

**GENERAL STANDARD**

**FOR**

**DELIVERY-COMMISSIONING,**

**PREVENTIVE MAINTENANCE OF**

**FIRE FIGHTING TRUCKS**

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## **0. INTRODUCTION**

Fire fighting trucks and the relevant equipment mounted on them should be as reliable as their maintenance. This means not only a daily routine such as checking batteries, tire pressure, fuel supply etc., are essential but a definite program of apparatus care including periodic lubrication, oil change, ignition check-up, complete testing of the pumps and appropriate major overhaul shall be a departmental policy to observe them.

On arrival of new fire appliances an acceptance test shall be carried by qualified personnel to make sure that all equipment are in good working order.

The fire authorities are responsible for general efficiency of the fire brigade as well as the inspection of the fire truck appliances and equipment in order to see that they are regularly tested and examined in accordance with this standard and the manufacturer's instruction manual.

## 1. SCOPE

This Standard specifies the minimum requirements for delivery, commissioning tests, preventive maintenance of fire fighting trucks and related fire fighting equipment. This standard establishes the site, environmental and equipment requirements for proper testing and procedures to be followed and shall serve those charged with conducting acceptance and in-service tests and maintenance. The standard consists of two sections as follows:

- Section I:** Standard Tests and Examinations of Fire Service Trucks and Related Fixed Equipment.
- Section II:** Standard Tests and Examinations of Equipment Carried on Fire Trucks.

## 2. REFERENCES

In preparation of this Standard, the following Codes and Standards have been referred to or considered. The latest edition of these Standards and Codes to the extent specified herein, shall form a part of this Standard:

### NFC (NATIONAL FIRE CODES) (NFPA)

- NFPA 1911 (1992) "Acceptance and Service Tests of Fire Department Pumping Apparatus"
- NFPA 1901 (1992) "Automotive Fire Apparatus"
- Fire Service Drill Book (Home Office Fire Dept. England 1980)

## 3. DEFINITIONS AND TERMINOLOGY

### 3.1 Acceptance Test

Test made at the time when the apparatus is delivered to assure the responsible user or purchaser that the appliance meets performance requirements as specified.

### 3.2 Preventive Maintenance

Reliable engineering efforts and program that eliminate the failure that require maintenance (pre-act instead of react).

### 3.3 Service Tests

Tests made occasionally after the apparatus has been put into service to determine if performance is still acceptable.

### 3.4 Certification Tests

Tests made at the apparatus manufacturing plant and witnessed by representative of a testing organization approved by purchaser's authority.

## 4. UNITS

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

## SECTION I

### 5. STANDARD TESTS AND EXAMINATIONS OF FIRE SERVICE TRUCKS AND RELATED FIXED EQUIPMENT

#### 5.1 General

**5.1.1** Fire truck shall be serviced and maintained as indicated by manufacturer and in accordance with fire service procedure. Cleaning, oiling, greasing should take place at station or in transport maintenance section with normal local procedure. Maintenance however shall be done by qualified staff only. Standard tests and preventive maintenance shall be carried out on acceptance, quarterly or more frequently after operational use and whenever it is considered necessary. Qualified personnel shall also carry out periodic technical inspection. These should cover checking of the condition and behavior of all parts of the appliances, their mechanism and safety devices. They may reveal the development of a fault at an early stage when it can easily be rectified. The use of maintenance report forms and check list in these inspections ensures that no important items are over-looked and provides a useful record for future references.

**5.1.2** Drivers selected to drive and operate a fire truck shall be trained and examined before being assigned. Drivers should be fully conversant with any peculiarities of their appliances and take them into consideration during operations.

The following important points are general consideration in running a fire truck:

- a)** The driver must avoid frequent stopping and starting before the engine warms up as this leads to excessive wear.
- b)** Driver should be familiar with normal working oil pressure of the appliance and maintain this during operations, topping up the sump when is necessary. He shall be aware that when there is a sudden or substantial drop in oil pressure he must stop the engine immediately to prevent a complete mechanical break down.
- c)** He shall watch the appliances fuel consumption at all times and inform his officer incharge when he needs more supplies.
- d)** Although problems sometimes arise from inexperienced handling but regular servicing and testing will minimize mechanical problems on the fire ground.

#### 5.2 Acceptance Tests and Requirements

##### 5.2.1 Road tests-all appliances

**5.2.1.1** Acceptance test shall be prescribed and conducted within 10 days after receiving by user in the presence of persons as assigned by the Companys' authority. In the execution of the acceptance test the following authorities are qualified candidates:

- a)** an expert from transport;
- b)** fire master;
- c)** maintenance engineer.

Manufacturer's representative or their agent shall be also present during the acceptance test.

##### 5.2.1.2 The delivery and certification test conducted at the manufacturing site

Material inspection reports and all flow schemes and data charts together with drawing and manufacturer's specification shall be at hand before performing the test. A check list shall be prepared and completed during the test.

**5.2.1.3** The apparatus loaded with a full complement of hose and men, a full water tank and equipment allowances shall meet the test on dry paved road.

The test shall consist of two runs in opposite directions over the same route; and the engine shall not operate in excess of the maximum no load-governed speed.

**5.2.1.4** From a standing start, through the gear, the vehicle shall attain a true speed of 80 km in 30 Seconds in the case of apparatus carrying 4000 liters of water or apparatus equipped with elevating platform.

**5.2.1.5** From steady speed of 35 km/h the vehicle shall accelerate to true speed of 80 km within 30 seconds. This shall be accomplished without moving gear selector.

**5.2.2 Pump test**

**5.2.2.1** The test site shall be adjacent to a supply of clear water at least 1.20 m deep with the water level of 3.5 meter below the center of the pump suction inlet and close enough to allow the suction strainer to be submerged at least 0.6 m below the surface of the water when connected to the pump by 6 m of suction hose.

**5.2.2.2 Conditions**

a) Pump tests shall be performed when conditions are as follows:

Air temperature	-17.78 to 38°C ( 0°F to 100°F)
Water temperature	1.67 to 32°C (35°F to 90°F)
Barometric pressure	(corrected to sea level) 73.7 cm Hg minimum (29 in Hg min.)

b) Engine driven accessories shall not be functionally disconnected or otherwise rendered inoperative during the tests.

c) All structural floor-boards grating, grills, heat shields etc., not furnished with a means for opening them in normal service shall be kept in place during the tests.

**5.2.2.3 Equipment**

a) Suction hose shall be of appropriate size for the rated capacity of the pump.

Appropriate suction and basket strainers with total friction and entrance loss shall be provided.

b) Sufficient fire hose shall be provided to discharge rated capacity to the nozzles or flow measuring equipment without exceeding a flow velocity of 4.5 m per second (approximately 1900 L for 65 mm hose).

c) For measuring the flow, smooth bore nozzles or flow meters together with speed measuring equipment consisting of revolution counter and stop watch should be used.

**5.2.2.4 Procedure**

a) The ambient air temperature, water temperature, vertical lift, elevation of test site and atmospheric pressure (corrected to sea level) shall be determined and recorded prior to and after each test. The engine, pump, transmission and all parts of the apparatus shall exhibit no undue heating, loss of power, overspeed or other defects during the entire test.

b) With the fire truck set up for the pumping test, the primer shall be operated in accordance with the manufacturer’s instruction until the pump has been primed and is discharging water and the interval from the time the primer was started until the time the main pump is discharging water should be noted.

The time required to prime the main pump if rated capacity is 4000 LPM or less as determined by the priming time test shall not exceed 30 sec.

**c)** The pump shall be subjected to a 3 hours pumping tests consisting of 2 hours of continuous pumping at rated capacity and designed pressure and ½ hour pumping 70 percent of rated capacity at 10 bar (7500 mm Hg ) and ½ hour of 50 percent of rated capacity at 15 bar (11250 mm Hg).

The pump shall not be stopped until after 2 hours test at rated capacity unless it becomes necessary to clean the suction strainer or to add fuel.

The capacity, discharge pressure, suction pressure and engine speed shall be recorded at least every 15 minute.

Average net pump pressure shall be calculated and recorded based on average value for discharge and suction pressure.

The fire truck shall be subjected to an overload test consisting of pumping rated capacity at 10 bar net pump pressure for at least 10 min. If desired, this test may be performed immediately following 2 hr segment of pumping test of rated capacity at 7 bar.

The capacity, discharge pressure, suction pressure, and engine speed shall be recorded once during overload test.

#### **5.2.2.5 Water tank flow rate**

Where a water tank of 1200 L or larger capacity is furnished the flow rate shall be checked as follows:

- a)** The water tank shall be filled until it overflows.
- b)** All inlets to the pump shall be closed.
- c)** The tank fill line and/or by-pass cooling line shall be closed.
- d)** Hose lines and nozzles suitable to discharge water at the required tank to pump flow rate shall be connected to one or more discharge outlets.
- e)** The tank-to-pump valve and the discharge valves leading to the hose lines and nozzles shall be fully opened.
- f)** The engine throttle shall be adjusted until the required flow rate  $-0 +5$  percent is established. The discharge pressure shall be recorded.
- g)** The discharge valves shall be closed and the water tank refilled. The by-pass line may be opened temporarily if needed to keep the water temperature within accepted limits.
- h)** The discharge valve shall be reopened fully and the time noted. If necessary the engine throttle shall be adjusted to maintain the discharge pressure recorded as noted in (f).
- i)** When the discharge pressure drops by  $1/3$  bar or more, the time shall be noted and elapsed time from the opening of the discharge valve calculated and recorded. The required tank-to-pump flow rate shall be maintained until 80% of the tank volume has been discharged. The volume discharged shall be calculated by multiplying the rate of discharge in LPM times in minutes elapsed from the opening of the discharge valves until the discharge pressure drops by at least 5 percent.

#### **5.2.2.6 Vacuum test**

**a)** With all opening to the pump closed, the primer shall be operated in accordance with the manufacturer's instructions. The maximum vacuum attained shall be at least 550 mm Hg at altitudes above 300 meters. The vacuum attained may be less than 550 mm Hg by 25 mm per 300 m altitude above 300 meters.

b) A vacuum test shall be performed and shall consist of subjecting the interior of the pump with capped suction and uncapped discharge outlets to a vacuum of 550 mm Hg by means of the pump priming device. The vacuum shall not drop more than 250 mm Hg in 5 minutes. The primer shall not be used after the 5 min. test period has begun. The engine shall not be operated at any speed greater than the no load governed speed during this test.

#### **5.2.2.7 Deep lift test**

If a pump passes satisfactorily on acceptance and quarterly output and vacuum tests, a deep lift test also may be carried out as follows:

The suction lift should be 6-7 meter measured from the center of the suction inlet to the surface of water.

The time for priming should not exceed six seconds per meter of lift.

#### **Note:**

**The output of the pump will be substantially below the normal output during deep lift test.**

### **5.3 Electrical System Testing**

**5.3.1** The wiring to vehicle mounted generator and associated receptacles shall be subject to 1 min. 900 dielectric voltage withstand test with any switches in the circuit(s) close between live parts including neutral and the vehicle frame.

**5.3.2** Associated wiring and receptacles shall be subject to the following tests:

- a) Continuity test to assure that all exposed electrically conductive parts are properly bonded.
- b) Electrical polarity checks of permanently wired equipment and receptacles connected to the vehicle mounted generator to determine that connections have been polarly made.

### **5.4 Test Elevating Platform**

#### **5.4.1 Stability test**

A test of the apparatus shall be performed to demonstrate that the platform and booms, or sections, are so designed and powered that at maximum horizontal reach a load representing 150 percent of the manufacturer's rated payload capacity can be placed on the platform and rotated a complete 360 degrees. This test shall be performed on firm level ground with the jacks firmly set.

#### **5.4.2 Operational tests**

a) After starting the engine setting the jacks and transmitting power to the platform booms or sections, a complete cycle of platform operation shall be carried out as follows:

With one person operating the machine from the lower control station raise the platform from a bedded position, extend to full-specified height and rotate through a 90-degree turn. This shall be completed smoothly and without undue vibration in not over 150 sec.

b) The platform shall then be retracted and lowered to its starting position, after which a thorough inspection shall be made of all moving parts, with special attention given to inspection of the platform leveling system.

c) The test specified in 5.4.2(a) shall be repeated, employing the control at the platform control station.

d) The effectiveness of the lower control station override shall be tested.

e) Operation of monitor and foam proportioning system.

The apparatus shall be set up to operate the monitor to demonstrate its ability to comply with specifications stated in IPS-G-SF-100.

## **5.5 Quarterly Fire Truck Pump Output Test**

**5.5.1** Pumps shall be subjected to a pumping test from open water, using one length of hose per delivery. The length of test shall be at least 15 minutes and any pump found incapable of sustaining the designed normal pressure with the lift as near as possible to, but not exceeding 3 m from the surface of water to the pump inlet shall be subject of a report and repair. The pump capacity also shall be checked in accordance with fire service procedures using appropriate nozzles or flowmeters.

**5.5.2** The vacuum test also shall be carried out as given hereunder:

All lengths of suction shall be coupled up to the suction inlet of the pump with the blank cap in position at the end of the last length but the blank cap left off all deliveries. The primer should be run at priming speed for not more than 45 seconds.

Priming should cease after obtaining 0.8 bar (600 mm Hg) or more vacuum and the compound gage needle should then be watched. If the needle falls back to 0.3 bar (225 mm Hg) in less than one minute, an excessive air leak is present.

This may be due to a defective pump gland to leakage at compound and pressure gage connections, delivery valves, cooling water connections or to faults in suction hose or couplings. Any leak should then be rectified. A leak in the suction hose may be found by water pressure test which should not be carried out as a routine but only when it is necessary to detect a leak.

## **5.6 Regular Checking and Maintenance**

Appliances shall be regularly checked, serviced and maintained as specified by manufacturer and fire service procedures. This shall include checking all fixing installed equipment such as pumps, ladder, hose reel equipment, foam proportioning system etc. On return from an incident and fire drills, petrol/fuel oil, lubricating oil and water shall be checked. Water tank and other extinguishing chemicals replenished and if other than fresh water has been used the pump system, tank, hose reels and suction shall be thoroughly flushed through with fresh water.

In winter antifreeze should be added to the cooling water of appliances. If there is any danger of freezing on the way to or from an incident the pump casing and hose reels shall be drained. The hose reel tank and foam tank should not need special precautions. Immersion heaters and other warning devices should be used on the appliances as necessary.

**SECTION II****6. STANDARD TESTS AND EXAMINATIONS OF EQUIPMENT CARRIED ON FIRE TRUCKS****6.1 General**

The firemaster and officer in charge of fire stations are responsible for general efficiency of fire service, including the appliances and equipment, and it is a part of their duties to make sure that the equipment and gears in the fire truck are regularly tested and examined. A standard test table is provided below indicating the intervals at which some form of check, test or technical inspection is required. Any defects revealed by the test or examination shall be dealt immediately either by rectifying the fault or reporting through appropriate channel.

The general aim of tests and examinations shall be to ensure that every piece of gear or equipment carried on an appliance shall be in efficient working order and it is the duty of officer incharge of the fire station to ensure that any special equipment that no test is specified and is carried on appliances should be adequately tested at sufficient intervals for its correct operation when required.

The Standard test table is intended to guide the frequency at which some form of check test or technical inspection is required. It is important that reference should be made to the specific method of test as follows in precise details.

FIRE EQUIPMENT STANDARD TEST TABLE

EQUIPMENT	ON ACCEPTANCE	AFTER OPERATIONAL USE	MONTHLY	3 MONTHLY	6 MONTHLY	ANNUALY	OTHER
<b>PUMPS</b>	✓			✓			
DELIVERY HOSE REEL	✓	✓				✓	
SUCTION	✓	✓		✓			
HOSE REEL EQUIPMENT	✓			✓			
<b>NOZZLES &amp; BRANCHES</b>				-	✓		
FOAM BRANCHES	✓				✓		
FOAM MONITOR	✓			✓			
FOAM LIQUID	✓				✓		
FOAM PROPORTIONATORS	✓				✓		
BREATHING APPARATUS	✓	✓					
AIR LINE RESPIRATOR	✓	✓					
RESUSCITATION	✓	✓					WEEKLY CHECK
GAS MASKES	✓	✓					
SERVICE RESPIRATORS	✓	✓					
RUBBER GLOVES	✓	✓		✓			
TORCHES AND LAMPS	✓	✓					DAILY & WEEKLY
LADDERS	✓	✓		✓			
ROPES	✓	✓		✓			
GAS TESTING EQUIPMENT	✓	✓					BEFORE OPERATIONAL USE
FIRST AID	✓	✓					
SIREN RADIO	✓	-		-			DAILY SHIFT CHANGE
MISCELLANEOUS GEARS AND TOOLS	✓	✓		✓			

## 6.2 Hose (Delivery-Suction and Hose Reel)

### a) Delivery hose

Delivery hose shall be tested on acceptance every 12 months and after operational use. A 12.5 mm (½ inch) nozzle for delivery hose and for reel hose its relevant branch should be used. If a shut-off branch is used it must not be closed until all air has been expelled out.

All delivery hose and reel hose shall be tested to a minimum of 10 bars or 50 percent above the normal working pressure, or the maximum pumping pressure.

The pressure shall be built up gradually in order to allow sufficient time for the hose to take the strain. Any defects should be marked and the hose sent for repair.

All couplings shall be examined at the same time for distortion, defective washers shall be replaced and the plunger of couplings slightly oiled or greased to ensure proper seating.

### b) Suction hose

All length of suction hose shall be examined on acceptance quarterly and after operational use to see that couplings are in good condition and that washers are in place. Defective washers should be replaced. Collars and threads should be lightly oiled or greased if necessary.

Leak in suction hose may be found by the water pressure test as detailed below which should not be carried out as a routine but when it is necessary to detect the leak:

- 1) All length of suction hoses should be coupled to the pump inlet and the suction connected by a suitable adaptor to a hydrant.

The static pressure of which shall not exceed 3 bars. One delivery should be opened to allow air to escape and the hydrant should then turned on slowly. The delivery should be shutdown as soon as water commences to flow from it and allow pressure to build up. If the pressure of hydrant is in excess of 3 bars, one delivery should be left open and gradually closed to allow the pressure to build up to required amount, not exceeding 3 bars. Any leak present will be indicated by the water flowing from it and then steps shall be taken to rectify it. When carrying out this test the hydrant must not be turned on until the pump delivery valve is opened and it must be closed slowly.

### c) Hose reel equipment

The hose reel equipment on all appliances shall be examined on acceptance and every quarterly and the hose should be tested as stated in (a) above by operating the pump. The correct operation of spray nozzle and tightness of couplings and glands should be checked and adjustment made if necessary.

## 6.3 Nozzles and Branches

Nozzles and foam branches shall be examined on acceptance and every six months to ensure that the inside section is truly circular and no defects are present. The foam branch and nozzles with suspected defects should be tested under pressure. Diffuser, hand controlled and adjustable jet branches should also be tested under pressure and should be operated to check that they are working satisfactorily. Instantaneous couplings should be examined for distortion. Repair shall be made on all defects.

## 6.4 Foam Equipment

### 6.4.1 Foam branches and foam monitors

Foam branches and monitors shall be examined and tested on acceptance and quarterly to make sure that they are in good working order. The throw and the quality of the foam shall be examined and any malfunctioning rectified.

**6.4.2** Foam liquid concentrate shall be tested on acceptance and on 6 monthly bases using apparatus of drainage test.

The foam tank also should be checked for corrosion, scale and sludges. If the foam considered to be deteriorated the foam shall be used for exercise and drills. The tank and piping shall be thoroughly washed, cleaned and refilled.

### 6.4.3 Foam proportionators

Foam proportionators should be tested on acceptance and every six months to make sure that the foam/water solution is in right proportion as stated in fire truck specification. The right proportion can be measured using a foam branch or monitor at appropriate water pressure and the amount of foam compound used measured in LPM.

## 6.5 Breathing Apparatus, Respirators and Resuscitation Equipment

**6.5.1** Self contained BA sets shall be examined and tested on acceptance monthly and after operational use or drill.

In addition a general check of apparatus shall be made at any time when taking over a set. BA sets should be fully tested once a month and after operational and training as follows:

- a) Carrying frames, harness and buckles should be carefully examined for sign of wear, face mask and goggles should be carefully examined to ensure that they are in good condition. Fittings for ancillary equipment should be checked to ensure that they are satisfactorily intact.
- b) If the set has been worn, it must be thoroughly washed, disinfected, dried and fully tested. The Manufacturer and fire authority's instructions should be followed.
- c) Before fitting the replacement cylinder on the apparatus the content pressure should be checked using the standard gage and noted. After the cylinder is fitted to the apparatus, the pressure reading on the set gage can be compared with that of standard gage, thus checking its accuracy.
- d) If a low cylinder pressure warning whistle fails to operate between pressure specified in the test of apparatus, it should be placed out of commission until the fault has been rectified.

**6.5.2** Cylinders should be kept in circulation and at intervals not exceeding 5 years must be subject of an inspection and hydraulic stretch test by technical inspection authorities. This does not apply to ultra light weight cylinders which must be inspected and tested at 3 yearly intervals. Any cylinders failing the test must be taken out of service.

**6.5.3** Cylinders showing a pressure reading of 80% of their maximum contents should be replaced by fully charged cylinders. They should be marked (M.T) to avoid confusion. Cylinders removed from the set and awaiting recharge should not be emptied. The valve should be closed and a blank cap fitted to the outlet.

### 6.5.4 General check-SCBA sets

#### 6.5.4.1 The procedure is as follows:

- a) Ensure that flow control valve is unscrewed and is in standard position and constant flow or by-pass valve if fitted, is closed. Open cylinder valve and take a pressure reading. The cylinder should be at least 80% full.

- b) Don the face mask and adjust the head harness.
- c) Test the constant flow or by-pass valve by opening it and closing it.
- d) Close the cylinder valve and continue breathing until the air in the set is exhausted, checking that the warning whistle operates when the needle of the pressure gage reaches 45 to 40 atmosphere (bar) and that the gage needle returns to zero when the air is exhausted, and it should be impossible to inhale thereby proving that the exhaling valve and the mask fittings are gas tight.
- e) Quickly slacken the head harness and remove the face mask, examine the set, clean, disinfect and anti-mist. Replace the face mask in its protective bag.

### 6.5.5 Air-Line respirators

#### 6.5.5.1 General check

The procedure is as follows:

- a) Assemble the apparatus completely by attaching the two face masks, harness and extension hoses to the air line.
- b) Ensure that the constant flow valve or purge valve attached to the cylinder manifold is closed.
- c) Open number 1 cylinder valve and take a pressure reading. The cylinder should be at least 80% full. Close the cylinder valve and check that the gage pressure does not drop more than 30 atmosphere (bar) in one minute. If this figure is exceeded check for leakage.
- d) Repeat the procedure with the other cylinder but do not release pressure from the apparatus.
- e) Under close surveillance, don the face mask and breath normally until the air is exhausted from the complete air line at the same time ensuring that the warning whistle sounds when the gage needle returns to zero. When the air is exhausted check that it is impossible to inhale. This will prove that the exhaling valves and masks fitting are gas tight.
- f) Quickly slacken off the head harness, remove the face masks, clean, disinfect the masks and apply anti-dim to the visor.
- g) Replace the masks in the protective bags.
- h) Check the breathing apparatus lamp and distress signal unit if provided.
- i) The apparatus should then be replaced in its normal stowage position.

#### 6.5.5.2 Monthly check

The procedure is as follows:

- a) Commence by completely unwinding the airline hose from the drum and layout in as straight a line as practicable on a clean floor.
- b) Examine for cuts and abrasions.
- c) Examine the carrying frame and trolley for defects.
- d) Continue with general check procedure.
- e) On completion of test, rewind the airline on the drum of the carrying frame and re-stow the masks and harnesses.
- f) Replace the apparatus in its normal stowage position.

### 6.5.6 Resuscitation apparatus

Each set shall be tested on acceptance and weekly, after operational use or drill according to instructions issued by the makers. Cylinders should be checked to see that they contain a full pressure of oxygen (usually 120 bars). Rubber parts such as masks, valves and bellows used should be examined to assure that they are not perished and are working freely. After each occasion when the set is worn, the mask and tubing should be disconnected and thoroughly washed and disinfected.

Cylinders shall be subjected to an inspection and test at intervals not exceeding 5 years as described for breathing apparatus cylinders.

### 6.6 Rubber Gloves (Electrical)

Rubber gloves carried on appliances should be examined on acceptance, quarterly and after every occasion on which they are used. They should be carefully examined, both inside and out to detect cuts and scratches. Care being taken not to wrench the fingers of gloves apart nor to subject the gloves to any undue strain. Damage gloves should be taken out of service. In case of minor damage gloves shall be submitted for retest. Rubber gloves should also be submitted for retest after being used, or at intervals of not more than 12 months.

### 6.7 Dry Battery Electric Torch

These torches should be checked daily for correct operation. They should also be examined on acceptance and operated weakly and after operational use. The batteries should be removed to see that sulphation has not set up between the batteries and the case and contact points should be cleaned if necessary. The batteries should then be replaced and the lamp operated to see that it is in working order.

### 6.8 Ladders

**6.8.1** Ladders should be examined and tested on acceptance, quarterly and after operational use. Ladder should be examined for any movement of the timber, for looseness of bolts or rivets in the fittings, for loose wedges and to see that the shoulders of rounds fit closely up to the strings. Riveted and screwed joints of metal ladders should be examined to ensure that they are tight, and joints of metal ladders should be examined to ensure that they are tight and there is no cracks.

With extension ladders special attention should be paid to the following points:

- a) That moving parts are clean and adequately lubricated.
- b) That extension lines and cables are correctly rove and run freely through the various pulleys.
- c) That ladder pawls are operating correctly.
- d) That anchages for lines and cables are secured.
- e) That mounting and securing gears on the fire truck are fit and function correctly.

**6.8.2** Every 12 months the following additional examination should be made:

- a) The ladder should be placed horizontally on two trestles, bearings, pulleys and pawls should then be examined to see that they are fit and function correctly and that they are sound and free from excessive wear. Nuts, screws, riveted joints and welded joints should be examined for tightness, soundness and freedom from cracks or fractures.

## 6.9 Ropes

**6.9.1** The ropes and lines shall be tested on acceptance, quarterly after operational use and in the case of rescue and lowering. In addition all ropes should be examined quarterly and after operational use.

### 6.9.2 Tests-Rescue and lowering line (long and short)

a) One end of the line should be secured to an immovable object in such a way that the line and any splices incorporated in it will be subjected to the test. Six men spaced out at intervals of about 1.5 m should take up positions at the free end of the line and when all are in position the front man should apply a steady pull to the line. The removing men should successively apply a steady pull to the line until the line is being tested by the combined strength of all six men. The combined load should be maintained for about 20 seconds and then the men should release the load in succession from the rear. The line should then be reversed and the test repeated.

### b) Examination

The whole length of the rope should be examined about 300 mm at a time and should be turned to reveal all sides of that 300 mm before passing on to the next. The laid ropes should be slightly untwisted locally at intervals of not more than 300 mm to reveal the inner surface of the strands. The strands must be returned to their original position afterwards.

## 6.10 Gas Testing Equipment

**6.10.1** Gas testing equipment shall be tested and calibrated on acceptance, and monthly tested also before and after operational use in accordance with manufacturer's maintenance instructions. Spare live batteries shall be available.

## 6.11 First Aid

**6.11.1** Items of first aid shall be checked on acceptance and after operational use and replenished if necessary.

## 6.12 Siren, Radio and Loud Hailer

**6.12.1** Fire truck siren shall be tested on acceptance and at the time of shift change by flick-testing. Radio set and loud hailer should whenever practicable be tested once daily and the faults or signs of deterioration or falling off performance shall be reported to the appropriate maintenance section.

## 6.13 Miscellaneous Gears and Tools

**6.13.1** In addition to the other items of equipment for which standard tests are laid down, there are many items of gears and tools carried on fire and emergency appliances which no definite test is provided should nevertheless be examined on acceptance, quarterly and after use to ensure that any moving parts are in good order and that the general efficiency of the equipment has not been impaired either by misuse, lack of attention or other causes. Hydraulic equipment should be examined and operated and reservoirs topped up as necessary. Any tools which require a sharp edge for their successful operation, should be sharpened as necessary. Items of equipment such as standpipe heads, foam branches inductors etc., which incorporate a strainer or filter should be dismantled in order that the strainer can be cleaned. Protective clothing shall be examined for defects.