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उत्पाद मैन्युअल

फसल संरक्षण उपस्कर - हस्त चालित कम्प्रेशन पीठ पर लादा जाने वाला फुहारा - विशिष्टि

IS 1970:2024 के अनुसार

PRODUCT MANUAL FOR
Crop Protection Equipment — Hand-Operated Compression Knapsack Sprayer — Specification ACCORDINGTO IS 1970:2024

विभिन्न उत्पादों के लिए भारतीय मानक ब्यूरो) अनुरूपता मूल्यांकन (विनियम, 2018 की योजना -I के तहत प्रमाणन के संचालन में एकरूपता और पारदर्शिता के लिए इस उत्पाद मैनुअल का उपयोग सभी क्षेत्रीय / शाखा कार्यालयों और लाइसेंसधारियों द्वारा संदर्भ सामग्री के रूप में किया जाएगा। दस्तावेज़ का उपयोग बीआईएस प्रमाणन प्राप्त करने के इच्छुक संभावित आवेदकों द्वारा भी किया जा सकता है।

This Product Manual shall be used as reference material by all Regional/Branch Offices & licensees to ensure uniformity of practice and transparency in operation of certification under Scheme-I of Bureau of Indian Standards (Conformity Assessment) Regulations,2018 for various products. The document may also be used by prospective applicants desirous of obtaining BIS certification.

1.	**मानक संख्या** **IS No.**	:	IS 1970:2024
	शीर्षक **Title**	:	Crop Protection Equipment — Hand-Operated Compression Knapsack Sprayer — Specification
	संशोधनों की संख्या **No. of amendments**	:	01
2.	**नमूना दिशानिर्देश** **Sampling Guidelines**		
a)	**कच्चा माल** **Raw material**	:	Materials of construction of the sprayer shall conform to Cl. 4 of IS 1970:2024 Conformity shall be established through raw material supplier test certificate/test report from BIS recognized lab/empanelledlab or any other lab having accreditation as per IS/ISO/IEC 17025 or in house testing/combination thereof

b)	**समूहीकरण दिशानिर्देश** **Grouping Guidelines**	:	Not applicable (IS does not specify any varieties)
c)	**नमूने का परिमाण** **Sample Quantity**	:	1 No. Note: This section indicates the quantity of the sample of the product and/or the raw material (if applicable), required to be sent to the laboratory for testing, for the purpose of Grant of Licence/Change in Scope of Licence/ Factory Surveillance (in case of market surveillance, effort may be made to procure the required quantity of product sample, as far as possible since raw material sample may not be available in market)
d)	**परीक्षण अनुरोध में घोषित किए जाने वाले पैरामीटर** **Parameters to be Declared in Test Request**		a) Preference of material for various comportments (Cl 4.1 and Table 1) b) Tank capacity (Cl 6.1) c) Type of cut-off device (Cl 6.14) d) Type of lance (Cl 6.14) e) Type of nozzle (Cl 6.15) f) Length of delivery hose (Cl 6.13) g) Filling funnel (Cl 6.3.2) h) Spare parts (Cl 7.2) j) Optional items (Cl 7.3) Note: Apart from the above, any other requirements/parameters may also be declared as per the standard, as applicable.
3.	**परीक्षण उपकरणों की सूची** **List of Test Equipment**	:	Please refer to Annex-A
4.	**निरीक्षण और परीक्षण की स्कीम** **Scheme of Inspection and Testing**	:	Please refer to Annex-B
5.	**एक दिन में संभावित परीक्षण** **Possible tests in a day**		
	Performance Tests, Constructional Requirements, Dimensions Note: This section is for the guidance of BIS Certification Officers/Technical Auditors of BIS Authorized Outside Surveillance Agencies (OSAs) during factory inspection to provide ready reference regarding the tests which can be witnessed during the inspection in the factory by the officer/auditor.		
6.	**लाइसेंस का दायरा /Scope of the Licence:**		
	Licence is granted to use Standard Mark as per IS 1970:2024 with the following scope:		
	Name of the product		Crop Protection Equipment — Hand-Operated Compression Knapsack Sprayer

ANNEX – A

LIST OF TEST EQUIPMENTS

(INDICATIVE LIST, FOR GUIDANCE ONLY)

Sl. No.	Tests Used In With Clause Reference	Test Equipment
1	Tank Capacity, Cl. 6.1	Measuring cylinder
2	Dimensions, thread sizes, spray angles	Vernier caliper, Micrometer, Thread gauges, Angle Protractors
3	Test for Discharge Rate, Cl. 11.1	Test Bench as per Fig. 5 Adjustable crank mechanism operated by a motor through a speed-step-down drive so as to give movement of (16 ± 1) cycles per minute, in such a manner as to maintain proper alignment between the piston rod and pump cylinder Pressure regulator and a pressure gauge (see IS 3624) having full scale reading from 0 to not exceeding 2.5 times and not less than 1.5 times the average working pressure of the sprayer Measuring Cylinder
4	Test for Volumetric Efficiency, Cl. 11.2	Test Bench as per Fig. 5 Adjustable crank mechanism operated by a motor through a speed-step-down drive so as to give movement of (16 ± 1) cycles per minute, in such a manner as to maintain proper alignment between the piston rod and pump cylinder Pressure regulator and a pressure gauge (see IS 3624) having full scale reading from 0 to not exceeding 2.5 times and not less than 1.5 times the average working pressure of the sprayer Measuring Cylinder Vernier calipers/measuring scale/tape
5	Test for Strap and its Assembly, Cl. 11.3	Arrangement for the test incorporating features for The sprayer (without discharge line) to be hung from a solid support by its strap(s) simulating its carriage on the shoulder of an operator. Raising the tank vertically to a height of 300 mm and allow to drop freely and hang by the strap(s).

6	TEST FOR ENDURANCE - For Compression Knapsack Sprayer, Non-Pressure Retaining Type	Pressure gauge
7	Test for Leakage and Deformation of Pressure Chamber, Pump Cylinder and Pressure Tank, Cl. 12.1	Pneumatic test - Arrangement for pneumatic pressurization Hydraulic test - Arrangement for hydraulic pressurization Pressure gauges
8	Test for operating lever, Handle and Piston Rod, Cl. 12.2	Pressure gauges
9	Test for Gasket and Piston Made up of Synthetic Material, Cl. 12.3	Test mixture of 60 percent kerosene, 5 percent benzene, 20 percent toluene and 15 percent xylene. Air-conditioning room/conditioning chamber maintained at 27 to 33°C
10	Test for Hose and Hose Connection, Cl. 12.4	Hydraulic pump Cut-off device Pressure gauges
11	Test for Pressure Development, Cl. 12.5	Pressure gauge (see IS 3624) having full scale reading from 0 to not exceeding 2.5 times and not less than 1.5 times the pressure (normal working pressure of the sprayer)
12	Test for Tank and Skirt Impact, Cl. 12.6	Arrangement for pneumatic pressurization of the tank Pressure gauges Platform consisting of a plain solid teak or similar hard wood plank of 60 mm thickness, placed on a hard level surface Metal cage to enclose the tank during drop Arrangement to drop the tank from the specified height and in the positions as per Fig. 6 of IS 1970
13	Test for Tank Fatigue, Cl. 12.7	Test Apparatus for Determination of Fatigue Failures in Compression as per Fig. 7 Power-driven compressor and reservoir, equal to the normal working pressure of the sprayer within a range of ± 10 percent Air filter or pressure regulating valve or air lubricator and an electrically operated three way valve. Timer switch connected in the circuit to open and close the three way valve
14	Test for Valve Assembly, Cl. 12.8	Arrangement for hydraulic pressurization Pressure gauges
15	Cut-off device, Cl. 6.14	

a)	Maximum torque required for trigger actuation, B-6.2.1	Arrangement for trigger actuation test as per Fig. 11 Standard Weights
b)	Strength Test of Cut-off Device	Hydraulic Pump Pressure Gauges
c)	Leakage and Reliability Test	Trigger type cutoff device durability tester as per Fig. 12 and 13 Or Knob Type cutoff device durability tester as per Fig. 14 Test Liquid - 5 percent suspension of any commercially available water dispersible powder. Spray nozzle or an orifice plate designed to deliver liquid approximately 0.75 litre per minute at a pressure of 300 kPa ± 30 kPa
16	Spray Lance, Cl. 6.14	
a)	Hydraulic Pressure test	Hydraulic pump Pressure Gauge
17	Hydraulic Spray Nozzle, Cl. 15	
a)	Discharge Rate	Supply of clean water or spray materials which are equal in density, surface tension and viscosity of water. Arrangement of discharge of spray materials at controlled pressure with the pressure gauge Stopwatch Measuring Cylinder
b)	Endurance Test	Patternator compressed air supply or small pump giving a steady output, with a liquid supply line from the reservoir of capacity two litres or more A constant pressure regulator and a pressure gauge Means of holding the nozzle at the appropriate height with the required facilities for adjustments. A test tube rack so made that the collecting tube can be inserted in the flow when constant flow has been achieved, and retracted after a predetermined period.

c)	Variation in Discharge and distribution due to Abrasion and corrosion	Test Liquid - Clean water with the addition of 20 g/l of abrasive or corrosive material Arrangement of discharge of spray materials at controlled pressure with the pressure gauge Stopwatch Measuring Cylinder Patternator Compressed air supply or small pump giving a steady output, with a liquid supply line from the reservoir of capacity two litres or more
18	Hydraulic Spray Gun, Cl. 6.14	
a)	Discharge Rate	Test Liquid - Clean water with the addition of 20 g/l of abrasive or corrosive material Arrangement of discharge of spray materials at controlled pressure with the pressure gauge Stopwatch Measuring Cylinder
b)	Maximum Torque Required for Triage Actuation	Arrangement for trigger actuation test as per Fig. 11 Standard Weights
c)	Test for Jet Spray	Circular area faced with blotting paper, or any other suitable paper Pressure gauge
d)	Test for strength	Hydraulic Pump Pressure Gauge
e)	Endurance Test	Test Liquid - Clean water with the addition of 20 g/l of abrasive or corrosive material Arrangement of discharge of spray materials at controlled pressure with the pressure gauge Stopwatch Measuring Cylinder Pressure gauges
19	Mass of Sprayer, Spray Gun	Weighing balance

Annex B

SCHEME OF INSPECTION AND TESTING

1. QUALITY ASSURANCE PLAN

1.1 It is expected that during operation of BIS licence, manufacturers will implement a Quality Assurance Plan (QAP) i.e. a plan of regular testing and in-process controls, designed to ensure that the product bearing theStandard Mark conforms to all requirements of the Indian Standard.

1.2 The manufacturers shall define a Quality Assurance Plan (QAP) defining the control unit (i.e. lot/batch etc.), the levels of control (i.e. the frequency and number of samples for conducting the differenttests as per the Indian Standard) and declare the arrangement for testing i.e. whether in-house or subcontracting/sharing for each applicable test and submit the same to BIS Branch Office for information. The manufacturer shall comply with the QAP and maintain test records in accordance with para 2.1.

1.3 **RECOMMENDED LEVELS OF CONTROL/CONTROL UNIT**:

1.3.1 For the guidance of manufacturers, the recommended definition of control unit is : Entire quantity of sprayers produced in one day from same consignment of raw material.

1.3.2 For the guidance of manufacturers in preparing the Quality Assurance Plan, recommendedlevels of control are given in **Table 1**. Manufacturer has the discretion of declaring their own levels of control or accept the levels of control given in this document.

1.3.3 The manufacturer shall ensure inspection and testing as per the Quality Assurance Plan submitted by them on the whole production of the factory which is covered by this plan.

2. ENSURING COMPLIANCE THROUGH TESTING- manufacturers shall ensure compliance of their products to all the requirementsof the Indian Standard for which they may have in-house test facilities. However, there is no obligation to maintain in-house laboratory. Licensee may use alternative arrangements for tests of the production as per the declared QAP. Various alternatives are available for operation of BIS certification as given below and the relevant guidelines for availing such relaxations by the manufacturers, as amended from time to time, are to be referred:

i) Shared testing resources like common facility,

ii) Cluster based testing facility,

iii) Sub-contracting to outside laboratories which may either be:

a) BIS recognised/empanelled laboratories, or

b) Any accredited laboratory as per ISO/IEC 17025

In case such alternate arrangement is not available, then the firm shall create in-house laboratory suitably staffed to carry out different test in accordance with the methods given in the Standard.

2.1 **TEST RECORDS**- The manufacturers shall maintain test records for the tests carried out (either in-house or at a sub-contracted or at shared test facility) to establish conformity of the product to the Standard for operation of licence. For the tests being subcontracted or conducted at a shared test facility, test results issued by the laboratories or test facilities, shall be made available for inspection by BIS.

3. PACKING AND MARKING - The Standard Mark as given in the Schedule of the licence shall be incorporated legibly and indelibly on each sprayer provided always that the material so marked conforms to each requirement of the specification.

3.1 Packing and Marking shall be done as per the Indian Standard.

3.2 **Additional Marking requirements**: The material shall also be marked with the following additional requirement on each sprayer.

a) "For BIS certification details please visit www.bis.gov.in"

4. REJECTION - The production which conforms to the Indian Standard and covered under the scope of this licence shall be marked with the Standard Mark. Disposal of non-conforming product shall be done in such a way so as to ensure that there is no violation of provisions of BIS Act,2016

TABLE 1
(Recommended Levels of Control By BIS- For Guidance Only)

(1)				(2)		
Test Details				**Levels of Control**		
Cl.	**Requirement**	**Test Methods Clause Reference**		**No. of Sample**	**Frequency**	**Remarks**
4	Materials	4	IS 1970	Manufacturer shall put in place adequate inspections and in process controls to ensure that materials as per the standard only are used		Conformity shall be established through raw material supplier test certificate/test report from BIS recognized lab/empaneled lab or any other lab having accreditation as per IS/ISO/IEC 17025 or in house testing/combination thereof
5	Performance Requirements					
5.1	Discharge Rate	11.1	IS 1970	5	Each control unit	
6	Constructional Requirement					
6.1	Tank and Skirt					
a)	Tank Capacity		IS 1970	5	Each control unit	
b)	Minimum Projection of Skirt beyond the lowest portion of the bottom of the tank.		IS 1970	5	Each control unit	
c)	Test for Tank and Skirt Impact	12.6	IS 1970	5	Each control unit	
6.2	Straps		IS 1970	5	Each control unit	
6.2.1	Test for Strap and its Assembly	11.3	IS 1970	5	Each control unit	
6.2.2	Back Rest		IS 1970	5	Each control unit	
6.3	Filler - Minimum Hole Diameter		IS 1970	5	Each control unit	
6.3.1	Filler Bung		IS 1970	5	Each control unit	
6.3.2	Strainer		IS 1970	5	Each control unit	

6.4	Pump Cylinder					
a)	Inner Diameter		IS 1970	5	Each control unit	
b)	Test for Leakage and Deformation	12.1	IS 1970	5	Each control unit	
6.5	Piston					
a)	Height of piston		IS 1970	5	Each control unit	
b)	Test for Piston Made up of Synthetic Material	12.3	IS 1970	5	Once a month	
6.5.1	Spreader		IS 1970	5	Each control unit	
6.6	Piston Rod – diameter		IS 1970	5	Each control unit	
6.6.1	Buffer		IS 1970	5	Each control unit	
6.6.2	Guide		IS 1970	5	Each control unit	
6.7	Handle		IS 1970	5	Each control unit	
6.7.1	Handle Locking Device		IS 1970	5	Each control unit	
6.8	Test for Valve Assembly	12.8	IS 1970	5	Each control unit	
6.9	Discharge Pipe		IS 1970	5	Each control unit	
6.10	Threaded Connections		IS 10216	5	Each control unit	
6.11	Discharge outlet		IS 1970	5	Each control unit	
6.12	Gaskets of synthetic rubber - Test for Gasket Made up of Synthetic Material	12.3	IS 1970	5	Once a month	
6.13	Delivery Hose					
6.13.1	Hose Connection		IS 1970	5	Each control unit	
6.13.2	Test for Hose and Hose Connection	12.4	IS 1970	5	Each control unit	
6.14	Cut-off device and Lance/Spray Gun					
a)	Cut-off device					
i)	Dimensions	B-2	IS 1970	5	Each control unit	

ii)	Strainer	B-3	IS 1970	5	Each control unit	
iii)	End Fittings	B-4	IS 1970	5	Each control unit	
iv)	Gaskets	B-5	IS 1970	5	Each control unit	
v)	Operating trigger/knob	B-6.1	IS 1970	5	Each control unit	
vi)	Maximum Torque required for Trigger Actuation	B-6.2.1	IS 1970	5	Each control unit	
vii)	Shape of operating knob in type B cutoff device	B-6.3	IS 1970	5	Each control unit	
viii)	Strength Test of Cutoff Device	B-7.1	IS 1970	5	Each control unit	
ix)	Leakage and reliability test	B-7.2	IS 1970	5	Each control unit	
b)	Spray Lance					
i)	Materials	C-2	IS 1970	5	Each control unit	
ii)	Dimensions	C-3	IS 1970	5	Each control unit	
iii)	Construction	C-4.1 and 4.2	IS 1970	5	Each control unit	
iv)	Hydraulic pressure test	C-4.3.1	IS 1970	5	Each control unit	
c)	Hydraulic Spray Gun			5	Each control unit	
i)	Dimensions	E-1	IS 1970	5	Each control unit	
ii)	Discharge rate	D-7	IS 1970	5	Each control unit	
iii)	Spray Angle	D-9	IS 1970	5	Each control unit	
iv)	Maximum torque required in case of trigger type spray gun for triage actuation	B-6.2	IS 1970	5	Each control unit	
v)	Test for strength	E-3.4.2	IS 1970	5	Each control unit	
vi)	Leakage and Reliability test	B-7.2	IS 1970	5	Each control unit	
vii)	Endurance test	D-7 and D-9	IS 1970	5	Each control unit	
viii)	Farthest point of the trigger in case	E-4.1	IS 1970	5	Each control unit	

	of the trigger type spray gun					
ix)	Lock for trigger	E-4.2	IS 1970	5	Each control unit	
x)	Total mass of Spray Gun	E-4.3	IS 1970	5	Each control unit	
6.15	Nozzles					
a)	Description	D-2	IS 1970	5	Each control unit	
b)	Rate of Discharge	D-7	IS 1970	5	Each control unit	
c)	Spray Angle	D-3.2	IS 1970	5	Each control unit	
d)	Endurance Test (Spray Distribution and Spray Angle)	D-8 and D-9	IS 1970	5	Each control unit	
e)	Average size of any side or diameter of the apertures (If strainer is provided)	D-4.1	IS 1970	5	Each control unit	
f)	Provision for rotating of nozzle by hand (if required by purchaser)	D-4.2	IS 1970	5	Each control unit	
g)	Designation – Identification mark	D-5	IS 1970	5	Each control unit	
h)	Workmanship and Finish	D-6	IS 1970	5	Each control unit	
i)	Variation in Discharge and distribution due to Abrasion and corrosion	D-10	IS 1970	5	Each control unit	
j)	Marking	D-11	IS 1970	5	Each control unit	
6.16	Adopter and Cap		IS 1970	5	Each control unit	
6.17	Height		IS 1970	5	Each control unit	
6.18	Mass		IS 1970	5	Each control unit	
6.19	Endurance	11.4	IS 1970	5	Each control unit	
7	OTHER REQUIREMENT					

7.1	Manual		IS 1970	Manufacturer shall put in place adequate inspections and in process controls to ensure that compliance to the standard is established
7.2	Spare parts		IS 1970	
7.3	Optional Items		IS 1970	
7.4	Safety		IS 1970	
8	WORKMANSHIP AND FINISH		IS 1970	