MATERIAL AND EQUIPMENT STANDARD

FOR

FIRE-FIGHTING VESSELS

ORIGINAL EDITION

MAR. 1996

This standard specification is reviewed and updated by the relevant technical committee on July 2002. The approved modifications are included in the present issue of IPS.

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0. INTRODUCTION

Tugs intended for berthing and unberthing the oil tankers are generally designed and built for fire fighting and emergency rescue operations.

The requirement in this material standard apply to the tugs and vessels primarily used for fighting fires and rescue operations on offshore and onshore structures as specified in IPS-E-SF-504.

1. SCOPE

This specification covers, the initial consideration and planning, quotation requirement, inspections quality control, certifications and all other purchase formalities of equipment intended for fire fighting and rescue operations on offshore and onshore oil loading terminals of the Iranian Petroleum and Petrochemical Industries.

Note:

This standard specification is reviewed and updated by the relevant technical committee on July 2002. The approved modifications by T.C. were sent to IPS users as amendment No. 1 by circular No 172 on July 2002. These modifications are included in the present issue of IPS.

2. REFERENCES

Throughout this Standard the following dated and undated standards/codes are referred to. These referenced documents shall, to the extent specified herein, form a part of this standard. For dated references, the edition cited applies. The applicability of changes in dated references that occur after the cited date shall be mutually agreed upon by the Company and the Vendor. For undated references, the latest edition of the referenced documents (including any supplements and amendments) applies.

IPS (IRANIAN PETROLEUM STANDARDS)

IPS-C-SF-505	"Standard for Installation Inspection & Testing of Fire Fighting Fixed System"
IPS-G-SF-126	"General Standard for Hand & Wheel Type Fire Extinguishers"
IPS-G-SF-140	"General Standard for Masks & Breathing Apparatus"
IPS-M-SF-105	"Material and Equipment Standard for Valves, Reels, Hoses, Nozzles and Monitors for Fire Fighting"
IPS-M-SF-142	"Material and Equipment Standard for Flc-Foam Proportioners Generators and Twin Agents"
IPS-M-SF-325	"Material and Equipment Standard for Personnel Safety and Fire Fighters Protective Equipment"
IPS-E-TP-100	"Engineering Standard for Paints"

BSI (BRITISH STANDARD INSTITUTION)

BS 336

3. DEFINITIONS AND TERMINOLOGY

Cargo

In this standard refers to liquids having flash point below 60ºC.

Deck Lights

A piece of heavy glass set in a ship deck or hull to admit light.

Deck

A platform in a ship.

Deck House

A super structure (as a cabin) built on the upper deck of a ship but not extending to the sides.

Sea Chests

A casting connected to the side of a ship below the water line and to a valve for obtaining sea water.

Thrusters

The force that is exerted endwise through a propeller shaft due to reaction of the water on the blades revolving.

Vessel

A craft used as a means of transportation on water.

Vessels Propulsion

The action driving forward or ahead.

4. UNITS

This Standard is based on International System of Units (SI), except where otherwise specified.

5. SERVICE CONDITIONS

5.1 General

5.1.1 Fire fighting tugs and vessels are generally stationed at oil loading terminals while the tugs' normal duties are berthing and unberthing the tankers. They shall participate in fire fighting and rescue operations in case of fire and emergency conditions. Fire fighting systems and rescue equipment shall be installed on the tugs and vessels in accordance with classifications and class notation specified in IPS-E-SF-504.

5.2 Site Conditions

The vessels shall be designed and fabricated for service at loading terminals, the temperature, humidity, dust, gaseous atmosphere and wind velocity should be considered in accordance with local conditions. The sea water specific gravity is 1.03 with salt content of 35-40 thousands part per million and temperature of approx. 32°C, can be used for making foam.

5.3 Operational Conditions

One of the main duties of tugs is to tow or push off the tanker on fire or unberth the neighboring tankers to the safe locations and attend fire fighting and rescue operations. When directed, the tugs also will attend the ships on fire and other emergencies in Persian Gulf. The tugs may also participate in sea oil pollution control.

6. INITIAL CONSULTATIONS AND PLANNING BEFORE PURCHASING ORDER

6.1 Specification and Design Stages

6.1.1 The owner should state his requirements giving as full description as possible that the supplier can prepare his proposal. Then both parties should review the relevant informations to enable them to prepare a suitable material specifications and design of equipment. Selected authorities who are

expert in the design and materials shall be consulted.

6.2 Planning

6.2.1 In planning and layout design of fire fighting equipment for vessels, particular consideration shall be given to the following:

a) Fire and emergency conditions giving the class notation for classification of fire fighter vessel specified in IPS-E-SF-504 Clauses 5 and 6;

b) saving regard to the potential fire hazard in value, the requirement of fire protection and emergency equipment shall be considered;

c) consideration shall also be given to the latest international convention for the safety of life at sea and the Iranian by-laws and regulations.

7. QUOTATION AND TECHNICAL INFORMATIONS

7.1 The Vendor shall include the following technical informations with the quotation:

7.1.1 General technical information of the vessel including:

a) The vessel size, propulsion, side thrusters, power, stability and control system;

b) communication systems;

c) fire fighter class notation;

d) number of crew and accommodation layout;

e) fuel storage capacity.

7.1.2 Fire fighting systems

a) Number of fire fighting monitors, type and design;

b) length and height of throw water/foam;

c) type of monitor control and design support;

d) number of water pumps with detail of specifications including data sheet and flow charts;

e) fire water piping, foam generating and proportioning system;

f) foam concentrate tank capacity, type of foam concentrate and spare containers (the type of foam agent shall e specified in purchase order);

g) fire alarm systems.

7.1.3 Self fire protection of the vessel

a) Fire water spray system;

b) pipe line and nozzles;

c) pumping system, capacity and data;

d) fire hose stations;

e) high expansion foam generator and capacity;

f) fire extinguishers.

7.1.4 Miscellaneous

a) Flood and search lights;

b) sea water inlets and sea chest;

c) firemen outfits;

d) breathing apparatus and compressor air supply;

e) corrosion protection and paints;

f) ventilation and air conditioning systems;

g) salvage operation system;

h) sign boards, marking and notices;

i) power generator and electrical system layout.

7.1.5 Emergency and rescue equipment

a) Life safety and rescue equipment;

b) first aid and resuscitation equipment.

7.1.6 Installation and color coding as specified in IPS-C-SF-505.

8. DRAWINGS AND DOCUMENTATION

8.1 Drawings

8.1.1 Complete drawings, flow charts, and data sheets shall be in English language and shall be attached to the fabricators vendor) quotation.

8.2 Documentations

8.2.1 At ordering stage

8.2.1.1 The manufacturer shall furnish the Purchaser within 6 weeks after receipt of purchase order the following informations: Five sets of dimensional drawings of the fire fighting vessel and its components for NIOC approval. No fabrication shall start until after manufacturer receipt of approved drawings. The manufacturer shall supply one set of corrected certified reproducible drawings within three weeks after receipt of drawings which have been approved or marked (approved as noted).

8.2.2 At hand over stage

8.2.2.1 The manufacturer shall furnish the owner with the following informations prior to hand-over:

1) Ten copies of test certification. This will be prerequisites for final approval and invoice approval.

2) Ten sets of recommended spare parts list for two years operation and one list of special tools for stock.

3) Ten sets of maintenance and operating instructions including comprehensive trouble

shooting instructions.

4) The following informations shall be included in an approved operation manual kept on board:

a) Detailed description of each fire fighting systems and the equipment covered by the classification;

b) instruction for use, testing and maintenance of the fire fighting installations and the equipment;

c) instructions for operation of the vessel during fire fighting.

8.3 Codes and Standards

8.3.1 All system components of fire fighting vessels shall be in compliance with IPS-E-SF-504 and fire fighting systems and equipment shall be in accordance with the following Iranian Petroleum Standards.

a) Fire fighting water/foam monitors IPS-M-SF-105 (for brief description see Appendix A.1);

b) foam generating and proportioning systems IPS-M-SF-142 (for brief description see Appendix A.2);

c) foam liquid concentrate IPS-M-SF-142 (for brief description see Appendix A.3);

d) fire hose IPS-M-SF-107 (for brief description see Appendix A.7);

e) fire hose couplings BS 336-1989;

f) fire extinguishers IPS-G-SF-126 (for brief description see Appendix A.4);

g) breathing apparatus and compressor air supply IPS-G-SF-140 (for brief description see Appendix A.8);

h) fire hydrant IPS-M-SF-105 (for brief description see Appendix A.6);

i) personnel safety and fire fighters protective equipment IPS-M-SF-325 (for brief description see Appendix A.9);

j) fire fighting nozzles IPS-M-SF-105 (for brief description see Appendix A.5).

8.4 Informations

8.4.1 The manufacturer shall furnish the following informations in four copies:

a) Manufacture's name and model numbers;

b) comprehensive catalogs, technical data and descriptive literature of equipment offered;

c) an explicit statement of any deviation from Engineering Standard, IPS-E-SF-504;

d) preliminary drawings and description of operations;

e) list of spare parts required for two years operation with prices;

f) list of all necessary operational and maintenance tests and required special tools for future maintenance.

9. DRAWINGS AND INSTRUCTIONS

9.1 Manufacturer shall furnish the following:

a) Design fabrication of the vessel;

b) system drawings complete with fire water pumps, piping layout, monitors control and supports, fire fighting installation details and electrical system wiring diagram;

c) systems test procedures initial and periodic;

d) operation and maintenance instructions and procedures.

10. QUALITY CONTROL

10.1 Quality Control Tests

10.1.1 The manufacturer shall certify in writing that all quality control tests including welding have been carried-out in accordance with DNV-Part 2 Chapter 3 Material and Welding standards.

The manufacturer also shall quote all normal tests required as well as hydrostatic and operation simulation tests specified below:

10.1.2 All pressure containing parts including fire water piping system shall be subjected to hydrostatic tests at a pressure not less than one and a half times the designed pressure.

10.1.3 Upon completion

The vessel shall be given an operational test simulating actual design operating conditions as closely as possible with fire fighting equipment in use. Tests shall be made to verify that the vessel with fire fighting systems and equipment is able to operate as intended and has the required capabilities.

The manufacturer shall conduct this test in presence of selected owners representative unless a written waiver is given.

The owner shall receive in writing from the vendor notification of 60 days perior to test date:

a) Manufacturer shall furnish all equipment, material and personnel required for the test;

b) defective parts, if present shall be replaced with new parts and system retested until completely reliable and accepted.

11. INSPECTIONS

11.1 The owner's representative shall witness the fabrication manufacturing, testing, assembly of any part of manufacture's work which concerns the vessel.

11.2 The supplier shall agree, by his acceptance of purchase order, to any inspection and rejection in accordance with IPS practices and codes specified.

11.3 Any inspection and testing in no way relieve the manufacturer of any responsibility for the vessel meeting all requirements of applicable codes.

11.4 The manufacturer shall issue instructions for the proper quality inspections according to IPS relevant standards.

Weldings shall be inspected in accordance with ISO group 0520 welding (brazing, soldering) equipment ISO codes and practices by an authorized marin welding inspector.

11.5 The official certificates shall be issued and furnished by vendor before official hand over at the manufacturing berth in accordance with IPS-E-SF-504 Clause 6.

12. TESTS

12.1 Test information and results as specified below shall be provided in a letter certifying that the fire fighting vessel was tested and met all requirements needed. It shall include:

a) Date of test;

b) equipment;

c) test procedures;

d) officially certified summary of test observation results and conclusions. Any malfunctions and/or system corrections shall be reported. In addition photographs shall be furnished;

e) signatures of manufacturer and owner representatives witnessed the tests.

13. GUARANTEE

13.1 Manufacturer shall guarantee by letter of acceptance the satisfactory performance of the fire fighter vessel in accordance with IPS-E-SF-504 specification. Provision of spare parts for vessels should be guaranteed for 10 years.

Manufacturers in Italy are prepared to guarantee mechanical parts for 10 years, electronic parts for 5 years. Any alternations necessary to meet test or pass inspection shall be made at manufacturer's expense.

14. SIGN WRITING AND NOTICES

14.1 The sign-writing details shall be specified in purchase order.

15. BOLLARD PULL TESTING PROCEDURE

Test of strength for pulling, pushing and towing shall be in accordance with D.N.V. Standard Part 5, Section 2, Chapter 7, Appendix A.2.

16. COATING

Anti-corrosion, primer coat, top coat and anti Fouling Coats shall be accomplished in accordance with the relevant D.N.V. Standards.

APPENDICES

APPENDIX A.1

Brief description of references given in Clause 8.3.1.

A.1.1 IPS-M-SF-105 Fire Fighting Monitors

Foam/water monitors and foam/water elevated fixed monitors shall be of fixed self-oscillating mechanism setting. The maneuvering of the monitors shall be remotely controllable by hydraulic and electric or hydraulic and pneumatic units and shall be duplicated (two systems). The remote control shall be arranged from a protected control station with a good general view in accordance with IPS-E-SF-504.

Foam monitors shall be of capacity not less than 5000 liters/min. with foam expansion of 15 to 1. The height of through 50 m above sea level and straight stream range approx. 70 meters in still air at 10 bar. The hydraulic cylinder to be for spray and straight stream functions.

A.1.2 IPS-M-SF-142 Foam Generating and Proportioning System

Foam proportioning system shall be of by-pass variable inductor type, give flexibility of use of foam and water from a single pump. It is also used in conjunction with large model foam/water monitors or deck hydrants. As small quantity of water is by-passed through a venturi it induces the foam compound at approximately the same rate. The foam compound/ water solution is conveyed at low pressure (1.5 bar) to the base of the monitor or headers which are fitted with special induction orifice. A negative pressure condition induces the solution into the water stream and quantity of foam liquid can be preset to the type of foam compound concentrate ratio used (%3 to %6). Foam injection is another method used to produce foam which should be installed on vessels.

A.1.3 IPS-M-SF-142 Foam Liquid Concentrate

To facilitate replenishment of the vessel foam compound storage tank from local stock shall be used. The type of foam compound shall be the same type as, used in oil terminals. Presently the foam compound solution type, Fluro-Protein is used and kept in storage stock at terminal (%3 concentrate).

A.1.4 IPS-G-SF-126 Portable Fire Extinguishers

Portable fire extinguishers shall also be the same standard as used in terminals. To facilitate recharging and replacement he Purchaser shall specify the types and supplier's name.

A.1.5 IPS-M-SF-105 Fire Fighting Nozzles

A.1.5.1 Fire fighting nozzles shall be of 6 Nos. hand hold of constant/select flow feature that allows on site manual djustment. The pattern selection is from straight to wide spray 300 to 600 LPM.

A.1.5.2 Fixed water spray deluge nozzles used for self protection of the vessel shall be designed and installed in accordance with IPS-E-SF-504, Clause 8.

A.1.6 IPS-M-SF-105 Fire Fighting Valves

Vessel hydrant shall be of four-way with hose delivery valve to be of straightway pattern having the inlet and outlet opening of the same 65 mm size. The valve shall be made of bronze or other material having corrosion resistance properties of sea water. The hose valve shall be fitted at the outlet with female instantaneous coupling (2½ in) 65 mm.

(to be continued)

APPENDIX A.1 (continued)

The hose valve shall be provided with outlet blank cap made of corrosion resistant material. The blank cap shall be of male instantaneous with brass chain attachment. The hose valve shall be designed and specifically manufactured for quick operational reliability.

A.1.7 IPS-M-SF-107 Fire Fighting Hoses

To be the same standard used in oil terminals fire service and of the same materials. The following are minimum requirements:

75 mm bore	**15 meter**	**length 5 Nos.**
75 mm bore	**25 meter**	**length 10 Nos.**

Delivery hose couplings shall be of instantaneous pattern made. The brass or corrosion resistant material. The release mechanism to be of pull release type.

A.1.8 IPS-G-SF-140 Masks and Breathing Apparatus

Breathing apparatus shall be the same as used in terminal fire service, and as approved by classification society.

Self contained breathing apparatus, open circuit demand compressed air type. The air cylinder shall be of minimum 1200 L capacity for minimum of ½ hour duration. The apparatus shall have warning audible device that operates when the pressure of cylinder drops to warn the wearer:

Number required	**six sets MESC**
Spare cylinders	**six No. MESC**

A.1.9 IPS-M-SF-325 Personnel Safety and Fire Fighters Protective Clothing

Fire fighters outfit (protective clothing) 12 sets of appropriate sizes. Protective clothing shall be of garment, trousers, gloves, helmet, and footwear.

A.1.9.1 The garment shall consist of a composite of outer shell moisture barrier and thermal barrier. The garment trim to be utilized to meet visibility of 50 mm retroreflective and fluorescent surface. The garment configured to provide protection to upper torso, arms and legs excluding head, hands and feet.

A.1.9.2 Helmet shall essentially consist of shell, an energy absorbing and retention systems, faceshield, ear cover and retroreflective marking.

A.1.9.3 Footwear, shall protect fire fighter's foot and ankle from adverse environmental effect. The footwear shall consist of a non slippery sole with heel upper with lining and insole with puncture resistant device, an impact and compression resistant toecap permanently attached.

A.1.9.4 Gloves shall protect adverse environmental effect to the fire fighters hand, wrests, and shall minimize the effect of heat sharp objects and other hazards protection and secure thermal and moisture.

APPENDIX A.2

BOLLARD PULL TESTING PROCEDURE

A.2.1 Bollard pull testing

A.2.2 Testing procedure

The following testing procedures are to be adhered to:

1) A proposed test programme shall be submitted prior to the testing.

2) During testing of continuous bollard pull BPcont the main engine(s) shall be run at the manufacturer's recommended maximum continuous rating (MCR).

3) During testing of overload pull, the main engines shall be run at the manufacturer's recommended maximum rating that can be maintained for minimum 1 hour. The overload test may be omitted.

4) The propeller(s) fitted when performing the test shall be the propeller(s) used when the vessel is in normal operation.

5) All auxiliary equipment such as pumps, generators and other equipment which are driven from the main engine(s) or propeller shaft(s) in normal operation of the vessel shall be connected during the test.

6) The length of the towline shall not be less than 300 metres, measured between the stern of the vessel and the shore.

7) The water depth at the test location shall not be less than 20 metres within a radius of 100 metres of the vessel.

8) The test shall be carried out with the vessel's displacement corresponding to full ballast and half fuel capacity.

9) The vessel shall be trimmed at even keel or at a trim by stern not exceeding 2% of the vessel's length.

10) The vessel shall be able to maintain a fixed course for not less than 10 minutes while pulling as specified in items 2 or 3 and 6 above.

11) The test shall be performed with a wind speed not exceeding 5 m/sec.

12) The current at the test location shall not exceed 1 knot in any direction.

13) The load cell used for the test shall be approved by Det norske Veritas and be calibrated at least once a year.

The accuracy of the load cell shall be ±2% within a temperature range of -10°C and +40°C and within the range of 25-200 tonnes tension.

14) An instrument giving a continuous read-out and also a recording instrument recording the bollard pull graphically as a function of the time shall both be connected to the load cell. The instruments shall be placed and monitored ashore.

15) The load cell shall be fitted between the eye of the towline and the bollard.

16) The figure certified as the vessel's continuous bollard the pull shall be towing force recorded as being maintained without any tendency to decline for a duration of not less than 10 minutes (T on Fig. 1). **(to be continued)**

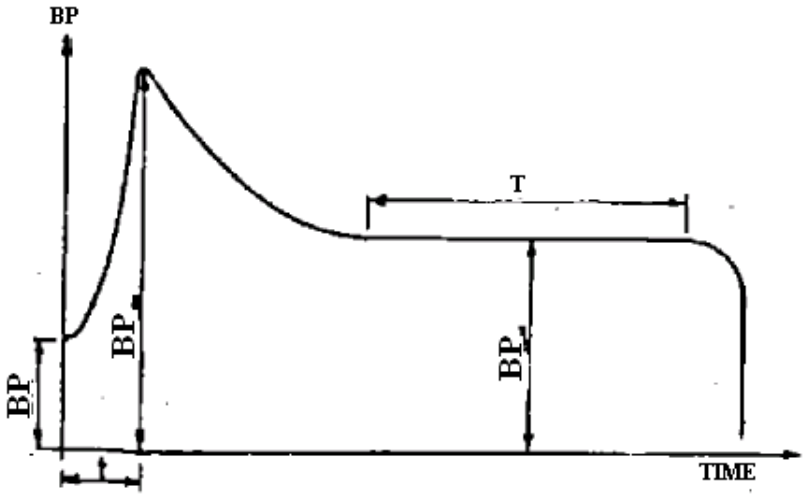
APPENDIX A.2 (continue)

17) Certification of bollard pull figures recorded when running the engine(s) at overload, reduced RPM or with a reduced number of main engines or propellers operating can be given and noted on the certificate.

18) A communication system shall be established between the vessel and the person(s) monitoring the load cell and the recording instrument ashore, by means of VHF or telephone connection, for the duration of the test.

19) The test results shall be made available to the VERITAS Surveyor immediately upon conclusion of the test programme.

20) For mean breaking strength of the towline, see rules Sec. 2 D103/104.



BOLLARD PULL TESTING