ICS-768 PS
ENGINE OPERATED PORTABLE 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
[ISO 9001:2015 CERTIFIED]

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3. TEST FOR DISCHARGE RATE OF PUMP
[vide Clause 8.3 of IS- 11313: 2007]

1. Date of test : 18.05.2019
2. Atmospheric conditions :
   a) Temperature : 32° C
   b) Relative humidity : 51 %
   c) Pressure : 98.9 kPa
3. Data recorded

<table>
<thead>
<tr>
<th>Speed of engine (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 delivery from the discharge line (ml/min)</th>
<th>Discharge rate of pump (ml/min)</th>
<th>Hydraulic Power (kW)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1.</td>
<td>8100</td>
<td>NIL</td>
<td>8130.0</td>
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<td>8000</td>
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<tr>
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<td>7750</td>
<td>NIL</td>
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<td>7790.0</td>
<td>0.12</td>
</tr>
<tr>
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<td>4.</td>
<td>7550</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Minimum discharge rate = 7532.5 ml/min at 10 kg/cm²
Maximum discharge rate = 8130.0 ml/min at 7 kg/cm²
Discharge at rated pressure = 7980.0 ml/min at 8 kg/cm²

4. TEST FOR VOLUMETRIC EFFICIENCY OF PUMP
[vide clause 8.4 of IS: 11313-2007]

Date : 03.06.2019
Rated pressure, kg/cm² : 8
Engine speed corresponding to rated pressure (rpm) : 6778
Theoretical cubic capacity of pump, ml : 8225.28
Actual volume at rated pressure, ml : 7980.0
Volumetric efficiency, % : 97

NORTHERN REGION FARM MACHINERY TRAINING & TESTING INSTITUTE, HISAR
[THIS REPORT VALID UP TO : 31st JULY 2026]
5. POWER REQUIREMENT

During the pump operation from minimum to maximum pressure range, the max. hydraulic power was observed as 0.12 kW against the declared net power output of engine as 0.75 kW.

6. ENGINE PERFORMANCE TEST

In pursuance of Ministry’s order No. 7-23/2011-M&T (I&P) dated 20.04.2011 the engine performance test has not been conducted and the specifications/performance as specified by the applicant/declared in the manual have been endorsed.

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Parameter</th>
<th>Declaration</th>
</tr>
</thead>
<tbody>
<tr>
<td>i</td>
<td>Engine Type</td>
<td>Single cylinder 4 stroke air cooled spark ignition engine.</td>
</tr>
<tr>
<td>ii</td>
<td>Bore,(mm)</td>
<td>39</td>
</tr>
<tr>
<td>iii</td>
<td>Stroke (mm)</td>
<td>26</td>
</tr>
<tr>
<td>iv</td>
<td>Displacement,(cc)</td>
<td>31</td>
</tr>
<tr>
<td>v</td>
<td>Net power output</td>
<td>0.75 kW@ 6500 rpm</td>
</tr>
<tr>
<td>vi</td>
<td>Max Torque</td>
<td>1.2 Nm at @ 5000 rpm</td>
</tr>
</tbody>
</table>

7. PRESSURE ADJUSTMENT TEST

(Wide clause 8.7.1 of IS: 11313-2007)

1. Date of test : 18.05.2019
2. Atmospheric conditions :
   a. Temperature : 32 °C
   b. Relative humidity : 51 %
   c. Pressure : 98.8 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>7</td>
<td>NIL</td>
<td>NIL</td>
<td>--</td>
</tr>
<tr>
<td>2</td>
<td>8</td>
<td>NIL</td>
<td>NIL</td>
<td>--</td>
</tr>
<tr>
<td>3</td>
<td>9</td>
<td>NIL</td>
<td>NIL</td>
<td>--</td>
</tr>
<tr>
<td>4</td>
<td>10</td>
<td>NIL</td>
<td>NIL</td>
<td>--</td>
</tr>
</tbody>
</table>

4. Resistance of pressure: Yes

8. TEST FOR HYDRAULIC SPRAY GUN

[vide Clause 7.3(b) of IS- 11313: 2007 & Annex E of IS- 3652; 1995]

Date of test : 30.05.2019
Type of gun : Screw type

8.1 TEST FOR DISCHARGE RATE OF SPRAY GUN

The discharge rate for fine cone spray & jet spray pattern as 1900 ml/min & 4000 ml/min at the pressure of 600 kPa was declared by the applicant. The discharge rate corresponding to 600 kPa pressure was observed as under
- For fine cone spray pattern : 1527.5 ml/min
- For jet spray pattern : 4230 ml/min

Remarks – The observed discharge rate for fine cone spray pattern was not within limit specified by the relevant code/standard.
16. CONFORMITY TO INDIAN STANDARDS

i) IS:11313-2007 (Reaffirmed 2012)-Hydraulic power sprayer—specification

Does not conform in toto

ii) Spray nozzle and spray gun as per IS:3652-1995: (Reaffirmed 2011)

Does not conform in toto

iii) Hose and hose connection as per IS:10134-1994

Conforms

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

Conforms

v) IS: 7347-1974 (Reaffirmed 2006)-Specification for performance of small size spark ignition engines for agricultural water pumps, sprayers, tillers, reapers and other similar applications

Could not be ascertained

17. COMMENTS AND RECOMMENDATIONS

17.1 The sprayer serial number and year of manufacture is not specified. It MUST be specified.

17.2 The pump year of manufacture is not specified. It should be specified.

17.3 The spray gun is not designated and marked by identification mark. The identification mark as specified by relevant Indian Standard. It MUST be specified.

17.4 The spreader material does not meet the requirement of Indian Standard. It MUST be looked into.

17.5 The spray nozzle is not designated and marked by its identification mark. The identification mark as specified by relevant Indian Standard. It MUST be provided.

17.6 The strainer in nozzle is not provided. It may be considered for providing.

17.7 The manufacture’s name or recognized trade mark and batch or code number on nozzle is not provided. It MUST be provided.

17.8 The discharge rate for fine cone spray pattern of gun at pressure of 600 kPa does not conform to the requirement of IS: 3652-1995. It MUST be looked into.

17.9 The discharge rate for fine cone spray pattern and jet spray pattern of nozzle at a pressure of 300 kPa does not conform to the requirement of IS: 3652-1995. It MUST be looked into.

17.10 The spray angle for fine cone spray pattern of gun at a pressure of 600 kPa does not conform to the requirement of IS: 3652-1995. It MUST be looked into for further improvement.

17.11 The spray angle for fine cone spray pattern of nozzle at a pressure of 300 kPa does not conform to the requirement of IS: 3652-1995. It MUST be looked into.

17.12 At rated pressure of 8 Kg/cm² the pump discharge was observed as 7980 ml/min. against the minimum requirement of 8000.0 ml/min. This MUST be examined.

17.13 The pressure gauge with fuel scale reading 100 kg/cm² is provided, thus it does not conform to requirement of IS: 11313-2007. It MUST be looked into.
17.14 Though a pressure regulator provided but that was not in working condition therefore its conformity to IS: 11313-2007 could not be ascertained. It MUST be looked into for corrective action.

17.15 The necessary tools are not provided. It MUST be provided.

17.16 The maximum achievable pressure does not meet the requirement of relevant code/standard. It MUST be looked into.

17.17 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 of engine
   ix. SFC of engine

17.18 Safety provision/safety wear

   i) Apron, gum boots and hand gloves MUST be added in safety wear.
   ii) Safety instructions regarding handling poisonous agro-chemical before, during and after spraying operations should be provided on sprayer.

18. TECHNICAL LITERATURE

The following literatures are provided with sprayer for guidance to the user.
   i) User’s manual and parts catalogue of pump and sprayer
   ii) Operator’s manual of engine with parts catalogue

The following literature MUST be provided with the sprayer :-
   i) Operator’s service manual of sprayer.

The operator instruction manual of sprayer needs to be updated as per IS 8132-1999.

TESTING AUTHORITY

R. K. NEMA  
SENIOR AGRICULTURAL ENGINEER

P. K. PANDEY  
DIRECTOR

19. APPLICANT'S COMMENTS

No comments received from applicant.