IS 942 (1982): Functional Requirements for 275 1/Min Portable Pump Set for Fire Fighting [CED 22: Fire Fighting]

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Indian Standard

FUNCTIONAL REQUIREMENTS FOR 275 l/MIN PORTABLE PUMP SET FOR FIRE FIGHTING

(Second Revision)

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(Second Revision)

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Indian Standard

FUNCTIONAL REQUIREMENTS FOR 275 l/MIN PORTABLE PUMP SET FOR FIRE FIGHTING

(Second Revision)

0. FOREWORD

0.1 This Indian Standard (Second Revision) was adopted by the Indian Standards Institution on 15 April 1982, after the draft finalized by the Fire Fighting Sectional Committee had been approved by the Civil Engineering Division Council.

0.2 The portable pump set is one of the essential equipment for fire fighting. However, the capacity of this pump being limited, it cannot be relied upon for fighting large fires, but it has advantages of being light-weight and portable, which enables it to be carried almost anywhere. This type of pump is very suitable for small factories, railway/dock yards, areas where there are narrow lanes, rural areas and towns where water is scarce.

0.2.1 This standard was first published in 1958 and revised in 1968. The second revision has been prepared to provide for use for diesel type of engines also.

0.3 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.

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1. SCOPE

1.1 This standard lays down the requirements regarding material and design of 275 l/min portable pump set for fire fighting.

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

2. GENERAL REQUIREMENTS

2.1 The unit shall consist of the pump having an output of not less than 275 l/min at a pressure of 4 kgf/cm^2, fitted on a tubular steel frame and with anti-vibration coils/pads. The complete unit shall be of lightweight construction, so that it can be easily carried by two men.

3. MATERIAL

3.1 The pump comprising volute, body (casing) impeller and one delivery outlet shall be manufactured from light aluminium alloy conforming to IS : 617-1975*.

3.1.1 The mild steel tubes used for the fabrication of tubular frame shall conform to IS : 3601-1966†.

3.1.2 The spindle of the delivery valve shall be made of stainless steel conforming to 07CR18Ni9 Grade of IS : 6603-1972‡.

3.2 All parts which form waterways, or come into contact with water, shall be of corrosion resisting material or treated in a suitable manner. All metal parts exposed to atmosphere shall be either corrosion resisting or treated in a suitable manner.

4. DESIGN

4.1 The components of the unit shall comply with the following requirements.

4.1.1 *Engine*

4.1.1.1 The engine shall be a single cylinder two-stroke or four-stroke petrol or diesel driven.

4.1.1.2 The engine shall be air-cooled.

4.1.1.3 A well designed hand starting device shall be provided to ensure reliable and quick starting engine.

4.1.2 *Pump*

4.1.2.1 The pump shall be of single stage centrifugal type, directly mounted on the extension of the crankshaft of the engine.

4.1.2.2 The pump casing shall be so designed as to afford easy access to the impeller and facilitate erection and inspection. The outer face of the pump casing shall carry the suction and delivery connections and their fittings and priming device.

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

†Specification for steel tubes of mechanical and general engineering purposes.

‡Specification for stainless steel bars and flats.

4.1.2.3 The pump shall be fitted with mechanical gland of self adjusting type.

4.1.2.4 The pump shall be tested for the performance of its duties (*see* **4.1.2.5**) at 27° ± 2°C and at pressure of 760 mm of mercury. The following allowances (deductions) shall be made :

a) Output — i) One percent of every 2·5°C rise in water temperature;

ii) 4 percent for every 300 mm elevation above mean sea level; and

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

b) Lift — i) 30 cm every 300 m elevation above mean sea level, and

ii) One percent for every 2·5°C rise in water temperature.

4.1.2.5 The pump shall be tested with suction stainer fitted continuously for 4 hours shall be with a lift of 3 m for the following duties:

Output l/min	Pressure kgf/cm^2
545	2·5
365	3·5
275	4·0

4.1.2.6 The pump suction shall be fitted with 75 mm male round threads and female blank cap. The round threads shall confirm to Table 3 of IS : 902-1974*.

4.1.2.7 The delivery valve shall be of screw down type and fitted with 63 mm female instantaneous coupling and blank cap. The delivery valve shall confirm to IS : 4928-1968†.

4.1.3 *Primer* — The primer shall be capable of lifting water at least through 7 m in not more than 45 seconds and shall be preferably fully automatic.

4.1.4 *Framework* — It shall be of a cradle design made of tubular steel and provided with anti-vibration coils/pads.

*Specification for suction hose couplings for fire fighting purposes (*second revision*).
†Specification for quick closing clack-valve for centrifugal pump outlet.

4.1.4.1 The cradle shall be fitted with 4 folding handles of spring loaded type. The handles shall be capable of being used for tying the ropes for slingling the pump down in the well.

4.1.5 *Suction Hose* — The lengths of 75 mm suction hose shall be 4 of 2·5 m or 2 of 4·5 m conforming to IS : 2410-1963*. The suction hose shall be fitted with 75 mm suction hose coupling conforming to IS : 902-1974†.

4.1.6 *Fuel Tank* — The fuel tank shall have a capacity for 2 hours continuous running.

4.1.7 The control panel shall include:

a) Hand trottle,

b) Pressure gauge calibrated from 0 to 10 kgf/cm^2, and

c) Compound gauge with pressure calibrated from 0 to 6 kgf/cm^2 in black and vacuum 0 to 75 cms of mercury in red.

4.2 Tools and Instruction Book — A tool kit comprising all essential tools required for normal maintenance, shall be provided with each pump along with a fully illustrated booklet and itemwise spare parts list.

4.3 Weight — The total weight of the unit with fuel shall not exceed 110 kgs.

5. WORKMANSHIP AND FINISH

5.1 All parts of the unit shall be of good workmanship.

5.2 The cradle shall be painted in Fire Red (*see* Shade No. 536 of IS : 5-1978‡). The paint shall conform to IS : 2932-1974§.

6. MARKINGS

6.1 Each pump set shall be clearly and permanently marked with the following information:

a) Manufacturer's name or trade-mark;

b) Type of engine and pump;

c) The output of the pump in l/min;

d) Weight of the pump set;

e) Year of manufacture; and

f) Instructions for operation of the pump.

*Specification for suction hose of rubber for fire services.

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

‡Specification for colours for ready mixed paints and enamels (*third revision*).

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

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INTERNATIONAL SYSTEM OF UNITS (SI UNITS)

Base Units

Quantity	*Unit*	*Symbol*
Length	metre	m
Mass	kilogram	kg
Time	second	s
Electric current	ampere	A
Thermodynamic temperature	kelvin	K
Luminous intensity	candela	cd
Amount of substance	mole	mol

Supplementary Units

Quantity	*Unit*	*Symbol*
Plane angle	radian	rad
Solid angle	steradian	sr

Derived Units

Quantity	*Unit*	*Symbol*	*Definition*
Force	newton	N	1 N=1kg. m/s^2
Energy	joule	J	1 J=1 N.m
Power	watt	W	1 W=1 J/s
Flux	weber	Wb	1 Wb=1 V.s
Flux density	tesla	T	1 T=1 Wb/m^2
Frequency	hertz	Hz	1 Hz=1 c/s (s^{-1})
Electric conductance	siemens	S	1 S=1 A/V
Electromotive force	volt	V	1 V=1 W/A
Pressure, stress	pascal	Pa	1 Pa=1 N/m^2