

THIS TEST REPORT VALID UP TO : 31st July, 2027



**SHAKTI, SBS-520s,
BATTERY CUM HAND OPERATED KNAPSACK SPRAYER**



भारत सरकार

Government of India

कृषि एवं किसान कल्याण मंत्रालय

Ministry of Agriculture and Farmers Welfare

कृषि एवं किसान कल्याण विभाग

Department of Agriculture and Farmers Welfare

उत्तरी क्षेत्र कृषि मशीनरी प्रशिक्षण एवं परीक्षण संस्थान

Northern Region Farm Machinery Training and Testing Institute

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[ISO 9001:2015 CERTIFIED]

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	-Gland seal	PVC	PVC	Conforms
	-Gland packing	Asbestos rope	Asbestos rope	Conforms
xxxiii)	Material of construction of various components as per IS: 3906-1995			
	Strap	Woven web cotton/synthetic yarn	Synthetic yarn	Conforms
	Skirt/Stand	Steel, plastic	Plastic	Conforms
	Strap buckle	Steel, Engg. Plastic	Steel	Conforms
	Cushion	Foam, rubber, foam plastic	Not available	Does not conform
xxxiv)	The material used for different components shall be declared by the manufacturer. All the components mentioned in the Table No.-I of IS:11313-2007 may not be present in a particular sprayer.		Declared by the manufacturer	Conforms

4. RUNNING-IN

The sprayer was run-in 1.0 hour as recommended by the applicant before starting of test.

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

1. Date of test : 12.07.2022
2. Atmospheric conditions
 - a) Temperature : 34.2 °C
 - b) Relative humidity : 69.9 %
 - c) Pressure : 97.8 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)
3361	1.0	1	2160	NIL	2165.0	2165.0
		2	2170			
		3	2150			
		4	2180			
3310	2.0	1	2000	NIL	2000.0	2000.0
		2	2020			
		3	2000			
		4	1980			
3262	3.0	1	1890	NIL	1895.0	1895.0
		2	1910			
		3	1900			
		4	1880			
3253	5.0	1	1080	NIL	1072.5	1072.5
		2	1060			
		3	1080			
		4	1070			

Minimum discharge rate = 1072.5 ml/min at 5 kg/cm²
Maximum discharge rate = 2165.0 ml/min at 1 kg/cm²
Discharge at rated pressure = 1895.0 ml/min at 3 kg/cm²

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

Date of Test	:	14.07.2022
Rated pressure, kg/cm ²	:	3.0
Avg. discharge of water at rated pressure, ml/min	:	1895.0
Avg. discharge of water at no-load, ml/min	:	3142.5
Avg. pump speed at no-load, rev/min	:	3598
Avg. pump speed at rated pressure, rev/min	:	3263
Volumetric efficiency of pump, %	:	66.49

7. POWER REQUIREMENT (Vide Clause 8.5 of IS : 11313-2007)

Date of test	:	14.07.2022
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	:	1.13 A
3. Avg. current drawn by motor at load	:	2.52 A
4. Avg. motor operating voltage	:	12.97 V
5. Avg. observed motor power requirement	:	32.66 watt
6. Avg. motor speed at no load	:	3598 rpm
7. Avg. motor speed at load	:	3263 rpm
8. Avg. time required for fully discharge of battery	:	7.5 to 8.0 hours
9. Avg. no load rpm of motor after 6 hours of operation	:	2892 rpm
10. Time required to full charge the battery with AC charger was observed as	:	7.0 to 7.5 hours
11. The spraying operation time after fully charging the battery was observed as	:	7.5 to 8.2 hours

8. PRESSURE ADJUSTMENT TEST

- Date of test : 12.07.2022
- Atmospheric conditions
 - Temperature : 34.2 °C
 - Relative humidity : 69.9 %
 - Pressure : 97.8 kPa
- Data recorded

Sr. 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.	5.0	NIL	NIL	--

- Resistance to different pressure: Yes

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

Date of test : 12.07.2022
Type : Gooseneck Type (Type-B₁)

9.1 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 bursting of lance was observed during test

9.2 MARKING ON SPRAY LANCE

Manufacturer's name or recognized trade mark : Marked as Shakti
Nominal length : Marked as 600 mm
Batch or code number : Marked as SALG-B₁

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

Date of test : 12.07.2022
Type : Trigger type (Type-A)

10.1 MAXIMUM TRIGGER ACTIVATION TORQUE

Required torque	:	35 kgf-cm
Observed torque	:	30.5 kgf-cm

10.2 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 Minutes
4	Observation	No leakage, crack or bursting of cut-off device was observed during test.

10.3 LEAKAGE AND RELIABILITY TEST FOR CUT-OFF DEVICE

Date of test: 12.07.2022		
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 @ 15 cycles per minutes
4	Observation	No drip or leak of cut off device through valve was observed during the test

10.4 MARKING ON CUT-OFF DEVICE

- a) Manufacturer's name or : Marked as Shakti
 b) recognized trade mark
 c) Batch or code number : Marked as SACTV-A
 d) Type of cut off device : **Not marked**

11. TEST FOR NOZZLE

(Vide Annex F of IS: 3652 -1995)

Date of test : 11.07.2022
 Type of Nozzle (apa) : Solid cone, adjustable

11.1 TEST FOR DISCHARGE RATE OF NOZZLE

The discharge rate for fine cone spray pattern & jet spray pattern as 1300 ml/min & 2050 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 : 1395.0 ml/min
 - For jet spray pattern : 1872.5 ml/min

11.2 TEST FOR SPRAY ANGLE OF NOZZLE

The spray angle of nozzle at a pressure of 300 kPa was declared by the applicant as 75 degree. The spray angle corresponding to 300 kPa pressure was observed as 79.1 degree.

11.3 ENDURANCE TEST OF NOZZLE

- i) Date : 21.06.2022 to 29.06.2022
 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.
		Fine cone spray pattern	Jet spray pattern	
a)	First collection	1420.0	1872.5	77.8
b)	Second collection	1407.5	1832.5	79.1
c)	Third collection	1412.5	1832.5	78.5
d)	Fourth collection	1460.0	1825.0	77.2
e)	Fifth collection	1482.5	1835.0	79.1
f)	Sixth collection	1420.0	1817.5	77.8
g)	Seventh collection	1457.5	1802.5	78.5
h)	Eighth collection	1392.5	1902.5	79.7

- Remark: i) Percentage variation in discharge rate at fine cone spray pattern from first to last collection is 1.94 %.**
ii) Percentage variation in discharge rate at jet spray pattern from first to last collection is 1.60 %
iii) The variation in spray angle for fine cone spray pattern from first to last collection is 1.9 degree.

11.4 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.

11.5 NOZZLE DESIGNATION : Marked as A 75° 1300 2050
Provision for strainer in nozzle : **Not provided**

11.6 MARKING OF NOZZLE

Manufacturer's name or recognized trade mark : Marked as Shakti
Batch or code number : Marked as SA-NDA

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

1. Date of test :- 13.06.2022 to 20.06.2022
2. Total running time (h) - 50
3. Quantity of liquid collected during endurance:-
Avg. Discharge (ml/min)
 - a) First Collection - 1902.5
 - b) Second Collection - 1905.0
 - c) Third Collection - 1892.5
 - d) Fourth collection - 1887.5
 - e) Fifth Collection - 1892.5
 - f) Sixth Collection - 1882.5
 - g) Seventh Collection - 1885.0
4. Percentage variation of discharge from first to last collection is 0.92 %.

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

Date of test : 11.07.2022

Sr. No	Details	Condition
1	Test Condition	: Outlet end closed
2	Pressure applied -Hydraulic pressure	: 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.

DATA FOR SPRAY DISTRIBUTION OF NOZZLE

No. of tube	10	9	8	7	6	5	4	3	2	1	Centre	1	2	3	4	5	6	7	8	9	10
Discharge in ml	04	10	23	39	75	77	78	62	60	58	70	71	58	52	45	49	56	47	29	09	05

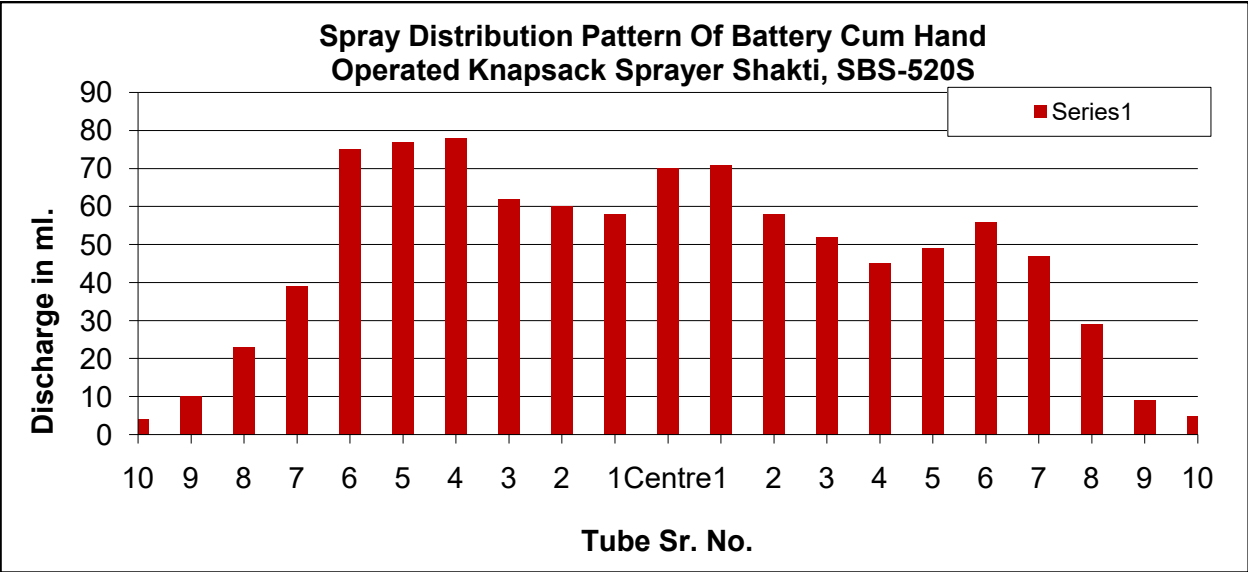


FIG. 1 : SPRAY DISTRIBUTION PATTERN

16.	Making/labelling of sprayer	The labelling plate should be provided on the body of sprayer having name & address of manufacturer, month & year of manufacture, rated pressure, discharge rate, country of origin.	Just a sticker not proper labelling plate is provided on the sprayer with following information Battery Cum Hand Operated Knapsack Sprayer Make-Shakti Model-SBS-520s Sl. no.- BS-12/22 Mfg- April, 2022 2153/9, St. No.-6, Arjun Nagar, Gill Road, Ludhiana-141003 (Punjab)	Conforms
17.	Literature	Operator manual, service manual & parts catalogue should be provided.	Provided	Conforms

Note:- The implementation of critical technical specifications has been deferred till 30.09.2022 vide Ministry's O.M. No. 13-1/2021 M&T (I&P) dated 03.02.2022

26. CONFORMITY TO INDIAN STANDARDS



- i) IS:11313-2007 Hydraulic power sprayers- : **Partially conform**
specification
- ii) IS: 10134-1994-Method of test for manually : **Partially conform**
operated sprayer
- iii) Spray nozzle and spray gun as per IS:3652- : **Partially conform**
1995 (Reaffirmed 2011)

27. COMMENTS & RECOMMENDATIONS

- 27.1 The strainer in nozzle is not provided. It may be provided.
- 27.2 The strainer in cut-off device is not provided. It **MUST** be looked into.
- 27.3 Agitator is not provided. It may be provided.
- 27.4 The type of cut-off device is not marked. It **MUST** be looked into.
- 27.5 The strap cushion is not provided. It **MUST** be looked into.
- 27.6 The volumetric efficiency of pump does not meet the requirement of Indian standard. It **MUST** be improved.
- 27.7 A suitable labeling plate (not sticker) needs to be provided with "Interlia" following information.
 - (i) Manufacturer's name
 - (ii) Make
 - (iii) Model
 - (iv) Month & year of manufacturer
 - (v) Rated speed
 - (vi) Rated pressure
 - (vii) Discharge rate
 - (viii) Power rating
 - (ix) Country of origin

29.1.11	Overall Dimensions, mm		
	Height	: 585	600
	Width	: 420	185
	Length	: 185	430
29.1.12	Total mass, kg	: 6.800	6.820
	Mass with full chemical tank, (kg)	22.500	22.820
29.1.13	Technical literature	: Operator cum service manual, specification sheet and detail of material construction of machine was provided	Operator manual, service manual and parts catalogue are provided..

TESTING AUTHORITY

Er. SANJAY KUMAR AGRICULTURAL ENGINEER	
Dr. MUKESH JAIN DIRECTOR	 25.07.2022

The draft test report is compiled by Abhishek Chourey, MTS (Technical)

30. APPLICANT'S COMMENTS

We will follow all points under comment and recommendations of test report in our production and testing process.