

व्यावसायिक परीक्षण रिपोर्ट

संख्या/ No.: PS-470/2647/2021

COMMERCIAL TEST REPORT (FIRST BATCH)

माह/Month : January, 2021

**THIS TEST REPORT VALID UP TO : 31<sup>st</sup> January, 2026**



**SHAKTI, SBS - 520 BATTERY  
CUM HAND OPERATED KNAPSACK SPRAYER  
(FIRST BATCH)**



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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**SHAKTI, SBS-520, BATTERY CUM HAND OPERATED  
KNAPSACK SPRAYER, COMMERCIAL(FIRST BATCH)**

	-Disc, tip,	Brass, ceramic, stainless steel,	Brass	Conforms
	-Spindle, coupling nut & gland nut	Brass, Engg. Plastics, Stainless steel	Brass	Conforms
xxxii)	<b>Material of construction of cut-off device</b>			
	-Body, valve seat, gland nut, cap & collar, Valve stem, Nipple	Brass, Engineering plastic, stainless steel	Brass	Conforms
	-Valve	Brass, synthetic rubber, stainless steel, plastic	Synthetic rubber	Conforms
	-Strainer	Brass, , stainless steel, plastic	NA	---
	-Operating knob	Brass, Engineering plastic,	Not applicable	---
	- Operating trigger	Steel, Engineering plastic	Steel	Conforms
	-Spring	Stainless steel,	Stainless steel	Conforms
	-Gasket	Synthetic rubber, fibre, PVC	Fiber	Conforms
	-Gland seal	PVC	Not applicable	--
	-Gland packing	Asbestos rope	Asbestos rope	--
xxxiii)	<b>Material of construction of other components as per IS: 3906-1995</b>			
	Lid or cap	Brass, Plastic, Stainless steel	Plastic	Conforms
	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	Foam Plastic	Conforms
xxxiv)	The material used for different components shall be declared by the manufacturer, all the components mentioned in the table-I may not be present in a particular sprayer.		Declared by the applicant	Conforms

**4. TEST FOR DISCHARGE RATE OF PUMP**

(Vide Clause 8.3 of IS: 11313 - 2007)

1. Date of test : 06.01.2021
2. Atmospheric conditions :
  - a) Temperature : 19.1 °C
  - b) Relative humidity : 54.1 %
  - c) Pressure : 98.7 kPa
3. Data recorded



Speed of Pump (rpm)	Working pressure (kg/cm <sup>2</sup> )	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)
3142	1.0	1	2920	NIL	2897.5	2897.5
		2	2870			
		3	2890			
		4	2910			
2946	2.0	1	2370	NIL	2345.0	2345.0
		2	2340			
		3	2320			
		4	2350			
2818	3.0	1	1950	NIL	1937.5	1937.5
		2	1930			
		3	1940			
		4	1930			
2796	4.0	1	1670	NIL	1672.5	1672.5
		2	1680			
		3	1660			
		4	1680			

Minimum discharge rate = 1672.5 ml/min at 4 kg/cm<sup>2</sup>  
 Maximum discharge rate = 2897.5 ml/min at 1 kg/cm<sup>2</sup>  
 Discharge at rated pressure = 1937.5 ml/min at 3.0 kg/cm<sup>2</sup>

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

Date of test : 06.01.2021  
 Rated pressure, kg/cm<sup>2</sup> : 3.0  
 Avg. discharge of water at rated pressure, ml/min : 1937.5  
 Avg. discharge of water at no load, ml/min : 3347.5  
 Avg. pump speed at no load, rev/min : 3342  
 Avg. pump speed at rated pressure, rev/min : 2818  
 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 : 06.01.2021  
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 : 0.85 A
3. Avg. current drawn by motor at load : 2.16 A
4. Avg. motor operating voltage : 12.52 V
5. Avg. observed motor power requirement : 27.04 Watt
6. Avg. motor speed at no load : 3342 rpm
7. Avg. motor speed at load : 2818 rpm
8. Avg. Time required for fully discharge of battery : 7 to 7.8 h
9. Avg. No load rpm of motor after 6 hours of Operation : 2477 rpm

### 7. PRESSURE ADJUSTMENT TEST (Vide Clause 8.7.1 of IS – 11313 : 2007)

1. Date of test : 06.01.2021
2. Atmospheric conditions :
  - a. Temperature : 19.1 °C
  - b. Relative humidity : 54.1 %
  - c. Pressure : 98.7 kPa

#### 3. Data recorded

S. No.	Working pressure (kg/cm <sup>2</sup> )	Fluctuation range (kg/cm <sup>2</sup> )	Pressure drop (kg/cm <sup>2</sup> )	Ratio
1.	1	NIL	NIL	--
2.	2	NIL	NIL	--
3.	3	NIL	NIL	--
4.	4	NIL	NIL	--

4. Resistance of pressure: Yes

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

Date of test : 08.01.2021  
Type : Straight (Type-A)

#### 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



**24. 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

**25. CONFORMITY TO INDIAN STANDARDS**

- |  |   |                                 |
|--|---|---------------------------------|
| i) IS: 11313:2007 Hydraulic power sprayers- specification  | : | <b>Does not conform in toto</b> |
| ii) IS: 10134-1994-Method of test for manually operated sprayer  | : | <b>Does not conform in toto</b> |
| iii) Spray nozzle and spray gun as per IS:3652-1995 (Reaffirmed 2011)  | : | <b>Does not conform in toto</b> |
| iv) IS: 2643-2005- Pipe threads where pressure-tight joint are not made on the threads-dimensions, tolerance and designation | : | <b>Does not conform</b>         |

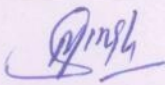
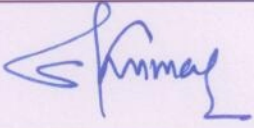

**26. COMMENTS & RECOMMENDATIONS**

- 26.1 The spray angle of nozzle at 300 kpa pressure does not conform to the requirement of IS: 3652-1995. It **MUST** be looked into.
- 26.2 The back rest cushion is not provided. It may be provided.
- 26.3 The strainer in cut-off device is not provided. It **MUST** be looked into.
- 26.4 The strainer in nozzle is not provided. It should be provided.
- 26.5 Agitator is not provided in sprayer. It may be provided.
- 26.6 Time required to full charge battery with AC charger is observed as 7 to 8 hours.
- 26.7 The spraying operation time after fully charging the battery was observed as 6 to 6.5 hours.
- 26.8 The volumetric efficiency of pump on battery operated mode does not meet the requirement of Indian Standard. It **MUST** be improved.
- 26.9 A suitable labeling plate (Not Sticker) needs to be provided with "Interalia" 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

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28.1.9	Mounting Arrangement		Not specified	Battery, motor and pump is mounted beneath the chemical tank
28.1.10	Safety wear (for operator's safety during operation)		A set of mask, hand gloves and safety goggles are provided.	Mask, goggle and hand gloves are provided.
28.1.11	Overall Dimensions, mm			
		Height :	635	650
		Width :	185	185
		Length :	410	415
28.1.12	Total mass, kg	:	6.300	6.680
	Mass with full chemical tank, (kg)	:	-	22.700
28.1.13	Technical literature	:	Manual including part's catalogue and operating instruction are provided.	Operator cum service manual and parts list.

#### TESTING AUTHORITY

MAAN SINGH SENIOR TECHNICAL ASSISTANT	
SANJAY KUMAR AGRICULTURAL ENGINEER	
P. K. PANDEY DIRECTOR	

#### 29. APPLICANT'S COMMENTS

“We will follow comments and recommendations in test report in our production and testing process of sprayer”

