

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



**SAARANSH, SAS-BS-SM8-01
BATTERY 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

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[ISO 9001:2015 CERTIFIED]

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3. Data recorded

Avg. Speed of Pump (rpm)	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)
2990	1.0	1	2180	NIL	2185.0	2185.0
		2	2200			
		3	2190			
		4	2170			
2879	2.0	1	1980	NIL	1967.5	1967.5
		2	1960			
		3	1970			
		4	1960			
2815	3.0	1	1770	NIL	1765.0	1765.0
		2	1760			
		3	1780			
		4	1750			
2718	4.0	1	1560	NIL	1550.0	1550.0
		2	1550			
		3	1540			
		4	1550			

Minimum discharge rate = 1550.0 ml/min at 4 kg/cm²
 Maximum discharge rate = 2185.0 ml/min at 1 kg/cm²
 Discharge at rated pressure = 1765.0 ml/min at 3 kg/cm²

5. TEST FOR VOLUMETRIC EFFICIENCY

(Vide Clause 8.4 of IS : 11313: 2007)

Date of Test : 04.03.2021
 Rated pressure, kg/cm² : 3
 Avg. discharge of water at rated pressure, ml/min : 1765
 Avg. discharge of water at no-load, ml/min : 2952
 Avg. pump speed at no-load, rev/min : 3229
 Avg. pump speed at rated pressure, rev/min : 2815
 Volumetric efficiency of pump, % : 68.6

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

6. POWER REQUIREMENT

(Vide Clause 8.5 of IS : 11313 : 2007)

Date of test : 05.03.2021
 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 : 0.75 A
 3. Avg. current drawn by motor at load : 1.60 A
 4. Avg. motor operating voltage : 12.41 V



5. Avg. observed motor power requirement : 16.34 watt
 6. Avg. motor speed at no load : 3229 rpm
 7. Avg. motor speed at load : 2815 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 : 2639 rpm

7. PRESSURE ADJUSTMENT TEST

1. Date of test : 04.03.2021
 2. Atmospheric conditions:-
 a. Temperature : 23.1 °C
 b. Relative humidity : 35.4 %
 c. Pressure : 98.8 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

8. TEST FOR SPRAY LANCE
(Vide Annex D of IS : 3652: 1995)

- Date of test : 03.03.2021
 Type : Gooseneck type (Type-B₁)

8.1 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

8.2 MARKING ON SPRAY LANCE

- Manufacturer's name or recognized trade mark : Not Marked
 Nominal length : Not Marked
 Batch or code number : Not Marked



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

Date : 03.03.2021
Type : Trigger type (Type – A)

9.1 MAXIMUM TRIGGER ACTIVATION TORQUE

Required torque	:	Observed torque
Less than 35 kgf-cm	:	30.2 kgf-cm

9.2 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 leak, crack or burst of cut-off device was observed during test.

9.3 LEAKAGE AND RELIABILITY TEST FOR CUT-OFF DEVICE

Sr. No.	Details	Condition
	Date of test	02.03.2021
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 @ 15 cycles per minutes
4	Observation	No drip or leak of cut off device through valve was observed during the test

9.4 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

10. TEST FOR NOZZLE
(Vide Annex F of IS : 3652: 1995)

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

**10.1 TEST FOR DISCHARGE RATE OF NOZZLE**

The discharge rate for fine cone spray pattern & Jet spray pattern as 1300 ml/min & 1950 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 : 1445.0 ml/min
- For Jet Spray Pattern : 1997.5 ml/min

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

10.2 TEST FOR SPRAY ANGLE OF NOZZLE

The spray angle of nozzle at a pressure of 300 kPa has been declared by applicant as 80° degree. The spray angle corresponding to 300 kPa pressure was observed as 75.9 degree.

10.3 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

S. No.	No. of collection	Avg. Discharge rate, ml/min		Spray angle, Degree.
		Fine cone Spray Pattern	Jet spray pattern	
a)	First collection	1455.0	2000.0	75.2
b)	Second collection	1442.5	1992.5	74.6
c)	Third collection	1447.5	2000.0	75.6
d)	Fourth collection	1447.5	2005.0	73.9
e)	Fifth collection	1452.5	1997.5	75.9
f)	Sixth collection	1430.0	1990.0	74.9
g)	Seventh collection	1450.0	2000.0	74.6
h)	Eighth collection	1422.5	2017.5	76.2

- Remark: i) Percentage variation in discharge rate at fine cone spray pattern from first to last collection, 2.23%.
 ii) Percentage variation in discharge rate at Jet spray Pattern from first to last collection 0.87%
 iii) Percentage variation is in spray angle for fine cone spray pattern from first to last collection, 1.33 %.

10.4 SPRAY DISTRIBUTION PATTERN OF NOZZLE

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

- 10.5 NOZZLE DESIGNATION** : Not Specified
 Provision for strainer in nozzle : Not provided

- 10.6 MARKING OF NOZZLE**
 Manufacturer's name or recognized trade mark : Not Marked
 Batch or code number : Not Marked



11. ENDURANCE TEST OF SPRAYER
(Vide clause 8.8 of IS:11313:2007)

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 - 1672.5
 - b) Second Collection - 1685.0
 - c) Third Collection - 1667.5
 - d) Fourth collection - 1680.0
 - e) Fifth Collection - 1672.5
 - f) Sixth Collection - 1677.5
 - g) Seventh Collection - 1665.0
4. Percentage variation of discharge from first to last collection, 0.45 %.

12. TEST FOR PUMP CHAMBER
(Vide Clause 7.1 of IS : 10134-1994)

Date of test : 02.03.2021

Sr. No	Details	Condition
1	Test Condition	: Outlet end closed
2	Pressure applied -Hydraulic pressure	: Motor stopped beyond 5.9 kg/cm ² pressure against the pressure requirement of 7.5 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 5.9 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.



- iv) IS: 2643-2005- Pipe threads where pressure -tight : **Does not conform**
Joint are not made on the threads-dimensions,
tolerance and designation.

18. COMMENTS & RECOMMENDATIONS	
18.1	The model of pump is not specified. It MUST be looked into.
18.2	The model of motor is not specified. It MUST be looked into.
18.3	The manufacturer's name or recognized trade mark, type of cut off device and batch or code number of cut off device is not marked. It MUST be looked into.
18.4	The strainer in nozzle is not provided. It may be considering for providing.
18.5	Agitator is not provided. It may be provided.
18.6	The strap cushion thickness does not meet the requirement of Indian Standard. It may be looked into.
18.7	Time required to full charge the battery with AC charger is observed as 8.5 to 9.0 hours.
18.8	The spraying operation time after fully charging the battery was observed as 5.3 to 6 hours.
18.9	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.
18.10	The discharge rate of nozzle for fine cone spray pattern does not meet the requirement of Indian Standard. It MUST be looked into.
18.11	The manufacturer's name or recognized trade mark, batch or code number and designation of nozzle is not marked. It MUST be looked into.
18.12	During the strap drop test the buckle/bracket of strap assembly found failed to hold the strap in it's position. It should be improved.
18.13	During the pump chamber of Hydraulic test the motor stopped beyond 5.9 kg/cm ² pressure against the pressure required of 7.5 kg/cm ² and the test could not be conducted. Thus MUST be looked into and improved.
18.14	The volumetric efficiency of pump does not meet the requirement of Indian standard. It MUST be improved.
18.15	The strap width does not meet the requirement of Indian Standard. It MUST be looked into.
18.16	The discharge outlet nipple length of pump does not meet the requirement of Indian Standard. It MUST be looked into.
18.17	The strainer in cut-off device is not provided. It MUST be looked into.
18.18	A suitable labeling plate (Not sticker) needs to be provided with "interalia" following information. <ol style="list-style-type: none"> I. Manufacture's name. II. Make. III. Model. IV. Month & year of manufacture. V. Rated speed. VI. Rated pressure. VII. Discharge rate. VIII. Power Rating IX. Country of Origin



18.19 Safety provision/Safety wear

The safety instructions regarding handling poisonous agrochemical before, during and after spraying operation should be provide on sprayer.


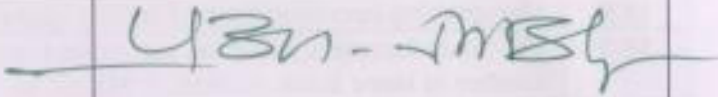
19. TECHNICAL LITERATURE

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

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

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

TESTING AUTHORITY

MAAN SINGH SENIOR TECHNICAL ASSISTANT	
P. K. PANDEY DIRECTOR	

20. APPLICANT'S COMMENTS

Para No.	Our Reference	Applicant's comments
20.1	18.1, 18.2, 18.4, 18.5 & 18.17	Will be provided.
20.2	18.3	We will maintain in future.
20.3	18.6, 18.10, 18.14, 18.15 & 18.16	Will be maintain in future as per Indian Standard.
20.4	18.9	We will mark in future.
20.5	18.11	Will be provided in future.
20.6	18.12	Will be improve bracket quality .
20.7	18.13	We will improve pump quality.
20.8	18.18	We will provide labeling plate.

