BATTERY CUM HAND OPERATED KNAPSACK SPRAYER,
CHAKRADHAR CHEMICALS, GANGA

Government of India
Ministry of Agriculture and Farmers Welfare
Department of Agriculture, Cooperation and Farmers Welfare
Northern Region Farm Machinery Training and Testing Institute

Website: http://nrfmtti.gov.in/
E-mail: fmti-nr@nic.in
Tele./FAX: 01662-276984
4. TEST FOR DISCHARGE RATE OF PUMP
(Vide Clause 8.3 of IS: 11313 - 2007)

1. Date of test: 15.05.2018
2. Atmospheric conditions:
   a) Temperature: 34 °C
   b) Relative humidity: 26%
   c) Pressure: 97.8 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 (ml/min)</th>
<th>Average discharge from the discharge line (ml/min)</th>
<th>Discharge rate of pump (ml/min)</th>
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</thead>
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</table>

Minimum discharge rate = 1347.5 ml/min at 4.0 kg/cm²
Maximum discharge rate = 2242.5 ml/min at 1 kg/cm²
Discharge at rated pressure = 1642.5 ml/min at 3.0 kg/cm²

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

| Date of test       | : 15.05.2018          |
| Rated pressure, kg/cm² | : 3 kg/cm²        |
| Avg. discharge of water at rated pressure, l/min | : 1.6425          |
| Avg. discharge of water at no load, l/min | : 2.790           |
| Avg. pump speed at no load, rev/min | : 3327.0          |
| Avg. pump speed at rated pressure, rev/min | : 2869.5          |
| Volumetric efficiency of pump, % | : 68              |

Remark:- The volumetric efficiency does not conform to the requirement of IS:11313-2007.
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 The sprayer year of manufacture is not marked. It should be marked.
26.2 The battery country of origin is not specified. It should be specified.
26.3 The serial number, motor power and rated speed of motor is not specified. It should be specified.
26.4 The battery charger make, model and country of origin is not specified. It should be specified.
26.5 The make model, serial number and country of origin of pump is not specified. It should be specified.
26.6 The material used for spray nozzles does not meet the requirements of Indian Standard. It MUST be looked into.
26.7 The material used for different component is not declared. It should be declared.
26.8 The dimension of straps does not meet the requirements of Indian Standard. It MUST be looked into.
26.9 The material used for pump inlet port end fitting does not meet the requirements of Indian standard. It MUST be looked into.
26.10 During the strap drop test the buckle/bracket of strap assembly found failed to hold the strap in its position. It should be provided.
26.11 The batch or code number on nozzle is not provided. It MUST be looked into.
26.12 The tank capacity of sprayer does not meet the requirement of IS : 3906-1995. It MUST be looked into.
26.13 The length of discharge outlet does not meet the requirements of Indian standard. It MUST be looked into.
26.14 The strap cushion thickness does not meet the requirement of Indian standard. It MUST be looked into.
26.15 The lance is not marked with batch or code number. It **MUST** be marked.

26.16 The cut off device is not marked. It must be marked.

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

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

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

26.20 Time required to full charge battery with AC charger is observed as 7.92 to 8.08 hours.

26.21 The spraying operation time after fully charging the battery was observed as 6.87 hours.

26.22 The current drawn by motor at no load and on load was observed 0.594A to 1.612 Amp respectively which does not conform to requirement of IS : 14459 : 1997.

26.23 **The volumetric efficiency of sprayer on battery operated mode was observed as 68 %, which is not within the requirement of the relevant Indian Standard.**

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

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

26.26 During the pump chamber hydraulic test the motor stopped beyond 5.0 kg/cm² pressure against the pressure requirement of 7.5 kg/cm². Thus the sprayer does not meet the requirement of Indian Standard.

26.27 The operating lever of sprayer distorted during test. It should be examined & improved.

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

26.29 Percentage variation in discharge for fine cone spray pattern during endurance test of nozzle does not meet the requirement of Indian Standard. It **MUST** be looked into.

26.30 Spares parts not provided during the test. It **MUST** be looked into.

26.31 The length of operating trigger does not meet the requirement of Indian Standard. It **MUST** be looked into.

26.32 The strainer are does not meet the requirement of Indian Standard. It **MUST** be looked into.

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

26.34 The spray angle of nozzle for fine cone spray pattern at a pressure of 300±30 kPa does not conform to the requirement of Indian Standard : 3652-1995. It **MUST** be looked into.
26.35 The volumetric efficiency of pump hand operating mode was observed as 71%, which is not within the requirement of relevant Indian Standard.

26.36 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

27. TECHNICAL LITERATURE
The operator’s manual of sprayer was provided during the test which found inadequate, however, the manual should be updated as per IS: 8132:1999, with the inclusion of safety instructions regarding handling poisonous agrochemical before, during and after spraying operation.

TESTING AUTHORITY

R. K. NEMA
SENIOR AGRICULTURAL ENGINEER

P. K. PANDEY
DIRECTOR

28. APPLICANT’S COMMENTS
In response to draft test report the applicant has commented as ‘Report is O.K.’