangements identified below.

1.3.1 Pressurized Fire Main System

The fire main and hydrants in the accommodation areas are to comply with all applicable Rules and Regulations as well as the following.

- i)* Be arranged so that at least one effective jet of water is immediately available from any hydrant in an interior location
- ii)* Be arranged so as to ensure the continuation of the output of water by the automatic starting of one of the required fire pumps

1.3.2 Secondary Fresh Water Hose Reel System

In addition to having a conventional non-pressurized fire main and hydrants installed in the accommodation areas that comply with all applicable Rules and Regulations, a separate, independent hose reel system complying with the following is to be provided.

- i)* The hose reel system is to be pressurized at all times with fresh water and ready for immediate use.
- ii)* The system is to be capable of discharging a jet of water from the most hydraulically remote nozzle in the system at a pressure of not less than 3 bar (3.1 kgf/cm², 43.5 psi) for a period of not less than ten (10) minutes.
- iii)* Hose reels containing semi-rigid hoses are to be located so that any point in the accommodation areas can be reached with a jet of water from at least one hose from a hose reel.
- iv)* The semi-rigid hoses are to not be more than 20 m (66 ft) and are to be of at least 19 mm (0.75 in.) internal diameter. The hoses are to be fitted a dual purpose (i.e., combination jet or spray) nozzle.
- v)* The hose reel stations are to be capable of operating when the hose is on the reel.
- vi)* Audible and visual alarms are to be provided on the navigation bridge and at a normally manned control station to indicate low pressure in the hose reel system.
- vii)* Arrangements are to be provided on the navigation bridge and at a normally manned control station to remotely start at least one of the main fire pumps and align (i.e., open or close) the valving necessary to supply the fire main with the required quantity and pressure.

1.5 Equipment

A conventional fire hydrant and associated equipment is to be located outside each entrance door to the accommodation areas.

CHAPTER 2 Accommodations

SECTION 5 Portable Fire Extinguishers and Fire-fighter's Outfits

1 Number and Location

1.1 Type

Portable extinguishers are to be of an approved type and size (see 2-5/Table 1 below).

1.3 Extinguishers

As a minimum, portable extinguishers are to be provided in the sizes, quantities and locations indicated in 2-5/Table 2 below. In all cases, the selection of the fire extinguishing medium is to be based on the fire hazard for the space protected. The portable extinguishers are to be visible and readily accessible.

1.5 Instructions

Instructions on the use of the portable extinguishers are to be posted in readily visible locations.

3 Fire-fighter's Outfits

Fire-fighter's outfits as specified in Chapter 1, Section 4 of this Guide are to be provided.

TABLE 1
Classification of Portable Extinguishers

Fire extinguishers are designated by types as follows: A, for fires involving combustible materials such as wood; B, for fires involving flammable liquids and greases; and F and K for fires involving cooking oils and fats.

Classification ⁽²⁾		Water	Foam	Carbon Dioxide	Dry Chemical ⁽¹⁾	Wet Chemical
Type	Size	liters (U.S. gallons)	liters (U.S. gallons)	kg (lb)	kg (lb)	liters (U.S. gallons)
A	II	9 (2.5)	9 (2.5)	—	5 (11)	9 (2.5)
B	II	—	9 (2.5)	5 (11)	5 (11)	—
F or K	II	—	—	—	—	9 (2.5)

Notes:

- 1 Must be specifically approved as type A or B extinguisher.
- 2 Classification is based on NFPA standard. Portable fire extinguishers following ISO or EN standards have different classification; refer to EN-2 standard and to IMO Res. A.951(23).

TABLE 2
Hand Portable Fire Extinguishers

<i>Space</i>	<i>Classification ⁽¹⁾</i>	<i>Quantity and Location</i>
Accommodation Spaces		
Individual cabins, lavatories, offices, and similar spaces.	—	None required.
Pantries with no cooking appliances, laundries, crew day rooms and similar spaces	A-II	1 in space or vicinity of entrance (see note 2).
Public spaces	A-II	1 for each 250 m ² (2,691 ft ²) or fraction thereof
Stairway and elevator enclosure	—	None required.
Corridors	A-II	At least 2 on each level. Maximum travel distance between 2 extinguishers not to exceed 25 m (82 ft) on each deck (May be located at stairways)
Hospital	A-II	1 required.
Service Spaces		
Galleys	B-II	1 for each 250 m ² (2,691 ft ²) or fraction thereof located in vicinity of exits, either inside or outside the spaces (see Note 2).
	F-II or K-II	2 additional for galleys with deep fat fryers
Pantries with cooking appliances and laundry drying rooms	A-II or B-II	1 for each 250 m ² (2,691 ft ²) or fraction thereof suitable for hazards involved.
Lockers and storerooms (deck area of 4 m ² or more)	B-II	1 for each 250 m ² (2,691 ft ²) or fraction thereof located in vicinity of exits, either inside or outside the spaces. (See Note 2)
Small lockers and storerooms (deck area less than 4 m ²)	—	None required.
Workshops (not part of machinery spaces, galley) and similar spaces	B-II	1 outside each space in vicinity of an exit. (See Note 2)

Notes:

- 1 See 2-5/Table 1.
- 2 Vicinity is intended to mean within 1 m (3 ft).

CHAPTER 2 Accommodations

SECTION 6 MODUs and Offshore Facilities – Additional Requirements for “EFP-A+” Notation

1 Application

1.1 General

MODUs and offshore installations complying with Chapter 1, having accommodation areas (i.e., accommodation spaces, public spaces and service spaces within or directly adjacent to accommodation or public spaces) designed, constructed and equipped in accordance with Chapter 2, Sections 1 through 5 of this Guide and also complying with either 2-6/3 or 2-6/5 below, as applicable, will be eligible to receive the class notation **EFP-A+**.

3 MODUs

3.1 Structural Boundaries Facing Drill Floor

In addition to any specific requirements for the fire integrity of bulkheads and decks in the *ABS MODU Rules* or *IMO MODU Code*, the exterior boundaries of accommodation areas (see definition in 1-1/9) and any escape routes from accommodation areas, including any overhanging decks supporting such spaces, are to comply with the following:

- i)* Any portion within 45 m (148 ft) of the center of the rotary table that faces the drill floor (i.e., could be exposed directly to the radiant heat from a fire in the drill floor area) is to have a boundary with at least an “A-60” fire integrity rating, and
- ii)* Any portion within 30 m (98 ft) of the center of the rotary table that faces the drill floor (i.e., could be exposed directly to the radiant heat from a fire in the drilling area) is to be covered by a water spray system complying with 2-2/3.3 below.

The requirements in *i)* and *ii)* above need not be applied where (1) the structure has been evaluated through a detailed fire load analysis for the worst foreseen fire scenario, (2) that analysis establishes that the structural integrity of the bulkhead or deck as well as the protection against heat radiation remains within the limits established by the FTP Code during the entire time period of the worst case fire event, but not less than 120 minutes; and (3) that the analysis is submitted to and approved by ABS.

3.3 Water Spray System

3.3.1 Capacity

Where required above, the water spray system is to be capable of simultaneously covering all exposed external surface areas of the accommodation areas as well as any structures of the escape routes that could be directly exposed to heat from a fire in the drilling area with a uniformly distributed water spray of at least 10 liters/m² per minute (0.25 gpm/ft²) for horizontal projected surfaces and 4 liters/m² per minute (0.1 gpm/ft²) for vertical surfaces. For structures having no clearly defined horizontal or vertical surfaces, the capacity of the water spray system should be the greater of the following:

- Projected horizontal surface multiplied by 10 liters/m² per minute (0.25 gpm/ft²); or
- Actual surface multiplied by 4 liters/m² per minute (0.1 gpm/ft²).

On vertical surfaces, spacing of nozzles protecting lower areas may take account of anticipated rundown from higher areas.

3.3.2 Distance between Nozzles

The vertical distance between any two (2) water spray nozzles providing protection for vertical surfaces is not to exceed 3.7 m (12 ft).

3.3.3 Stop Valves

Stop valves are to be fitted at intervals in the spray main for the purpose of isolating damaged sections. Alternatively, the system may be divided into two or more sections which may be operated independently provided the necessary controls are located together, in a position that would be readily accessible in the event of a fire in the industrial area.

3.3.4 Pipes, Valves, Nozzles, and Other Fittings

All pipes, valves, nozzles and other fittings in the water spray systems are to be:

- i) Resistant to corrosion by seawater, for which purpose galvanized pipe, for example, may be used, and
- ii) Not rendered ineffective by the heat of a fire.

3.3.5 Materials for Water Spray Systems in which Sea Water may be Retained

There is a potential for chloride pitting in the piping of water spray systems in which sea water may be retained within the piping system in a stagnant or low flow condition [i.e., less than 1 m/sec (3.28 ft/sec)]. Therefore, where there may be stagnant or low flow conditions, the following grades of stainless steel are not to be used for the piping or piping components:

- 304 and 304L stainless steels
- 316 and 316L stainless steels with a molybdenum content of less than 2.5%

Other stainless grades, when used, are to be confirmed suitable for the application by the manufacturer.

3.3.6 Materials for Water Spray System Maintained in a Dry Condition

Where the water spray system will be maintained in a dry condition and the system will only be exposed to seawater during actual operations of the water spray, 316 and 316L stainless steels with a molybdenum content of less than 2.5% may be used provided there are provisions to immediately flush the system with fresh water and then dry the internal portions of the system piping and components. The requirement for flushing and drying of the system and the procedures to carry out these efforts are to be clearly posted.

3.3.7 Remote Starting of Pumps

Remote starting of pumps supplying the water spray system and remote operation of any normally closed valves required to operate the system are to be arranged in suitable locations outside the industrial area, adjacent to the accommodation spaces and readily accessible and operable in the event of fire in an industrial area.

3.5 Means of Egress

3.5.1 Escape Routes

At least two (2) escape routes from the accommodation areas are to be arranged so as to minimize the possibility of having both routes blocked by a particular emergency situation within the industrial area.

3.5.2 Minimum Width

Escape routes are to have a minimum width of 0.71 m (28 in.).

3.5.3 Materials

All materials that comprise the escape routes are to be of steel or equivalent material. However, Fiber Reinforced Plastic (FRP) grating may be used if the layout is designed in accordance with Appendix 5-3-A1 of the *MODU Rules*, and provided that the FRP grating is approved as meeting the applicable criteria as defined in same.

5 Offshore Installations

5.1 Structural Boundaries Facing Industrial Areas

In addition to any specific provisions for fire integrity of bulkheads and decks in the ABS *Facilities Rules*, the exterior boundaries of accommodation areas (see definition in 1-1/9) and any escape routes from accommodation areas, including any overhanging decks supporting such spaces, are to comply with the following:

- i) Any portion within 45 m (148 ft) that could be exposed directly to the radiant heat from a fire in the industrial area is to have a boundary with an “H-60” fire integrity rating (the alternative indicated in note “d” of 3-6/Table 3A of the *Facilities Rules* is not permitted in this case).
- ii) Any portion within 30 m (98 ft) that could be exposed directly to the radiant heat from a fire in the industrial area is to be covered by a water spray system complying with 2-2/3.3 above.
- iii) All potential sources of jet fires (see *Note* below) which could possibly reach and impact the structure of accommodation areas are to be evaluated considering a worst case scenario. Where it is determined that a jet fire from that source could impact the structure of accommodation areas, arrangements are to be provided to further protect the structure. Those arrangements could be:
 - a) The installation of a “H” rated fire wall between the potential source of release and the structure of the accommodations areas of a size and location adequate to prevent the impact of the jet fire on the structure of the accommodation area and (2) a water spray system complying with 2-6/3.3 above over the area of the structure of the accommodation area within 10 m (33 ft) of the fire wall
 - b) The installation of an “H60/J30” fire rated bulkhead or deck, as discussed in 2-6/5.3 below, for any portion of the structure of the accommodations areas which face the potential source of the jet fire and is within 15 m (49 ft) of that source
 - c) Other arrangements determined by appropriate analysis or testing to provide an equivalent level of protection

The requirements in *a)*, *b)* and *c)* above need not be applied where (1) the structure has been evaluated through a detailed fire load analysis for the worst foreseen fire scenario, (2) that analysis establishes that the structural integrity of the bulkhead or deck as well as the protection against heat radiation remains within the limits established by the FTP Code during the entire time period of the worst case fire event, but not less than 120 minutes; and (3) that the analysis is submitted to and approved by ABS.

Note: For this Guide, sources of “jet fires” are considered to be valves, flanges, bolted connections, etc. in the industrial system that are maintained under pressure during industrial operations and could release a jet of flammable liquid or gas.

5.3 Jet Fire Integrity Rating

5.3.1 “H60/J30” Fire-rated Boundary

Where an “H60/J30” fire-rated boundary is selected in accordance with 2-6/5.1iii)b) above, the rating is to be understood to be a combination of:

- i) The “H60” structural fire protection rating as identified in the ABS *Facilities Rules*, and
- ii) A jet fire rating based on the methodology in ISO 22899, *Determination of the Resistance to Jet Fires of Passive Fire Protection Materials*, and applying the maximum point temperature rise requirement of 180°C (356°F) identified in Annex 1, Part 3 of the FTP Code on the backside of the protection system as the acceptance criteria.

5.3.2 Jet Fire Testing for Bulkhead and Deck Ratings

The jet fire testing procedure given in ISO 22899-1 using the panel testing configuration in section 6.6 of ISO 22899-1 is to be used with the panel thickness corresponding to the steel plate thickness used in the “H” rated fire testing. Instrumentation for the test is to follow Section 8.2 of ISO 22899-1.

5.5 Means of Egress

The two (2) escape routes from the accommodation areas are to be arranged so as to minimize the possibility of having both routes blocked by a particular emergency situation within the industrial areas.



CHAPTER 3 Machinery Spaces

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CHAPTER 3 Machinery Spaces

SECTION 1 General

1 General

1.1 Application

Vessels, MODUs, MOUs, and offshore installations complying with Chapter 1 of this Guide and having machinery spaces designed, constructed and equipped in accordance with this Chapter will be eligible to receive the class notation **EFP-M**.

1.3 Rules and Regulatory Requirements

In addition to complying with all requirements identified in Chapters 1 and 3 of this Guide, all fire safety systems and arrangements must also comply fully with all applicable Rule and Regulatory requirements (see 1-1/3.9 of this Guide).

3 Basic Principles

The fire safety requirements identified in this Chapter are based on the following principles:

- To limit the potential of flammable products coming into contact with heated surfaces
- To provide a means to detect a fire within a machinery space
- To provide appropriate means for the crew to control and extinguish a fire of the type and scale that is likely to occur in a machinery space
- To provide safe means of escape from any location within a machinery space in the event of a fire

CHAPTER 3 Machinery Spaces

SECTION 2 Fire Safety Arrangements

1 Machinery Arrangements

1.1 Segregation of Certain Equipment

The following equipment is not to be located in the same space as combustion engines or oil fired boilers:

- Fuel oil purifiers
- Oil fired thermal oil heaters
- Incinerators
- Hydraulic power units with a working pressure above 15.5 bar (15.8 kgf/cm², 225 psi), unless arrangements have been specifically evaluated by the attending Surveyor and shielding has been determined to be capable of preventing any released hydraulic mist from coming in contact with any surface in excess of 220°C (428°F).

1.3 Protection by Fixed Fire Extinguishing Systems

The spaces in which the above equipment are located are to be protected by the main fixed fire extinguishing system (see Chapter 3, Section 4 of this Guide) as well as a local fixed fire extinguishing system (see Chapter 3, Section 5 of this Guide).

1.5 Hydraulic Power Units of 15.5 bar and less

Hydraulic power units of 15.5 bar (15.8 kgf/cm², 225 psi) or less installed in the machinery space are to be provided with spray shielding if located within 10 m (33 ft.) of an internal combustion engine or boiler or within 3 m (10 ft) of an electric motor or similar electrical device.

1.7 Oil Tanks, Piping Containing Oil Under Pressure, and Oil Processing Equipment

Oil tanks, piping containing oil under pressure, oil processing equipment and similar machinery are to be arranged to minimize the danger of leakage and ignition. As a minimum, the arrangements are to comply with the following.

- i)* Sources containing oil under pressure and sources of ignition are to be separated to the greatest extent possible. Where oil spray from a release or leak may still have the ability to reach sources of ignition, spray shields are to be installed.
- ii)* Drip trays, or equivalent arrangements are to be provided under all pumps and similar equipment containing oil where leakage may occur during operation or maintenance.

1.9 Piping of an Oil System with a Working Pressure Above 15 Bar

Piping containing or transferring flammable fluids (see 1-1/9.17 for definition) with a working pressure above 15 bar (15.3 kgf/cm², 218 psi) that is located within a category A machinery space is to comply with the following:

- i) The piping is not to be routed above combustion machinery unless utilizing double wall piping that has arrangements to drain any leakage to the waste oil tank, or other suitable location.
- ii) All flanges and couplings are to be provided with metallic screens that have a small hole at the bottom to indicate leaks and divert leakage to a safe area. The requirement does not apply to flanges and couplings effectively screened from ignition sources (e.g., tight floor plating).

Note: These requirements need not be applied to oil piping that is within the separate space addressed in 3-2/1.1 above.

1.11 Fire Safety Related Equipment

Fire safety-related equipment (valves, actuators, controllers, etc.) in the machinery space required to operate during a fire in the space are to be located so that it will not be damaged by the heat of a fire in the area they serve. Where this is not practical, the equipment, as well as their sources of power and control, are to be provided with mechanical protection as well as structural fire protection arrangements to adequately protect it from damage due to the heat of a fire for the expected duration of a fire, but not less than two (2) hours.

3 Heated Surfaces

3.1 Heated Surfaces

All surfaces of machinery, equipment and piping within the machinery spaces which may be above 220°C (428°F) are to be adequately insulated and protected against coming into contact with flammable materials.

3.3 Insulation

Where required above, the insulation and insulating arrangements for the heated surfaces are to comply with the following:

- i) All insulation is to be of non-combustible material, and is to either have a surface that is impervious to oil or be adequately protected by a sheet metal or similar covering.
- ii) The protective covering and the insulation is to be arranged to allow for removal to accommodate inspection of the equipment, as necessary.
- iii) The insulation is to be suitable for the environment to which it will be exposed.
- iv) Alternative arrangements that would ensure that any released flammable fluid would not come into contact with the heated surface may be specially considered, as determined suitable to the attending Surveyor.

3.5 Verification with Infrared Scanning

- i) All surfaces of equipment, machinery, etc. within the machinery space that could have a temperature above 220°C (428°F) are to be examined by an infrared scanning camera while the equipment, machinery, etc. is operating at not less than 85% of its rated load.
- ii) The infrared scanning is to be carried out by qualified personnel to the satisfaction of the attending Surveyor. The calibration of the equipment is to be documented and the chosen emissivity factor justified.
- iii) A report is to be submitted to the attending Surveyor identifying all exposed surfaces in the machinery space with temperatures above 220°C (428°F).
- iv) Where the report indicates exposed surfaces in the machinery space with temperatures above 220°C (428°F), additional means are to be provided to reduce the temperature to 220°C (428°F) or below. Such means may include improved insulation or improved heat dissipation arrangements.
- v) The reduction of the surface temperatures to 220°C (428°F) or below is to be verified to the satisfaction of the attending Surveyor. Manual equipment (i.e., non-infrared equipment) may be used to verify that the arrangements provided have reduced the temperature to 220°C (428°F) or below.

5 Ventilation

5.1 Fans

At least one (1) of the fans serving each category A machinery space is to comply with the following:

- Have the ability to extract smoke and fumes from the machinery space (i.e., be reversible or otherwise capable of discharging air from the machinery space)
- Be supplied from both the main power supply and the emergency source of power.
- Have the starter panel, wiring and means of control located outside of the Category A machinery space
- If the cabling passes through high fire risk areas, it is to be of the fire-resistant type (see 4-8-3/9.7 and 4-8-4/1.11 of the *Steel Vessel Rules*)

5.3 Ventilation Air Inlets and Discharges

Each ventilation air inlet and discharge serving a machinery space is to be fitted with a damper or other closing device that complies with the following:

- i) Have the means to secure the damper in the closed position
- ii) Provided with controls from either:
 - The open deck, or
 - A space separated from the machinery space by A-60 boundaries and with access directly from the open deck
- iii) Have a hand lever located not more than 2 m (6.5 ft) above the deck
- iv) Have an indicator located adjacent to the controls showing the open or closed position

5.5 Dampers

All dampers required above are to be made of suitable corrosion resistant material.

7 Means of Egress

7.1 Engine Control Room

At least one of the egress routes from the engine control room is to be arranged so that it does not require personnel to enter into or pass through the engine room.

7.3 Other Machinery Spaces and Workshops

Any "other machinery space" and "workshop" (as defined in SOLAS) that is located within the machinery block is to be provided with at least one egress route that does not require personnel to enter into or pass through a category A machinery space.

CHAPTER 3 Machinery Spaces

SECTION 3 Fire Detection, Monitoring, and Controls

1 Machinery Space Fire Detection

1.1 Fire Detection System

A fire detection system complying with 4-7-2/1.13.1, 4-7-3/11 and 4-9-6/21.5 of the ABS *Steel Vessel Rules* and Chapter 9 of the IMO International Code for Fire Safety Systems (*FSS Code*) is to be provided for machinery spaces, regardless of whether or not the vessel or unit is intended to operate with reduced manning within the machinery spaces.

1.3 Coverage Area

All machinery spaces and workshops are to be covered by the fire detection system. This includes all “machinery spaces of category A” as well as “other machinery spaces”.

1.5 Types of Detectors

A minimum of at least two different types of fire detectors are to be provided for each category A machinery space.

1.7 Infrared Flame Detectors

All engines, heated fuel oil units, oil-fired boilers and similar equipment are to be covered by infrared flame detectors. No more than two adjacent pieces of equipment are to be covered by any one detector.

1.9 Response Time

The response time from when any detector(s) initiates an alarm to the activation of an alarm condition at the central unit is not to exceed five (5) seconds.

1.11 Workshops

Where smoke detectors are installed and occasional activities or operations in the area may result in nuisance alarms, the smoke detectors may be temporarily deactivated provided the system complies with the following arrangements:

- i) The detector is connected to a timer that automatically re-activates the detector after not more than twenty (20) minutes.
- ii) There is a clear indication at all fire detection control panels that the detector has been temporarily deactivated.
- iii) Heat detector(s) that will not be deactivated also cover the area.

3 TV Monitoring System

3.1 Coverage Area

A color TV monitoring system is to be provided and is to cover the areas containing the following equipment:

- i) All internal combustion engines with a rated power above 375 kW (500 hp), except the engine driving the emergency generator
- ii) Heated fuel oil separators
- iii) Oil-fired boilers
- iv) Any other oil-fired equipment

3.3 Viewing Stations

As a minimum, monitors to view the above equipment are to be provided at:

- i) The engine control room or other continuously manned station, and
- ii) The Machinery Space Fire Control Station required by 3-3/5 below.

3.5 Recording

The system is to be capable of continuously recording at least the last twenty-four (24) hours of operations and the recording device is to be located so that it will not be damaged from the heat of a fire within the machinery space.

5 Machinery Space Fire Control Station

5.1 General

A centralized fire control station is to be provided at the main machinery control station. Where a main control station is not provided, then the centralized fire control station is to be located at some other continuously manned station, such as the bridge. In any case, the centralized fire control station is to be separated from any category A machinery space with at least smoke tight divisions and is to have means for access and egress that are independent of any category A machinery space.

5.3 Controls

As a minimum, the centralized fire control station is to be provided with controls to carry out the following:

- i) Activate the local fixed extinguishing systems
- ii) Stop all fuel pumps serving the machinery space
- iii) Stop all ventilation fans serving the machinery space
- iv) Start the fire pump located outside of the machinery space and align any necessary valves

5.5 Fire Detection Panel and CCTV System

An indication panel for the fire detection system required by 3-3/1 of this Guide and a monitor for the CCTV system required by 3-3/3 of this Guide are to be located at the above mentioned station, in close proximity to the above controls.

5.7 Periodically Unmanned Propulsion Machinery Space

Where the vessel or unit will receive the **ACCU** notation, the arrangements identified in 3-3/5.1 through 3-3/5.5 above are to also be provided at the fire-fighting station required by 4-9-6/21 of the *Steel Vessel Rules*.

CHAPTER 3 Machinery Spaces

SECTION 4 Main Fixed Fire Extinguishing Systems

1 General

1.1 Types of Systems

Machinery spaces of category A are to be protected by one of the following fixed fire extinguishing systems:

- A CO₂ total flooding system
- A high expansion foam system
- A water mist system
- An equivalent gaseous agent

1.3 Additional Spaces to be Protected

The following spaces are to also be protected by a fixed fire extinguishing system that is suitable for the particular service involved:

- Spaces identified in 3-2/1.1 of this Guide
- Spaces containing main electric propulsion systems (if fitted). This includes electrical motors if inside the hull, as well as the switchboards and transformers serving such motors
- Spaces containing the main switchboards (of any size) and switchboards with capacity exceeding 1000 kW
- Machinery control room

1.5 General System Requirements

1.5.1 General

The main fixed fire extinguishing system is to comply with all applicable Rule and Regulatory requirements as well as the additional requirements identified in this Section.

1.5.2 High Voltage Equipment

The fixed fire extinguishing system selected to protect switchboard rooms or similar spaces is to be determined suitable for use on high voltage equipment.

1.5.3 Segregation of System Types

Bulkheads and decks having at least an “A-0” rating are to be provided between adjacent spaces where different types of main fixed fire extinguishing systems (e.g., gas and foam) are used.

1.5.4 Arrangements between Main Fixed and Local Fixed Fire Extinguishing Systems

Arrangements between the main fixed fire extinguishing system and the local fixed fire extinguishing system addressed in Chapter 3, Section 5 are to comply with the following requirements:

- i) The main fixed fire extinguishing system and the local fixed fire extinguishing system are to be completely independent systems and are not to have any interconnections of the piping or control systems, and
- ii) Either the main fixed fire extinguishing system or all local fixed fire extinguishing systems within the space are to be fully operable in a situation where all power supply from within the space engaged in the fire is not available and the emergency power system for the vessel or unit is out of operation.

3 High Pressure and Low Pressure CO₂ Total Flooding Systems

3.1 Quantity of CO₂ Gas

The minimum quantity of CO₂ gas is to be based on volume of not less than 40% of the protected space, including any casing.

3.3 Manual Operation

In addition to the required local control within the CO₂ storage room to activate the system, means are to also be provided for the crew to manually open each valve necessary to facilitate the release of CO₂ (i.e., via a handle or lever). The normal and local manual actuation positions for each such valve are to be clearly identified along with any necessary instructions and precautions needed to facilitate a safe release.

3.5 Pressure Relief

A pressure gauge is to be fitted on each CO₂ system manifold. In addition, a means to safely vent any CO₂ in the manifold out to the weather is to be provided.

3.7 CO₂ Release Stations – Marking and Instructions

The CO₂ system release stations are to be clearly marked and provided with clear instructions. Further, where a release station has the controls necessary to release CO₂ into more than one space, a principal diagram of the protected spaces and related controls is to be provided.

3.9 Section Valves

The moving parts of the CO₂ section valves are to be of corrosion-resistant materials (stainless steel or equivalent), and there is not to be any metal to metal contact between the main moving part (e.g., ball) and the valve housing of each valve.

5 Low Pressure CO₂ Total Flooding Systems

5.1 Indication of Liquid Level

Means are to be provided for the crew to directly determine the liquid level in the CO₂ storage tank. Float indicators are not considered as being equivalent to a direct means of level indication.

5.3 Bypass Valves

An adequately sized manual bypass valve is to be installed at the main tank valve and at each section valve. A placard stating required time for the valve to be open for each protected space is to be posted adjacent to the bypass valves.

7 Water Mist Systems

7.1 Pumps

Where the water mist system utilizes a pump for operations, a back-up pump of equivalent pressure and capacity is to be provided. The pumps are to be installed in a manner that minimizes the risk of both the primary and back-up pumps being put out of operation by a single event or cause.

7.3 Manual Operation of Valves

Where the system is designed to cover multiple spaces, arrangements are to be provided to manually open each section valve. Where this is not possible due to the type of valve involved (for instance valves operated on pilot pressure) a manual bypass valve, complying with 3-4/5.3 above, is to be provided in parallel with the section valve. A placard identifying the valve, its normal position and its operation is to be posted adjacent to the bypass valve.

9 High Expansion Foam Systems

9.1 Pumps

Where foam injection pumps are fitted, they are to be duplicated. The pump are to be installed in a manner that minimizes the risk of both pumps being taken out of operation at the same time by a single event or cause.

9.3 Operation with Exhaust Fan

The foam system is to be capable of operating simultaneously with the exhaust fan addressed in 3-2/5.1 of this Guide.

11 Equivalent Gaseous Agent

Any equivalent gaseous agent for the machinery spaces category A is to comply with the provisions identified in 4-7-3/3.11 of the *Steel Vessel Rules*.

CHAPTER **3** Machinery Spaces

SECTION **5** Fixed Local Application Fire Extinguishing Systems

1 General

1.1 Locations to be Protected

As a minimum, the following locations and equipment are to be protected by a local application fire extinguishing system:

- i)* The fire hazard portions of any internal combustion engines
- ii)* Turbochargers and other turbo machinery
- iii)* The fire hazard portions of the boiler front
- iv)* The fire hazard portions of incinerators
- v)* Heated and unheated fuel oil purifiers
- vi)* Oil-fired thermal oil heaters

1.3 Additional Requirements

The local fixed fire extinguishing system is to comply with the applicable ABS Rules, IMO MSC/Circ.1387, and the following additional requirements.

3 System Details and Information

The following information is to be provided in the engine control room:

- i)* Description of the operation of the system
- ii)* How many sections can be released simultaneously, based on available pump or accumulator capacity
- iii)* Instructions to stop ventilation to the space in which the protected area is located
- iv)* Guidelines for when and how to use the main fixed fire extinguishing system in case the local fixed fire extinguishing system does not extinguish the fire

5 Source of Power

5.1 Power Supply

The local fixed fire extinguishing system is to be provided with power from both the main and emergency power supply.

5.3 Loss of Power

Either the local fixed fire extinguishing system or the main fixed fire extinguishing system is to be fully operable in a situation where all power supply from the space on fire is not available and the emergency power system is out of operation (see 3-4/1.5.4ii).

5.5 Alternative Source of Power

The requirement in 3-5/5.3 above may be met by:

- i)* Accumulators having the extinguishing media stored under sufficient pressure at all times,
- ii)* Two independent pumps, each sized to supply the required flow rate and pressure, and each are driven by a dedicated diesel engine, or
- iii)* Other arrangements determined to meet 3-5/5.3 above.

5.7 Continued Operation

Where an accumulator is used to comply with 3-5/5.3 above, the system is to also be provided with a water pump that is capable of continuing to supply the system in a manner that complies with this Section after the pressure in the accumulator is expended.

5.9 Engine Driven Pump

Where the pump is to be driven by a diesel engine, the system is to be capable of delivering water at full pressure within twenty (20) seconds (time to be measured from the stand-by condition).

5.11 Environmental Conditions

The pump and its prime mover are to be suitable for operation in all possible temperatures in which they may be required to operate. Environment controls are to be provided, as needed.

7 System Arrangements

7.1 Independence from Main Fixed Fire Extinguishing System

The local fixed fire extinguishing system and main fixed fire extinguishing system are to be completely independent systems and are not to have any interconnections of the piping or control systems. See 3-4/1.5.4 of this Guide.

7.3 Capacity and Medium

The local fixed fire extinguishing system is to be capable of continuously supplying a fresh water-based medium for at least the first twenty (20) minutes. In the case that the fresh water tank used also serves other systems of the vessel, a low level alarm is to be provided at a height to ensure that sufficient amount of water remains in the tank for operation of the local fixed fire extinguishing system for the required time.

7.5 Pump Operation

Any pump is to be capable of operation under all conditions applicable to the emergency fire pump (see 3-6 of the Guide) without the use of a priming system.

7.7 Separation into Sections

Where the system is to be divided into sections within a machinery space, the arrangements are to comply with the following:

- i)* The pump capacity is to be sufficient to simultaneously cover any of the individual pieces of equipment identified in 3-5/1 above that are less than 3 m (10 ft) apart, including those arranged as separate sections.
- ii)* The water supply is to be designed to cover all auxiliary engines within a space or the main engine, whichever demands the largest water supply.
- iii)* Where multiple engine are installed, the system is to cover more than one-half the engines within the machinery space.

7.9 Section Valves

Each section valve is to comply with the following.

- i) Be capable of manual operation. Alternatively, a manual bypass valve may be fitted. Where fitted, the bypass valve is to comply with the arrangements identified in 3-4/5.3 of this Guide
- ii) Be located outside the protected area
- iii) Be readily accessible during a fire in the protected area
- iv) Provided with a placard identifying the section valve and if fitted, any bypass valve, their function, operation and clear operating instructions

7.11 Test, Drain and Isolation Valves

- i) The system is to be provided with test and drain valves. Where necessary for testing, isolation valves may also be provided
- ii) Each valve is to be located in a visible and easily accessible location and is to be clearly marked with its function as well as its intended position during normal system operations. Further, means to secure each valve in its position for normal system operations (i.e., non-testing position) are to also be provided. .
- iii) No valves or other devices which could possibly impede the proper operation of the system are to be installed downstream of the testing and isolation valves.
- iv) Test, drain and isolation valves are to be located outside the protected area and be readily accessible during a fire in the protected area.

7.13 Electrical Equipment in Area

The electrical and electronic equipment located within areas protected by Local Fixed Pressure Water-spraying or Water-mist Fire Extinguishing System and those within adjacent areas exposed to direct spray are to comply with 4-8-3/1.11.2 of the *Steel Vessel Rules*.

7.15 Activation Alarm

Activation of a local fixed fire extinguishing system is to be alarmed at the machinery fire control station and on the bridge.

9 Automatic Release

Automatic release for the local fixed fire extinguishing system is to be provided and is to comply with the following:

- i) The automatic release arrangements are to be operational even when the vessel is without main power, but not necessarily in the dead ship condition. In a dead ship condition, manual release from a readily accessible position is considered acceptable.
- ii) Not less than three detectors are to be provided for each section.
- iii) The fire detectors serving the local fixed fire extinguishing system are to be independent of the regular fixed fire detection and fire alarm system discussed in Chapter 3, Section 3 of this Guide.
- iv) All detectors are to be approved by a nationally recognized organization.

CHAPTER 3 Machinery Spaces

SECTION 6 Emergency Fire Pump

1 Emergency Fire Pump

1.1 Capacity

The capacity of the emergency fire pump is not to be less than 72 m³/hour (317 gpm) at the pressure required in 3-6/1.3 below. Where the emergency fire pump may be expected to supply other fire services simultaneously, the capacity of the emergency fire pump is to be increased accordingly.

1.3 Minimum Pressure

The emergency fire pump is to be able to maintain a minimum pressure of 5 bar (5.1 kgf/cm², 72.5 psi) at all hydrants that may be utilized during a fire in the machinery space while delivering two (2) jets of water from the most remote hoses that may be used to serve the machinery spaces.

1.5 Suction Head

The total suction head and net positive suction head of the above fire pump are to be such that the capacity and pressure requirements above will be obtained under all conditions of list, trim, roll and pitch which may be encountered in service, and calculations verifying the same are to be submitted.

1.7 Safety Margin

In selecting the pump, the minimum available net positive suction head is to provide a safety margin of at least 1 meter (3.3 feet) or 30% of required net positive suction head of the pump, whichever is less under all conditions.

1.9 Testing

Where the fire pump is driven by an electric motor, the ability of the pump to be started and operate satisfactorily is to be demonstrated to the satisfaction of the attending Surveyor while being supply only by the emergency generator while the emergency generator is supplying all other required emergency loads.

1.11 Environmental Conditions

The pump and its prime mover are to be suitable for operation in all possible temperatures in which they may be required to operate. Environment controls are to be provided, as needed.

1.13 Space Containing the Emergency or Standby Fire Pump

The location, access and ventilation of the space containing the emergency fire pump are to comply with SOLAS Ch. II-2/Reg. 10.2.2.3.2 and be provided with adequate emergency lighting to allow for operation as well as maintenance of the emergency fire pump and its prime mover.

CHAPTER 3 Machinery Spaces

SECTION 7 Outfitting

1 Portable and Semi-portable Fire Extinguishers

1.1 Number and Location

1.1.1 Type

Portable extinguishers are to be of an approved type and size (see 3-7/Table 1 below).

1.1.2 Extinguishers

As a minimum, portable and semi-portable extinguishers are to be provided in the sizes, quantities and locations indicated in 3-7/Table 1 and 3-7/Table 2. In all cases, the selection of the fire extinguishing medium is to be based on the fire hazard for the space protected. The fire extinguishers are to be visible and readily accessible.

1.1.3 Instructions

Instructions on the use of the portable extinguishers are to be posted in readily visible locations.

TABLE 1
Classification of Portable and Semi-Portable Extinguishers

Fire extinguishers are designated by types as follows: A, for fires in combustible materials such as wood; B, for fires in flammable liquids and greases; C, for fires in electrical equipment.

Fire extinguishers are designated by size where size II is the smallest and size V is the largest. Size II is a hand portable extinguisher, and sizes III, IV, and V are semi-portable extinguishers.

Classification ⁽²⁾		Water liters (U.S. gallons)	Foam liters (U.S. gallons)	Carbon Dioxide kg (lb)	Dry Chemical ⁽¹⁾ kg (lb)	Wet Chemical liters (U.S. gallons)
Type	Size					
A	II	9 (2.5)	9 (2.5)	—	5 (11)	9 (2.5)
B	II	—	9 (2.5)	5 (11)	5 (11)	—
B	III	—	45 (12)	15.8 (35)	9.0 (20)	—
B	V	—	152 (40)	45 (100)	22.5 (50)	—
C	II	—	—	5 (11)	5 (11)	—

Notes:

- 1 Must be specifically approved as type A, B, or C extinguisher.
- 2 Classification is based on NFPA standard. Portable fire extinguishers following ISO or EN standards have different classification; refer to EN-2 standard and to IMO Res. A.951(23).

TABLE 2
Hand Portable Fire Extinguishers and Semi-portable Fire-Extinguishing Systems for Machinery Spaces

<i>Space</i>	<i>Classification⁽¹⁾</i>	<i>Quantity and Location</i>
Machinery Spaces		
Central control station for propulsion machinery	A-II and/or C-II	1 required; when main switchboards are arranged in central control station, 1 additional suitable for electrical fires
Machinery spaces of Category A	B-II	2 required in each space, in addition to those required for the machinery located therein.
Spaces containing oil-fired boilers, either main or auxiliary, or their fuel units	B-V	1 required in each space.
Spaces containing main propulsion engines	B-II	4 on lower level, and 4 on platform level
	B-III	1 required in each space.
Internal combustion engines or gas turbines with total power output not less than 750 kW (1000 hp) other than main engines.	B-II	1 for each 750 kW (1000 hp) but not less than 2 nor more than 6 in each space.
	B-III	1 required in each space.
Internal combustion engines or gas turbines with total power output less than 750 kW (1000 hp) other than main engines.	B-II	1 outside the space containing engines or turbines in vicinity of exit. (See Note 2)
Electric generators, propulsion motors, thrusters that do not have enclosed ventilating system.	C-II	1 for each motor or generator.
Main switchboards	C-II	2 required in the vicinity of the switchboards. (See Note 2)
Electric emergency motors or generators	C-II	1 outside the space containing motors or generators in vicinity of exit. (See Note 2)
Enclosed space with oil-fired inert gas generators, incinerators and waste disposal units or oil fired thermal oil heater	B-II	2 required, 1 at the entrance to and 1 inside the space
Enclosed room with fuel oil purifiers	B-II	2 required, 1 at the entrance to and 1 inside the space
Workshops forming part of propulsion machinery spaces and other machinery spaces	B-II or C-II	1 required in each space.

Notes:

- 1 See 3-7/Table 1.
- 2 Vicinity is intended to mean within 1 m (3 ft).

1.3 Sand

Each firing space of a main or auxiliary oil-fired boiler is to be provided with a receptacle containing at least 0.28 m³ (10 ft³) of sand, sawdust impregnated with soda or other dry material suitable for extinguishing oil fires. Alternatively, an approved portable extinguisher may be substituted.

1.5 Portable Foam Applicator Units

1.5.1 Locations

A portable foam applicator unit complying with the below requirements is to be provided for each space containing an oil fired-boiler, an oil fuel unit, or internal combustion machinery.

1.5.2 Specification

A portable foam applicator unit is to consist of a foam nozzle/branch pipe, either of a self-inducing type or in combination with a separate inductor, capable of being connected to the fire main by a fire hose, together with a portable tank containing at least 20 liters (5.3 US gal.) of foam concentrate and at least one spare tank of foam concentrate of the same capacity.

1.5.3 System Performance

- i) The nozzle/branch pipe and inductor are to be capable of producing effective foam suitable for extinguishing an oil fire, at a foam solution flow rate of at least 200 liters/min (52.8 gpm) at the nominal pressure in the fire main.
- ii) The foam concentrate shall be approved by ABS based on the Guidelines for the Performance and Testing Criteria and Surveys of Low-expansion Foam Concentrates for Fixed Fire-extinguishing Systems (MSC/Circ.1312).
- iii) The values of the foam expansion and drainage time of the foam produced by the portable foam applicator unit are not to differ more than $\pm 10\%$ of that determined in 3-7/1.5.3ii) above.
- iv) The portable foam applicator unit is to be designed to withstand clogging, ambient temperature changes, vibration, humidity, shock, impact and corrosion normally encountered on ships.

3 Fire-fighter's Outfits

Fire-fighter's outfits as specified in Chapter 1, Section 4 of this Guide are to be provided. In addition, an emergency escape breathing device (EEBD) complying with Ch. 3/2.2 of the *FSS Code* is to be provided in the machinery space for every crew member assigned with machinery space duties.

CHAPTER 4 Cargo Decks and Cargo Spaces

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CHAPTER 4 Cargo Decks and Cargo Spaces

SECTION 1 Introduction

1 Application

1.1 General

Cargo vessels in the services listed below complying with the criteria identified in Chapter 1 of this Guide and the having fire safety arrangements in the cargo areas designed, constructed and equipped in accordance with Sections 2 through 7 of this Chapter, as applicable, will be eligible to receive the enhanced fire protection notation **EFP-C**.

The requirements and provisions in this Chapter are applicable to the following types of vessels:

- i)* Container carriers
- ii)* Oil carriers
- iii)* Chemical carriers
- iv)* Liquefied gas carriers (LNG, LPG)
- v)* General cargo carriers and dry bulk cargo carriers
- vi)* Vessels with ro-ro cargo spaces (e.g., vehicle carriers, general ro-ro vessels)

Note: Other types of cargo vessels are not covered in this Guide, and would be subject to special consideration.

1.3 Rules and Regulatory Requirements

In addition to complying with all requirements identified in Chapters 1 and 4 of this Guide, all fire safety systems and arrangements must also comply fully with all applicable Rule and Regulatory requirements (see 1-1/3.9 of this Guide).

3 Basic Principles

The fire safety requirements identified in this chapter are based on the following principles:

- To detect a fire in cargo spaces
- To provide appropriate means for the crew to control and extinguish a fire of the type and scale that is likely to occur in the cargo area

CHAPTER 4 Cargo Decks and Cargo Spaces

SECTION 2 Container Carriers

1 General

1.1 Application

Container carriers complying with the criteria identified in Chapter 1 of this Guide and having the fire safety arrangements in the cargo areas designed, constructed and equipped in accordance with this Section of the Guide, as applicable, will be eligible to receive the enhanced fire protection notation **EFP-C**.

3 Fire Extinguishing System – Enclosed Cargo Holds

3.1 Controls

The controls for the release of the fixed fire extinguishing medium into the cargo holds may be located in the medium storage room or remotely from a location near the house. In either case, the controls are to comply with the following.

- i)* Be readily accessible to the crew on duty
- ii)* In a location that will not be cut off by a fire in a protected cargo hold
- iii)* Grouped together and arranged for simple operation
- iv)* Have the ability to release different quantities of fire extinguishing media into different cargo holds
- v)* Provided with all instructions necessary for the release of the fire extinguishing medium including the amount to be released into each cargo hold under various scenarios

Where the above controls are not located in the medium storage room, the remote control arrangements are to be of robust construction and protected so as to remain operable in case of fire in a protected cargo hold.

3.3 High Pressure CO₂ System

Where a high pressure CO₂ system is utilized as the fixed fire extinguishing medium for the cargo holds, the arrangements are to also comply with the following.

- i)* The quantity of CO₂ available is to be sufficient to give a minimum volume of free gas equal to 40% of the gross volume of the largest hold.
- ii)* Comply with the requirements identified in 3-4/3 and 3-4/5 of this Guide, as applicable, for the CO₂ total flooding systems.

3.5 Other Types of Fire Extinguishing Systems

Other types of fire extinguishing systems are to comply with applicable requirements identified in Chapter 3, Section 4 of this Guide.

3.7 Medium Storage Room

The storage room for the fixed fire extinguishing medium is to be:

- i)* Easily accessible and in a location that will not be cut off by a fire in a protected cargo hold
- ii)* Provided with the controls necessary for the release of the fixed fire extinguishing medium

3.9 Piping

The piping for the fire extinguishing medium located outside the cargo spaces is to be galvanized or otherwise protected internally and externally against corrosion.

5 Fire Extinguishing System – Open Decks

The fire-fighting systems for on-deck cargo areas are to comply with the requirements for the class notation **FOC** or **FOC+** of the *ABS Guide for the Class Notation Fire-fighting Systems for On-deck Cargo Areas of Container Carriers*.

7 Outfitting

7.1 Communications – Radios

7.1.1 Number and Type

The vessel is to be provided with a minimum of ten (10) two-way portable radios of a similar type.

7.1.2 Installation inside Helmets

At least two (2) of the radios are to be suitable for installation inside the helmets of fire-fighter's outfits.

7.1.3 Relay Stations

If a radio in a cargo hold cannot communicate with the navigation bridge or another radio in another cargo hold, then stations for relaying the signals of the radios are to be provided.

7.3 Fire-fighter's Outfits

A total of at least eight (8) fire-fighter's outfits (i.e., the four (4) required by 1-4/3 of this Guide plus four (4) additional fire-fighter outfits) complying with Chapter 1, Section 4 of this Guide are to be provided for all container carriers.

CHAPTER 4 Cargo Decks and Cargo Spaces

SECTION 3 Oil Carriers

1 Application

Oil carriers complying with the criteria identified in Chapter 1 of this Guide and having the fire safety arrangements in the cargo areas designed, constructed and equipped in accordance with this Section of the Guide will be eligible to receive the enhanced fire protection notation **EFP-C**.

3 Gas Detection Systems

3.1 Application

Oil carriers, regardless of size, are to be provided with a fixed hydrocarbon gas detection system complying with 5C-1-7/20 of the *Steel Vessel Rules*.

3.3 Coverage Area

The fixed hydrocarbon gas detection system is to cover all spaces adjacent to cargo tanks and are to include ballast tanks, double-hull and double-bottom void spaces, the forepeak tank and any other tanks and spaces located adjacent to a cargo tank.

5 Inert Gas Systems

5.1 Application

The cargo tanks and double hull spaces within the cargo area of an oil carrier, regardless of size, are to be supplied with inert gas from a system complying with the provisions of 5C-1-7/19.3 and 5C-1-7/25 of the *Steel Vessel Rules*.

7 Cargo Pump Rooms

7.1 Fixed Fire Extinguishing System

The fixed fire extinguishing system protecting the cargo pump room is to also comply with the requirements identified in Chapter 3, Section 4 of this Guide for the type of system selected.

7.3 CO₂ Fixed Fire Extinguishing System

Where a fixed CO₂ system is provided, the available quantity of CO₂ gas is to be sufficient to give a minimum volume of free gas corresponding to 45% of the gross volume of the pump room.

7.5 Other Gas Fixed Fire Extinguishing Systems

Where a gas extinguishing medium other than CO₂ is provided, the quantity of gas to be provided is to be the larger of the quantity sufficient to provide a minimum volume of free gas equal to:

- i) At least 1.3 times the ideal extinguishing concentration for the cargoes in question, or
- ii) The concentration required by IMO MSC/Circ. 848, as amended by MSC/Circ. 1267.

7.7 Fire Detection System

Cargo pump rooms are to be fitted with a fire detection system that:

- i) Complies with Chapter 9 of the IMO International Code for Fire Safety Systems (*FSS Code*),
- ii) Is suitable for use in gas hazardous atmosphere, and
- iii) Is monitored from the navigation bridge as well as the cargo control room, if provided.

7.9 Portable Fire Extinguishers

Either a “B-II” foam (9 liters/2.5 gal) or “B-II” dry chemical (5 kg/11 lb) extinguisher is to be provided at each of the following locations of a cargo pump room:

- i) One (1) portable fire extinguisher in the vicinity of the entrance to the cargo pump room (within 1 m (3.3 ft) of the entrance); and
- ii) Two (2) portable fire extinguishers located in readily accessible positions in the lower portion of the cargo pump room.

The portable extinguishers are to be of an approved type.

9 Fire Main System

In addition to complying with the appropriate requirements for the fire main system in the ABS *Steel Vessel Rules* and IMO (e.g., SOLAS, *FSS Code*), the fire main system serving the cargo area is to also comply with the following additional requirements.

9.1 Arrangements

9.1.1 Fire Main on Deck

The fire main serving the cargo area is to have a loop or ring type configuration, with two (2) main lines running the length of the cargo block, one (1) located to the port side and one (1) located on the starboard side, separated across the beam of the vessel as far as practicable and cross-connected at both ends of the cargo deck area.

9.1.2 Isolation Valves

Arrangements are to be provided in the loop or ring type main so that any damaged portion can be isolated. As a minimum, stop valves are to be fitted in the following locations:

- i) The supply line(s) before the connection to the fire main loop or ring,
- ii) In the aft crossover in a manner that would allow either the port or starboard portion of the loop or ring to be supplied,
- iii) In the forward crossover near the centerline of the vessel; and
- iv) At intervals of not more than 40 meters (130 feet) between hydrants on the deck in the cargo tanks area.

9.1.3 Remote Control

Arrangements are to be provided to start and connect each main fire pump to the fire main system remotely from the navigation bridge.

9.1.4 Drainage

Drainage arrangements are to be provided to protect the fire main system exposed to the weather against freezing water damage.

9.3 Capacity

In addition to any other requirements, the total capacity of the fire pumps is to be sufficient to supply the required pressure and volume for the simultaneous operation of the following:

- i) The fire main system at the most hydraulically remote location in the cargo area,
- ii) All other fire-fighting systems that may be engaged during a fire in the cargo block that are served by the fire pumps, and
- iii) Any non-fire-fighting services supplied, unless capable of remote isolation from a manned control station.

9.5 Fire Hoses

9.5.1 Number

Vessels below 10,000 gross tons are to have at least nine (9) fire hoses readily available for use on the cargo deck, and vessels of 10,000 gross tons and above are to have at least twelve (12) fire hoses readily available.

9.5.2 Storage Arrangements

The above fire hoses together with all necessary fittings and tools are to be kept ready for use in boxes constructed of corrosion-resistant material. The boxes are to be in a location that would be accessible in the event of a fire in the cargo block and are to be well marked. Further, at least one (1) box with a minimum of three (3) hoses is to be provided on the cargo deck or within one level of the cargo deck in a protected location outside of the cargo block and next to the accommodations structure.

9.5.3 Diameter

The fire hoses are to have diameters of either 38 mm (1.5 in.) or 50 mm (2 in.), unless specifically approved otherwise. All couplings and connections associated with these hoses are to be interchangeable.

9.5.4 Other

The hoses provided in accordance with 4-3/9.5.1 above are to also be capable of being connected to and being supplied from the foam system addressed in 4-3/11 of this Guide. Hoses are to be made of synthetic fibers or equivalent nonperishable material and approved to a recognized standard.

9.7 Nozzles and Hydrants

9.7.1 Nozzles

All nozzles on board the vessel are to be of an approved dual purpose type incorporating a shutoff and constructed of material resistant to the effects of fire and to corrosion by water.

11 Deck Foam System

11.1 General

All oil carriers, including those of less than 4,000 tonnes deadweight, are to be provided with a deck foam system that complies with 5C-1-7/27 of the *Steel Vessel Rules* as well as the following additional requirements.

11.3 Arrangement

The arrangements for the deck foam fire extinguishing system are to comply with the following:

- i) The foam main is to be independent and arranged as a single line running along the center of the vessel.
- ii) Foam outlet branches are to be provided on both the port and starboard sides of the main for connecting foam applicators.
- iii) At least one foam hydrant, outfitted with a hose and applicator, is to be provided at the house front.
- iv) All necessary hoses, foam nozzles and fittings are to be kept ready for use in marked boxes made of corrosion-resistant materials placed adjacent to each foam hydrant.

11.5 Redundancy

The foam system is to be provided with two foam mixing units and two foam concentrate pumps with the following arrangements.

- i) Each combination of one (1) foam mixing unit and one (1) foam concentrate pump together with the water supply is to be capable of delivering the required amount of foam solution.
- ii) The foam concentration pumps are to be installed and the piping arranged in a manner that minimizes the risk of both pumps being put out of operation from a single event or cause.
- iii) Both foam mixing units, the foam concentrate pumps and the storage tank for the foam concentrate are to be located together in a readily accessible and dedicated space.

11.7 Water Supply

The water supply to the foam extinguishing system is to be capable of simultaneously supplying:

- i) The required rate of supply of foam required by Ch. 14/2.2.1.1 of the *FSS Code*,
- ii) One foam applicator with a capacity not less than 400 liters/min (106 gpm) from the foam main,
- iii) Any other fire-fighting systems that may be engaged during a fire in the cargo block that is served by the foam system water supply pumps, and
- iv) Any other non-fire-fighting services supplied, unless capable of remote isolation from a manned control station.

Unless the foam system water supply pumps are arranged with redundant capability, back-up arrangements from the main fire pumps are to be provided.

11.9 Foam Monitors

Each foam monitor, as a minimum, is to comply with the following:

- i) Constructed of corrosion-resistant materials
- ii) Allows swiveling of the discharge nozzle for adjusting the throw direction of the foam in both the horizontal and vertical planes, while in continuous operation. The vertical swivel range is to be at least plus or minus 45 degrees. The horizontal swivel range is to be able to reach any part of the deck intended to be protected
- iii) Arrangements to lock the discharge nozzle in any position within these ranges
- iv) The design configuration is to permit unattended operation once the monitor is locked in any position within the ranges of 4-3/11.9ii) above
- v) The design and construction of the monitor and its foundation is capable of withstanding the loads they will be subjected to on the open deck

11.11 Additional Requirements for Foam Monitors

The port and starboard foam monitors at the front of the poop or accommodation spaces and monitors covering cargo manifolds are to comply with the following:

- i) Arranged for remote control from the navigation bridge or from another protected area with a good view over the area covered by the monitors. The remote control arrangement is to cover the vertical as well as the horizontal movement of the monitors
- ii) In lieu of the locking device of 4-3/11.9iii) above, the design configuration is to minimize nozzle thrust reaction, permitting unattended operation once the monitor is placed in position without a locking device
- iii) Valves located within the cargo deck area supplying foam mixture to these monitors are to be capable of remote operation from the same position as the remote control for these monitors

11.13 Foam Concentrate

Foam concentrate sufficient for thirty (30) minutes of continuous foam production is to be stored onboard. The foam concentrate is to be synthetic based and not protein based.

13 Water Spray Protection for Lifeboats

13.1 General

Lifeboats not protected by steel bulkheads from the heat of a fire in the cargo area are to be protected by a water spray system.

13.3 System Arrangement

The water-spray system is to be arranged such that:

- i) All lifeboats are to be protected by spray nozzles. Nozzles are to be grouped into sections, with each section covering one (1) lifeboat. Each section of nozzles is to be capable of being isolated by one stop valve only. The stop valve in each section is to be readily accessible and able to be operated from the navigation bridge.
- ii) Nozzles are so located to maintain an average application rate of not less than 10 liters/min/m² (0.25 gpm/ft²) over the sides and top of each lifeboat.
- iii) All piping, valves and nozzles are suitably protected from damage and corrosion.
- iv) Drainage arrangements are to be provided to protect against freezing water damage.

13.5 System Capacity

The total pumping capacity is to be provided by at least two independently driven pumps. The pumps and the piping system are to be capable of maintaining the necessary pressure to provide a continuous output of water sufficient for the simultaneous coverage of all the on board lifeboats at the application rate specified in 4-3/13.3ii) above.

If pumps for other fire protection systems are used, they are to be provided with sufficient capacity to provide pressure and volume for adequate operation of the other fire protection systems and the water-spray system, simultaneously.

15 Outfitting

15.1 Portable Foam Applicators

A minimum of four (4) portable foam applicator units, complying with 4-7-3/15.3 of the *Steel Vessel Rules* are to be provided and stored in the following locations:

- i) Two (2) units at the front of the poop or accommodation spaces facing the cargo area, and
- ii) Two (2) units at suitable positions for ready use on the cargo manifolds

15.3 Fire-fighter's Outfits

A total of at least six (6) fire-fighter's outfits (i.e., the four (4) required by 1-4/3 of this Guide plus two (2) additional fire-fighter outfits) complying with Chapter 1, Section 4 of this Guide are to be provided.

15.5 Emergency Escape Breathing Devices

At least two (2) Emergency Escape Breathing Devices (EEBDs) are to be provided in any cargo or ballast pump room of an oil carrier.

CHAPTER 4 Cargo Decks and Cargo Spaces

SECTION 4 Chemical Carriers

1 Application

Chemical carriers carrying flammable products that comply with Chapter 1 of this Guide and have the fire safety arrangements in the cargo areas designed, constructed and equipped in accordance with this Section of the Guide will be eligible to receive the enhanced fire protection notation **EFP-C**.

This Section is not intended to address chemical carriers that only carry non-flammable cargoes.

3 Gas Detection Systems

3.1 Application

Chemical carriers, regardless of size, carrying toxic or flammable products or both are to be provided with a fixed vapor detection system for measuring the specific vapor concentrations.

The vapor detection system is to comply with 5C-9-13/2 of the *Steel Vessel Rules* and is to be designed and calibrated for the specific vapors to be carried.

3.3 Coverage Area

All spaces adjacent to cargo tanks are to be covered by the fixed vapor detection system. These are to include ballast tanks, double-hull and double-bottom void spaces, the forepeak tank and any other tanks and spaces located adjacent to a cargo tank.

5 Inert Gas Systems

5.1 Application

The cargo tanks and the double hull spaces within the cargo area of chemical carriers, regardless of size, are to be provided with an inert gas system complying with 5C-1-7/19.3 and Annex 5C-9-A3 of the *Steel Vessel Rules*.

7 Cargo Pump Rooms

7.1 Fixed Fire Extinguishing System

The fixed fire extinguishing system protecting the cargo pump room is to also comply with the requirements identified in Chapter 3, Section 4 of this Guide for the type of system selected.

7.3 CO₂ Fixed Fire Extinguishing System

Where a fixed CO₂ system is provided, the available quantity of CO₂ gas is to be sufficient to give a minimum volume of free gas corresponding to 45% of the gross volume of the pump room.

7.5 Other Gas Fixed Fire Extinguishing Systems

Where a gas extinguishing medium other than CO₂ is provided, the quantity of gas to be provided is to be the larger of the quantity sufficient to provide a minimum volume of free gas equal to:

- i) At least 1.3 times the ideal extinguishing concentration for the cargoes in question, or
- ii) The concentration required by IMO MSC/Circ. 848, as amended by MSC/Circ. 1267.

7.7 Fire Detection System

Cargo pump rooms are to be fitted with a fire detection system that:

- i) Complies with Chapter 9 of the IMO International Code for Fire Safety Systems (*FSS Code*),
- ii) Is suitable for use in gas hazardous atmosphere, and
- iii) Is monitored from the navigation bridge as well as the cargo control room, if provided.

7.9 Portable Fire Extinguishers

Either a “B-II” foam (9 liters/2.5 gal) or “B-II” dry chemical (5 kg/11 lb) extinguisher is to be provided at each of the following locations of a cargo pump room:

- i) One (1) portable fire extinguisher in the vicinity of the entrance to the cargo pump room (within 1 m (3.3 ft) of the entrance); and
- ii) Two (2) portable fire extinguishers located in readily accessible positions in the lower portion of the cargo pump room.

The portable extinguishers are to be of an approved type.

9 Fire Main System

In addition to complying with the appropriate requirements for the fire main system in the ABS *Steel Vessel Rules* and IMO (e.g., SOLAS, IBC Code), the fire main system serving the cargo area is to also comply with the following additional requirements.

9.1 Arrangements

9.1.1 Fire Main on Deck

The fire main serving the cargo area is to have a loop or ring type configuration, with two (2) main lines running the length of the cargo tanks deck area, one (1) located to the port side and one (1) located on the starboard side, separated across the beam of the vessel as far as practicable and cross-connected at both ends of the tank deck area.

9.1.2 Isolation Valves

Arrangements are to be provided in the loop or ring type main so that any damaged portion can be isolated. As a minimum, stop valves are to be fitted in the following locations:

- i) The supply line(s) before the connection to the fire main loop or ring,
- ii) In the aft crossover in a manner that would allow either the port or starboard portion of the loop or ring to be supplied,
- iii) In the forward crossover near the centerline of the vessel, and
- iv) At intervals of not more than 40 meters (130 feet) between hydrants on the deck in the cargo tanks area

9.1.3 Remote Control

Arrangements are to be provided to start and connect each main fire pump to the fire main system remotely from the navigation bridge.

9.1.4 Drainage

Drainage arrangements are to be provided to protect the fire main system exposed to the weather against freezing water damage.

9.3 Capacity

In addition to any other requirements, the total capacity of the fire pumps is to be sufficient to supply the required pressure and volume for the simultaneous operation of the following:

- i) The fire main system at the most hydraulically remote location in the cargo area,
- ii) All other fire-fighting systems that may be engaged during a fire in the cargo block that are served by the fire pumps, and
- iii) Any non-fire-fighting services supplied, unless capable of remote isolation from a manned control station.

9.5 Fire Hoses

9.5.1 Number

Vessels below 10,000 gross tons are to have at least nine (9) fire hoses readily available for use on the cargo deck, and vessels of 10,000 gross tons and above are to have at least twelve (12) fire hoses readily available.

9.5.2 Storage Arrangements

The above fire hoses together with all necessary fittings and tools are to be kept ready for use in boxes constructed of corrosion-resistant material. The boxes are to be in a location that would be accessible in the event of a fire in the cargo block and are to be well marked. Further, at least one (1) box with a minimum of three (3) hoses is to be provided on the cargo deck or within one level of the cargo deck in a protected location outside of the cargo block and next to the accommodations structure.

9.5.3 Diameter

The fire hoses are to have diameters of either 38 mm (1.5 in.) or 50 mm (2 in.), unless specifically approved otherwise. All couplings and connections associated with these hoses are to be interchangeable.

9.5.4 Other

The hoses provided in accordance with 4-3/9.5.1 above are to also be capable of being connected to and being supplied from the foam system addressed in 4-4/11 of this Guide. Hoses are to be made of synthetic fibers or equivalent nonperishable material and approved to a recognized standard.

9.7 Nozzles and Hydrants

9.7.1 Nozzles

All nozzles on board the vessel are to be of an approved dual purpose type incorporating a shutoff and constructed of material resistant to the effects of fire and to corrosion by water.

11 Deck Foam System

11.1 General

All chemical carriers, including those of less than 4,000 tonnes deadweight, are to be provided with a deck foam system that complies with Section 5C-9-11 of the *Steel Vessel Rules* for the type of vessel involved as well as the following additional requirements.

11.3 Arrangement

The arrangements for the deck foam fire extinguishing system are to comply with the following:

- i) The foam main is to be independent and arranged as a single line running along the center of the vessel.
- ii) Foam outlet branches are to be provided on both the port and starboard sides of the main for connecting foam applicators.

- iii) At least one foam hydrant, outfitted with a hose and applicator, is to be provided at the house front.
- iv) All necessary hoses, foam nozzles and fittings are to be kept ready for use in marked boxes made of corrosion-resistant materials placed adjacent to each foam hydrant.

11.5 Redundancy

The foam system is to be provided with two foam mixing units and two foam concentrate pumps with the following arrangements.

- i) Each combination of one (1) foam mixing unit and one (1) foam concentrate pump together with the water supply is to be capable of delivering the required amount of foam solution.
- ii) The foam concentration pumps are to be installed and the piping arranged in a manner that minimizes the risk of both pumps being put out of operation from a single event or cause.
- iii) Both foam mixing units, the foam concentrate pumps and the storage tank for the foam concentrate are to be located together in a readily accessible and dedicated space.

11.7 Water Supply

The water supply to the foam extinguishing system is to be capable of simultaneously supplying:

- i) The required rate of supply of foam required by Ch. 14/2.2.1.1 of the *FSS Code*,
- ii) One foam applicator with a capacity not less than 400 liters/min (106 gpm) from the foam main,
- iii) Any other fire-fighting systems that may be engaged during a fire in the cargo block that is served by the foam system water supply pumps, and
- iv) Any other non-fire-fighting services supplied, unless capable of remote isolation from a manned control station.

Unless the foam system water supply pumps are arranged with redundant capability, back-up arrangements from the main fire pumps are to be provided.

11.9 Foam Monitors

Each foam monitor, as a minimum, is to comply with the following:

- i) Constructed of corrosion-resistant materials
- ii) Allows swiveling of the discharge nozzle for adjusting the throw direction of the foam in both the horizontal and vertical planes, while in continuous operation. The vertical swivel range is to be at least plus or minus 45 degrees. The horizontal swivel range is to be able to reach any part of the deck intended to be protected
- iii) Arrangements to lock the discharge nozzle in any position within these ranges
- iv) The design configuration is to permit unattended operation once the monitor is locked in any position within the ranges of 4-4/11.9ii) above
- v) The design and construction of the monitor and its foundation is capable of withstanding the loads they will be subjected to on the open deck

11.11 Additional Requirements for Foam Monitors

The port and starboard foam monitors at the front of the poop or accommodation spaces and monitors covering cargo manifolds are to comply with the following:

- i) Arranged for remote control from the navigation bridge or from another protected area with a good view over the area covered by the monitors. The remote control arrangement is to cover the vertical as well as the horizontal movement of the monitors
- ii) In lieu of the locking device of 4-4/11.9iii) above, the design configuration is to minimize nozzle thrust reaction, permitting unattended operation once the monitor is placed in position without a locking device
- iii) Valves located within the cargo deck area supplying foam mixture to these monitors are to be capable of remote operation from the same position as the remote control for these monitors

11.13 Foam Concentrate

Foam concentrate sufficient for thirty (30) minutes of continuous foam production is to be stored onboard. The foam concentrate is to be synthetic based and not protein based.

13 Water Spray Protection for Lifeboats

13.1 General

Lifeboats not protected by steel bulkheads from the heat of a fire in the cargo area are to be protected by a water spray system complying with 4-3/13 of this Guide.

15 Outfitting

15.1 Portable Foam Applicators

A minimum of four (4) portable foam applicator units, complying with 4-7-3/15.3 of the *Steel Vessel Rules*, are to be provided and stored in the following locations:

- i) Two (2) units at the front of the poop or accommodation spaces facing the cargo area, and
- ii) Two (2) units at suitable positions for ready use on the cargo manifolds

15.3 Fire-fighter's Outfits

A total of at least six (6) fire-fighter's outfits (i.e., the four (4) required by 1-4/3 of this Guide plus two (2) additional fire-fighter outfits) complying with Chapter 1, Section 4 of this Guide are to be provided.

15.5 Emergency Escape Breathing Devices

At least two (2) Emergency Escape Breathing Devices (EEBDs) are to be provided in any cargo or ballast pump room of a chemical carrier.



CHAPTER 4 Cargo Decks and Cargo Spaces

SECTION 5 Liquefied Gas Carriers (LNG, LPG)

1 Application

Liquefied Gas (LNG and LPG) Carriers that comply with Chapter 1 of this Guide and have the fire safety arrangements in the cargo areas designed, constructed and equipped in accordance with this Section of the Guide will be eligible to receive the enhanced fire protection notation **EFP-C**.

3 Fire Main System

3.1 General

The fire main system is to comply with the requirements of 4-3/9 of this Guide, except for the reference in 4-3/9.5.4 to foam service.

5 Dry Chemical Powder Fire-Extinguishing System

5.1 General

In addition to the requirements of 5C-8-11/4 of the *Steel Vessel Rules*, dry chemical powder fire-extinguishing systems are to comply with the following additional requirements.

5.3 Capacity

A sufficient quantity of dry chemical powder is to be stored in each container to provide a minimum sixty (60) second discharge time when all attached hand hose lines and monitors are operated simultaneously.

5.5 Pressure Gas and Piping

Industrial grade nitrogen with a dew point of -50°C (-58°F) or lower is to be used as the expellant gas (i.e., pressure gas) to discharge the dry chemical powder. Pressure gas piping is to be regarded as class I piping. However, the main powder piping can be classified as class III piping (see 4-6-1/5 of the *Steel Vessel Rules* for “class” of piping).

5.7 Materials

The powder distribution lines and the pressure gas lines are to be constructed of type 316 stainless steel or equivalent corrosion-resistant materials having melting points of at least 925°C (1700°F).

5.9 Distance of Fixed Piping between the Powder Container and the Monitors

The distance of fixed piping between the powder container and the monitors is to be limited to 10 meters (33 feet). However, longer distances may be considered provided full-scale testing has documented that the length of piping:

- i) Is capable of maintaining the powder in a fluidized state during both sustained and intermittent use,
- ii) Can be purged of powder when the system is shut down, and
- iii) Has means to avoid free water in the line.

5.11 Dry Chemical Powder Hose Station

Each dry chemical powder hose station is to consist of:

- i)* One (1) dry powder hose line with trigger nozzle, and
- ii)* One (1) nitrogen gas container for pneumatic release of the system.

The above equipment is to be stored in boxes that are:

- i)* Clearly marked,
- ii)* Made of corrosion-resistant materials and,
- iii)* Provided with instructions for operation of the system.

7 Fire Protection for Cargo Handling Spaces and Equipment

7.1 Cargo Handling Spaces

The following spaces are to be provided with fire safety systems complying with 4-5/7.3 through 4-5/7.9 below:

- i)* Cargo compressor room,
- ii)* Cargo re-liquefaction room, if fitted, and
- iii)* Any electrical equipment room or other such spaces located in the cargo area.

7.3 Fixed Fire Extinguishing System

The fixed fire extinguishing system protecting the cargo pump room is to also comply with the requirements identified in Chapter 3, Section 4 of this Guide for the type of system selected.

7.5 CO₂ Fixed Fire Extinguishing System

Where a fixed CO₂ system is provided, the available quantity of CO₂ gas is to be sufficient to give a minimum volume of free gas corresponding to 45% of the gross volume of the pump room.

7.7 Other Gas Fixed Fire Extinguishing Systems

Where a gas extinguishing medium other than CO₂ is provided, the quantity of gas to be provided is to be the larger of the quantity sufficient to provide a minimum volume of free gas equal to:

- i)* At least 1.3 times the ideal extinguishing concentration for the cargoes in question, or
- ii)* The concentration required by IMO MSC/Circ. 848, as amended by MSC/Circ. 1267.

7.9 Fire Detection System

A fire detection system approved for use in gas hazardous atmosphere is to be provided and monitored from the navigation bridge.

7.11 Gas Venting Arrangement

Venting mast risers for cargo tank venting systems are to be provided with a fixed system for extinguishing a fire at the vent outlet. Nitrogen, CO₂ or any other suitable medium is acceptable.

9 Water Spray Protection in Cargo Area

9.1 Water Spray for Cargo Manifold Area

In addition to the fixed water spray arrangements required in 5C-8-11/3.1.3 of the *Steel Vessel Rules*, the cargo manifold area is to also be covered by fixed water monitor(s) complying with the following:

- i) The monitor(s) are to be supplied with water from the fire main.
- ii) The monitor(s) are to be in the same location as the dry chemical powder monitor(s) addressed in 5C-8-11/4.3 of the *Steel Vessel Rules*.
- iii) The monitors are to be capable of providing a horizontal coverage of the manifolds and at least 1.5 meters (4.9 ft) to each side and 1.5 meters (4.9 ft) forward and aft from the manifold connections.
- iv) The water spray coverage rate of the area identified in 4-5/9.1iii) above is to not be less than 10 liter/min/m² (0.25 gpm/ft²).

9.3 Control Arrangements for Water Monitors and Stop Valves

The water monitors and stop valves for water supply to the monitors are to be arranged with both local manual operation and remote operation from a position outside the cargo tanks deck area and accessible in the event of a fire in the cargo area.

9.5 Water Spray Piping

All piping in the water spray system required by 5C-8-11/3 of the *Steel Vessel Rules* is to be made of copper-nickel alloy or equivalent corrosion-resistant materials.

11 Water Spray Protection for Lifeboats

Lifeboats not protected by steel bulkheads from the heat of a fire in the cargo area are to be protected by a water spray system complying with 4-3/13 of this Guide.

13 Outfitting

A total of at least eight (8) fire-fighter's outfits (i.e., the four (4) required by 1-4/3 of this Guide plus four (4) additional fire-fighter outfits) complying with Chapter 1, Section 4 of this Guide are to be provided for all liquefied gas carriers.

CHAPTER 4 Cargo Decks and Cargo Spaces

SECTION 6 General Cargo Carriers and Dry Bulk Cargo Carriers

1 Application

1.1 General

General cargo carriers and dry bulk cargo carriers that comply with Chapter 1 of this Guide and have the fire safety arrangements in the cargo areas designed, constructed and equipped in accordance with this Section of the Guide will be eligible to receive the enhanced fire protection notation **EFP-C**.

1.3 Vessels with Exemption Certificates

As indicated in 1-1/3.9 of this Guide, vessels exempted from IMO requirements are not eligible for these optional notations. Therefore, a vessel having an exemption certificate cannot be assigned the **EFP-C** notation unless it has been determined that all requirements which would normally be applicable to a similar type of non-exempt vessel have been met.

3 Fire Detection

3.1 Dry Cargo Holds

A smoke extraction or heat detection system is to be fitted in all dry cargo holds. The system is to automatically indicate the presence of smoke or abnormal heat in any cargo hold on the navigation bridge.

5 Fire Main System

5.1 Fire Main on Deck

The quantity of water delivered through the fire main by the combined fire pumps is to be capable of supplying four (4) nozzles at a minimum pressure of 2.7 bar (2.8kgf/cm², 40 psi) through the most hydraulically remote hydrants in the cargo area. The number and location of the hydrants on deck is to be such as to provide the required four (4) jets of water through at least two single length hoses (each of the other two jets of water through two hoses connected in series).

7 Fixed Fire Extinguishing System for Cargo Holds

7.1 Medium Storage Room

The storage room for the fixed fire extinguishing medium is to be:

- i) Easily accessible and in a location that will not be cut off by a fire in a protected cargo hold.
- ii) Provided with the controls necessary for the release of the fixed fire extinguishing medium.

7.3 Controls

The controls for the release of the fixed fire extinguishing medium into the cargo holds may be located in the medium storage room or remotely from a location near the house. In either case, the controls are to comply with the following.

- i) Be readily accessible to the crew on duty
- ii) In a location that will not be cut off by a fire in a protected cargo hold
- iii) Grouped together and arranged for simple operation
- iv) Have the ability to release different quantities of fire extinguishing media into different cargo holds
- v) Provided with all instructions necessary for the release of the fire extinguishing medium including the amount to be released into each cargo hold under various scenarios.
- vi) Where the above controls are not located in the medium storage room, the remote control arrangements are to be of robust construction and protected so as to remain operable in case of fire in a protected cargo hold

7.5 High Pressure CO₂ System

Where a high pressure CO₂ system is utilized as the fixed fire extinguishing medium for the cargo holds, the arrangements are to also comply with the following.

- i) The quantity of CO₂ available is to be sufficient to give a minimum volume of free gas equal to 40% of the gross volume of the largest hold.
- ii) The system is to comply with the requirements identified in 3-4/3 of this Guide for the CO₂ total flooding systems.

7.7 Other Types of Fire Extinguishing Systems

Other types of fire extinguishing systems are to comply with applicable requirements identified in Chapter 3, Section 4 of this Guide.

7.9 Piping

The piping for the fire extinguishing medium located outside the cargo spaces is to be galvanized or otherwise protected internally and externally against corrosion.

9 Outfitting

Fire-fighter's outfits as specified in Chapter 1, Section 4 of this Guide (i.e., the four (4) required by 1-4/3 of this Guide) are to be provided.

CHAPTER 4 Cargo Decks and Cargo Spaces

SECTION 7 Vessels with Ro-Ro Decks (Vehicle Carriers and General Ro-Ro Vessels)

1 Application

Vessels with ro-ro cargo spaces (e.g., vehicle carriers, general ro-ro vessels) that comply with Chapter 1 of this Guide and have the fire safety arrangements in the cargo areas designed, constructed and equipped in accordance with this Section of the Guide will be eligible to receive the enhanced fire protection notation **EFP-C**.

3 Fire Detection and Monitoring

3.1 Addressable Fire Detection and Fire Alarm System

All ro-ro decks and special category spaces are to be covered by an addressable fire detection and alarm system that incorporates the following arrangements.

- i)* All areas on the ro-ro decks and in special category spaces are to be provided with combination smoke and heat detectors.
- ii)* The indication panel of the alarm system is to be located at a manned station.
- iii)* The indication panel is to graphically display the location of the alarm point on a display of the general layout of the vessel.

3.3 CCTV Fire Monitoring System

All decks including moveable decks are to be provided with a color television monitoring system. The system is to be monitored from a manned control station.

5 Fire Extinguishing Systems

5.1 High Pressure CO₂ Systems

5.1.1 General

The high pressure CO₂ system is to also comply with the requirements for the CO₂ total flooding system in 3-4/3 of this Guide.

5.1.2 Fire Main Connection

In order to cool down a space on fire after release of CO₂ or in case of the failure of the CO₂ system, the vessel is to be fitted with a connection from the fire main system to the CO₂ discharge piping. This arrangement is to comply with the following:

- i)* The connection need not to be fixed. The use of movable (non-fixed) pipe sections such as spool pieces or fire hoses is permitted.
- ii)* The arrangements are to allow the release of fire main water through any of the CO₂ section valves.
- iii)* Any non-fixed fittings or components needed to make the connection along with the necessary tools are to be stored together in a location that will be readily accessible in the event of a fire in the cargo spaces.

5.3 Low Pressure CO₂ Systems

5.3.1 General

The low pressure CO₂ system is to also comply with the requirements for the fixed low pressure CO₂ total flooding system in 3-4/3 and 3-4/5 of this Guide.

5.3.2 Fire Main Connection

The low pressure CO₂ system is to be provided with a fire main connection complying with 4-7/5.1.2 of this Guide.

5.5 High Expansion Foam System

5.5.1 General

Where the use of a high expansion foam system is determined acceptable (see 5C-10-4/3.3.1(a) of the *Steel Vessel Rules*), it is to also comply with the requirements in 3-4/9 of this Guide and the following.

5.5.2 Operation with Exhaust Fan

The foam system and at least one exhaust fan is to be capable of simultaneous operation. This fan can be served by power from the main switchboard, but power and control cables are to be routed independent of the protected space.

7 Outfitting

7.1 Portable Fire Extinguishers

The required portable extinguishers in the ro-ro spaces are to be approved “B-II” foam (9 liters/2.5 gal) or dry chemical (5 kg/11 lb) extinguishers.

7.3 Communications - Radios

7.1.1 Number and Type

The vessel is to be provided with a minimum of ten (10) two-way portable radios of a similar type.

7.1.2 Installation inside Helmets

At least two (2) of the radios are to be suitable for installation inside the helmets of fire-fighter’s outfits.

7.1.3 Relay Stations

If a radio in the ro-ro space cannot communicate with the navigation bridge or another radio in another space, then stations for relaying the signals of the radios are to be provided.

7.5 Fire-fighter’s Outfits

A total of at least eight (8) fire-fighter's outfits (i.e., the four (4) required by 1-4/3 of this Guide plus four (4) additional fire-fighter outfits) complying with Chapter 1, Section 4 of this Guide are to be provided for all vessels with ro-ro decks.

CHAPTER 5 Industrial Areas

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CHAPTER 5 Industrial Areas

SECTION 1 General

1 Application

1.1 General

Mobile Offshore Drilling Units (MODUs), as well as fixed and floating offshore installations complying with Chapter 1 of this Guide and having fire safety arrangements in the industrial areas designed, constructed and equipped in accordance with the requirements in this Chapter, will be eligible to receive the enhanced fire protection notation **EFP-IA**.

1.3 Rules and Regulatory Requirements

In addition to complying with all requirements identified in Chapters 1 and 5 of this Guide, all fire safety systems and arrangements must also comply fully with all applicable Rule and Regulatory requirements (see 1-1/3.9 of this Guide).

3 Basic Principles

The fire safety requirements identified in this chapter are based on the following principles:

- To limit the potential of flammable products coming into contact with heated surfaces
- To provide a means to detect and quickly identify the location of a fire within an industrial area
- To provide appropriate means for the crew to control and extinguish a fire of the type and scale that is likely to occur in an industrial area
- To provide safe means of escape from any location within an industrial area in the event of a fire



CHAPTER 5 Industrial Areas

SECTION 2 Fire Safety Arrangements

1 Heated Surfaces

1.1 Application

All surfaces in the industrial areas that could have a temperature above 220°C (428°F) are to be insulated in accordance with 5-2/1.3 below, unless the attending Surveyor is satisfied that the surface is of a sufficient distance away from any possible release point of a flammable fluid (pump, tank, valve, flange, etc.) that it does not represent a fire hazard.

1.3 Insulation

Where required above, the insulation and insulating arrangements for heated surfaces are to comply with the following:

- i)* All insulation is to be of non-combustible material, and is to either have a surface that is impervious to oil or be adequately protected by a sheet metal or similar covering.
- ii)* The protective covering and the insulation is to be arranged to allow for removal to accommodate inspection of the equipment, as necessary.
- iii)* The insulation is to be suitable for the environment to which it will be exposed.
- iv)* Alternative arrangements that would ensure that any released flammable fluid would not come into contact with the heated surface may be specially considered, as determined suitable to the attending Surveyor.

1.5 Verification with Infrared Scanning

- i)* All surfaces of equipment, machinery, etc., described in 5-2/1.1 above are to be examined by an infrared scanning camera while the equipment, machinery, etc. is operating at not less than 85% of its rated load.
- ii)* The infrared scanning is to be carried out by qualified personnel to the satisfaction of the attending Surveyor. The calibration of the equipment is to be documented and the chosen emissivity factor justified.
- iii)* A report is to be submitted to the attending Surveyor identifying all exposed surfaces with temperatures above 220°C (428°F).
- iv)* Unless exempted in accordance with 5-2/1.1 above, additional means are to be provided to reduce the temperature of all surfaces identified in the report to 220°C (428°F) or below. Such means may include improved insulation or improved heat dissipation arrangements.
- v)* The reduction of the surface temperatures to 220°C (428°F) or below is to be verified to the satisfaction of the attending Surveyor. Manual equipment (i.e., non-infrared equipment) may be used to verify that the arrangements provided have reduced the temperature to 220°C (428°F) or below.

3 Arrangements in the Industrial Area

3.1 Tanks, Piping under Pressure, Processing Equipment, and Similar Equipment

Tanks, piping under pressure, processing equipment and similar machinery are to be arranged to minimize the danger of leakage and ignition. As a minimum, the arrangements are to comply with the following.

- i)* Sources containing flammable fluid under pressure and sources of ignition are to be separated to the extent possible. Where oil spray from a leak may have the ability to reach sources of ignition, spray shields are to be installed.
- ii)* Drip trays or equivalent arrangements are to be provided under all pumps, strainers, fluid measuring devices and similar equipment containing flammable fluids where leakage may occur during operation or maintenance.

3.3 Piping

Piping containing a flammable fluid with a working pressure above 15 bar (15.3 kgf/cm², 218 psi) is to comply with the following:

- i)* The piping is not to be routed above combustion machinery unless utilizing double wall piping that has arrangements to drain any leakage to the waste oil tank, or other suitable location.
- ii)* All flanges and couplings are to be provided with metallic screens with a small diameter hole at the bottom to indicate leaks and divert leakage to a safe area. The requirement does not apply to flanges and coupling effectively screened from ignition.

3.5 Hydraulic Power Unit

Hydraulic power units, including pumps and other pressurized components, with a working pressure above 15.5 bar (15.8 kgf/cm², 225 psi) are to be within an enclosure or room unless:

- i)* The unit is at least 15 m (49 ft) from any combustion engine or boiler and at least 4 m (13 ft) from an electric motor or similar electrical device, and
- ii)* Arrangements have been specifically evaluated by the attending Surveyor and shielding has been determined to be capable of preventing any released hydraulic mist from coming in contact with any surface in excess of 220°C (428°F).

Hydraulic power units of 15.5 bar (15.8 kgf/cm², 225 psi) or less are to either be installed inside an enclosure or room, or be provided with spray shielding if located within 10 m (33 ft) of a combustion engine or boiler or within 3 m (10 ft) of an electric motor or similar electrical device.

3.7 Fire Safety Related Equipment

Fire safety-related equipment (valves, actuators, controllers, etc.) required to operate during a fire are to be located so that it will not be damaged by the heat of a fire in the area they serve. Where this is not practical, the equipment, as well as their sources of power and control, is to be provided with mechanical protection as well as structural fire protection arrangements to adequately protect it from damage due to the heat of a fire for the expected duration of a fire, but not less than two (2) hours.

3.9 Internal Combustion Engines

All internal combustion engines (i.e., diesel, gas turbine, etc.) are to be fitted with automatic air intake shutoff valves or equivalent safety devices that will prevent the uncontrolled over-speeding of the engine in the event of ingestion of flammable gas unless it can be established that under no possible scenario that any released gas could reach the air intake of the engine.

The above over-speed device is to be tested annually and documentation verifying the testing dates and responsible party is to be maintained onboard.

5 Means of Escape

5.1 Number

At least two (2) separate escape routes are to be provided from any location in the industrial area that may be manned on a regular basis. The two (2) escape routes are to be situated so that both escape routes would not be blocked by a single emergency situation.

5.3 Arrangement

The escape routes are to be arranged and maintained so as to be readily accessible to personnel in the area and are to provide adequate headroom and width.

5.5 Materials

Fixed stairways or fixed ladders along the path of egress are to be constructed of steel. All other parts of the escape routes are to be of steel or equivalent material which would not be rendered ineffective by heat. Fiber Reinforced Plastic (FRP) gratings may be considered, provided all conditions listed in Appendix 5-3-A3 of the *MODU Rules* or Appendix 3 of the *Facilities Rules*, as applicable, are fully met.

5.7 Marking and Lighting

Escape routes are to be clearly marked and lighted. The lighting is to be supplied from the emergency source of power.

CHAPTER 5 Industrial Areas

SECTION 3 Detection, Monitoring and Controls

1 Fire Detection and Alarm System

1.1 Application

Any location (open or enclosed) within an industrial area containing arrangements which could be considered to represent a potential point where a fire could originate is to be monitored by the fixed automatic fire detection and alarm system.

As a minimum, where any of the following are located within an industrial area, that area is to be covered by the fire detection and alarm system:

- i) Internal combustion engines, regardless of size
- ii) Fired processing equipment
- iii) Fired equipment, boilers and similar equipment
- iv) Electrical motors over 100 kW
- v) Hydraulic power units
- vi) Workshops
- vii) Flammable liquid storage lockers
- viii) Other enclosed or semi-enclosed spaces where flammable vapors could accumulate

1.3 System Requirements

1.3.1 General

The automatic fire detection and fire alarm system and manually operated call system is to comply with 5-2-5/1 of the *MODU Rules* or 3-8/7 of the *Facilities Rules* related to fire detection and alarm systems, as applicable, in addition to the following.

1.3.2 Type of Detector

Each detector is to be suitable for the location and service. In determining the type of detector to be used, factors such as the types of combustible material, electrical area classification, environmental conditions, and the sensor's speed of response and coverage are to be considered. Also, equipment selection should consider the risk of spurious alarms caused by environmental factors such as lightning.

1.3.3 Protection Against Physical Damage

All detectors are to be suitably protected against physical damage.

1.3.4 Indication Panel

The system is to provide an indication panel at the Centralized Fire Control Station required by 5-3/7 of this Guide. The indicator board is to clearly indicate the location where a fire has been detected.

1.3.5 Arrangements to Prevent Nuisance Alarms

Where smoke detectors are utilized and occasional activities or operations in the area may result in nuisance alarms, the smoke detectors may be temporarily deactivated provided the system complies with the following arrangements:

- i)* The detector is connected to a timer that automatically reactivates the detector after not more than twenty (20) minutes.
- ii)* There is a clear indication at all fire detection control panels that the detector has been temporarily deactivated.
- iii)* Heat detector(s) that will not be deactivated also cover the area.

1.5 Manually Operated Alarm System

Sufficient manual fire alarm stations are to be installed throughout an industrial area and its escape routes. As a minimum, manual pulls are to be provided within 20 m (66 ft) of any point on any walkway within the industrial area and at each exit.

3 Combustible Gas Detection and Alarm System

3.1 Application

Any enclosed or semi-enclosed spaces within an industrial area where flammable vapors could accumulate are to be fitted with a fixed gas detection system.

3.3 Alarms

The gas detection system is to provide an audible and visual alarm. The system is to activate a low gas level alarm at not more than 20% of the lower explosive limit (LEL) and a high gas level alarm at not more than 60% of the lower explosive limit (LEL).

3.5 Indication Panel

The system is to provide an indicator panel at the Centralized Fire Control Station required by 5-3/7 of this Guide and the panel is to clearly indicate the location and concentration of the gas hazard.

3.7 Portable Combustible Gas Detectors

In addition to the fixed automatic gas detection system, two (2) portable combustible gas detectors are to be provided on the unit.

5 CCTV Monitoring System

5.1 Locations

A closed circuit color TV monitoring system is to cover all locations in the industrial areas that present potential points of fire outbreak. These include, but are not limited to, industrial areas identified in 5-3/1.1 above as well as any other areas where potential sources of flammable fluids or gases are in close proximity to potential sources of ignition. The cameras and associated devices are to be suitable for the location and hazard classification of the area involved. For MODUs, the drill floor and mud processing area are to also be covered.

5.3 Recording

The system is to be capable of continuously recording at least the last twenty-four (24) hours of operations and the recording device is to be located so that it will not be damaged from the heat of a fire within the industrial area.

7 Centralized Fire Control Station for the Industrial Area

7.1 General

A Centralized Fire Control Station for the industrial areas is to be provided.

7.3 Location

The Centralized Fire Control Station is to be located at the normally manned Emergency Control Station required by the applicable Rules (see 5-3-1/7 of the *MODU Rules* or 3-8/5.11 or 4-8/5.9 of the *Facilities Rules*).

The station is to be provided with access and escape arrangements that are independent of any industrial areas and hazardous areas.

7.5 Controls and Alarms

As a minimum, the Centralized Fire Control Station is to be provided with the following controls and alarms:

- i) Controls for starting one of the fire pumps and opening all necessary valves to charge the fire main within the industrial areas
- ii) Means to isolate non-fire-fighting services supplied by the fire pumps and/or fire main system
- iii) Controls for activating and monitoring any other fixed fire safety or extinguishing system installed in the industrial area
- iv) An indication panel for the fire detection and alarm system required by 5-3/1 of this Guide
- v) An indication panel for the gas detection system required by 5-3/3 of this Guide
- vi) Means to stop ventilation systems serving enclosed spaces within the industrial area
- vii) Means to stop those pumps serving process support systems within the industrial areas that contain flammable fluids.

7.7 CCTV Monitors

Monitors for the CCTV monitoring system required by 5-3/5 of this Guide are to be provided at the Centralized Fire Control Station.

7.9 Power Supplies

The Centralized Fire Control Station is to be supplied by an uninterruptible power supply (i.e., UPS) with a capability of supplying all required equipment in the Centralized Fire Control Station for a period of not less than sixty (60) minutes. The UPS is to be supplied from both the main and emergency sources of power.

7.11 Communications

The fire control station is to be provided with means to communicate with all other control stations as well as the navigation bridge. In addition, the communications system is to be powered by a UPS complying with 5-3/7.9 above.

CHAPTER 5 Industrial Areas

SECTION 4 Fire Extinguishing Systems

1 Fire Main System

In addition to complying with all applicable Rule and Regulatory requirements, the fire main system serving industrial areas is to also comply with the requirements in this section.

1.1 Fire Pumps

- i) Where only two fire pumps are provided, each fire pump is to be capable of supplying the maximum probable water demand for the unit.
- ii) The “maximum probable water demand” is to be considered as the combination of all hydraulic demands on the fire main system that could occur simultaneously when considering a worst case scenario during a single fire event. As a minimum, these are to include a combination of:
 - a) The most hydraulically demanding water deluge systems that could be expected to operate simultaneously (see note below),
 - b) All water monitors that could be expected to be operate simultaneously with the above deluge system(s),
 - c) Any water curtains or water spray systems supplied by the fire main, and
 - d) The two (2) most hydraulically remote jets of water from fire hydrants at a pressure of at least 5.2 bar (5.3 kg/cm², 75 psi).

Note: As a minimum, the deluge system covering the area with the fire as well as any deluge systems covering areas adjacent to the primary area are to be considered as operating simultaneously, unless the adjacent areas are separated from the primary area by either an A-60 fire wall or an adequately justified distance.
- iii) Multiple-pump installations will be considered in lieu of a single primary and standby pump installation, provided they are arranged in such a manner that a fire in one location would not reduce the available supply of water required to handle that fire, or such that if the largest pump is out of service for maintenance, the available supply of water would not be reduced below the maximum probable water demand.
- iv) The fire pumps are to be provided with the following:
 - a) Relief valves to prevent exceeding the pressure rating of the equipment (valves, piping, fittings, etc.) unless the pumps are of the centrifugal type and have a shutoff head that will not exceed the pressure of the lowest rated piping component in the system
 - b) Circulation relief valves to prevent overheating of the pump. Minimum flow orifices, pressure control valves or other devices may also be used
 - c) Test header (hose valves) to allow for flow testing (flow meters or portable pitot tubes can also be used)
 - d) Automatic air release valves, if needed for the particular pump to operate properly
- v) Fire pumps and all accessories exposed to sea water are to be constructed of materials resistant to corrosion by sea water.

1.3 Additional Requirements for Pumps

At least one (1) of the fire pumps addressed in 5-4/1.1 above is to comply with the following:

- i) The total suction head and net positive suction head are to be such that the capacity and pressure requirements will be obtained under all conditions of list, trim, roll and pitch which may be encountered in service, and
- ii) Have a minimum available net positive suction head which provides a safety margin of at least 1 meter (3.3 feet) or 30% of required net positive suction head of the pump, whichever is less under all conditions.

Calculations verifying the above are to be submitted for review.

1.5 Fire Main

- i) The fire main within the industrial areas is to be of a ring type configuration with isolation valves located at intervals not more than 40 m (150 ft) each along the length of the fire main so that any damaged portion of the fire main in the industrial areas can be isolated and the remaining portions of the fire main continue to be pressurized. Branches of less than 20 m (66 ft) off of the ring to serve remote locations are permitted provided the branch is fitted with an isolation valve where it connects to the ring.
- ii) The fire main is to be adequately sized to simultaneously deliver the quantity of water required by 5-4/1.1 above to the most hydraulically remote combination of services in the industrial area. Calculations verifying the same are to be submitted for review.

1.7 Inaccessible Areas

Any location within industrial areas which contains a fire hazard and cannot be reached by at least two (2) effective hand-held hose streams, one from a single length of hose, due to limited access or height are to be covered by either a fixed fire monitor complying with 5-4/3.5 below or a fixed water spray system that complies with 5-4/3.3 below.

1.9 Non-Fire-fighting Services

Any non-fire-fighting services supplied by the fire main system are to be provided with:

- i) A valve or other means of isolation where the service branches off of the fire main, and
- ii) A remote means to isolate the branch piping supplying the non-fire-fighting service from the fire main from any location where the fire pumps are remotely controlled.

1.11 Arrangements to Prevent Freezing

The fire main pipes and hydrants are to be arranged to prevent the possibility of freezing.

1.13 Testing

Where the fire pump is driven by an electric motor, the ability of the pump to be started and operate satisfactorily is to be demonstrated to the satisfaction of the attending Surveyor while being supply only by the emergency generator while the emergency generator is supplying all other required emergency loads.

1.15 Pump Driven by Diesel Engine

Where a fire pump is driven by a diesel engine, the starting and fuel supply arrangements are to comply with the requirements identified in Ch. 12/2.2.2 of the IMO International Code for Fire Safety Systems (*FSS Code*). Also, the exhaust piping is to be equipped with spark arrestors.

3 Fixed Water Systems for Designated Areas

3.1 Areas to be Covered by Fixed Water Spray System

The following areas are to be covered by a fixed water spray system complying with 5-4/3.3 below as well as two (2) fixed fire monitors complying with 5-4/3.5 below, as applicable.

- i) Drill floor
- ii) Surface wellheads and BOPs
- iii) Well test area
- iv) Moonpool area, where hydrocarbons may be present
- v) Discharge from mud gas separator unit
- vi) Turret area

3.3 Fixed Water Spray System

The fixed water spray system used to meet the requirements of 5-4/1.7 or 5-4/3.1 above is to comply with the following:

- i) The water spray system can be designed to be activated either (a) manually or (b) automatically by way of an automatic detection system which activates the entire water spray zone. Where designed to be activated automatically, means to activate it manually are to also be provided.
- ii) All controls needed to discharge water from the system are to be provided locally as well as at the Centralized Fire Control Station addressed in 5-3/7 above, including those systems designed to be activated automatically.
- iii) As a minimum, the system is to provide a water coverage density of not less than 20.4 liters/m²/min (0.50 gpm/ft²).
- iv) The system is to generally be in compliance with NFPA Standard 15, *Standard for Water Spray Fixed Systems for Fire Protection*, API Publication 2030 *Application of Fixed Water Spray Systems for Fire Protection in the Petroleum and Petrochemical Industries* or an equivalent standard.
- v) For water spray systems in which sea water may be retained within the piping system in a stagnant or low flow condition [i.e., less than 1 m/sec (3.28 ft/sec)], there is a potential for chloride pitting and the following grades are not to be used for the piping or piping components:
 - 304 and 304L stainless steels
 - 316 and 316L stainless steels with a molybdenum content of less than 2.5%Other stainless grades, when used, are to be confirmed suitable for the application by the manufacturer.
- vi) Where the water spray system will be maintained in a dry condition and the system will only be exposed to seawater during actual operations of the water spray, 316 and 316L stainless steels with a molybdenum content of less than 2.5% may be used provided there are provisions to immediately flush the system with fresh water and then dry the internal portions of the system piping and components. The requirement for flushing and drying of the system and the procedures to carry out these efforts are to be clearly posted.

3.5 Fixed Fire Monitor

A fixed fire monitor used to meet the requirement of 5-4/1.7 or 5-4/3.1 above, is to:

- i) Be a dual-purpose (jet/spray) fire monitor
- ii) Sized to deliver a minimum flow of at least 100 m³/hr (440 gpm) to any portion of the coverage area
- iii) Capable of being operated either remotely or locally

- iv) Be of corrosion-resistant materials and/or be protected with a suitable coating to protect the equipment from the offshore environment, and
- v) Incorporate shut off arrangements.’

Monitors arranged for local operation only are to be placed in an accessible location that provides the operator with adequate protection from the heat of the fire.

5 Fixed Fire Extinguishing Systems for Equipment

5.1 Enclosed Space Containing Internal Combustion Engine with Power Output of 375 kW (500 hp) or More

Any enclosed space within the industrial areas containing an internal combustion engine (i.e., diesel, gas turbine, etc.) with an aggregate total power output of 375 kW (500 hp) or more is to be provided with a fixed fire extinguishing system complying with either the requirements in 5-2-3/1 through 5-2-3/7 of the *MODU Rules*, or 3-8/5.5 of the *Facilities Rules*, as applicable.

5.3 Equipment in Open or Semi-enclosed Spaces

Where any of the following equipment is located in either an open area or a semi-enclosed space of the industrial area, it is to be covered by a fixed local fire extinguishing system complying with the requirements in Chapter 3, Section 5 of this Guide.

- i) Internal combustion engines having a total power output of 375 kW (500 hp) or above.
- ii) Oil or gas-fired boilers, incinerators and inert gas generators
- iii) Other oil or gas-fired equipment
- iv) Oil fuel units

7 Fire Extinguishing System for Gaseous Products

7.1 Dry Chemical Fire Extinguishing System

If arrangements are provided onboard to compress any gaseous hydrocarbons, a dry chemical powder fire extinguishing system is to be provided and is to comply with the following.

- i) The system is to be capable of delivering dry chemical powder extinguishing agent from at least two (2) hand hose lines or combination monitor/hand hose lines to any part of a piping system and equipment which may release gaseous hydrocarbons (e.g., equipment, flanged joints, etc.).
- ii) The system is to be activated by an inert gas such as nitrogen, used exclusively for this purpose and stored in pressure vessels adjacent to the powder containers.
- iii) The system is to consist of at least two (2) independent self-contained dry chemical powder units with associated controls, pressurizing medium fixed piping, monitors or hand hose lines.
- iv) Where fixed piping is provided between the powder container and a hand hose line or monitor, the length of piping should not exceed that length which is capable of maintaining the powder in a fluidized state during sustained or intermittent use, and which can be purged of powder when the system is shut down and documentation verifying the same is to be submitted.
- v) Each monitor and hand hose line is to be supplied from independent pipes with a manifold at the powder container, unless a suitable alternative means is provided to maintain proper performance and specially approved. Where two (2) or more pipes are attached to a unit, the arrangement is to be such that any or all of the monitors and hand hose lines should be capable of simultaneous or sequential operation at their rated capacities.
- vi) All hand hose lines and monitors should be capable of actuation at the hose storage reel or monitor. At least one (1) hand hose line or monitor should be situated a safe distance away from the piping or equipment being protected.

- vii) A monitor is to be provided to protect any discharge manifold areas and be capable of actuation and discharge locally and remotely. The monitor is not required to be remotely aimed if it can deliver the necessary powder to all required areas of coverage from a single position. The capacity of a monitor should be not less than 10 kg/sec (22 lbs/sec).
- viii) Hand hose lines should be non-kinkable and be fitted with a nozzle capable of on/off operation and discharge at a rate not less than 3.5 kg/sec (7.7 lbs/sec). The maximum discharge rate should be such as to allow operation by one (1) man. The length of a hand hose line should not exceed 33 m (108 ft).
- ix) Hand hose lines and nozzles should be of weather-resistant construction or stored in weather-resistant housing or covers and be readily accessible.

7.3 Gas Compressor Rooms

Any gas compressor room is to be provided with a carbon dioxide system complying with SOLAS Reg. II-2/10.9.1.1, as amended. A notice is to be posted at the controls stating that the system is only to be used for fire-extinguishing and not for inerting purposes, due to the electrostatic ignition hazard. The alarms referred to in SOLAS Reg. II-2/10.9.1.1.1, as amended are to be certified safe for use in a flammable vapor-air mixture. For the purpose of this requirement, an extinguishing system is to be provided which would be suitable for machinery spaces. However, the amount of carbon dioxide gas carried should be sufficient to provide a quantity of free gas equal to 45% of the gross volume of the cargo compressor room in all cases.

7.5 Fire Extinguishing Systems for Atmospheric Vents

When a venting system is selected for disposal of hydrocarbon vapors, the venting system is to be provided with a fixed system for extinguishing a fire at the vent outlet. Nitrogen, CO₂ or any other suitable medium is acceptable.

CHAPTER 5 Industrial Areas

SECTION 5 Outfitting

1 Portable and Semi-portable Fire Extinguishers

1.1 Extinguishers

As a minimum, portable and semi-portable extinguishers are to be provided in the quantities and locations indicated in 5-5/Tables 1 and 2 below. In all cases, the selection of the fire extinguishing medium is to be based on the fire hazard for the space protected.

Where a specific class fire extinguisher is identified below, an extinguisher rated for two (2) or more classes may be used, provided one (1) rating is the specified class.

1.3 Placement of Extinguishers

1.3.1 Location and Mounting

The extinguishers are to be located so as to:

- i)* Minimize the possibility of damage from a fire or explosion
- ii)* Be accessible and available in the event of fire
- iii)* Provided in sufficient number and located so that the overall fire control capability is not seriously impaired by a single fire.
- iv)* Have a maximum travel distance from any point having a potential for fire to an extinguisher is not to exceed 15.2 m (50 ft).
- v)* mounted where they can be seen and should not be obstructed

1.3.2 Mounting

- i)* Hand portable extinguishers are to be installed on hangers or brackets, or set on shelves that permit easy removal.
- ii)* All hand portable extinguishers are to be installed so as to provide adequate clearance between the bottom of the extinguisher and the floor for protection from salt water corrosion.

1.5 Spares

Spare portable extinguishers in a number of at least 50% of each type/size required are to be provided onboard unless arrangements are provided onboard to recharge expended extinguishers.

1.7 Sand

Each firing space of an auxiliary oil-fired boiler is to be provided with a receptacle containing at least 0.28 m³ (10 ft³) of sand, sawdust impregnated with soda or other dry material suitable for extinguishing oil fires. Alternatively, an approved portable extinguisher may be substituted therefore.

1.9 Portable Foam Applicator Units

1.9.1 General

A portable foam applicator unit complying with the below requirements is to be provided for each area containing oil-fired equipment such as oil-fired boilers, oil fuel units, as well as for any area containing internal combustion machinery. Where the two (2) pieces of equipment are located in close proximity, a single unit may be considered to cover both.

1.9.2 Specification

A portable foam applicator unit is to consist of a foam nozzle/branch pipe, either of a self-inducing type or in combination with a separate inductor, capable of being connected to the fire main by a fire hose, together with a portable tank containing at least 20 liters (5.3 US gal.) of foam concentrate and at least one (1) spare tank of foam concentrate of the same capacity.

1.9.3 System Performance

- i) The nozzle/branch pipe and inductor are to be capable of producing effective foam suitable for extinguishing an oil fire, at a foam solution flow rate of at least 200 liters/min (52.8 gpm) at the nominal pressure in the fire main.
- ii) The foam concentrate shall be approved by ABS based on the Guidelines for the Performance and Testing Criteria and Surveys of Low-expansion Foam Concentrates for Fixed Fire-extinguishing Systems (MSC/Circ.1312).
- iii) The values of the foam expansion and drainage time of the foam produced by the portable foam applicator unit are not to differ by more than $\pm 10\%$ from that determined in 5-5/1.9.3ii) above.
- iv) The portable foam applicator unit is to be designed to withstand clogging, ambient temperature changes, vibration, humidity, shock, impact and corrosion normally encountered.

3 Fire-fighter's Outfits

3.1 General

A total of at least six (6) fire-fighter's outfits (i.e., the four (4) required by 1-4/3 of this Guide plus two (2) additional fire-fighter outfits) complying with Chapter 1, Section 4 of this Guide are to be provided.

3.3 Helmet

Each rigid helmet is to be provided with a face shield.

TABLE 1
Classification of Portable and Semi-Portable Extinguishers

Fire extinguishers are designated by types as follows: A, for fires in combustible materials such as wood; B, for fires in flammable liquids and greases; C, for fires in electrical equipment.

Fire extinguishers are designated by size where size II is the smallest and size V is the largest. Size II is a hand portable extinguisher, and sizes III, IV, and V are semi-portable extinguishers.

Classification ⁽²⁾		Water liters (U.S. gallons)	Foam liters (U.S. gallons)	Carbon Dioxide kg (lb)	Dry Chemical ⁽¹⁾ kg (lb)	Wet Chemical liters (U.S. gallons)
Type	Size					
A	II	9 (2.5)	9 (2.5)	—	5 (11)	9 (2.5)
B	II	—	9 (2.5)	5 (11)	5 (11)	—
B	III	—	45 (12)	15.8 (35)	9.0 (20)	—
B	V	—	152 (40)	45 (100)	22.5 (50)	—
C	II	—	—	5 (11)	5 (11)	—

Notes:

- 1 Must be specifically approved as type A, B, or C extinguisher.
- 2 Classification is based on NFPA standard. Portable fire extinguishers following ISO or EN standards have different classification; refer to EN-2 standard and to IMO Res. A.951(23).

TABLE 2
Hand Portable Fire Extinguishers and Semi-portable Fire-Extinguishing Systems for Machinery Spaces

<i>Space</i>	<i>Classification ⁽¹⁾</i>	<i>Quantity and Location</i>
Gas/oil-fired equipment; fired process equipment, fired boilers, inert gas generators, incinerators and waste disposal units, oil-fired thermal oil heater, etc.	B-II	2 required in each space
	B-V	1 required in each space
Internal combustion engines or gas turbines with total power output not less than 750 kW (1000 hp) other than main engines.	B-II	1 for each 750 kW (1000 hp) but not less than 2 nor more than 6 in each space or area
	B-III	1 required in each space
Internal combustion engines or gas turbines with total power output less than 750 kW (1000 hp) other than main engines.	B-II	1 outside the space containing engines or turbines in vicinity of exit. (See Note 2)
Electric generators, thrusters that do not have enclosed ventilating system.	C-II	1 for each motor or generator.
Switchboards	C-II	2 required in the vicinity of the switchboards. (See Note 2)
Drill floor	C-II	2 required, one at each exit.
Mud pump room	C-II	1 required
Mud pits and mud processing areas	B-II	1 for each enclosed space (travel distance to an extinguisher not to exceed 10 m (33 ft) for open space)
Cranes with electric motors/hydraulics	B-II	1 required
Cranes with internal combustion engines	B-II	2 required, one in cab and one at exterior of engine compartment in vicinity of exit. (See Note 2)
Paint storerooms	B-II	1 outside each room in vicinity of exit (See Note 2)
Storerooms	A-II	1 for every 232 m ² (2500 ft ²) or fraction thereof, located in vicinity of exits, either inside or outside of spaces (See Note 2)
Workshop and similar spaces	C-II	1 outside each space in vicinity of an exit (See Note 2)
Other rooms or other enclosed areas containing a significant concentration of electrical equipment or controls	C-II	In vicinity of the entrance (See Note 2)
Stairways	B-II	Within 3.0 m (10 ft) of each stairway on each deck level which has a potential for fire

Notes:

- 1 See 5-5/Table 1.
- 2 Vicinity is intended to mean within 1 m (3 ft).



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CHAPTER 6 Surveys After Construction

SECTION 1 Enhanced Fire Protection

1 General

In addition to all annual or special survey requirements identified in the applicable Rules for the type of vessel or unit involved, where one or more of the optional notations addressing in this Guide are selected, the survey of the fire safety systems and equipment is to also include the following.

3 All Notations (EFP-A, EFP-A+, EFP-M, EFP-C, and EFP-IA Notations)

3.1 Annual Surveys

3.1.1 Fire Protection System Manuals

Confirm the manuals for the fire detection, alarm and extinguishing systems required by Chapter 1, Section 3 of this Guide are readily available to the crew.

3.1.2 Fire-fighter's Outfits

- i) Verify that the number of fire-fighter's outfits as indicated below is provided onboard:
- *All Vessels, MODUs, MOUs and Offshore Facilities.* At least four (4) fire-fighter outfits (see 1-4/3, 2-4/3, 3-7/3 and 4-6/9 of this Guide, as applicable)
 - *Container Carriers.* At least eight (8) fire-fighter outfits (see 4-2/7.3 of this Guide)
 - *Oil Carriers and Chemical Carriers with the EFP-C Notation.* At least six (6) fire-fighter outfits (see 4-3/15.3 and 4-4/15.3 of this Guide)
 - *LNG Carriers with the EFP-C Notation.* At least eight (8) fire-fighter outfits (see 4-5/13 of this Guide)
 - *Ro-Ro Vessels with the EFP-C Notation.* At least eight (8) fire-fighter outfits (see 4-7/7.5 of this Guide)
 - *MODUs, MOUs and Offshore Facilities with the EFP-IA Notation.* At least six (6) fire-fighter outfits (see 5-5/3.1 of this Guide)
- ii) Verify the storage arrangements for the fire-fighter's equipment ensures easy access, that each piece of equipment has its own place and that arrangements are provided for hanging up protective clothing and other equipment in a suspended position as required by 1-4/9 of this Guide.

3.1.3 Breathing Apparatus

Confirm the breathing apparatus has:

- i) A capacity of at least 1,800 liters (475 gal) or otherwise capable of operating for at least 45 minutes
- ii) Has audible alarm and a visual or other device which will alert the user before the volume of the air in the cylinder has been reduced to no less than 200 liters (52.8 gal)
- iii) Two spare charges are provided for each required breathing apparatus

See 1-4/5.3 of this Guide.

3.1.4 Communications

Confirm that at least two (2) two-way portable radiotelephone apparatus are available for each fire party and that the two-way portable radiotelephone apparatus are to be either of the explosion-proof type or intrinsically safe where hazardous areas may be encountered (see 1-4/5.7 of this Guide).

3.1.5 Air Compressor for Recharging Breathing Apparatus

Confirm the proper operation of the air compressor required by 1-4/7 of this Guide for recharging the breathing apparatus.

3.3 Special Periodical Surveys

Verify items identified in 6-1/3.1 above.

5 EFP-A Notation

5.1 Annual Surveys

5.1.1 Self-Closing Doors

Confirm that any self-closing doors required in 2-2/7.13 of this Guide that are fitted with any type of hold back device will be automatically released upon activation of the fire detection system.

5.1.2 Marking of Escape Routes

Verify the lighting or photoluminescent strips marking the escape routes required in 2-2/9.3.2 of this Guide are functioning properly.

5.1.3 Fire Main in Accommodation Areas

Confirm the fire main or secondary hose reel system in the accommodation areas is pressurized and that the equipment required by 2-4/1.3 of this Guide is provided.

5.1.4 Portable and Semi-portable Fire Extinguishing Appliances

Verify that all portable and semi-portable fire extinguishing appliances, including portable foam applicator units required by 2-5/1 of this Guide, are provided and in satisfactory condition.

5.3 Special Periodical Surveys

Verify items identified in 6-1/5.1 above.

7 EFP-A+ Notation

7.1 Annual Surveys

7.1.1 Items required for EFP-A Notation

Verify all items required by 6-1/5 above for the **EFP-A** notation.

7.1.2 Water Spray System (MODUs only)

Proper operation of any water spray system required by 2-6/3.1ii) of this Guide is to be satisfactorily demonstrated.

7.1.3 Water Spray System (Offshore Installations only)

Proper operation of any water spray system required by 2-6/5.1ii) of this Guide is to be satisfactorily demonstrated.

7.3 Special Periodical Surveys

Verify items identified in 6-1/7.1 above.

9 EFP-M Notation

9.1 Annual Surveys

9.1.1 Heated Surfaces

Confirm that infrared scanning of heated surfaces in the machinery spaces, as described in 3-2/3.5 of this Guide, has been carried out and the reported results are acceptable.

9.1.2 Shielding and Insulation Arrangements

The arrangements and condition of all insulation and cladding as well as spray shields, drip trays and piping protection required by 3-2/1.7 and 3-2/3 of this Guide are to be examined and be in satisfactory condition.

9.1.3 CCTV System

Verify the proper operation and coverage of the TV monitoring system required by 3-3/3 of this Guide.

9.1.4 Portable and Semi-portable Fire Extinguishing Appliances

Verify that all portable and semi-portable fire extinguishing appliances, including portable foam applicator units required by Chapter 3, Section 7 of this Guide are provided and in satisfactory condition.

9.3 Special Periodical Surveys

Verify items identified in 6-1/9.1 above.

11 EFP-C Notation

11.1 Annual Surveys

11.1.1 Container Carriers

- i) *Required FOC or FOC+ Notation.* Confirm that the vessel continues to be assigned the **FOC** or **FOC+** notation (see 4-2/5 of this Guide).
- ii) *Communications.* Verify that a minimum of ten (10) sets of two-way portable radiotelephone apparatus are provided and that at least two of the radiotelephone apparatus are suitable for use by the fire-fighting team by being installed inside helmets of fire-fighter's outfits as required in 4-2/7.1 of this Guide.

11.1.2 Oil Carriers

- i) *Cargo Deck Fire-fighting Equipment.* Confirm that the storage box required by 4-3/9.5.2 of this Guide to be located on the cargo deck or within one level of the cargo deck in a protected location outside of the cargo block and next to the accommodations structure contains a minimum of three (3) fire hoses as well as all necessary tools and fittings.
- ii) *Portable Foam Applicators.* Verify that the portable foam applicators required by 4-3/15.1 of this Guide is provided and in satisfactory condition.
- iii) *Lifeboat Water Spray System.* The proper operation of the water spray system for the lifeboats is to be demonstrated to the satisfaction of the attending Surveyor.
- iv) *Emergency Escape Breathing Devices (EEBDs).* Verify that the EEBDs required by 4-3/15.5 of this Guide are provided and in satisfactory condition.

11.1.3 Chemical Carriers

- i) *Cargo Deck Fire-fighting Equipment.* Confirm that the storage box required by 4-4/9.5.2 of this Guide to be located on the cargo deck or within one level of the cargo deck in a protected location outside of the cargo block and next to the accommodations structure contains a minimum of three (3) fire hoses as well as all necessary tools and fittings.

- ii) *Portable Foam Applicators.* Verify that the portable foam applicators required by 4-4/15.1 of this Guide is provided and in satisfactory condition.
- iii) *Lifeboat Water Spray System.* The proper operation of the water spray system for the lifeboats is to be demonstrated to the satisfaction of the attending Surveyor.
- iv) *Emergency Escape Breathing Devices (EEBDs).* Verify that the EEBDs required by 4-4/15.5 of this Guide are provided and in satisfactory condition.

11.1.4 Liquefied Gas Carriers

- i) *Mast Vent Extinguishing System.* The fire extinguishing system for the vent mast riser of a liquefied petroleum gas carrier, as required in 4-5/7.11 of this Guide, is to be examined and be in satisfactory condition.
- ii) *Lifeboat Water Spray System.* The proper operation of the water spray system for the lifeboats required by 4-5/11 of this Guide is to be demonstrated to the satisfaction of the attending Surveyor.

11.1.6 General Cargo Carriers and Dry Bulk Cargo Carriers

- i) *Smoke Extraction or Heat Detection System.* Verify the proper operation of the smoke extraction or heat detection system required by 4-6/3.1 of this Guide.

11.1.7 Vehicle Carriers and Ro-Ro Vessels

- i) *CCTV System.* Verify the proper operation and coverage of the TV monitoring system required by 4-7/3.3 of this Guide.
- ii) *Portable Fire Extinguishers.* Verify that the portable fire extinguishing appliances required by 4-7/7.1 of this Guide is provided and in satisfactory condition.
- iii) *Communications.* Verify that a minimum of ten (10) sets of two-way portable radiotelephone apparatus are provided and that at least two of the radiotelephone apparatus are suitable for use by the fire-fighting team by being installed inside helmets of fire-fighter's outfits as required in 4-7/7.3 of this Guide.

11.3 Special Periodical Surveys

Verify the items identified in 6-1/11.1 above.

13 EFP-IA Notation

13.1 Annual Surveys

13.1.1 Heated Surfaces

Confirm that infrared scanning of heated surfaces in the machinery spaces, as described in 5-2/1.5 of this Guide, has been carried out and the reported results are acceptable.

13.1.2 Shielding and Insulation Arrangements

The arrangements and condition of all insulation and cladding as well as spray shields, drip trays and piping protection required by 5-2/1.3 and 5-2/3 of this Guide are to be examined and be in satisfactory condition.

13.1.3 Internal Combustion Engine Automatic Shutdown Arrangements

The overspeed device addressed in 5-2/3.9 of this Guide is to be tested annually and documentation verifying the testing dates and responsible party is to be maintained onboard.

13.1.4 Portable Combustible Gas Detectors

Verify that the portable combustible gas detectors required by 5-3/3.7 of this Guide are provided and in satisfactory condition.

13.1.5 CCTV System

Verify the proper operation and coverage of the TV monitoring system required by 5-3/5 of this Guide.

13.1.6 Dry Chemical Fire Extinguishing System

Where provided, verify that the dry chemical fire extinguishing system is in satisfactory condition.

13.1.7 Vent Riser Fire Extinguishing System

The fire extinguishing system for the vent mast riser, as required by 5-4/7.5 of this Guide, is to be examined and be in satisfactory condition.

13.1.8 Portable and Semi-portable Fire Extinguishing Appliances

Verify that all portable and semi-portable fire extinguishing appliances, including portable foam applicator units required by 5-5/1 of this Guide are provided and in satisfactory condition.

13.1.9 Fire Pumps

Proper operation of the fire pumps is to be demonstrated.

Where a fire pump is driven by an electric motor, it is to be tested with power served only from the emergency generator. The pump is to be started and run up to full flow with all other required consumers being connected to the emergency generator to the satisfaction of the attending Surveyor.

13.3 Special Periodical Surveys

Verify items identified in 6-1/13.1 above.