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# भारतीय मानक

# फसल संरक्षण उपस्कर — पाद फुहारा — विशिष्टि

( चौथा पुनरीक्षण )

Indian Standard

# CROP PROTECTION EQUIPMENT — FOOT SPRAYER — SPECIFICATION

(Fourth Revision)

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

# AMENDMENT NO. 1 JULY 2000 TO

# IS 3652: 1995 CROP PROTECTION EQUIPMENT — FOOT SPRAYER — SPECIFICATION

(Fourth Revision)

( Page 18, clause E-3.6) — Substitute the following for the existing text matter:

#### 'E.3.6 Endurance Test

When tested in accordance with F-7 and F-9 at a pressure of  $600 \pm 60$  kPa after operating for 48 h duration with 6 h continuous stretch in each setting of the fine cone spray and jet spray pattern, the discharge rate and spray angle observed shall not vary by more than  $\pm$  10 percent and  $\pm$  5 degrees respectively from the initial values obtained before the test.'

(Page 21, clause F-3.3) — Substitute the following for the existing text:

'The hydraulic spray nozzle when tested in accordance with F-7 and F-9 at a pressure of  $300 \pm 30$  kPa after operating for 48 h duration with continuous stretches of 6 h, variation in discharge rate and spray angle from initial values should not be more than  $\pm 5$  percent and  $\pm 3$  degrees respectively.'

( Page 22, clause F-7.1, second sentence) — Substitute the following for the existing sentence:

'The water or spray material shall be under a controlled pressure of 75 kPa or 300 kPa or 600 kPa (as the case may be).'

(FAD 59)

# AMENDMENT NO. 2 MAY 2002 TO

# IS 3652: 1995 CROP PROTECTION EQUIPMENT— FOOT SPRAYER—SPECIFICATION

(Fourth Revision)

(Page 1, clause 4.3) — Insert the following new clause after 4.3:

'4.4 The engineering plastics used for manufacturing various components as given in Table 1 shall be co-polymer plastics or reinforced high density polyethylene or reinforced polypropylene.'

[ Page 5, Table 1, Sl No. (xvi), col 3 ] — Insert 'brass' at the end.

[ Page 5, Table 1, Sl No. (xviii), (Disc, tip, swirl core)] — Insert 'engineering plastics' after 'stainless steel' in col 3.

[ Page 5, Table 1, Sl No. (xviii), (Spindle, coupling nut, gland nut)]—Insert 'engineering plastics' after 'brass' in col 3.

[ Page 5, Table 1, Sl No. (xix), (Operating trigger) ] — Substitute 'Stainless steel, engineering plastics' for 'Steel' in col 3.

[ Page 5, Table 1, Sl No. (xx), (Barrel, connecting rod, connecting guide, connections for extension, holder and inlet collector, lock nuts and rigid washer)]
— Insert 'engineering plastics' after 'Brass' in col 3.

( Page 7, clause 7.2) — Insert the following new clause after 7.2:

'7.3 Each sprayer shall be provided with a set of mask, hand gloves and safety goggles.'

[ Page 12, clause C-10(c) ] — Delete.

[ Page 16, clause **D-5**(c) ] — Delete.

( Page 18, clause E-3.4.1, sentence 3) — Substitute the following for the existing sentence:

'The gun shall be firmly secured horizontally at a height of about 1 m above the ground.'

#### Amend No. 2 to IS 3652: 1995

( Page 22, clause F-8.1.1) — Substitute the following for the existing:

'The patternator ( see Fig. 19 ) normally consist of 16 channels each  $25 \pm 0.5$  mm wide and of any convenient length provided that it encompasses the area of the spray. The number of channels may be increased or decreased so that the whole of the spray falls within the patternator. The channels lead the liquid directly to the measuring tube having a bore not more than 24 mm and be long enough to hold minimum of test liquid. The depth of channels shall be at least 50 mm and shall have provision to avoid rebound of the spray droplets. The top edge of the trough dividers shall be round (tapered to  $2.0 \pm 0.5$  mm on the top edge ) and straight in the horizontal plane, so that no point along with the edge lies more than 1 mm from the straight line joining the corresponding point at positioned so that when a straight edge is laid across the full width of the front and back of the troughs no edge lies more than 1 mm below this. Each divider shall be straight in the vertical plane to within  $\pm 0.5$  mm.'

(Page 22, clause F-8.2.3) — Substitute the following for the existing:

'F-8.2.3 Test the cone spray nozzle in three different positions of nozzles, namely, 90°, 180° and 270°.'

[ Page 26, clause F-11(c)] — Delete.

(FAD 59)

# AMENDMENT NO. 3 AUGUST 2010 TO

# IS 3652: 1995 CROP PROTECTION EQUIPMENT — FOOT SPRAYER — SPECIFICATION

#### (Fourth Revision)

- (*Pages* 1 to 26) Delete year of publication against all IS numbers appearing from clause **3** onwards.
  - (Page 3, clause **5.2**, line 3) Substitute '82 percent' for '80 percent'.
- [Page 5, Table 1, col 3, Sl No. (i)] Substitute 'Brass, stainless steel, engineering plastic' for 'Brass'.
- [Page 5, Table 1, col 3, Sl No. (ii)] Substitute 'Brass, stainless steel, engineering plastic' for 'Brass, engineering plastic'.
- [Page 5, Table 1, col 3, Sl No. (iii)] Substitute 'Brass, stainless steel, engineering plastic' for 'Brass, engineering plastic, aluminium alloy'.
- [Page 5, Table 1, col 3, Sl No. (iv)] Substitute 'Brass, stainless steel, engineering plastic' for 'Brass, stainless steel, plastic'.
- [Page 5, Table 1, col 3, Sl No. (vi)] Substitute 'Steel' for 'Brass, steel'.
- [Page 5, Table 1, col 3, Sl No. (viii)] Substitute 'Plastic' for 'Wood, engineering plastic'.
- [Page 5, Table 1, col 3, Sl No. (ix)] Substitute 'Chrome tanned leather, PVC' for 'Chrome tanned leather, synthetic rubber, PVC'.
- [Page 5, Table 1, col 3, Sl No. (x)] Substitute 'Cast iron, steel' for 'Cast iron, steel, cast aluminum alloy'.
- [Page 5, Table 1, col 3, Sl No. (xi)] Substitute 'Plastic' for 'rubber, plastic'.
- [Page 5, Table 1, col 3, Sl No. (xiii)] Substitute 'PVC' for 'Braided rubber, PVC'.

#### Amend No. 3 to IS 3652: 1995

- [*Page* 5, *Table* 1, *col* 3, *Sl No.* (xiv)] Substitute 'Synthetic rubber, PVC, fibre' *for* 'Synthetic rubber, PVC, leather, fibre'.
- [Page 5, Table 1, col 3, Sl No. (xvi) (see also Amendment No. 2)] Substitute 'Steel, brass, aluminium alloy, for 'Aluminium alloy, steel'.
- [Page 5, Table 1, col 3, Sl No. (xvii)] Substitute 'Brass, plastic, stainless steel' for 'Brass, plastic'.

[Page 5, Table 1, Sl No. (xviii) (see also Amendment No. 2)] — Substitute the following matter under col 2 and col 3 for the existing:

(2)	(3)		
Nozzle components:			
<ul> <li>Body and cap</li> </ul>	Brass, engineering plastic, stainless steel		
<ul> <li>Swirl core</li> </ul>	Brass, engineering plastic, stainless steel		
<ul><li>Disc tip</li></ul>	Brass, ceramic, stainless steel		
<ul> <li>Spindle, coupling nut and gland nut</li> </ul>	Brass, engineering plastic, stainless steel		

[Page 5, Table 1, Sl No. (xix)] — Substitute the following matter under col 2 and col 3 for the existing:

(2)	(3)		
Cut-off device components:			
<ul> <li>Body, valve stem, valve seat,</li> </ul>	Brass, engineering plastic, stainless steel		
gland nut, cap and collar, nipple			
– Valve	Brass, synthetic rubber, stainless steel, plastic		
<ul><li>Strainer</li></ul>	Brass, stainless steel, plastic		
<ul> <li>Operating knob</li> </ul>	Brass, engineering plastic		
<ul> <li>Operating trigger</li> </ul>	Steel, engineering plastic		
- Spring	Stainless steel		
<ul><li>Gasket</li></ul>	Synthetic rubber, fibre, PVC		
<ul> <li>Gland seal</li> </ul>	PVC		
<ul> <li>Gland packing</li> </ul>	Asbestos rope		

[Page 5, Table 1, Sl No. (xx) (see also Amendment No. 2)] — Substitute the following matter under col 2 and col 3 for the existing:

#### Amend No. 3 to IS 3652: 1995

(2)	(3)
Spray gun components:  - Barrel, connecting rod, connecting rod Guide, connections for extension, holder and inlet collector, lock nut, gland nut	Brass, engineering. plastic, stainless steel
and rigid washer  - Swirl rotor, nozzle cap and body  - Spring  - Nozzle disc  - Grip	Brass, engineering plastic, stainless steel, Stainless steel Brass, stainless steel, ceramic Plastic
<ul><li>Packing gland</li><li>Gland seal</li><li>Split pin/pivot pin</li></ul>	Asbestos rope PVC Steel

(*Page* 6, *clause* **6.5**) — Substitute 'metallic threaded connections' *for* 'threaded connections' wherever appears.

(*Page 7, clause* **6.8.3**, *Note*) — Substitute the following for the existing:

'NOTE – In case the cut-off device, spray lance and spray gun of types other than those specified in Annexes C, D and E is required by the purchaser, for the social purpose, its requirements shall be as agreed to between the purchaser and the supplier.'

(*Page* 15, *Annex* D, *clause* **D-2.1**, *line* 1) — Substitute 'Brass or stainless steel or plastic tube' *for* 'Brass tube or plastic tube'.

(Page 16, Annex E, clause **E-2.1**, line 2) — Substitute '0.60 mm' for '0.63 mm'.

(Page 21, Annex F, clause F-3.3, line 2) — Substitute 'F-7' for 'F-8'.

#### **FOREWORD**

This Indian Standard (Fourth Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Crop Protection Equipment Sectional Committee had been approved by the Food and Agriculture Division Council.

This standard was first published in 1966 and subsequently revised in 1972, 1974 and 1982. The standard has been revised again to incorporate certain improvements found necessary in the light of the modifications suggested by the testing authorities and the manufacturers. The revised version incorporates, among others, the following:

- a) Amendments No. 1 and 2 issued to earlier version of this standard;
- b) Editorial changes including updating of referred standards;
- c) Material of construction are modified and chemical composition of brass casting components as per their relevent Indian Standard is to ensure conformity;
- d) Requirements of spray lance, cut off device, spray nozzle and spray gun and their method of test which were earlier covered in separate specifications, i.e., IS 7417: 1982, IS 7458: 1982, IS 7515: 1982, IS 10064: 1982, IS 10093: 1982, IS 10107: 1982 and IS 11776: 1986 are now covered in this standard. With the publication of this standard these standards will be withdrawn;
- e) Test for piston made of synthetic rubber; and
- f) Provision of supplying a spray gun and adjustable nozzle.

The figures given in the standard are meant only for illustration of the components. These should not be considered as suggestive of any standard design.

For the guidance of the purchaser, information to be supplied if quoted to the manufacturer is given in Annex A.

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 'Rules for rounding off numerical values (revised)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

# Indian Standard

# CROP PROTECTION EQUIPMENT — FOOT SPRAYER — SPECIFICATION

# (Fourth Revision)

#### 1 SCOPE

1.1 This standard specifies material, performance, constructional and other requirements of foot sprayer used for spraying pesticides.

1.1.1 The sprayers of this type are normally used with an average working pressure of 600 kPa (  $100 \text{ kPa} = 1.0197 \text{ kg/cm}^2 = 1 \text{ bar}$  ).

#### 2 REFERENCES

The following Indian Standards are necessary adjuncts to this standard:

IS No.	Title
292:1983	Leaded brass ingots and casting (second revision)
2643 (Part 1): 1975	Dimensions for pipe threads for fastening purposes: Part 1 Basic profile and dimensions (first revision)
7201 (Part 1): 1987	Method of sampling for agricultural machinery and equipment: Part 1 Hand tools and hand operated/ animal drawn equipment (first revision)
8480 : 1977	Glossary of terms relating to crop protection equip- ment
10134 : 1994	Methods of tests for manually operated sprayers (first revision)
10216: 1988	Pipe threads where pressure- tight joints are not made on the threads — verification by means of limit gauges (first revision)
11429 : 1985	Method of calibration of sprayers

#### 3 TERMINOLOGY

3.0 For the purpose of this standard, the following definitions in addition to IS 8480: 1977 shall apply ( see also Fig. 1, 2 and 3).

#### 3.1 Frame

A structure which holds pump and other accessories together.

#### 3.2 Handle

A grip on top of the frame to enable the operator to rest his hand while operating the pedal lever.

#### 3.3 Pedal Lever

A lever, connecting the frame and piston rod to operate the piston.

#### 3.4 Pedal Lever Pivot

A pivot for connecting the pedal lever with the frame.

#### 3.5 Stroke

The maximum travel of the piston rod in one direction when the pedal lever moves from a maximum of 30° above to a maximum of 30° below (that is, total of 60° or less), a horizontal plane passing through the central line of the pedal lever pivot.

# 3.6 Total Mass

The mass of the sprayer without its discharge line, that is, without delivery hose, spray gun/cut-off device, lance and nozzle.

#### 3.7 Valve Assembly

A device provided to check or to allow the flow of the fluid.

#### 4 MATERIALS

4.1 The material of construction of various components of the sprayer shall be selected from col 3 of Table 1. The material other than brass casting may conform to the relevant Indian Standard, however, brass casting components shall conform to chemical composition of 1S 292: 1983 (Grade to be declared by the manufacturer). Some of the relevant Indian Standards are given in Annex B for guidance.

4.2 All metallic parts coming in contact with the pesticides should preferably be of the same material to minimize bimetallic corrosion.

4.3 The material used for different components shall be declared by the manufacturer in the manual ( see 7.1).

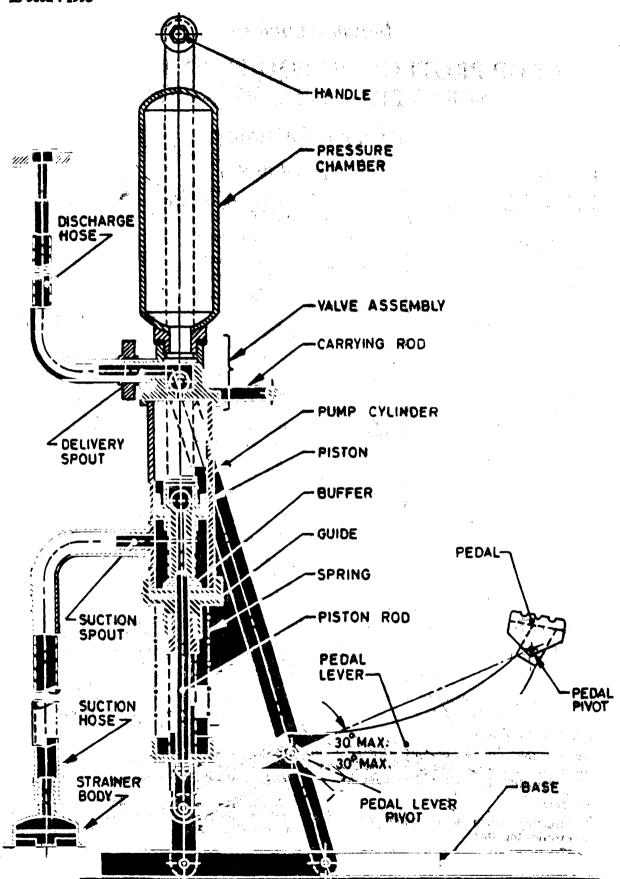


Fig. 1 Nomenclature of Different Parts of the Foot Sprayer

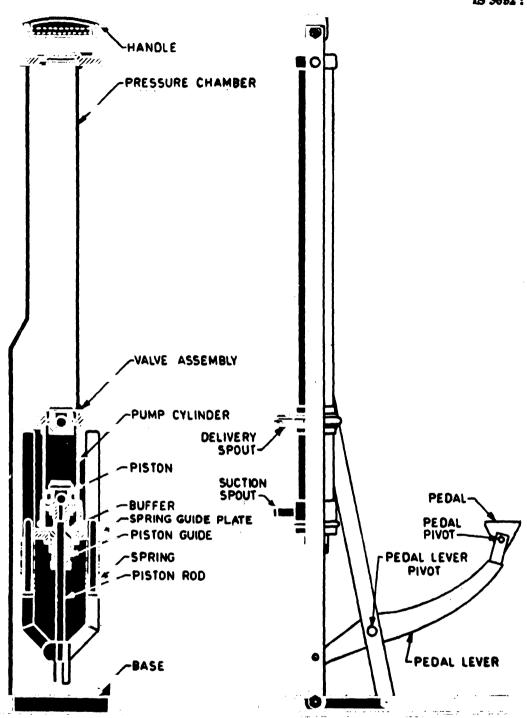


Fig. 2 Foot Sprayer with Double Spring

# 5 PERFORMANCE REQUIREMENTS

# 5.1 Discharge Rate

hen tested in accordance with the method given in 6.1.2 of IS 10134: 1994 the pump shall be capable of discharging a minimum of 200 ml of water per minute.

# 5.2 Volumetric Efficiency

When tested in accordance with the method given in 6.2 of IS 10134: 1994, the volumetric efficiency shall be not less than 80 percent.

# 5.3 Endurance Test

The sprayer shall withstand the test prescribed in 8.1 of IS 10134; 1994.

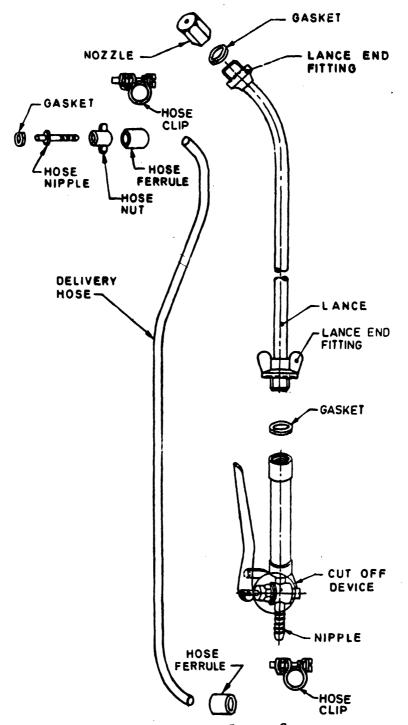


Fig. 3 Discharge Line of Sprayer

4

# Table 1 Materials of Construction of Various Components

( Clause 4.1 )

SI No.	Components	Material
(1) i)	Pressure chamber, pump cylinder, piston rod, piston rod guide, valve seat, suction and delivery spout, spreader	Brass
ii)	Hose nut	Brass, engineering plastic
iii)	Hose nipple, strainer body	Brass, engineering plastic, alumi- nium alloy
iv)	Strainer	Brass, stainless steel, plastic
v)	Frame, pedal lever	Steel
vi)	Hose ferrule/clip	Brass, steel
vii)	Spring housing, joint brackets	Brass, steel, aluminium alloy
viii)	Handle	Wood, engineering plastic
ix)	Piston	Chrome tanned leather, synthe- tic rubber, PVC
x)	Pedal	Cast iron, steel, cast aluminium alloy
xi)	Buffer	Rubber, plastic
xii)	Spring	Spring steel
xiii)	Hose	Braided rubber, PVC
xiv)	Gasket	Synthetic rubber, PVC, leather, fibre
xv)	Valve	Brass, stainless stee!
xvi)	Spring housing guide plate	Aluminium alloy, steel
xvii)	Spray lance	Brass, plastic
xviii)	Nozzle components	
	- Body and cap	Brass, engineering plastics
	- Disc, tip, swirl core	Brass, stainless steel
	<ul> <li>Spindle, coupling nut and gland nut</li> </ul>	Brass
xix)	Cut-off device components	
	<ul> <li>Body, valve stem, valve seat, gland nut, cap and collar</li> </ul>	Brass, engineering plastic
	- Nipple	Brass, aluminium alloy, plastic
	- Valve	Brass, synthetic rubber, plastic
	- Strainer	Brass, aluminium alloy, stainless steel, plastic
	<ul> <li>Operating knob</li> </ul>	Brass, engineering plastic
	- Operating trigger	Steel
	- Spring - Gasket	Stainless steel, phosphor bronze Synthetic rubber, fibre, leather, PVC
	<ul> <li>Gland packing</li> </ul>	Asbestos rope
xx)	Spray gun components	•
,,	<ul> <li>Barrel, connecting rod, connecting guide, connections for extension, holder and inlet collector, lock nuts, gland nut and rigid washer</li> </ul>	Brass
	<ul> <li>Swirl rotor, nozzle cap and body</li> </ul>	Brass, engineering plastic
	- Spring	Phosphor bronze, stainless steel
	- Nozzle disc	Brass, stainless steel
	- Trigger, trigger lock or screw	Brass, steel
	- Nozzle valve	Synthetic rubber, PVC, fibre
	— Grip	Plastic, wood
	- Packing gland	Asbestos rope
	— Split pin	Steel
	•	

# NOTES

- 1 All the components mentioned above may not be present in a particular design.
- 2 The components other than those listed in table and coming in direct contact with the pesticides shall be of corrosion resistance material.

# 6 CONSTRUCTIONAL REQUIREMENTS

#### 6.1 Frame

It shall withstand the test prescribed in 7.8 of IS 10134: 1994.

#### 6.2 Pedal and Pedal Lever

A pedal of minimum 90 mm length and 60 mm width shall be provided at one end of the lever. The pedal lever shall be so mounted that the height of the pedal from ground shall not exceed 300 mm and the clearance between the lever and the base of the frame, when the piston is at its highest position, shall be minimum 5 mm. The lever shall not foul with any part of the sprayer.

6.2.1 The movement of the pedal lever shall not be more than 30° above and 30° below the horizontal plane passing through the central line of the pedal lever pivot.

6.2.2 The pedal lever shall withstand the test prescribed in 7.8 of IS 10134: 1994.

#### 6.3 Pump

#### 6.3.1 Pump Cylinder

It shall be not more than 55 mm in inner diameter and shall withstand the test prescribed in 7.1 of IS 10134: 1994. A guide shall be attached to the pump cylinder.

#### 6.3.2 Piston

The thickness and height of piston(s) shall be minimum of 3.5 mm and 16 mm respectively. In case the piston is made out of synthetic rubber it shall withstand the test specified in 6.9.

#### 6.3.3 Piston Spreader

It shall be capable of holding the piston in its position and shape without distortion against the wall of the pump cylinder.

#### 6.3.4 Piston Rod

It shall be not less than 12.0 mm in diameter. A buffer shall be provided on the piston rod so as to prevent direct impact of the piston against the guide.

6.3.4.1 The piston rod shall withstand the test prescribed in 7.8 of IS 10134: 1994.

#### 6.3.5 Guide

A guide shall be attached to the pump cylinder.

# 6.3.6 Spring

One or two compression spring(s) shall be provided. When a single spring is provided, it shall be placed centrally enveloping the piston rod. When two springs are provided, each of

them shall be placed on either side of the piston rod.

6.3.6.1 The spring(s) shall withstand the test prescribed in 7.5 of IS 10134: 1994.

#### 6.4 Pressure Chamber

The pressure chamber shall have a minimum volumetric capacity of 6 times of the piston displacement.

6.4.1 The pressure chamber shall withstand the test prescribed in 7.1 of IS 10134: 1994.

#### **6.5 Threaded Connections**

All threaded connections on the sprayer and its components shall conform to IS 2643 (Part 1): 1975. The size designation and type of threads are as given in Table 2. The engaged length of the threads shall be not less than 6 mm.

NOTE — The measurement of the thread size shall be done by gauges and not by measuring absolute dimensions ( see IS 10216: 1988).

Table 2 Threaded Connections

Component	Туре	Size Designation
Suction spout	External	G1/2B
Delivery spout Hose connection	External	G1/4B
<ul> <li>for suction spout</li> </ul>	Internal	G1/2
- for delivery spout	Internal	G1/4
- for cut off device	Internal	G1/4
Cut off device		
- inlet end	External	G1/4B
- outlet end	Internal	G1/2 or G1/4
Spray lance		
<ul> <li>Nozzle end</li> </ul>	External	G1/4B
- Cut off device end	External	G1/2B or G1/4B
- Bent portion for connection with straight portion (in case of type B2)	Internal	G1/4
Spray gun inlet	External	G1/4B
Nozzle body	Internal	G1/4

# 6.6 Suction and Delivery Spout

There shall be one suction spout having serrated nipple or threaded connection and two delivery spouts with threaded connections. In case of nipple connection the length of nipple shall be 20 mm.

#### 6.7 Suction Line

#### 6.7.1 Suction Hose

A suction hose of suitable diameter and at

least 2 metres in length shall be provided as agreed to between the purchaser and the supplier. The hose shall be connected with suction spout and strainer body through hose connections ( see 6.7.3).

#### 6.7.2 Strainer Assembly

A removable strainer fitted in the strainer body shall be provided.

#### 6.7.2.1 Strainer

The average size of any side or diameter of apertures of the strainer shall be not more than 625  $\mu m$ .

NOTE — For measuring the size of the apertures, select 10 consecutive apertures in the strainer and measure each side or diameter as the case may be. Average the measured value and report.

#### 6.7.2.2 Strainer body

The strainer body shall have a serrated nipple connection for attaching the suction hose. The length of the nipple shall be not less than 20 mm.

# 6.7.3 Hose Connections

#### 6.7.3.1 For suction spout

The hose connection for threaded type and nipple type suction spout shall be nut-nipple and clamp type, and clamp type respectively. The clamp shall be in the form of ferrule or clip.

# 6.7.3.2 For strainer body

The hose connection shall be clamp type. The clamp shall be in the form of ferrule or clip.

# 6.8 Discharge Line

#### 6.8.1 Delivery Hose

One or two delivery hoses of suitable diameter and preferably 5 metres in length shall be provided, as agreed to between the purchaser and the supplier. The hose shall be connected with delivery spout and cut-off device through hose connections ( see 6.8.2 ).

# 6.8.2 Hose Connections

# 6.8.2.1 For delivery spout

The hose connection shall be nut-nipple and clamp type. The clamp shall be in the form of ferrule or clip.

# 6.8.2.2 For cut-off device

The hose connection, for cut off device side having threaded or nipple connection, shall be nut-nipple and clamp type respectively. The clamp shall be in the form of ferrule or clip.

6.8.2.3 The delivery hose and hose connections shall withstand the test prescribed in 7.2 of IS 10134: 1994.

#### 6.8.3 Cut-off Device and Spray Lance | Spray Gun

Each sprayer shall be provided with a cut-off device and spray lance conforming to the requirements given in Annex C and D or a spray gun conforming to the requirements given in Annex E.

NOTE — In case the cut-off device and spray lance of types other than those specified in Annex C and Annex D is required by the purchaser, for the special purpose, its requirements shall be as agreed to between the purchaser and the supplier.

#### 6.8.4 Nozzle

Unless otherwise specified by the purchaser, the nozzle shall conform to the requirements as given in Annex F.

#### 6.9 Gaskets

Gaskets of synthetic rubber wherever provided, shall withstand the test prescribed in 7.4 of IS 10134: 1994.

#### 6.10 Handle

A handle shall be provided on the frame at a height not exceeding one metre from the ground. The length of the handle shall be not less than 90 mm.

# **6.11 Lifting Arrangement**

An arrangement for lifting the sprayer for shifting from one place to another shall be provided.

#### 6.12 Total Mass

The total mass of the sprayer (see 3.6) shall be not more than 11.5 kg.

#### 7 OTHER REQUIREMENTS

#### 7.1 Manual

The manual shall include technical specifications of the sprayer, material of construction of various component shown in the exploded view of the sprayer, instructions for operations and maintenance, common faults and their remedies and safety precautions. Reference of IS 11429: 1985 shall also be given for the purpose of calibration of the sprayer.

# 7.2 Spare Parts

Spare parts, separately packed for each sprayer, according to the number required by the purchaser shall be provided. If no demand for spare parts has been made, a set of gaskets shall be provided with each sprayer.

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#### 8 WORKMANSHIP AND FINISH

- 8.1 The components of the sprayer shall have a smooth finish and shall be free from burrs, sharp edges and other defects that may be detrimental for their use.
- 8.2 The exposed steel parts shall have a protective coating to prevent surface deterioration. The steel used for hose ferrule/clip shall be plated with cadmium, zinc or nickel-chrome. Exposed brass parts may be given a suitable protective finish with clear transparent lacquer.

#### 9 MARKING AND PACKING

#### 9.1 Marking

Each sprayer shall be marked with the following particulars:

- a) Manufacturer's name or recognized trademark, and
- b) Batch or serial number.

#### 9.2 BIS Standard Mark

Each sprayer may also be marked with the Standard Mark.

9.2.1 The use of the Standard Mark is governed by the provisions of the Bureau of Indian Standards Act, 1986 and the Rules and Regulations made thereunder. The details of conditions under which a licence for the use of the Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

#### 9.3 Packing

Each sprayer shall be packed, as agreed to between the purchaser and the supplier, for safe handling in transit.

#### 10 SAMPLING FOR LOT ACCEPTANCE

10.1 Unless otherwise agreed to between the purchaser and the supplier, sampling of the

sprayers for lot acceptance shall be done in accordance with 3 of IS 7201 (Part 1): 1987.

#### 11 METHODS OF TESTS

- 11.1 The requirements of this specification shall be tested in accordance with the relevant clauses of IS 10134: 1994.
- 11.2 Tests for various requirements given in the order below shall be followed by the testing authorities:
  - a) Dimensional and visual check (see 6.2, 6.2.1, 6.5, 6.6, 6.7.1, 6.7.2, 6.7.2.1, 6.7.2.2, 6.7.3.1, 6.7.3.2, 6.8.1, 6.8.2.1, 6.8.2.2, 6.8.3, 6.8.4, 6.10, 6.11, 7 and 9.1);
  - b) Mass ( see 6.12 );
  - c) Discharge rate ( see 5.1 );
  - d) Volumetric efficiency ( see 5.2);
  - e) Endurance test (see 5.3);
  - f) Dimensional and visual check ( see 6.3.1, 6.3.2, 6.3.3, 6.3.4, 6.3.5, 6.3.6 and 8 );
  - g) Pump cylinder test ( see 6.3.1 );
  - h) Pressure chamber test ( see 6.4 and 6.4.1);
  - j) Hose and hose connection test ( see 6.8.2.3);
  - k) Frame (see 6.1), pedal lever test (see 6.2.2), and piston rod (see 6.3.4.1);
  - m) Test for spring ( see 6.3.6.1);
  - n) Test for nozzle ( see 6.8.4);
  - p) Test for lance ( see 6.8.3 );
  - q) Test for cut-off device ( see 6.8.3);
  - r) Test for spray gun ( see 6.8.3 ); and
  - s) Test for piston and gaskets ( see 6.3.2 and 6.9).

#### **NOTES**

- 1 Test for hose and hose connection, lance and cutoff device strength may be conducted at one time.
- 2 The gasket and piston test shall be conducted with a new set of gaskets and piston provided with the sprayer.

# ANNEX A

(Foreword)

# SPECIFICATION SHEET

- 1 Name of the purchaser.
- 2 Type of design one spring or two springs.
- 3 Preference of material for various components ( see 4.1 ).
- 4 Length of suction hose ( see 6.7.1 ).
- 5 Length of delivery hose ( see 6.8.1 ).
- 6 Type of cut-off device ( see 6.8.3 ).
- 7 Type of lance ( see 6.8.3).
- 8 Type of nozzle ( **6.8.4** ).
- 9 Type of spray gun ( see 6.8.3 ).
- 10 Spare parts needed ( see 7.2 ).

# ANNEX B

( Clause 4.1 )

# LIST OF RELEVANT INDIAN STANDARDS FOR MATERIALS OF CONSTRUCTION

IS No.	Title	IS No.	Title
28:1985	Phosphor bronze ingots and castings ( fourth	1741 : 1960	Latex foam rubber products
210 1000	revision)	2062: 1992	Steel for general structural
210 : 1993	Grey iron castings (fourth revision)	2107 : 1977	purpose (fourth revision) White heart malleable iron
277:1992	Galvanized steel sheet	2107 . 1977	castings (first revision)
	( plain and corrugated ) (fifth revision)	2108:1977	Black heart malleable iron castings (first revision)
292: 1983	Leaded brass ingots and castings (second revision)	2954: 1978	Vegetable tanned leather for belts (first revision)
407 : 1981	Brass tubes for general purposes (third revision)	4170 : 1967	Brass rods for general engineering purposes
410: 1977	Cold rolled brass sheet,	4413 : 1981	Brass wires for general
	strip and foil ( third revision)		engineering purposes (first revision)
617 : 1975	Aluminium and aluminium alloy ingots and castings for general engineering purposes (second revision)	4454 (Part 1): 1981	Steel wires for cold formed springs: Part 1 Patented and cold drawn steel wire unalloyed (second revision)
737:1986	Wrought aluminium and	4687:1980	Asbestos gland packing
	aluminium alloys, sheet and strip (for general engineer- ing purposes ) ( third	6528: 1972	Specification for stainless steel wire
	revision)	6603:1972	Stainless steel bars and flats
739 : 1992	Wrought aluminium and aluminium alloy wire for general engineering pur-	6911 : 1992	Specification for stainless steel, strip and plate (first revision)
	poses (third revision)	7328 : 1974	High density polyethylene
1570	Schedules for wrought steels		materials for moulding and extrusion
( Part 5 ): 1985	for general engineering pur- poses: Part 5 Stainless and	7608:1987	Phosphor bronze wires (for
	heat resisting steels ( second revision )		general engineering pur- poses) (first revision)