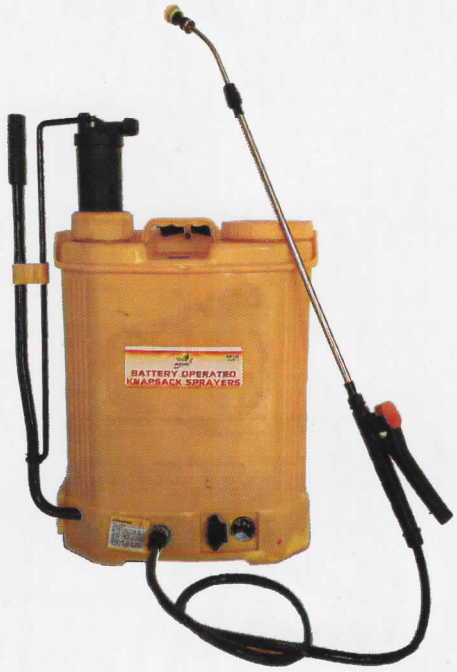
व्यावसायिक परीक्षण रिपोर्ट

COMMERCIAL TEST REPORT

संख्या/ **No.: PS-378/2268/2019**

माह/**Month : January, 2019**

THIS TEST REPORT VALID UP TO : 31st JANUARY, 2024



KISAN SHAKTHI KS-21
BATTERY CUM HAND OPERATED KNAPSACK SPRAYER

सत्यमेव जयते

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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[ISO 9001:2015 CERTIFIED]

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3. RUNNING - IN

Not recommended by the manufacturer.

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

1. Date of test : 21.12.2018
2. Atmospheric conditions :
   a) Temperature : 17 °C
   b) Relative humidity : 54 %
   c) Pressure : 99.02 kPa

3. Data recorded

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)
2919	1.0	1	2480	NIL	2492.5	2492.5
		2	2500			
		3	2490			
		4	2500			
2764	2.0	1	2140	NIL	2140.0	2140.0
		2	2130			
		3	2140			
		4	2150			
2678	3.0	1	1680	NIL	1695.0	1695.0
		2	1720			
		3	1700			
		4	1680			
2566	4.0	1	1440	NIL	1412.5	1412.5
		2	1400			
		3	1410			
		4	1400			

Minimum discharge rate = 1412.5 ml/min at 4.0 kg/cm^2
Maximum discharge rate = 2492.5 ml/min at 1 kg/cm^2
Discharge at rated pressure = 1412.5 ml/min at 4.0 kg/cm^2

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

Date of test	:	21.12.2018
Rated pressure, kg/cm^2	:	4
Avg. discharge of water at rated pressure, l/min	:	1.413
Avg. discharge of water at no load, l/min	:	2.928
Avg. pump speed at no load, rev/min	:	3029
Avg. pump speed at rated pressure, rev/min	:	2566
Volumetric efficiency of pump, %	:	57 %

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)

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	:	0.97 A
3. Avg. current drawn by motor at load	:	1.85 A
4. Avg. motor operating voltage	:	12 V
5. Avg. observed motor power requirement	:	23.15 Watt
6. Avg. motor speed at no load	:	3029 rpm
7. Avg. motor speed at load	:	2568 rpm
8. Avg. Time required for fully discharge of battery	:	8 to 8.5 hr
9. Avg. No load rpm of motor after 5.5 hours of Operation	:	1625 rpm

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

1. Date of test : 21.12.2018
2. Atmospheric conditions :
   a. Temperature : 17 °C
   b. Relative humidity : 54 %
   c. Pressure : 99.9 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

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.	Not declared	**Does not conform**

16. RUNNING - IN

Though the applicant has not recommended running-in, with the consent of the applicant the running-in of the sprayer was conducted for one hour in order to overcome variation in initial performance. Lubrication and the adjustment of the components was done as per applicants recommendation.

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

1. Date of test : 21.12.2018
2. Atmospheric conditions :
   a) Temperature : 17°C
   b) Relative humidity : 54%
   c) Pressure : 99.02 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	680	Nil	677.5	677.5
16	300	2	690	Nil		
16	300	3	670	Nil		
16	300	4	670	Nil		

Average discharge rate : 677.5 ml/min at 300 kPa pressure

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

	Date of test	:	07.01.2019
Sl. No.	Details		Observation
1.	Discharge of water in 10 successive stroke one minute	:	410 ml
2.	No of cycle in one minute	:	10
3.	Actual volume of water in one cycle	:	41.0 ml
4.	Inner diameter of pump cylinder	:	44.05 mm
5.	Stroke length at normal working pressure	:	33.61 mm
6.	Piston displacement	:	51.22 cc
7.	Theoretical volume of water in one cycle	:	51.22 ml
8.	Volumetric efficiency, %	:	80%

Remark: The volumetric efficiency of pump does not conform to the requirement of IS 10134-1994.

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

Date of test : 27.12.2018

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.

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

Date of test : 21.12.2018

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

25. 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**
vi)	IS: 2643-2005-Pipe threads where pressure-tight joint are not made on the threads-dimensions, tolerance and designation	:	Conforms

26. COMMENTS & RECOMMENDATIONS

26.1 The sprayer, Serial No. year of manufacture is not marked. It should be marked.

26.2 The motor make, Serial No, power and rated speed is not specified. It should be specified.

26.3 The Make, Model and Country of origin of battery charger is not specified. It should be specified.

26.4 The serial No and Country of origin of battery is not specified. It should be specified.

26.5 The country of origin and Serial No of pump is not specified. It should be specified.

26.6 During the strap drop test the buckle/bracket of strap assembly found failed to hold the strap in its position. It should be provided.

26.7 The manufacture's name or recognized trade mark and batch or code Number on Nozzle is not provided. It **MUST** be provided

26.8 The average size of strainer of cut-off device does not meet the requirement of Indian Standard. It **MUST** be looked into.

26.9 The spray angle of nozzle at 300 kPa pressure does not conform to the requirement of IS: 3652-1995. It **MUST** be looked into.

26.10 Material used for pump inlet port end fitting does not meet the requirement of IS:11313-2007. It **MUST** be looked into.

26.11 The lance is not marked . It should be be marked.

26.12 The cut off device is not marked. It **MUST** be marked.

26.13 The strainer in nozzle is not provided. It may be considered for providing.

26.14 Agitator is not provided in sprayer. It may be provided.

26.15 Time required to full charge battery with AC charger is observed as 8.0 to 8.5 hours.

26.16 The spraying operation time after fully charging the battery was observed as 5 to 5.5 hours.

26.17 The current drawn by motor at no load and on load was observed 0.97 to 1.85 Amp. respectively which does not conform to requirement of IS: 14459:1997.

26.18 **The volumetric efficiency of sprayer on battery operated mode was observed as 57%, which is not within the requirement of the relevant Indian Standard.**

26.19 The volumetric efficiency of pump on hand operated mode was not within the requirement of the relevant code/Standard.

26.20 The material used for different components are not declared. It **MUST** be provided.

26.21 The nozzle is not marked. It should be marked.

26.22 During the pump chamber hydraulic test the motor stopped beyond 5 kg/cm^2 pressure against the pressure requirement of 10 kg/cm^2. Thus the sprayer does not meet the requirement of Indian Standard.

26.23 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

26.24 Safety provision/Safety wear.

i) Safety wears for operator's safety during operation was not provided. It **MUST** be provided.

ii) Safety instructions regarding handling poisonous agro chemical before, during and after spraying operations should be provided on sprayer.

27. TECHNICAL LITERATURE

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

i) Operator's cum maintenance manual with part's catalogue.

The operator instruction manual of sprayer needs to be provided as per IS : 8132 -1999.

TESTING AUTHORITY

R. K. NEMA SENIOR AGRICULTURAL ENGINEER	
P. K. PANDEY **DIRECTOR**	

28. APPLICANT'S COMMENTS

Para No.	Our reference	Applicant's comments
28.1	26.1 to 26.14	Now we are following these points at the time of manufacturing
28.2	26.24	Now we are providing safety wear at the time of delivery of sprayers to farmers along with the packing.