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व्यावसायिक परीक्षण रिपोर्ट  
COMMERCIAL TEST REPORT

संख्या/ No.: PS-274/1998/2017

माह/Month : April, 2017



**SHAKTI SBS-520 e  
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

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	Skirt/ stand	Steel, plastic	Plastic	Conforms
	Strap buckle	Steel, Engg. Plastic	Engg. plastic	Conforms
	Cushion	Foam rubber, foam plastic	Rubber	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 in the specification sheet.	Conforms

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

1. Date of test : 13.02.2017
2. Atmospheric conditions :
  - a) Temperature : 20 °C
  - b) Relative humidity : 51 %
  - c) Pressure : 99.8 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)
3014	1.0	1	2440	NIL	2440.0	2440.0
		2	2430			
		3	2450			
		4	2440			
2874	2.0	1	2150	NIL	2145.0	2145.0
		2	2140			
		3	2150			
		4	2140			
2758	3.0	1	1610	NIL	1612.5	1612.5
		2	1640			
		3	1600			
		4	1600			
2708	4.0	1	1270	NIL	1318.0	1318.0
		2	1270			
		3	1380			
		4	1350			
1965	4.5	1	920	NIL	902.5	902.5
		2	900			
		3	900			
		4	890			

**Minimum discharge rate** = **902.5 ml/min at 4.5 kg/cm<sup>2</sup>**  
**Maximum discharge rate** = **2440 ml/min at 1.0 kg/cm<sup>2</sup>**  
**Discharge at rated pressure** = **1318 ml/min at 4.0 kg/cm<sup>2</sup>**

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

Rated pressure, kg/cm <sup>2</sup>	:	4
Discharge of water at rated pressure l/min	:	1.318
Discharge of water at no load, l/min	:	2.713
Pump speed at no load, rev/min	:	3150
Pump speed at rated pressure, rev/min	:	2708
Volumetric efficiency of pump, %	:	56.51

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

**5. POWER REQUIREMENT**  
(Vide Clause 8.5 of IS – 11313 : 2007)

The power requirement of DC motor fitted on sprayer was observed as following.

1. Avg. motor operating voltage	:	12 V
2. Avg. voltage required at rated pressure	:	12.31 V
3. Avg. current drawn by motor at no load	:	0.55 A
4. Avg. current drawn by motor at load, rated pressure	:	1.43 A
5. Avg. observed motor power requirement at rated pressure	:	17.56 Watt
6. Motor speed at no load	:	3147 rpm
7. Motor speed at on load, rated pressure	:	2715 rpm
8. Time required for fully discharge of battery	:	6 <sup>1</sup> / <sub>2</sub> to 7 hr.

**6. PRESSURE ADJUSTMENT TEST**  
(Vide Clause 8.7.1 of IS – 11313 : 2007)

- Date of test : 13.02.2017
- Atmospheric conditions :
  - Temperature : 20 °C
  - Relative humidity : 49 %
  - Pressure : 99.7 kPa
- 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.	1.0	NIL	NIL	--
2.	2.0	NIL	NIL	--
3.	3.0	NIL	NIL	--
4.	4.0	NIL	NIL	--
5.	4.5	NIL	NIL	--

- Resistance of pressure: Yes

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

Date of test	:	21.01.2017
Type	:	Gooseneck (Type B <sub>1</sub> )

**24. CONFORMITY TO INDIAN STANDARDS**

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

**25. COMMENTS & RECOMMENDATIONS**

- 25.1 The sprayer serial number is not marked. It should be marked.
- 25.2 The motor serial number, motor power and rated speed is not specified. It should be specified.
- 25.3 As the discharge rate of nozzle at a pressure of 300 kPa for Fine cone spray and jet spray pattern does not conform to the requirement of IS: 3652:1995.
- 25.4 The battery serial number, model and country of origin is not specified. It should be specified.
- 25.5 Country of origin of battery charger is not marked. It should be marked.
- 25.6 The country of origin of pump is not specified. It should be specified.
- 25.7 The dimension of straps does not meet the requirements of Indian Standard.
- 25.8 The metallic threaded connection provided on sprayer does not meet the requirement of Indian Standard. It should be looked into.
- 25.9 The batch or code number on nozzle is not provided. It should be looked into.
- 25.10 The strap cushion thickness does not meet the requirement of Indian Standard.
- 25.11 The delivery hose length is not as per Indian Standard. It should be looked into.
- 25.12 The lance is not marked batch or code number. It should be marked.

- 25.13 The strainer is not provided in cut off device. It may be provided.
- 25.14 The trigger actuation force is observed more than as defined in Indian Standard. It should be examined & improved.
- 25.15 The strainer in nozzle is not provided. It should be provided.
- 25.16 Agitator is not provided in sprayer. It may be provided.
- 25.17 During the strap drop test the buckle/bracket of strap assembly found failed to hold the strap in its position, it should be improved.
- 25.18 The batch or code number of cut-off device is not marked. It should be marked.
- 25.19 Time required to full charge battery with AC charger is observed as 7 to 8<sup>1</sup>/<sub>2</sub> hours.
- 25.20 The spraying operation time after fully charging the battery was observed as 6.5 to 7 hours.
- 25.21 **The volumetric efficiency of sprayer on battery operated mode was observed as 56.51%, which is not within the requirement of the relevant Indian Standard.**
- 25.22 The current drawn by motor at no load and on load was observed as 0.55 A and 1.4 A respectively which does not conform to requirement of IS: 14459-1997.
- 25.23 The sprayer does not conform to the relevant standard in toto. It should be looked into.
- 25.24 The nozzle designation marked on nozzle does not meet the requirement of Indian Standard.
- 25.25 During the pump chamber hydraulic test the motor stopped at 6.0 kg/cm<sup>2</sup> pressure against the pressure requirement of 10 kg/cm<sup>2</sup>. Thus the sprayer does not meet the requirement of Indian Standard.
- 25.26 A suitable labelling plate (not sticker) needs to be provided with ,inter alia ,following information;-
- i. Manufacturer'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

