

ब्यावसायिक परीक्षण रिपोर्ट
COMMERCIAL TEST REPORT

संख्या/ No.: PS-480/2690/2021
माह/Month: March, 2021

THIS TEST REPORT VALID UP TO : 31st March, 2026



**SAARANSH, SB-21
BATTERY CUM HAND OPERATED KNAPSACK SPRAYER**



भारत सरकार

Government of India

कृषि एवं किसान कल्याण मंत्रालय

Ministry of Agriculture and Farmers Welfare

कृषि, सहकारिता एवं किसान कल्याण विभाग

Department of Agriculture, Cooperation and Farmers Welfare

उत्तरी क्षेत्र कृषि मशीनरी प्रशिक्षण एवं परीक्षण संस्थान

Northern Region Farm Machinery Training and Testing Institute

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3. TEST FOR DISCHARGE RATE OF PUMP (Vide Clause 8.3 of IS: 11313 - 2007)

1. Date of test : 05.03.2021
2. Atmospheric conditions :
 - a) Temperature : 21.8 °C
 - b) Relative humidity : 49.6 %
 - c) Pressure : 98.9 kPa

3. Data recorded

Avg. Speed of Pump (rpm)	Working pressure (kg/cm ²)	Test No.	Delivery from the discharge line (ml/min)	Overflow (ml/min)	Average discharge from the discharge line (ml/min)	Discharge rate of pump (ml/min)
3434	1.0	1	2580	NIL	2585.0	2585.0
		2	2600			
		3	2590			
		4	2570			
3102	2.0	1	2100	NIL	2092.5	2092.5
		2	2120			
		3	2080			
		4	2070			
2982	3.0	1	1750	NIL	1762.5	1762.5
		2	1770			
		3	1760			
		4	1770			
2958	4.0	1	1540	NIL	1552.5	1552.5
		2	1560			
		3	1550			
		4	1560			

Minimum discharge rate = 1552.5 ml/min at 4 kg/cm²
 Maximum discharge rate = 2585.0 ml/min at 1 kg/cm²
 Discharge at rated pressure = 1762.5 ml/min at 3.0 kg/cm²

4. TEST FOR VOLUMETRIC EFFICIENCY (Vide Clause 8.4 of IS: 11313 - 2007)

Date of test : 05.03.2021
 Rated pressure, kg/cm² : 3.0
 Avg. discharge of water at rated pressure, ml/min : 1762
 Avg. discharge of water at no load, ml/min : 3437
 Avg. pump speed at no load, rev/min : 3597
 Avg. pump speed at rated pressure, rev/min : 2982
 Volumetric efficiency of pump, % : 61.8 %



Remarks: - The volumetric efficiency does not conform to the requirement of IS: 11313-2007.

5. POWER REQUIREMENT

(Vide Clause 8.5 of IS : 11313 : 2007)

Date of test : 05.03.2021
The power requirement of DC motor fitted on sprayer was observed as following.

1. Motor operating voltage : 12 V
2. Avg. current drawn by motor at no load : 1.20 A
3. Avg. current drawn by motor at load : 2.42 A
4. Avg. motor operating voltage : 12.67 V
5. Avg. observed motor power requirement : 30.66 Watt
6. Avg. motor speed at no load : 3597 rpm
7. Avg. motor speed at load : 2982 rpm
8. Avg. Time required for fully discharge of battery : 7 to 7.5 h
9. Avg. No load rpm of motor after 6 hours of Operation : 2420 rpm

6. PRESSURE ADJUSTMENT TEST

(Vide Clause 8.7.1 of IS : 11313 : 2007)

1. Date of test : 05.03.2021
2. Atmospheric conditions :
 - a. Temperature : 21.8 °C
 - b. Relative humidity : 49.6 %
 - c. Pressure : 98.9 kPa
3. Data recorded

S. No.	Working pressure (kg/cm ²)	Fluctuation range (kg/cm ²)	Pressure drop (kg/cm ²)	Ratio
1.	1.0	NIL	NIL	--
2.	2.0	NIL	NIL	--
3.	3.0	NIL	NIL	--
4.	4.0	NIL	NIL	--

4. Resistance of pressure: Yes

7. TEST FOR SPRAY LANCE

(Vide Annex. D of IS: 3652-1995)

Date of test : 04.03.2021
Type : Straight (Type-A)

7.1

STRENGTH OF SPRAY LANCE

Sr. No.	Details	Condition
1	Test Condition	Outlet closed
2	Hydraulic pressure applied	1 MPa
3	Duration of pressure retained	5 minutes
4	Result	No leak, crack, or burst of lance was observed during test

7.2 MARKING ON SPRAY LANCE

Manufacturer's name or recognized trade mark : Not marked
 Nominal length, mm : Not marked
 Batch or code number : Not marked

8. TEST FOR CUT-OFF DEVICE
 (Vide Annex C Clause 6.8.3 of IS: 3652: 1995)

Date : 04.03.2021
 Type : Trigger type (Type - A)

8.1 MAXIMUM TRIGGER ACTUATION TORQUE

Required torque	:	35 kgf-cm
Less than 35 Kgf-cm	:	26.7 kgf-cm

8.2 STRENGTH TEST FOR CUT-OFF DEVICE

Sr. No.	Details	Condition
1	Condition of outlet	Closed
2	Hydraulic pressure	750 kPa
3	Duration of pressure retained	5 Minute
4	Observation	No leakage, crack or burst of cut off device was observed during test.

8.3 LEAKAGE AND RELIABILITY TEST FOR CUT-OFF DEVICE

Sr. No	Details	Condition
1	Test Condition	Mounted on test setup
2	Hydraulic pressure retained	300 kPa
3	Operating cycles	5000 cycles at pressure 300 kPa and repeated for 500 cycles at a pressure of 600 kPa @ appox. 15 cycles per minutes
4	Observation	No drip or leak of cut-off device through valve was observed during the test.

8.4 MARKING ON CUT-OFF DEVICE

a) Manufacturer's name or recognized trade mark : Not marked
 b) Batch or code number : Not marked
 c) Type of cut-off device : Not marked



9. TEST FOR NOZZLE

(Vide Annex F of IS: 3652-1995)

Date of test : 27.02.2021
Type of Nozzle (apa) : Solid Cone type

9.1 TEST FOR DISCHARGE RATE OF NOZZLE

The discharge rate for fine cone spray pattern as 1350 ml/min at a pressure of 300 kPa was declared by the applicant. The discharge rate corresponding to 300 kPa pressure was observed as under:-

- For fine cone spray pattern : 2000 ml/min

Remarks: The discharge rate for fine cone spray pattern does not conform to the requirement of IS: 3652:1995.

9.2 TEST FOR SPRAY ANGLE OF NOZZLE

The spray angle of nozzle at a pressure of 300 kPa has been declared by applicant as 65 degree. The spray angle corresponding to 300 kPa pressure was observed as 51.9 degree.

Remarks : The spray angle for fine cone spray pattern does not conform to the requirement of IS:3652:1995.

9.3 ENDURANCE TEST OF NOZZLE

- i) Date : 22.02.2021 to 26.02.2021
ii) Total running time (h) : 48
iii) Quantity of liquid collected and spray angle observed during endurance test.

Sr. No.	No. of collection	Avg. Discharge rate ml/min	Spray angle, degree
a)	First collection	1972.5	51.0
b)	Second collection	1997.5	51.9
c)	Third collection	2000.0	51.4
d)	Fourth collection	1995.0	50.1
e)	Fifth collection	1995.0	51.9
f)	Sixth collection	2007.5	51.0
g)	Seventh collection	1997.5	50.6
h)	Eighth collection	1992.5	51.4

Remark: i) Percentage variation in discharge rate for fine cone spray pattern from first to last collection, 1.01 %.

ii) Percentage variation in spray angle from first to last collection 0.78 %.

9.4 SPRAY DISTRIBUTION PATTERN OF NOZZLE

The liquid discharge from nozzle at 300 kPa pressure was collected in glass tubes of patternator. The spray pattern as per the quantity of liquid collected is represented in tabular form and in Fig. 1.

- 9.5 NOZZLE DESIGNATION : Not Specified.
Provision for strainer in nozzle : Not provided



9.6

MARKING OF NOZZLE

Manufacturer's name or recognized trade mark : Not marked

Batch or code number : Not made

10. ENDURANCE TEST OF SPRAYER

(Vide clause 8.8 of IS-1313:2007)

1. Date of test :- 19.02.2021 to 22.02.2021
2. Total running time (h)-50
3. Quantity of liquid collected during endurance:-
Avg. discharge (ml/min)
 - a) First Collection - 1762.5
 - b) Second Collection - 1772.5
 - c) Third Collection - 1765.0
 - d) Fourth collection - 1770.0
 - e) Fifth Collection - 1755.0
 - f) Sixth Collection - 1757.5
 - g) Seventh Collection - 1750.0
4. Percentage variation of discharge from first to last collection, 0.71 %

11. TEST FOR PUMP CHAMBER

(Vide Clause 7.1 of IS 10134-1994)

Date of test : 03.03.2021

Sr. No.	Details	Condition
1	Test Condition	Outlet end closed
2	Pressure applied -Hydraulic pressure	Motor stopped beyond 5.7 kg/cm ² pressure against the pressure requirement of 7.5 kg/cm ² 4.5 kg/cm ² .
	-Pneumatic pressure	4.5 kg/cm ²
3	Duration	1 minutes each
4	Result	No leakage, crack deformation or breakage observed in pump chamber during the test.

Remarks : Tendency of stalling of motor was observed beyond 5.7 kg/cm² hydraulic pressure and therefore test could not be taken up to the requirement pressure of 7.5 kg/cm² and therefore sprayer does not conform to the requirement laid down in clause 7.1 of IS: 10134-1994.



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xxi)	Gasket	Synthetic rubber, PVC, fibre	PVC	Conforms
xxii)	Valve seat	Brass, stainless steel, engg. plastic	Engg. Plastic	Conforms
xxiii)	valve	Brass, stainless steel, engg. plastic	Engg. Plastic	Conforms
xxiv)	Skirt/ stand	Steel, plastic	Plastic	Conforms
xxv)	Strap buckle	Steel, Engg. Plastic	Engg. Plastic	Conforms
xxvi)	Cushion	Foam rubber, foam plastic	Foam Plastic	Conforms

Materials of components of spray lance, nozzle, cut of device (as per IS: 3652-1995):
Refer chapter No. 2 of this test report.

Clause No.	Specified requirement	Observations	Remarks
Cl. 4.4 IS: 3906:1995	The material used for different components shall be declared by the manufacturer in the manual.	Declared by the applicant	Conforms

15. TEST FOR DISCHARGE RATE (Vide Clause 6.1.3 of IS: 10134-1994)

1. Date of test : 10.03.2021
2. Atmospheric conditions
 - a) Temperature : 25.8 °C
 - b) Relative humidity : 53.5 %
 - c) Pressure : 98.6 kPa
3. Data recorded

No. of hand strokes per minute	Working pressure (kPa)	Test No.	Delivery from the discharge line (ml/min)	Overflow (ml/min)	Average delivery from the discharge line (ml/min)	Discharge rate of pump (ml/min)
16	300	1	820	Nil	815.0	815.0
16	300	2	800	Nil		
16	300	3	830	Nil		
16	300	4	810	Nil		

Average discharge rate : 815.0 ml/min at 300 kPa pressure



16. TEST FOR VOLUMETRIC EFFICIENCY (Vide Clause 6.2 of IS: 10134-1994)

Sl. No.	Date of test	:	10.03.2021
Sl. No.	Details	:	Observation
1.	Discharge of water in 10 successive stroke	:	500.0 ml
2.	No of cycle	:	10
3.	Actual volume of water in one cycle	:	50.0 ml
4.	Inner diameter of pump cylinder	:	44.0 mm
5.	Stroke length at 300 kPa pressure	:	49.0 mm
6.	Piston displacement	:	74.47 cc
7.	Theoretical volume of water in one cycle	:	74.47 ml
8.	Volumetric efficiency, %	:	67.14 %

17. TEST FOR PRESSURE CHAMBER (Vide Clause 7.1 of IS: 10134-1994)

Date of test : 10.03.2021

Sr. No	Details	Condition
1	Test Condition	Outlet end closed
2	Pressure applied -Hydraulic pressure -Pneumatic pressure	7.5 kg/cm ² 4.5 kg/cm ²
3	Duration	1 minutes each
4	Result	No leakage, crack, deformation or breakage observed in pressure chamber during the test.

18. TEST FOR OPERATING LEVER, HANDLE & PISTON ROD (Vide clause 7.6 of IS: 10134:1994)

Date of test : 03.03.2021

Sr. No	Details	Condition
1	Test Condition	Discharge outlet closed
2	Pressure applied	7.5 kg/cm ²
3	Result	No distort, crack or break observed in handle, operating lever and piston.

19. TEST FOR HOSE AND HOSE CONNECTION (Vide Clause 5.14.3 of IS 11313:2007 & Clause 7.2 of IS: 10134-1994)

Refer Chapter 12 of this report.



23. CRITICAL TECHNICAL SPECIFICATIONS

Deferred till 31.03.2021 vide Ministry's O.M.No.13-13/2020-M&T(I&P) dated 22.12.2020

24. CONFORMITY TO INDIAN STANDARDS

- | | | |
|---|---|---------------------------------|
| i) IS: 11313:2007 Hydraulic power sprayers- specification | : | Does not conform in toto |
| ii) IS: 10134-1994-Method of test for manually operated sprayer | : | Does not conform in toto |
| iii) Spray nozzle and spray gun as per IS:3652-1995 (Reaffirmed 2011) | : | Does not conform in toto |

25. COMMENTS & RECOMMENDATIONS

- 25.1 The make and model of pump is not specified. It **MUST** be looked into.
- 25.2 The dimension of straps does not meet the requirements of Indian Standard. It **MUST** be looked into.
- 25.3 During the strap drop test the buckle/bracket of strap assembly found failed to hold the strap in it's position. It **MUST** be improved.
- 25.4 The strap cushion thickness does not meet the requirement of Indian standard. It **MUST** be looked into.
- 25.5 The average size of strainer of cut-off device does not meet the requirement of Indian Standard. It **MUST** be looked into.
- 25.6 The Manufacturer's name or recognized trade mark, type of cut-off device and batch or code number is not marked. It **MUST** be looked into.
- 25.7 The discharge rate of nozzle at a pressure of 300 kPa for fine cone spray pattern does not conform to the requirement of IS: 3652-1995. It **MUST** be looked into.
- 25.8 The manufacture's name or recognized trade mark, nominal length and batch or code number of lance is not marked. It **MUST** be looked into.
- 25.9 The manufacturer's name or recognized trade mark, batch or code number and designation of nozzles is not marked. It **MUST** be looked into.
- 25.10 The spray angle for fine cone spray pattern at a pressure of 300 kPa does not conform to the requirement of IS:3652-1995. It **MUST** be looked into.
- 25.11 The strainer in nozzle is not provided. It should be provided.
- 25.12 Agitator is not provided in sprayer. It may be provided.



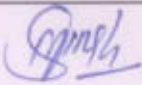
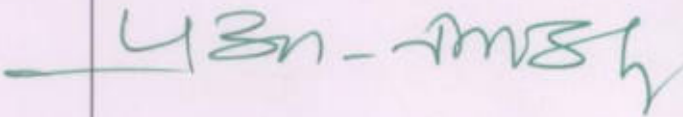
26. TECHNICAL LITERATURE

The following literature are provided with sprayer for guidance to the user.

- i. Operator's manual
- ii. Service manual
- iii. Part's catalogue

However, the manual's of sprayer should be updated as per IS:8132-1999.

TESTING AUTHORITY

MAAN SINGH SENIOR TECHNICAL ASSISTANT	
P. K. PANDEY DIRECTOR	

27. APPLICANT'S COMMENTS

Para No.	Our Reference	Applicant's Comments
27.1	25.1, 25.8, 25.9, 25.11, 25.12 & 25.20	Will be provided.
27.2	25.2, 25.4, 25.5, 25.7, 25.13, 25.15 & 25.18	Will be maintained in future as per Indian Standard
27.3	25.3	We will maintain in future.
27.4	25.6	We will mark in future.
27.5	25.10 & 25.14	We will improve the quality.
27.6	25.19	We will provided labelling plate.

