BATTERY CUM HAND OPERATED KNAPSACK SPRAYER
GREEN AGRITECH, GA-18L

Government of India
Ministry of Agriculture and Farmers Welfare
Department of Agriculture, Cooperation and Farmers Welfare
Northern Region Farm Machinery Training and Testing Institute
Tractor Nagar, Sirsa Road, HISAR (Haryana)-125 001

Website: http://nrfmtti.gov.in/
E-mail: fmti-nr@nic.in
Tele./FAX: 01662-276984
3. 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 were done as per applicants' recommendation.

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

1. Date of test : 08.06.2018
2. Atmospheric conditions :
   a) Temperature : 37 °C
   b) Relative humidity : 31 %
   c) Pressure : 97.2 kPa
3. Data recorded

<table>
<thead>
<tr>
<th>Speed of Pump (rpm)</th>
<th>Working pressure (kg/cm²)</th>
<th>Test No.</th>
<th>Delivery from the discharge line (ml/min)</th>
<th>Overflow</th>
<th>Average discharge from the discharge line (ml/min)</th>
<th>Discharge rate of pump (ml/min)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3180</td>
<td>1.0</td>
<td>1</td>
<td>2740</td>
<td>NIL</td>
<td>2765.0</td>
<td>2765.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2</td>
<td>2740</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>3</td>
<td>2770</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>4</td>
<td>2810</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2984</td>
<td>2.0</td>
<td>1</td>
<td>2380</td>
<td>NIL</td>
<td>2377.5</td>
<td>2377.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2</td>
<td>2370</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>3</td>
<td>2400</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>4</td>
<td>2300</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2928</td>
<td>3.0</td>
<td>1</td>
<td>2040</td>
<td>NIL</td>
<td>2032.5</td>
<td>2032.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2</td>
<td>2030</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>3</td>
<td>2010</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>4</td>
<td>2050</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2818</td>
<td>4.0</td>
<td>1</td>
<td>1700</td>
<td>NIL</td>
<td>1682.5</td>
<td>1682.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2</td>
<td>1660</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>3</td>
<td>1700</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>4</td>
<td>1670</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Minimum discharge rate = 1682.0 ml/min at 4.0 kg/cm²
Maximum discharge rate = 2765.0 ml/min at 1 kg/cm²
Discharge at rated pressure = 2032.5 ml/min at 3.0 kg/cm²
5. TEST FOR VOLUMETRIC EFFICIENCY
(Vide Clause 8.4 of IS: 11313 - 2007)

| Date of test | 08.06.2018 |
| Rated pressure, kg/cm² | 3 kg/cm² |
| Avg. discharge of water at rated pressure, l/min | 2.035 |
| Avg. discharge of water at no load, l/min | 3.315 |
| Avg. pump speed at no load, rev/min | 3377 |
| Avg. pump speed at rated pressure, rev/min | 2984 |
| Volumetric efficiency of pump, % | 69 % |

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 : 08.06.2018

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 : 1.11 A
3. Avg. current drawn by motor at load : 2.325 A
4. Avg. motor operating voltage : 12.57 V
5. Avg. observed motor power requirement : 25.11 Watt
6. Avg. motor speed at no load : 3378 rpm
7. Avg. motor speed at load : 2932 rpm
8. Avg. Time required for fully discharge of battery : 4.50 to 5.50 hr
9. Avg. No load rpm of motor after 5 hours of Operation : 2332 rpm

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

1. Date of test : 08.06.2018
2. Atmospheric conditions :
   a. Temperature : 37.2 °C
   b. Relative humidity : 31 %
   c. Pressure : 97.2 kPa
3. Data recorded

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Working pressure (kg/cm²)</th>
<th>Fluctuation range (kg/cm²)</th>
<th>Pressure drop (kg/cm²)</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>1.0</td>
<td>NIL</td>
<td>NIL</td>
<td>NIL</td>
</tr>
<tr>
<td>2.</td>
<td>2.0</td>
<td>NIL</td>
<td>NIL</td>
<td>NIL</td>
</tr>
<tr>
<td>3.</td>
<td>3.0</td>
<td>NIL</td>
<td>NIL</td>
<td>NIL</td>
</tr>
<tr>
<td>4.</td>
<td>4.0</td>
<td>NIL</td>
<td>NIL</td>
<td>NIL</td>
</tr>
</tbody>
</table>

4. Resistance of pressure: Yes
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
   --

26. COMMENTS & RECOMMENDATIONS

26.1 Material used for different component is not declared. It should be declared.

26.2 The sprayer serial no. and year of manufacture is not marked. It should be marked.

26.3 The motor Make, Model, Power and rated speed is not specified. It should be specified.

26.4 The country of origin of battery is not specified. It should be specified.

26.5 The country of origin of battery charger is not specified. It should be specified.

26.6 The Make, Model, serial No. and country of origin of pump is not specified. It should be specified.

26.7 The dimension of straps does not meet the requirements of Indian Standard. It MUST be looked into.

26.8 The pump inlet port end fitting does not meet the requirement of Indian Standard. It MUST be looked into.

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

26.10 The batch or code number on nozzle is not provided. It MUST be looked into.

26.11 The strap cushion thickness does not meet the requirement of Indian standard. It MUST be looked into.

26.12 The strainer area of cut-off device does not meet the requirement of Indian standard. It MUST be looked into.

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

26.14 The spray angle of nozzle at 300 kPa pressure does not conform to the requirement of IS: 3652-1995. It MUST be looked into.
26.15 The lance is not marked with batch or code number. It **MUST** be marked.

26.16 The tank capacity does meet the requirement of Indian Standard. It **MUST** be looked into.

26.17 The discharge rate of nozzle at a pressure of 300 kPa for fine cone spray pattern does not conform to the requirement of IS: 3652-1995.

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

26.19 The strainer in nozzle is not provided. It should be provided.

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

26.21 The batch or code number and type of cut-off device is not marked. It should be marked.

26.22 Time required to full charge battery with AC charger is observed as 7.5 to 8.0 hours.

26.23 The spraying operation time after fully charging the battery was observed as 4.50 to 5.50 hours.

26.24 The current drawn by motor at no load and on load was observed 1.11 to 2.32 Amp. respectively which does not conform to requirement of IS: 14459:1997.

26.25 The volumetric efficiency of sprayer on battery operated mode was observed as 69%, which is not within the requirement of the relevant Indian Standard.

26.26 The sprayer does not conform to the relevant standard in toto. It **MUST** be looked into.

26.27 The volumetric efficiency of sprayer on hand operated mode was observed as 64%, which is not within the requirement of the relevant Indian Standard.

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

26.29 During the pump chamber hydraulic test the motor stopped beyond 6.5 kg/cm² pressure against the pressure requirement of 7.5 kg/cm². Thus the sprayer does not meet the requirement of Indian Standard.

26.30 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

26.31 Safety provision/safety wear
   i) The safety instructions before, during and after spraying operation MUST be provided on sprayer.

27. TECHNICAL LITERATURE

No literature was provided with sprayer during test.
The following literature MUST be provided with the sprayer.
   i) Operator’s manual containing all the information including safety instructions before, during and after spraying operation.
   ii) Part’s catalogue

TESTING AUTHORITY

R. K. NEMA
SENIOR AGRICULTURAL ENGINEER

P. K. PANDEY
DIRECTOR

28. APPLICANT’S COMMENTS

The changes suggested will be incorporated by us.