COMMERCIAL TEST REPORT

No.: PS-287/2024/2017

Month : July, 2017

BHARAT-88 B
BATTERY OPERATED KNAPSACK SPRAYER

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
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Page 1 of 26
3. TEST FOR DISCHARGE RATE OF PUMP
(Vide Clause 8.3 of IS – 11313 : 2007)

1. Date of test : 16.05.2017
2. Atmospheric conditions :
   a) Temperature : 31°C
   b) Relative humidity : 52 %
   c) Pressure : 97.6 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>2950</td>
<td>1.0</td>
<td>1</td>
<td>2560</td>
<td>Nil</td>
<td>2560.0</td>
<td>2560.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2</td>
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</tr>
<tr>
<td></td>
<td></td>
<td>3</td>
<td>2570</td>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td></td>
<td>4</td>
<td>2560</td>
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<td></td>
</tr>
<tr>
<td>2750</td>
<td>2.0</td>
<td>1</td>
<td>2110</td>
<td>Nil</td>
<td>2112.5</td>
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<tr>
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</tr>
<tr>
<td>2639</td>
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<td>1420.0</td>
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<tr>
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<td>Nil</td>
<td>1235.0</td>
<td>1235.0</td>
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<td>1230</td>
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<tr>
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<td></td>
<td></td>
<td>4</td>
<td>1240</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Minimum discharge rate = 1235 ml/min at 4 kg/cm²
Maximum discharge rate = 2560 ml/min at 1 kg/cm²
Discharge at rated pressure = 1420 ml/min at 3 kg/cm²

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

<table>
<thead>
<tr>
<th>Rated pressure, kg/cm²</th>
<th>Discharge of water at rated pressure, l/min</th>
<th>Discharge of water at no-load, l/min</th>
<th>Pump speed at no-load, rev/min</th>
<th>Pump speed at rated pressure, rev/min</th>
<th>Volumetric efficiency of pump, %</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>3.022</td>
<td>3.015</td>
<td>3131</td>
<td>2639</td>
<td>56</td>
</tr>
</tbody>
</table>

### Cl. 8.2
The exposed mild steel parts shall have a protective coating to prevent surface deterioration. The steel used for hose ferrule/clip shall be plated with cadmium, zinc or nickel exposed brass parts may be given a suitable protective finish with clear transparent lacquer.

### Cl. 9.1
Each sprayer shall be marked with the following particulars

<table>
<thead>
<tr>
<th>a) Manufacturer’s name or recognized trade mark</th>
<th>Bharat-88 B Battery Operated Knapsack Sprayer</th>
</tr>
</thead>
<tbody>
<tr>
<td>b) Batch or Serial No.</td>
<td>5 or CH-1051</td>
</tr>
<tr>
<td>c) Tank nominal capacity</td>
<td>18 ltr.</td>
</tr>
</tbody>
</table>

### 15. 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

- iv) IS: 2643-2005-Pipe threads where pressure-tight joint are not made on the threads-dimensions, tolerance and designation
  Does not conform in toto

### 16. COMMENTS & RECOMMENDATIONS

16.1 Serial number of battery is not marked. It should be marked.

16.2 Battery charger country of origin is not marked. It should be marked.

16.3 The serial number of motor is not specified. It should be specified.

16.4 Pump serial number 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 pump inlet port end fitting material is not as per Indian Standard. It MUST be looked into.

16.7 During the strap drop test the buckle/bracket of strap assembly found failed to hold the strap in its position. It MUST be improved.

16.8 The cut-off device and spray lance batch or code number, manufacturer’s name or recognized trade mark and nominal length is not marked. It MUST be marked.

16.9 The volumetric efficiency of pump does not meet the requirement of Indian Standard. It MUST be improved.
16.10 The maximum trigger actuation torque is 46.6 kgf-cm. This exceeds the limit specified by Indian Standard. It **MUST** be improved.

16.11 Agitator is not provided. It may be provided.

16.12 Metallic threaded connection provided on sprayer does not meet the requirements of Indian Standard. It **MUST** be looked into.

16.13 The strap width and strap cushion thickness does not meet the requirement of Indian Standard. It **MUST** be improved.

16.14 The current drawn by motor at no load and on load was observed as 0.72 and 1.61 A respectively which does not conform to requirement of IS-14459: 1997. It **MUST** be looked into.

16.15 Time required to full charge the battery with AC charger is observed as 8 to 9 hours.

16.16 The spraying operation time after fully charging the battery was observed as 7 to 8 hours.

16.17 During the pump chamber hydraulic test the motor stopped at 6.0 kg/cm² pressure against the pressure requirement of 7.5 kg/cm² and the test could not be conducted. This **MUST** be looked into and improved.

16.18 The discharge rate of nozzle for fine cone spray pattern does not meet the requirement of Indian Standard. It **MUST** be looked into.

16.19 The nozzle designation does not meet the requirement of Indian Standard. It **MUST** be improved.

16.20 The nozzle batch or code number and manufacturer’s name or recognized trade mark is not marked. It **MUST** be marked.

16.21 The spray angle of nozzle at 300 kPa pressure does not meet the requirement of Indian Standard. It **MUST** be looked into.

16.22 The tank capacity of sprayer does not meet the requirement of Indian Standard. It **MUST** be looked into.

16.23 The cut-off device strainer apertures size is not as per Indian Standard. It should be looked into.
16.24 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

17. TECHNICAL LITERATURE

The specification sheet and material construction of different component of sprayer provided during the test, which is not found adequate. It is recommended to develop the operator's manual as per IS: 8132-1999. Service manual and spare part catalogue should be also brought out for guidance of user, with the inclusion of safety instructions regarding handling of poisonous chemicals & first aid.

TESTING AUTHORITY

<table>
<thead>
<tr>
<th>R. K. NEMA</th>
<th>P. K. PANDEY</th>
</tr>
</thead>
<tbody>
<tr>
<td>SENIOR AGRICULTURAL ENGINEER</td>
<td>DIRECTOR</td>
</tr>
</tbody>
</table>

18. APPLICANT'S COMMENTS

The report is O.K.