PART 9

PUMPING AND PIPING SYSTEMS

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Section 9.1 - (i) Sea water piping

9.1.1 All engine cooling sea water piping and fittings are to be to the engine Manufacturer's requirements, and may be of aluminium bronze, cupro-nickel or similar recommended corrosion-resistant material. Mild steel piping, where used, is to be schedule 80 and is to be **fully galvanised after fabrication**. Valves, strainers, and other fittings are to be of compatible material to avoid electrolytic action. Bends should have as long a radius as practicable.

9.1.2 All flexible sea water inlet piping hose within the engine space is to be of a fire-resistant Standard as detailed in Paragraph 9.1.10, or alternatively marine exhaust hose approved to a recognised Standard.

9.1.3 Solid pipe connections may be flanged and bolted, welded, or brazed as appropriate, but must not be connected by soft soldered joints or non fire-resistant materials within the engine compartment. Screwed mild steel joints and malleable iron fittings are not to be used. Short flexible connections to pumps and other machinery may be fitted, see Paragraphs 9.1.2 and 9.1.10, to the Surveyor's approval. Piping joints should be arranged in order that sections may be easily removed for service/replacement.

9.1.4 All seacocks, filters, valves, and piping, are to be readily accessible, and braced and supported against vibration. Seacocks and valves are to be clearly marked, indicating the direction of turn to open or close. Valve chests are to be clearly labelled with regard to the function and position of each valve. Arrangements to prevent back-flooding are to be incorporated in all systems.

9.1.5 Piping or valves attached to the hull are to be fitted as described in Part 3, Section 3.8.

Section 9.1 - (ii) Oil fuel piping

9.1.6 Pipes used to convey fuel oil, lubricating oil, cooling oil or hydraulic oil, should be of solid drawn black seamless steel or other approved material, and is to be installed to best marine practice. Flanged joints in fuel and oil pipe systems are to have jointing gaskets which are impervious to oil.

9.1.7 Fuel return pipes are to be led back to the fuel tank, and care is to be taken that where tanks can be isolated, the fuel should be returned to the emptying tank except where a service tank is incorporated in the system.

9.1.8 Dual filters are to be fitted in the main and auxiliary engine fuel lines on all vessels over 10m, and should be so arranged that they can be changed over and cleaned without the need to stop the relevant machinery.

Section 9.1 - (iii) General

9.1.9 Flexible piping and associated fittings will be considered with regard to the intended service and the properties of the material proposed, and are to be of robust construction complying with established Standards. In enclosed engine rooms, plastic piping is not to be used for the fuel supply to the engine or fuel tanks.

9.1.10 Fire-resistant hoses should comply with one of the following British Standards (BS) or their equivalent ISO Standards:-

BS EN 853 Rubber covered wire braided reinforced hydraulic type
BS EN 856 Rubber covered spiral wire reinforced hydraulic type
ISO 7840 Fire-resistant flexible oil fuel hose.

9.1.11 All pipes should be colour coded to indicate service and direction of flow. Colour codes are shown in Table 9.5.1. Simple pipe work systems on vessels of less than 12m RL need not be colour coded providing the valves are clearly labelled.

9.1.12 All valves are to be labelled indicating service and function.

9.1.13 Keel cooling systems, where fitted, are to be of substantial construction and are to meet the requirements of engine Manufacturer.

9.1.14 The connection between keel coolers and the vessel hull is to be approved by MCA or Fishing Vessel Certifying Authority prior to installation.

Section 9.2 - Tanks

9.2.1 Fuel tanks are to be constructed of approved material suitable for the fuel type, with non-metallic tanks complying with ISO 21487 or an equivalent Standard. Tanks may be integral with the hull structure or independently mounted within the vessel. Tanks are to be fitted with baffles and all necessary valves, cocks, filling pipes, vents and filters. Tanks which are not integral with the hull structure are to be mounted on seats and secured to the main structure of the hull.

9.2.2 In vessels with an enclosed engine room, and where oil fuel tanks are sited in the engine space, the fuel tanks shall be fire-resistant to a B15 Standard.

9.2.3 Where tanks are connected by common lines such as suction, filling, or levelling pipes, etc., particular care is to be taken to avoid situations where transferring of liquids will be detrimental to the stability of the vessel.

9.2.4 Steel plate and sections used for the construction of fuel tanks are to be thoroughly de-scaled and cleaned.

9.2.5 Adequate save-alls are to be fitted to integral and non-integral tanks to the approval of the Surveyor, in order to prevent oil spillage to the bilges or on to hot surfaces. Save-alls should be fitted under all drain or draw-off cocks.

9.2.6 Fuel filler pipes are to be led up to the main deck terminating below the height of the venting pipe, and fitted with watertight covers marked "**Fuel**". Pipes should be of adequate sectional area. Alternative proposals are to be submitted for approval prior to installation.

9.2.7 Tank air pipes are to be led outside of the engine room or tank space, terminating to outside atmosphere above main deck level at a height according to Part 3, Section 3.2 of the Standards. The open end of fuel, hydraulic and lubricating oil tank vent pipes are to be fitted with a gooseneck with a removable flame screen and an automatic means of closure, or similar approved device at the Surveyor's discretion.

9.2.8 In general, tank air pipes are to be 1.25 times the cross-sectional area of the tank filling pipes. For fuel tanks less than 1000 litres capacity, the internal diameter of the air pipe may be reduced in size but should be no less than 16mm. In such cases, a notice is to be fitted next to the fuel filling pipe opening stating "**Closed fuel filling systems are not to be used**".

9.2.9 Consideration is to be given to the total combined cross-sectional area of the supply lines from the tank, which should not be more than the cross-sectional area of the air pipe.

9.2.10 Levelling pipes between tanks should have a cross-sectional area proportional to the size of the tank. Isolating valves are to be fitted at each tank so that the levelling pipes can be isolated in case of rupture or leakage, and to reduce free surface effects.

9.2.11 In non-integral tanks, where practicable, a sediment sump of suitable dimensions should be provided, complete with self-locking ball valve. Adequate provision is to be made to prevent sediment etc. being pumped from integral tanks into the fuel system. Integral tanks are to be fitted with a drain-off cock for drawing water.

9.2.12 All permanently fitted tanks are to be provided with access for cleaning. Where accesses are fitted at the tank side, save-alls are to be fitted below to collect any leakage or spillage.

9.2.13 In vessels with an enclosed engine room, and where oil fuel tanks are sited in the engine space, shut-off valves capable of being remotely closed from outside the engine room are to be fitted to all fuel tank outlets used for supply of fuel oil. All shut-off valves are to be accessible.

9.2.14 Sight glasses, contents gauges or sounding pipe arrangements are to be fitted to all fuel tanks. Sight glasses are to be adequately guarded and fitted with spring loaded isolating valves or other approved positive shut-off

device, so that in the event of a breakage, only the contents of the glass can spill.

9.2.15 Non-integral fresh water tanks should be constructed of steel or other approved material, and should be complete with all necessary baffles, inspection covers, cocks, vents, filling pipes, contents indicator, etc., and are to be securely mounted to the hull structure.

9.2.16 All tanks are to be tested in accordance with Part 1, Section 1.5 'Testing of structures' unless stamped to an approved Standard.

Permanently fitted petrol tanks above deck

9.2.17 Petrol tanks greater than 27 litres in capacity are to be permanently and securely mounted above deck whereby tooling is required for removal e.g. bolted metal straps.

9.2.18 Petrol tanks are to be non-integral to the vessel's structure and arranged so that they are separated and protected from the engine(s) and working deck by bulkheads, one of which may be the well deck perimeter structure.

9.2.19 Petrol tanks are to be raised from the deck by a minimum of 25mm.

9.2.20 Petrol tanks are to be provided with means of protection in their stowage location, which prevents damage from fishing activities.

9.2.21 Where petrol fuel tanks are fitted within stowage boxes/lockers, the following will apply:-

(i) Each box/locker is to be provided with ventilation. This may be by means of a 25mm diameter or greater opening(s) at the base. Where ventilation pipes are proposed to be fitted atop of the box/locker, these are to have a minimum inside diameter of 35mm and extend to the lower one third of the compartment, and consist of a supply pipe and exhaust pipe located at opposite sides of the box/locker;

(ii) Tank supports are not to inhibit the free flow of air around the base e.g. side to side transverse or longitudinal bearers. Support tables may be considered for plastic petrol tanks providing they are perforated;

(iii) The base of every box/locker will require a drain cock to allow drainage should water enter, or spillages occur.

9.2.22 Refuelling arrangements are to ensure that any accidental spillages do not enter the vessel below deck/sole level.

9.2.23 In vessels with open bilges (unsealed sole), petrol tanks are to be stowed in sealed boxes which are vented in accordance with Paragraph 9.2.21

above. The vent exhaust is to expel any vapour overboard, to prevent any vapour build up in the bottom of the vessel.

9.2.24 Petrol tanks are to be constructed, tested and marked in accordance with ISO 21487. Other fabricated tanks may be acceptable providing they are tested and certificated in accordance with Part 1, Section 1.5.

9.2.25 The inside diameter of the fuel fill is to be no less than 38mm. Where fuel fills are extended, the hose is to be double clamped at the tank spigot and at the fuel fill cap fitting.

9.2.26 Fuel fill caps are to be provided with a positive means of watertight closure and labelled "**PETROL**".

9.2.27 The inside diameter of a petrol tank air pipe is to be no less than 11mm. It is to be noted that the inside diameter of each petrol tank air pipe is to be greater than any fuel supply, or combined area of supplies from that tank.

9.2.28 The open ends of petrol tank air pipes are to be provided with both a gooseneck and flame arresting breather head. An alternative arrangement may be considered upon full details being submitted to MCA or Fishing Vessel Certifying Authority.

9.2.29 Petrol fuel tank filler height is to be lower than the height of the air pipe. Where the air pipe is adjacent to the filler and visible during filling then the filler may terminate at an equal level of the air pipe.

9.2.30 All flexible hoses are to be fire-resistant and meet ISO 7840 A1 or A2, or an equivalent.

9.2.31 Petrol tanks are to be independent from each other i.e. no balancing pipes.

9.2.32 Fuel supply to be provided with fuel/water separating filters. All relevant components within the system should be approved and fitted in accordance with ISO 10088 or an equivalent Standard and securely fixed to the vessel's structure.

9.2.33 A means is to be provided to determine the fuel contents of the tanks. Tanks fitted with fuel gauge sender units are to be fully compliant with the current ISO 8846 Standard or an equivalent. The means of dipping the tank for gauging contents is not permitted.

9.2.34 A fuel shut-off valve is to be provided and positioned on the tank with a clear visible label fitted in close proximity stating "**FUEL SHUT-OFF**" along with location of valve if not openly visible. Where the fuel shut-off cannot be positioned directly at the tank then details of an alternative arrangement are to be submitted for consideration prior to fitting/installation.

9.2.35 All gaskets and associated fittings are to be suitable for the use with petrol. Metallic fittings are to be protected against galvanic corrosion from other connecting differing metals.

9.2.36 Metallic tanks and any directly adjoining metallic components are to be grounded independently; all connections are to have a resistance of less than 1Ω. The only electrical supply to the tank shall be the sender for the fuel gauge and is to be no greater than 24 volts. No other electrical supply shall go to the tank or stowage box/locker (where applicable), and no other electrical devices on board the vessel are to share any petrol tank grounding connection.

Portable Petrol tanks fitted above deck

9.2.37 Where a portable fuel tank is provided, it is to be no greater in capacity than 27 litres. The tank is to be fitted on the open deck and arranged such that it can be easily and securely fitted in place, and can be quickly jettisoned in an emergency (quick release hose fittings).

9.2.38 Portable petrol tanks are acceptable providing they are in compliance with ISO 13591 with associated markings, and/or CE marked.

Petrol tanks general

9.2.39 Petrol engines and petrol tanks are not permitted below decks, or within recessed weathertight deck lockers.

9.2.40 Petrol tanks are not to be sited within a 500mm radius of any internal combustion engine or other source of ignition.

9.2.41 Petrol tanks are not to share spaces containing batteries or other electrical equipment.

9.2.42 Small petrol tank arrangements fitted to hydraulic power packs by engine Manufacturers will be accepted providing the capacity does not exceed 5 litres.

Risk Control

9.2.43 Suitable safety signage is also required to be affixed to the vessel in the relevant areas detailing the carriage of petrol and safety rules to be complied with.

9.2.44 There shall be an emergency plan permanently affixed to the vessel. All crew are to familiarise themselves with this plan in the possible event of failure of any risk control measures set out above. This plan should be used as the basis for the provision of suitable emergency and fire equipment.

Section 9.3 - Bilge pumping systems

9.3.1 An approved means of draining any compartment (other than integral bait and vivier tanks), is to be provided in accordance with the following:-

(i) Where a vessel is divided into watertight compartments, the bilge suctions and means of drainage are to be so arranged that any water entering any main watertight compartments can be pumped out through at least one bilge suction situated in that compartment;

(ii) Where peak compartments are incorporated in a vessel's design and are not for ballasting purposes, an accessible drain cock may be fitted in the bulkhead or vertical floor, providing that any drainage from the drain cock will flow naturally to an adjacent bilge suction.

9.3.2 Bilge pumps are to be fitted in accordance with the following requirements:-

Vessel size (LOA)	**Total no. of pumps**	**Number and type of pump**		**Minimum capacity of power pumps L/Min.**	**Minimum capacity of hand pumps L/Min**
		Hand	**Power**		
Below 7m	1	1	-	-	65
7m – Below 10m	2	1	1	65	65
10m – Below 15m	2	1	1	125	65

9.3.3 The Table above primarily relates to bilge pumping systems where the pumps are capable of drawing from any compartment. Where individual pumps are installed, such as submersible pumps, the requirements shall apply to each compartment.

9.3.4 The hand operated pump may be omitted in favour of a second power pump providing the two pumps draw power from independent power sources, in such cases the second power pump should have the minimum capacity equal to the hand pump requirement.

Systems incorporating a bilge main

9.3.5 Where two pumps are required, the system should be so arranged that either pump can draw from any compartment via a suitable changeover system. The changeover system is to be clearly and permanently labelled with direction and operation.

9.3.6 The power pump may be either the washdeck or general service pump, providing that the sea water suction is isolated from the bilge system by means of a positive accessible changeover valve, or interlocking valve arrangement to ensure only one system may be used at any time, and to prevent sea water draining to the bilge system. The positive changeover valve or cock is to be arranged to avoid the possibility of leak-back or seepage from the sea water system into the bilge pumping system.

9.3.7 To prevent any leakage from compartment to compartment, bilge pumping systems are to have non-return valves fitted in all suction lines.

9.3.8 The diameter of the bilge main and branch sections are to be accordance with the system designed capacities.

Individual power pumps

9.3.9 Where an individual power pump is installed to provide bilge suction for a single compartment, then an additional means of pumping out the compartment is to be provided in the form of a hand operated pump of a capacity not less than the minimum hand pump capacity stated in the Table for the relevant size of vessel.

9.3.10 Discharge pipes should be of an inside diameter to suit the pump, in accordance with the Manufacturer's instructions, to maintain the stipulated pumping capacity.

9.3.11 The total capacity of power pumps providing suction in any one compartment shall not be less that the minimum power pump capacity stated in the Table for the relevant size of vessel.

9.3.12 Where used, submersible pumps must be fixed in place and have suitable strainers fitted that do not restrict the capacity of the pump.

Additional requirements

9.3.13 Shut-off valves and non-return valves are to be fitted on all discharges below the weathertight or freeboard deck, placed directly on the vessel's sides in an accessible position, and sited above the maximum load waterline, see Part 3, Section 3.8 for full details.

9.3.14 All bilge suctions should be fitted with readily accessible strainers. The total area of the perforation in the strainer should be not less than twice the cross-sectional area of the bilge pipe (for submersible pumps, see Paragraph 9.3.12).

9.3.15 Complex bilge systems and valves are to be clearly labelled with regard to compartment served and position of valve. Simple bilge systems are to be labelled at the discretion of the attending Surveyor.

9.3.16 Small compartments may be drained by individual portable hand pump. Such compartments should be no greater in volume than one cubic metre and should not contain any sea inlets or any machinery crucial to the operation of the vessel. The minimum capacity of the hand pump shall be no less than 70 L/min for spaces with a volume of one cubic metre and 35 L/min for spaces with a volume of half a cubic metre or less.

9.3.17 Where a watertight compartment that contributes to buoyancy is to be completely sealed and is void of any piping, then a means of bilge drainage

may be omitted providing the volume of the compartment is no greater than volume Vm in m^3 (determined using the formula below) or filled with an approved closed-cell foam. In any such cases, details should be submitted for approval.

$Vm = L \times B \times D \times 0.14$

Where L = length of hull (m)
B = breadth of hull (m)
D = moulded depth of hull (m)

For catamarans L, B & D are for each hull.

9.3.18 Piping used in bilge systems is to be of an approved metal or non-collapsible tubing, and in machinery spaces piping/tubing is to be of fire-resistant material.

9.3.19 Metals for piping and valves or fittings are to be compatible in order to avoid electrolytic action and wasting. Mild steel piping is to be galvanised after fabrication. Malleable iron fittings are not to be used in bilge systems.

9.3.20 In decked vessels, hand operated bilge pumps, where fitted, are to be capable of operation from above the deck with the hatches and doors closed.

9.3.21 In all vessels, a bilge alarm system is to be fitted in the wheelhouse with audible and visible indication at helm/control position. Bilge level sensors are to be fitted in the machinery space and fishroom/hold. Sensors should also be fitted in any compartment which has a bilge suction if the level of bilge water cannot be readily checked visually without entering the compartment.

9.3.22 Where bilge spaces are to be filled with cement or solid ballast, drain holes are to be fitted to ensure adequate drainage when the cement or ballast is not fitted flush with the top of the vertical floor plates, permitting drainage to the bilge suction well or space under all normal conditions of trim.

9.3.23 Provision is to be made for drainage or approved overboard discharges from both port and starboard sides of any weathertight deck shelter.

9.3.24 All bilge pipework is to be colour coded for immediate identification. Simple bilge pipework systems on vessels of less than 12m RL need not be colour coded providing the valves are clearly labelled.

Section 9.4 - Hydraulic installations

9.4.1 Hydraulic equipment should be installed in accordance with the best marine and hydraulic engineering practices, these Standards, and to the Manufacturer's requirements. Installers should take all necessary precautions to avoid contamination, and all systems are to be flushed and cleansed prior to commissioning.

9.4.2 All equipment is to be designed to produce the specified performance when operating at or below the maximum design pressure and flow rate.

9.4.3 Hydraulic pumps are to be capable of safe operation with the prime mover running at its maximum design speed. All motors, pumps and valves should be capable of accepting the oil flow under the stipulated conditions and within the Manufacturer's recommendations.

9.4.4 All hydraulic piping, except for pump suction pipes, is to be of cold drawn mild steel or reinforced rubber hose to BS EN 853 1997 or BS EN 856 1997 (or equivalent), or other approved material, and is to conform with current statutory requirements. The following guidance is provided:-

(i) All tubing or flexible hose end terminations must be compatible with the tube or flexible hose;
(ii) All the components that form part of the termination must be from a single Manufacturer and compatible;
(iii) All tube or flexible hose assemblies must have a safe working pressure greater than the maximum designed working pressure and have at least a 4:1 burst safety factor;
(iv) Oil velocities within all tube or flexible hose should not exceed 4.6 m/sec in pressure and return lines, and not greater than 1.2 m/sec in pump suction lines;
(v) All tube and hose assemblies should be suitable and adequately clamped, protected and supported.

9.4.5 All pump suction piping, return, and relief valve drain piping, is to be capable of accepting the full flow under maximum operating conditions, and within industry Standards and the equipment Manufacturer's recommendations.

9.4.6 All pump and motor case drain piping is to be capable of accepting flows of twice the Manufacturer's stated leakage flow rate, and the bore size of the piping should be no less than the bore size in the pump or motor pipe connection.

9.4.7 If no leakage flow rate is available, a value of 15% of the input flow rate should be assumed. Drain piping is to be rated to withstand pressures of not less than 10 Bar.

9.4.8 The drain pipes must be connected directly to the oil tank and not connected into any other return flow pipes and the normal working pressure within these lines should not exceed the Manufacturer's recommendations.

9.4.9 All hydraulic piping should be connected by means of approved high pressure couplings and adaptors rated to withstand operating pressures of not less than 120% of the normal maximum working pressure, and should be pressure tested to 1.5 times the maximum designed working pressure prior to commissioning. Re-usable hose fittings of the screw threaded inner type are not to be used.

9.4.10 Oil reservoirs should, unless formed as an integral unit with the pump, be sited to provide an effective static head of oil in accordance with the requirements of the pump Manufacturer. Oil supply piping from the reservoirs to the pump is to be arranged to provide a continuous fall to the pump suction. Small radius bends or elbows fittings are not to be fitted unless supplied as the pump Manufacturer's standard fitting.

9.4.11 Long length suction pipes and lines should be avoided; if they cannot be avoided the suction pipe internal bore should be increased to counteract any increased oil flow resistance.

9.4.12 Reservoir tanks may be free-standing or built-in, and are to be fitted with an oil level indicator which is easily visible. Where tanks are built-in, to avoid condensation contamination of the oil, it is recommended that the shell plating of the vessel should not form a tank boundary.

The general tank design should take into consideration the following points:-

(i) Oil capacity based on the application, circuit, and the systems maximum flows;
(ii) Inspection plates and internal cleaning, after it's been fabricated;
(iii) Safe isolation of the pump suction feed line;
(iv) Oil circulation and the natural cooling effect of the oil within the tank;
(v) Possible baffle plates;
(vi) Oil filling points;
(vii) Oil tank breather;
(viii) Visual oil level gauge with an integral temperature thermometer;
(vix) All return lines to be terminated below the oil level.

9.4.13 Where the reservoir capacity is greater than 75 litres, the filling system is to incorporate a manual or powered pump delivering to the reservoir through a filter of not more than 25 Micron.

9.4.14 Circulation filtration is to be provided in accordance with the following requirements:-

(i) High pressure, not more than 10 Microns;
(ii) Low pressure, not more than 25 Microns;

(iii) The pump suction strainer or filter should be capable of accepting at least twice the maximum rated pump flow;
(iv) A magnetic drain plug should be fitted in the reservoir, or some such similar device shall be incorporated in the system.

9.4.15 Filters should be sited so as to permit easy access for cleaning and replacement of their elements. Dirty filter indicators should be clearly visible. All filters should include bypass safety check valves within the filter assembly.

9.4.16 All piping is to be installed clear of all sources of extreme heat. Where practical, the use of flexible pipes is to be avoided in the engine rooms, but when fitted, should not be run over engines or adjacent to heat sources, or exceed a maximum length of 1.50m. Installations of flexible pipe systems in small vessels will be specially considered on submission of details.

9.4.17 Where piping is routed through fish rooms areas above the fish storage levels, the use of pipe couplings is to be avoided and arrangements should be incorporated to protect the catch from accidental oil leakage.

9.4.18 An oil temperature gauge is to be provided on the return side of the system, or other suitable provisions made for monitoring the oil temperature within the oil reservoir.

9.4.19 A range of pressure test points should be installed in all hydraulic systems to check and monitor maximum working pressures in the high pressure and the low pressure lines of the system. If pressure gauges are permanently fixed they should include safe isolation valves.

9.4.20 The type and viscosity of the hydraulic oil should be clearly displayed at the oil reservoir or other convenient prominent location.

9.4.21 Where oil coolers are sea water cooled, the sea water inlet, discharge valves and piping are to be as required for engine cooling systems.

9.4.22 All hydraulic systems should be protected by an individual and independent system safety relief valve.

9.4.23 An emergency stop facility is to be fitted at the helm position for all hydraulically operated deck equipment, and in addition a local emergency stop device is to be fitted at the winch or hauler. See Part 11, Paragraph 11.14.4 and 11.14.5.

9.5 Tables

9.5.1 Table 1: Colour codes for piping

Pipe contents	Ground colour		Colour band	
	Colour	**BS colour no.**	**Colour**	**BS colour no.**
Water				
Cooling (primary)	Sea green	217	-	-
Drinking	Aircraft blue	108	-	-
Treated	Aircraft grey/blue	283	-	-
Central heating below 60°C	French blue	166	-	-
Central heating 60°C to 100°C	French blue	166	Post Office red	538
Central heating above 100°C	Crimson	540	French blue	166
Cold water domestic service	Brilliant green	221	-	-
Domestic hot water supply	Eau-de-Nil	216	-	-
Sea, river, untreated	Grass green	218	-	-
Air				
Compressed up to 14g/cm^2	White	-	-	-
Compressed over 14g/cm^2	White	-	Post Office red	538
Vacuum	White	-	Black	-
Drainage/bilge	Black	-	-	-
Electrical service	Light orange	557	-	-
Oils				
Diesel fuel	Light brown	410	-	-
Lubricating	Salmon pink	447	-	-
Hydraulic power	Salmon pink	447	Sea green	217
Transformer	Salmon pink	447	Light orange	557
Fire installations	Signal red	537	-	-

Notes:-

1. The above Table is for guidance only. For any colour coding systems which are used, a clear and visible legend is to be placed within the machinery space(s).