



**HYMARK HK-58
BATTERY OPERATED KNAPSACK SPRAYER
(FITTED WITH SOLAR PANEL)**



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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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	Conforms
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3. TEST FOR DISCHARGE RATE OF PUMP

(Vide Clause 8.3 of IS – 11313 : 2007)

1. Date of test : 19.07.2017
2. Atmospheric conditions :
 - a) Temperature : 39.5 °C
 - b) Relative humidity : 46.6 %
 - c) Pressure : 97.4 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)
2925	2.0	1	2060	Nil	2060	2060
		2	2050			
		3	2050			
		4	2080			
2830	3.0	1	1700	Nil	1720	1720
		2	1750			
		3	1700			
		4	1730			
2803	3.5	1	1380	NIL	1385	1385
		2	1370			
		3	1390			
		4	1400			
2760	4.0	1	1450	Nil	1460	1460
		2	1470			
		3	1480			
		4	1440			
2042	5.0	1	950	Nil	950	950
		2	940			
		3	960			
		4	950			

Minimum discharge rate = 950 ml/min at 5 kg/cm²
Maximum discharge rate = 2060 ml/min at 2 kg/cm²
Discharge at rated pressure = 1385 ml/min at 3.5 kg/cm²

Remarks : Tendency of stalling of motor was observed beyond 5 kg/cm² pressure against working pressure 2 to 6 kg/cm² declared by the applicant. Therefore, sprayer does not meet the requirement laid down in clause 8.3 of IS: 11313-2007.

4. TEST FOR VOLUMETRIC EFFICIENCY

(Vide Clause 8.4 of IS – 11313 : 2007)

Rated pressure, kg/cm ²	:	3.5
Avg. discharge of water at rated pressure, l/min	:	1.385
Avg. discharge of water at no-load, l/min	:	2.563
Avg. pump speed at no-load, rev/min	:	3173
Avg. pump speed at rated pressure, rev/min	:	2803
Volumetric efficiency of pump, %	:	61

Remarks : The volumetric efficiency does not conform to the requirement of IS: 11313:2007.

5. POWER REQUIREMENT

(Vide Clause 8.5 of IS – 11313 : 2007)

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	:	0.70 A
3. Avg. current drawn by motor at load	:	1.58 A
4. Avg. motor operating voltage	:	12.44 V
5. Avg. observed motor power requirement	:	19.63 watt
6. Avg. motor speed at no load	:	3175 rpm
7. Avg. motor speed at on load	:	2042 rpm
8. Avg. time required for fully discharge of battery	:	8.08 to 8.42 h
9. Avg. No load rpm of motor after 6 hours of operation	:	2526 rpm

6. PRESSURE ADJUSTMENT TEST

(Vide Clause 8.7.1 of IS: 11313:2007)

- Date of test : 22.07.2017
- Atmospheric conditions :
 - Temperature : 33 °C
 - Relative humidity : 64 %
 - Pressure : 97.4 kPa
- Data recorded

S. No.	Working pressure (kg/cm ²)	Fluctuation range (kg/cm ²)	Pressure drop (kg/cm ²)	Ratio
1.	2.0	NIL	NIL	--
2.	3.0	NIL	NIL	--
3.	4.0	NIL	NIL	--
4.	5.0	NIL	NIL	--

- Resistance of pressure: Yes

Remarks : Tendency of stalling of motor was observed beyond 5 kg/cm² pressure against working pressure 2 to 6 kg/cm² declared by the applicant. Therefore, sprayer does not meet the requirement laid down in clause 8.7.1 of IS: 11313-2007.

7. TEST FOR SPRAY LANCE

(Vide Annex D of IS – 3652 : 1995)

Date of test	:	04.07.2017
Type	:	Straight type (Type-A)

Cl. 9 Marking & Packing Cl. 9.1 Marking	Each sprayer shall be marked with the following particulars		
	a) Manufacturer's name or recognized trade mark	Hymark Hymark Agritech Pvt. Ltd. F-21, Sector-11, Noida-201301 (UP) India	Conforms
	b) Batch or Serial No.	S-1/7	Conforms
	c) Tank nominal capacity	16 ltr.	Conforms
Cl.9.3 IS:3906-1995 Packing	Each sprayer shall be packed as agreed to between the purchase and the supplier for safe handling in transit.		

15. 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:3652-1995 : **Does not conform in toto**
(Reaffirmed 2011)
- iv) IS: 2643-2005-Pipe threads where pressure-tight : **Does not conform in toto**
joint are not made on the threads-dimensions,
tolerance and designation

16. COMMENTS & RECOMMENDATIONS

- 16.1 Battery charger model and country of origin is not marked. It should be marked.
- 16.2 The model and serial number of Solar panel for battery charging is not specified. It should be specified.
- 16.3 The serial number and speed of motor is not specified. It should be specified.
- 16.4 Pump model, rated speed and country of origin is not marked. It should be marked.
- 16.5 The strainer in nozzle is not provided. It should be provided.
- 16.6 The cut-off device and spray lance is not marked. It should be marked.
- 16.7 The Strap cushion is not provided. It should be provided.
- 16.8 The volumetric efficiency of pump does not meet the requirement of Indian Standard. It **MUST** be improved.
- 16.9 The maximum trigger actuation torque is 42.7 kgf-cm. This exceeds the limit specified by Indian Standard. It **MUST** be improved.
- 16.10 Agitator is not provided. It may be provided.

- 16.11 During the strap drop test the buckle/bracket of strap assembly found failed to hold the strap in its position. It **MUST** be improved.
- 16.12 The strap width does not meet the requirement of Indian Standard. It **MUST** be looked into.
- 16.13 The spray angle of nozzle does not meet the requirement of Indian Standard. It **MUST** be looked into.
- 16.14 The current drawn by motor at no load and on load was observed as 0.70 and 1.58 A respectively which does not conform to requirement of IS- 14459: 1997.
- 16.15 Time required to full charge the battery with AC charger is observed as 9.3 to 10.2 hours.
- 16.16 Time required to full charge the battery with solar plate was observed as 10.2 to 12.5 hours.
- 16.17 The spraying operation time after fully charging the battery was observed as 8.08 to 8.42 hours.
- 16.18 During the pump chamber hydraulic test the motor stopped beyond 5.0 kg/cm² pressure against the pressure requirement of 8.75 kg/cm² and the test could not be conducted. This **MUST** be looked into and improved.
- 16.19 The discharge rate of nozzle for fine cone spray pattern does not meet the requirement of Indian Standard. It **MUST** be looked into.
- 16.20 The nozzle designation is not marked. It **MUST** be marked.
- 16.21 The nozzle is not marked. It **MUST** be marked.
- 16.22 The material of pump inlet port end fitting does not meet the requirement of Indian Standard. It should be looked into.
- 16.23 Pump discharge outlet nipple length does not meet the requirement of Indian Standard. It should be improved.
- 16.24 The cut-off device strainer area is less than the requirement of Indian Standard. It should be improved.
- 16.25 Cut-off device strainer aperture opening is less than the requirement of Indian Standard. It should be improved.
- 16.26 The strap cushion is not provided. It should be provided.

16.27 The back rest cushion is not provided on sprayer. It should be provided.

16.28 A suitable labeling 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



17. TECHNICAL LITERATURE

Operator manual was provided during the test. However, it should be updated as per IS:8132-1999, with the inclusion of safety instructions regarding handling of poisonous chemicals & first aid.

TESTING AUTHORITY

R. K. NEMA SENIOR AGRICULTURAL ENGINEER	<i>Ran</i>
P. K. PANDEY DIRECTOR	<i>PK Pandey</i>

18. APPLICANT'S COMMENTS

Sr. No.	Applicant's Comments
1	We will mention the battery charger model and also the country of origin in future.
2	We will mention the serial number and model of solar panel.
3	We will specify the motor serial number and rated speed in further production batches.
4	We will mention the pump model, country of origin and rated speed of pump in future.
5	We will provide strainer in nozzle.
6	We will mark batch numbers on cut off device and spray lance in future.
7	We will improve the volumetric efficiency of pump to meet the requirement of Indian Standard.