COMMERCIAL TEST REPORT

MODEERN Ml D-02-1
BATTERY CUM HAND 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

Website: http://nrfmtti.gov.in/
### MODERN MTI B-02-I
**BATTERY CUM HAND OPERATED KNAPSACK SPRAYER (COMMERCIAL)**

<table>
<thead>
<tr>
<th>xxxiv)</th>
<th>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.</th>
<th>Not declared</th>
<th>Does not conform</th>
</tr>
</thead>
</table>

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

1. Date of test : 12.06.2017
2. Atmospheric conditions :
   a) Temperature : 42 °C
   b) Relative humidity : 32%
   c) Pressure : 97.5 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>
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<td>4</td>
<td>1530</td>
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</tr>
</tbody>
</table>

**Minimum discharge rate** = 1575.0 ml/min at 4.0 kg/cm²
**Maximum discharge rate** = 2332.5 ml/min at 1.0 kg/cm²
**Discharge at rated pressure** = 1760.0 ml/min at 3.0 kg/cm²
4. TEST FOR VOLUMETRIC EFFICIENCY  
(Vide Clause 8.4 of IS: 11313 - 2007)

Date of test : 12.06.2017  
Rated pressure, kg/cm² : 3  
Avg. discharge of water at rated pressure, l/min : 1.773  
Avg. discharge of water at no load, l/min : 2.663  
Avg. pump speed at no load, rev/min : 3207  
Avg. pump speed at rated pressure, rev/min : 2861  
Volumetric efficiency of pump, % : 75

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. Motor operating voltage : 12 V  
2. Avg. current drawn by motor at no load : 0.8 A  
3. Avg. current drawn by motor at load : 2.04 A  
4. Avg. motor operating voltage : 12.36 V  
5. Avg. observed motor power requirement : 25.26 Watt  
6. Avg. motor speed at no load : 3205 rpm  
7. Avg. motor speed at on load : 2794 rpm  
8. Avg. Time required for fully discharge of battery : 7.8 to 8.2 hr.  
9. Avg. No load rpm of motor after 6 hours of operation : 2615 rpm

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

1. Date of test : 12.06.2017  
2. Atmospheric conditions :  
   a. Temperature : 45 °C  
   b. Relative humidity : 35 %  
   c. Pressure : 97.5 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>
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<tr>
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<td>NIL</td>
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</tr>
<tr>
<td>4.</td>
<td>4.0</td>
<td>NIL</td>
<td>NIL</td>
<td>--</td>
</tr>
</tbody>
</table>

4. Resistance of pressure: Yes

7. TEST FOR SPRAY LANCE  

Date of test : 25.05.2017  
Type : Gooseneck (Type B₁)
24. 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 : Does not conform in toto

25. COMMENTS & RECOMMENDATIONS

25.1 The sprayer serial number and year of manufacture is not marked. It should be marked.

25.2 The motor make, motor power and rated speed is not specified. It should be specified.

25.3 The battery make, model and country of origin is not specified. It should be specified.

25.4 Make, model and country of origin of battery charger is not specified. It should be specified.

25.5 The model, serial number and country of origin of pump is not specified. It should be specified.

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

25.7 The metallic threaded connection provided on sprayer does not meet the requirement of Indian Standard. It MUST be looked into.

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

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

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

25.11 The lance is not marked with batch or code number. It MUST be marked.

25.12 The material used for different components is not declared by the manufacturer. It should be declared.

25.13 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.
25.14 The strainer is not provided in cut off device. It may be provided.

25.15 The trigger actuation force is observed more than as defined in Indian Standard. It **MUST** be examined & improved.

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

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

25.18 The material of pump inlet part end filling does not meet the requirement of Indian Standard.

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

25.20 Time required to full charge battery with AC charger is observed as 10.1 to 11.3 hours.

25.21 The spraying operation time after fully charging the battery was observed as 7.8 to 8.2 hours.

25.22 **The volumetric efficiency of sprayer on battery operated mode was observed as 75%, which is not within the requirement of the relevant Indian Standard.**

25.23 The current drawn by motor at no load and on load was observed as 0.8 A and 2.04 A respectively which does not conform to requirement of IS: 14459-1997.

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

25.25 The nozzle designation marked on nozzle does not meet the requirement of Indian Standard. It **MUST** be looked into.

25.26 During the pump chamber hydraulic test the motor stopped beyond 6.0 kg/cm² pressure against the pressure requirement of 7.5 kg/cm². Thus the sprayer does not meet the requirement of Indian Standard.

25.27 **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

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