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FUNCTIONAL REQUIREMENTS FOR WATER TENDER, TYPE B FOR FIRE BRIGADE USE

(Second Revision)

(Incorporating Amendment Nos. 1 & 2)

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

Price Group 5

Indian Standard

FUNCTIONAL REQUIREMENTS FOR WATER TENDER, TYPE B FOR FIRE BRIGADE USE

(Second Revision)

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Indian Standard

FUNCTIONAL REQUIREMENTS FOR WATER TENDER, TYPE B FOR FIRE BRIGADE USE

(Second Revision)

0. FOREWORD

0.1 This Indian Standard (Second Revision) was adopted by the Indian Standards Institution on 30 September 1980, after the draft finalized by the Fire Fighting Sectional Committee had been approved by the Civil Engineering Division Council.

0.2 Water tender, type B are used in towns or parts of town and industries where the fire risk is such that high rate of discharge of water is necessary for fire fighting and a high degree of manoeuvrability is also desired of the fire appliance at the same time. This standard was first published in 1959 and revised in 1970. The second revision is being based on the experience gained in the past 10 years. The revision includes provision of higher capacity of water tank, made in accordance with the recommendation of the Standing Fire Advisory Council of Government of India.

0.2.1 A list of accessories and equipment which do not form part of this appliance and most of which are normally required to assist in operation of the appliance is given in Appendix A for information and guidance.

0.3 This edition 3.2 incorporates Amendment No. 1 (November 1983) and Amendment No. 2 (October 1984). Side bar indicates modification of the text as the result of incorporation of the amendments.

0.4 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1. SCOPE

1.1 This standard lays down the requirements regarding material, design and construction, workmanship and finish, accessories and equipment of water tender, type B for fire brigade use.

*Rules for rounding off numerical values (*revised*).

2. GENERAL REQUIREMENTS

2.1 The appliance shall incorporate a fire pump of 1 800 1/min capacity and a water tank of 1 800 1 to 3 000 1 capacity depending upon the type of chassis used. It shall carry an extension ladder and shall be capable of towing a trailer pump.

2.2 The water tender shall be fabricated in a manner so as to conform to the following characteristics:

a)	Gross vehicle weight	Not less than 8 500 kg including crew, water and equipment
b)	Maximum speed on level road fully laden	72 km/h
c)	Acceleration from a standing start through the gears (fully laden)	64 km/h in 55 seconds

d) The appliance shall be capable of being started from rest on a gradient of 1 to 4,

e) When travelling at 48 km/h on a level dry surface the foot brake shall be capable of stopping the vehicle within a distance of 15 m from the point at which the brake is applied. The hand brake shall be capable of holding the fully laden appliance on a dry surface gradient of 1 in 4 when in neutral gear.

f) The appliance shall have the following overall dimensions:

Wheel base	Not more than 4 500 mm
Turning circle	Not more than 20 m
Road clearance	Not less than 23 cm
Overall width	Not more than 2.50 m

3. MATERIAL

3.1 The choice of material to be used in the construction of the appliance shall be made with a view to combining lightness with strength and durability. The following choice of materials shall be followed:

a)	Pump casing and impeller	Aluminium alloy (die cast) according to IS : 617-1975* or lead tin bronze (Grade LTB 2 of IS : 318-1981†)

*Specification for aluminium and aluminium alloy ingots and castings for general engineering purposes (*second revision*).

†Specification for leaded tin bronze ingots and castings (*second revision*).

b) Impeller ring and impeller neck ring	Lead tin bronze (Grade LTB 2 of IS : 318-1981*) for lead tin bronze pump and stainless steel (Grade 04Cr18 Ni10 of IS : 6603-1972†) of aluminium alloy pump
c) Pump shaft	Stainless steel (Grade 04Cr18Ni10 of IS : 6603-1972†)
d) Pump panel	Mild steel sheets (IS : 513-1975‡) ordinary grade

3.2 All parts which form water ways or come into contact with water shall be of corrosion-resisting material or should be made of material duly treated for anti-corrosion. All metal parts exposed to atmosphere shall either be of corrosion-resisting material or treated.

3.3 Lubricating nipples shall be provided wherever necessary.

4. DESIGN AND CONSTRUCTION

4.1 Engine

4.1.1 The engine shall be provided with cooling system to permit its continuous stationery running without overheating. Indirect cooling system shall be incorporated, if necessary, which shall be of the open circuit type discharging water to the waste. Arrangements should be made to divert the cooling discharge water to water tank, if necessary.

4.1.2 The operating temperature of the engine cooling water shall preferably be thermostatically controlled.

4.1.3 The oil in the oil sump shall be prevented from overheating.

4.1.4 Suitable gauge for cooling water and glow lamp for lubricating system shall be provided in the driver's cab and on the pump panel. This shall be marked with operating temperature.

4.1.5 External filter shall be provided for the lubricating system and a tubular dip-stick to gauge the level of oil in the oil sump shall be provided.

4.2 Electrical System

4.2.1 A trickle type battery charger shall be provided for recharging the battery *in situ*. A red pilot lamp, indicating when the batteries are being charged from an external supply, shall be provided.

*Specification for leaded tin bronze ingots and castings (*second revision*).

†Specification for stainless steel bars and flats.

‡Specification for cold-rolled carbon steel sheets (*second revision*).

4.2.2 All important electrical circuits shall have separate fuses suitably indicated and shall be grouped into a common fuse-box located in an accessible position in driver's cab and fitted with means for carrying spare fuses. The wiring shall be single pole and shall not be exposed to the atmosphere. Conduits shall be used wherever necessary.

4.3 Water Tank — It shall vary from 1 800 to 3 000 litres depending upon the type of chassis used.

4.3.1 A tank of required capacity constructed out of mild steel treated for anti-corrosion shall be suitably mounted on the chassis in a manner keeping in view the proper load distribution on the axles. The tank shall be suitably baffled to prevent surge when the vehicle is breaking, cornering or accelerating. The baffles shall be arranged in a manner to facilitate the passage of a man throughout the tank for cleaning purpose. The tank shall be mounted on minimum of three cross members to counteract stresses caused by chassis flexing and shall be so secured that it can be removed. The tank body and baffle shall be minimum of 3 mm thick plate.

4.3.2 The tank shall be fitted with a 50 mm bore overflow pipe. A 63 mm instantaneous hydrant connection, incorporating a strainer, shall be provided close to the pump panel control for filling the tank through 50 mm bore pipe work or feeding the hose reel equipment. An 80 mm bore pipe line shall be taken from the tank to the suction inlet of the pump incorporating an 80 mm quick action spherical type valve. Separate valve(s) for performing the function given in **4.3.6** shall be provided to control the flow of water to the hose reel equipment. Drain plugs or drain cocks shall be provided wherever necessary.

4.3.3 The tank shall be given adequate anti-corrosive treatment of expoxy treatment consisting of one coat of primer with two coats of finish after preparing the surface by sand blasting from inside after fabrication if it is not galvanized. The open end of the overflow pipe should be taken down to a point well below the chassis without affecting the effective ground clearance when fully loaded and shall discharge away from the wheels.

4.3.4 Dial gauge water level indicator for the tank shall be provided preferably in the driver's cab or a visual level gauge of the glass tube shall be provided at the control panel calibrated 1/4, 1/2, 3/4 and full (preferably calibrated in litres).

4.3.5 The tank shall have a bolted manhole of 45 cm dia minimum. A cleaning hole of at least 25 cm dia shall also be provided at the bottom.

4.3.6 The tank shall be connected with the pump and hose reel and valve(s) shall be provided in such a way that any of the following operations are possible:

a) Hydrant tanks,

b) Hydrant reel,

c) Tank-pump-reel,

d) Hydrant pump-reel, and

e) Off.

4.4 Hose Reel

4.4.1 One hose reel (*see* IS : 884-1969*) shall be provided at the rear of the appliance with 60 m lengths of 20 mm bore hose connected by screw 'C' type quick release couplings and terminating with a control branch and 5 mm nozzle. The reel shall be fitted with over brake or locking device.

4.5 Pump

4.5.1 A centrifugal pump shall be preferably mounted at midship of the appliance. The pump may be either multi-stage or single-stage type. Anti-friction bearings external to the casing be provided so as to avoid any bearings within the pump casing. The gland shall be of the mechanical self-adjusting type.

The impeller should be dynamically balanced. A drain cock plug shall be provided at the bottom of the casing in a way to prevent the cock being opened due to vibrations. Studs, etc, used in the pump casing shall be preferably of stainless steel. In case light alloy castings are used, these shall be of die-cast and without any blow holes, internal cracks, etc. The interior of the casting shall be smooth finished. The castings shall withstand the hydraulic pressure as given in **4.5.4**.

4.5.2 The pump shall be preferably completely covered. However, all the controls on the panel and the gauges shall be uncovered. The pump shall be coupled to the prime-mover of the chassis through a power take-off capable of full torque of the engine used for the appliance. A control lever for engaging and disengaging the pump, with suitable locking devices, shall be provided in the driver's cab.

4.5.3 The pump shall be designed to give its rated output of 1 800 litres per minute at 7 kgf/cm^2 (*see* Table 1) with an engine and pump input at shaft speed safe enough to operate the engine. The pump shall give performance as given in Table 1, when working with strainers (except basket strainer) at 27 ± 2°C.

*Specification for first-aid hose-reel for fire fighting (for fix installations).

TABLE 1 PUMP PERFORMANCE DATA

(*Clause* 4.5.3)

OUTPUT	PRESSURE	LIFT	REMARKS
(1)	(2)	(3)	(4)
Litres/minutes	kgf/cm^2	m	
1 800	7	3	When working through two 2.45 m lengths of specified suction hose
1 450	8.8	3	do
720	7	7	When working through 9.8 m, that is four 2.45 m lengths of specified suction hose

4.5.3.1 *Allowances for output*

a) One percent for every 2.5°C rise in water temperature,

b) Four percent for every 300 m above mean sea level, and

c) No allowance shall be made for humidity up to 75 percent. However, deduction at the rate of 1 percent of every 5 percent change in humidity shall be made when humidity changes from 75 to 95 percent.

4.5.4 *Pump Test* — The pump shall be run for a period of four hours non-stop delivering the rated output at 7 kgf/cm^2 with a lift of 3 m. During the test, the water shall not be replenished for the cooling system and the temperature of the engine oil should not exceed 115°C or of the engine manufacturer rated temperature for continuous working whichever is less. The engine should show no sign of stress during the test. The temperature of the cooling water (radiator water) tank shall not exceed 85°C. The PTO sump oil temperature shall not exceed 100 percent of the manufacturers recommended temperature for the grade of oil used. The pump casing and impeller shall be subjected to a hydraulic pressure of 21 kgf/cm^2 to detect leakage, perforation, etc.

4.6 Suction Inlet and Delivery Valves

4.6.1 The Pump shall have suction inlet(s) having 100 mm standard suction connection (*see* IS : 902-1974*) with internal strainer(s) and blank cap(s). The strainer(s) shall be retained firmly when in use but shall be easily removable. In the case of midship mounted pumps, suction inlets shall be provided at each of two control panels.

4.6.2 The pump shall be provided with two delivery valves having 63 mm standard hose couplings (*see* IS : 903-1975†) with screwed wheel type quick closing clack valve (*see* IS : 4928-1968‡). Blank caps

*Specification for suction hose couplings for fire fighting purposes (*second revision*).

†Specification for fire hose delivery couplings, branch pipe, nozzles and nozzle spanner (*second revision*).

‡Specification for quick closing clack-valve for centrifugal pump outlet.

fastened with chains and incorporating means to relieve pressure between the valve and the cap shall be provided one for each delivery valve. In the case of midship mounted pump, two delivery valves shall be provided at each panel.

4.7 Primer

4.7.1 The primer shall be capable of lifting water at least 7.0 m (measured from water level to the centre of pump) in not more than 24 seconds and shall preferably be fully automatic. The allowance shall be 30 cm for every 300 m elevation above mean sea level and 1 percent for 2.5°C rise in water temperature.

4.7.2 In the case of water ring type primer, means shall be provided to automatically disengage the primer when the pump is primed. Where required header tank complete with isolating valve enabling antifreeze solution to be used in the circuit. If the primer is of the reciprocating type, means shall be provided to automatically limit the speed of engine while the primer is engaged.

4.7.3 The primer shall be constructed of light alloy casting, shall have stainless steel shaft and shall be fitted with suitable lubricated bearing depending upon the type of primer.

4.7.4 In the case of reciprocating type primer, the selection of materials shall be made with a view that no major part is required to be replaced in course of service and the material used for these parts shall be phosphor bronze and stainless steel depending upon their respective strength and use. The caps of primer and springs shall be properly secured. The primer lever shall be easily accessible from the operator(s) position.

4.7.5 In the case of reciprocating type, the primer shall be preferably designed with a view to prime when the pump is running at speed of 1 000 to 1 500 rpm.

4.8 Control Panels

4.8.1 Adequately illuminated control panel shall be provided and positioned as follows:

a) *Rear mounted pump* — One control panel at the rear of the appliance.

b) *Midship mounted pump* — Two control panels, one on each side of the appliance.

4.8.2 The control panel(s) shall include the following:

a) Throttle control for engine;

b) Pressure gauge — 0 to 17.5 kgf/cm^2;

c) Compound gauge calibrated as under:

Vacuum — 0 to 75 cm Hg, preferably in black;

Pressure — 0 to 6 kgf/cm^2, preferably in black;

d) Primer control (if the primer is not fully automatic);

e) Gauge for cooling water and glow lamp for lubricating system; and

f) Cooling water circuit control.

4.8.3 The following shall also be provided at a convenient position near the control panel(s):

a) Water level indicator (*see* **4.3.4**),

b) Control valve hydrant connection (*see* **4.3.6**).

4.9 Body Work and Stowage

4.9.1 Enclosed accommodation for six persons shall be provided in the driver cab-*cum*-crew compartment including the driver and the incharge of the crew. Two doors on each side shall be provided on the driver cab-*cum*-crew compartment. The doors shall be hinged opening outwards and shall be hung forward and shall have catch locks and flush type handles.

4.9.2 The cab and lockers should be of composite construction with sufficient rigidity and reinforcement and shall be kept as light as possible. Pressed sections of sufficient strength shall be used for the superstructure.

4.9.3 Lockers shall be provided for secure stowage of all equipment given in Appendix A except those mentioned at Sl No. 1, 26, 44 to 46. The height of the lockers from the bottom to the top of the opening shall be not less than 600 mm and the depth not less than 600 mm.

4.9.4 All lockers shall be provided with internal automatic lighting arrangement with the master switch in the cab. The doors of the lockers shall have efficient means for holding them closed by efficient flush fitting spring loaded locks. The doors of the side lockers shall not be hinged at the bottom.

4.9.5 Hose tunnels shall be provided to carry four 2.5-m lengths of suction hoses in convenient location. Drain holes shall be provided preferably at the bottom of the tunnel and hose stowage compartment.

4.9.6 *Ladder Gallows* — Gallows shall be provided to carry a 10.5-m, aluminium extension ladder. The design shall be such that the ladder can be released without difficulty from a reasonably accessible position

and shall embody rollers to permit easy withdrawal by one man. Means shall also be provided for locking the ladder when stowed.

4.9.7 *Tool-Kit Container* — A specially fitted recessed tray for the normal kit of tools, carried on the appliance, shall be provided.

4.10 *Stability* — The stability of the appliance shall be such that when under fully equipped and loaded conditions (but excluding crew), if the surface on which the appliance stands is tilted to either side, the point at which overturning occurs is not passed at an angle of 30 degrees from the horizontal.

5. WORKMANSHIP AND FINISH

5.1 All parts of the appliance shall be of good workmanship and shall have streamlined finish.

5.2 The appliance shall be painted fire red colour conforming to Shade No. 536 of IS : 5-1978*. The paint shall conform to IS : 2932-1974†.

6. INSTRUCTION BOOK, ACCESSORIES AND EQUIPMENT

6.1 Instruction Book or Books — Instruction book(s) for the guidance of the user(s), including both operating and normal maintenance procedure shall be supplied. The book(s) shall include an intemised and illustrated spare-parts list giving reference numbers of all the wearing parts.

6.2 Accessories

6.2.1 The following accessories shall be provided in addition to those normally fitted on modern commercial vehicles:

a) *Fire bells* — 250 mm diameter fire bell shall be mounted externally and shall be capable of being operated from within the driving compartment. The bell shall be of the hand operated type.

b) *Head lamps* — Two.

c) *Fog lamps* — Two.

d) *Reversing light* — Lamp suitably situated to assist reversing.

e) *Amber blinkers lights* — Situated on the head of the driving compartment.

f) *Trafficators* — Illuminated with indicating lights on instrument panel or in any other prominent position in driving compartment.

*Specification for colours for ready mixed paint (*third revision*).

†Specification for enamel, synthetic, exterior (a) undercoating, (b) finishing (*first revision*).

g) *Wind screen wipers*

h) *Tools* — All tools required for normal routine maintenance of the appliance which are not included in the kit for the chassis.

j) *Siren* — Battery operated.

k) *Search light* — Adjustable to give flood or beam light, mounted in a convenient position but capable of being readily disconnected and mounted on a tripod away from the appliance, complete with tripod and with not less than 30 m of TRS cable on a reel mounted on the appliance.

m) *Spot light* — Adjustable, mounted in a convenient position on the near side of the driving compartment.

n) *Inspection lamp* — Protected type on wander lead with plug. A socket shall be provided in the control panel in the driver's cab for plugging in the lamp.

p) *Tail lamps* — Two of combined stop and tail.

q) *Rear reflectors*

r) *Cab, instrument panel and locker, light*

s) *Public address system.*

7. MARKING

7.1 Each appliance shall be clearly and permanently marked with the following information:

a) Manufacturer's name, or trade-mark, if any;

b) Capacity of the pump in litres/minute, and of the water tank in litres; and

c) Year of manufacture.

APPENDIX A

(*Clauses* 0.2.1 *and* 4.9.3)

SCHEDULE OF EQUIPMENT TO BE STOWED IN THE APPLIANCE

Sl No.	*Items*	*Quantity*
1.	Aluminium extension ladder — 10.5 m (IS : 4571-1977*)	1

*Specification for aluminium extension ladders for fire brigade use (*first revision*).

Sl No.	Items	Quantity
2.	a) Rubber lined delivery hose according to Type II of IS : 636-1979* in 22.5 m or 15 m lengths fitted with 63 mm delivery hose couplings (*see* IS : 903-1975†)	180 m
	b) Unlined flax canvas hose according to IS : 4927-1968‡ in 30 m lengths fitted with delivery hose couplings (*see* IS : 903-1975†) or Controlled percolating hose according to IS : 8423-1977§ in 30 m lengths fitted with delivery hose couplings (*see* IS : 903-1975†)	150 m
3.	a) Hose-clamps [*see* IS : 5612 (Part I)-1977||]	25
	b) Hose bandages [*see* IS : 5612 (Part II)-1977¶]	25
	c) Hose slings	20
	d) Hose straps	20
4.	Suction hose of rubber of 100 mm internal diameter in 2.5 m lengths (*see* IS : 2410-1963**) fitted with 100 mm suction hose couplings (*see* IS : 902-1974††)	10 m
5.	3 Way suction collecting head 100 m size (*see* IS : 904-1983‡‡)	1
6.	Suction wrenches for 100 mm suction coupling (*see* IS : 4643-1968§§)	2
7.	Suction strainer 100 mm size (*see* IS : 907-1965||||)	1
8.	Basket strainer (cylindrical type) (*see* IS : 3582-1966¶¶)	1

*Specification for fire fighting hose (rubber lined, or rubberized fabric lined, woven jacketed) (*second revision*).

†Specification for fire hose delivery couplings, branch pipe, nozzles and nozzle spanner (*second revision*).

‡Specification for unlined flax canvas hose for fire fighting.

§Specification for controlled percolating hose for fire fighting.

||Specification for hose-clamps and hose-bandages for fire brigade use: Part I Hose clamps.

¶Specification for hose-clamps and hose-bandages for fire brigade use: Part II Hose-bandages.

**Specification for suction hose of rubber for fire services.

††Specification for suction hose couplings for fire fighting (*second revision*).

‡‡Specification for 2-way and 3-way suction collecting heads for fire fighting purposes (*second revision*).

§§Specification for suction wrenches for fire brigade use.

||||Specification for suction strainers, cylindrical and shoe types, for fire fighting purposes (*revised*).

¶¶Specification for basket strainers for fire fighting purposes (cylindrical type).

Sl No.	*Items*	*Quantity*
9.	Dividing breeching with control instantaneous pattern 63 mm (*see* IS : 5131-1969*)	1
10.	Collecting breaching instantaneous pattern 63 mm (*see* IS : 905-1980†)	1
11.	a) Hydrant — stand pipe — two way (*see* IS : 5714-1981‡)	1
	b) Double female coupling (*see* IS : 901-1975§)	2
	c) Hydrant connection, 63 mm double armoured hose 1 m long with 63 mm female instantaneous pattern delivery couplings at both ends (*see* IS : 901-1975§)	2
12.	Combined key for hydrant, hydrant cover and lower valve (*see* IS : 910-1980||)	2
13.	Fog nozzle (*see* IS : 952-1969¶) with extension applicator with fog head	1
14.	Hand controlled branch for 63 mm size hose coupling	1
15	Branch pipe, universal (*see* IS : 2871-1983**)	1
16.	Branch with revolving head (IS : 906-1972††)	1
17.	Branch pipe (*see* IS : 903-1975‡‡)	4
18.	Nozzle of sizes 12 mm, 16 mm, 20 mm and 32 mm (two each) (*see* IS : 903-1975‡‡)	10
19.	a) Adaptor for 100 mm suction female screw coupling and 63 mm male instantaneous	2
	b) Adaptor double female instantaneous pattern 63 mm	2
	c) Adaptor double male instantaneous pattern 63 mm	2
20.	Nozzle spanners (*see* IS : 903-1975‡‡)	2
21.	Portable electric box lamp with rechargeable accumulator	2
22.	Hand lamp (torch — 4 cells)	2

*Specification for dividing breeching with control, for fire brigade use.

†Specification for delivery breechings, dividing and collecting, instantaneous pattern for fire fighting purposes (*second revision*).

‡Specification for hydrant stand pipe for fire fighting (*first revision*).

§Specification for couplings, double male and double female, instantaneous pattern for fire fighting (*second revision*).

||Specification for combined key for hydrant, hydrant cover and lower valve (*second revision*).

¶Specification for fognozle for fire brigade use.

**Specification for branch pipe universal for fire fighting purposes (*first revision*).

††Specification for branch with revolving head for fire fighting purposes (*second revision*).

‡‡Specification for fire hose delivery couplings branch pipe, nozzles and nozzle spanner (*second revision*).

Sl No.	*Items*	*Quantity*
23.	Flameproof lamp (usable in the presence of inflammable gases or vapours)	2
24.	Self-contained breathing apparatus (compressed air type) complete with spare cylinder and tool kit (*see* IS : 10245 (Part II)-1982*)	1 set
25.	Portable fire extinguisher, dry powder type, 2 kg (*see* IS : 2171-1976†)	1
26.	Portable chemical fire extinguisher, foam type, 9 litres capacity (*see* IS : 933-1976‡)	1
27.	Foam making branch FB-4 with pick up tube (*see* IS : 2097-1983§)	1
28.	Lowering line — 50 mm hemp or terylene, 40 m long having two ends spliced in and one end with a running noose (*see* IS : 1084-1969||)	1
29.	Long line — 50 mm manila, 30 m long (*see* IS : 1084-1969||)	1
30.	Short line — 50 mm manila, 15 m long (*see* IS : 1084-1969||)	1
31.	Canvas buckets	2
32.	First aid box for 10 persons	1
33.	Rubber gloves (in case) (*see* IS : 4770-1968¶)	1 pair
34.	Asbestos guantlets (in case)	1 pair
35.	Axe, large (*see* IS : 703-1966**)	1
36.	Spade	1
37.	Pick axe (*see* IS : 273-1973††)	1
38.	Crow bar (*see* IS : 704-1968‡‡)	1
39.	Sledge hammer, 6.5 kg (*see* IS : 841-1968§§)	1
40.	Carpenter's saw, 60 cm (*see* IS : 5098-1969||||)	1

*Specification for breathing apparatus: Part II Open circuit breathing apparatus.
†Specification for portable fire extinguishers, dry powder type (*second revision*).
‡Specification for portable chemical fire extinguisher, foam type (*second revision*).
§Specification for foam-making branches (*second revision*).
||Specification for manila ropes (*second revision*).
¶Specification for rubber gloves for electrical purposes.
**Specification for axes (*revised*).
††Specification for picks and beaters (*second revision*).
‡‡Specification for crow-bars and claw-bars (*fist revision*).
§§Specification for hand hammers (*first revision*).
||||Specification for cross-cut and rip saws.

Sl No.	*Items*	*Quantity*
41.	Spanner, adjustable, 30 cm long handle (*see* IS : 6149-1971*)	1
42.	Door breaker	1
43.	Hydraulic jack — 7.5 tonne	1
44.	Fire hook (*see* IS : 927-1981†)	1
45.	Tool kit	1
46.	Grease gun	2
47.	Oil feeder	1
48.	Can oil — 2 litres	1
49.	Can oil	1
50.	Funnel for oil or fuel filling	1
51.	File bastard 30 cm (*see* IS : 1931-1972‡)	1

*Specification for single ended open jaw adjustable wrenches.
†Specification for fire hooks (*second revision*).
‡Specification for engineers' files (*first revision*).

(*Continued from page* 2)

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