ALAP, AHP-2S
ENGINE 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/
E-mail: fmti-nr@nic.in
Tele./FAX: 01662-276984
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 (ml/min)</th>
<th>Average delivery from the discharge line (ml/min)</th>
<th>Discharge rate of pump (ml/min)</th>
<th>Hydraulic Power (kW)</th>
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</table>

Minimum discharge rate = 6817.5 ml/min at 15 kg/cm²
Maximum discharge rate = 7200 ml/min at 10 kg/cm²
Discharge at rated pressure = 7200 ml/min at 10 kg/cm²

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

Date : 03.04.2019
Rated pressure, kg/cm² : 10
Engine speed corresponding to rated pressure (rpm) : 6528
Theoretical cubic capacity of pump, ml : 7655.44
Actual volume at rated pressure, ml : 7200
Volumetric efficiency, % : 94

5. POWER REQUIREMENT

During the pump operation from minimum to maximum pressure range, the max. hydraulic power was observed as 0.17 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.
7. PRESSURE ADJUSTMENT TEST
(Vide clause 8.7.1 of IS: 11313-2007)

1. Date of test : 13.03.2019
2. Atmospheric conditions :
   a. Temperature : 27 °C
   b. Relative humidity : 39%
   c. Pressure : 98.9 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>
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<tbody>
<tr>
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</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 : 13.03.2019
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 2000 ml/min & 3130 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 : 1807.5 ml/min
- For jet spray pattern : 3462.5 ml/min

Remarks – The observed discharge rate for jet spray pattern was not within limit specified by the relevant code/standard.

8.2 TEST FOR SPRAY ANGLE OF SPRAY GUN

The spray angle for fine cone spray pattern at a pressure of 600±60 kPa was declared as 65 degree by the applicant. The same was observed as 73.2 degree.

Remarks: The observed spray angel for fine cone spray pattern at the pressure of 600 ± 60 kPa was observed not within the limit specified by the relevant code/standard.
16. COMMENTS AND RECOMMENDATIONS

16.1 The sprayer serial number is not specified. It MUST be specified.

16.2 The sprayer year of manufacture is not specified. It should be specified.

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

16.4 The pump manufacturing year, serial No & Country of origin is not specified. It MUST be specified.

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

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

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

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

16.9 The spray gun batch or code number is not marked on spray gun. It MUST be marked.

16.10 The diameter of connecting rod is less than the value specified in the relevant code/Standard. It MUST be improved.

16.11 The thickness of wall of barrel does not meet the requirement of relevant code/Standard. It MUST be improved.

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

16.13 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.

16.14 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.

16.15 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.

16.16 At rated pressure of 10 Kg/cm² the pump discharge was observed as 7200 ml/min. against the minimum requirement of 8000.0 ml/min. This MUST be examined.

16.17 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.

16.18 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.

16.19 Suction strainer apertures size does not meet the requirement of relevant code/standard. It MUST be looked into.
16.20 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

16.21 Safety provision/safety wear
   i) Ear protector 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.

17. TECHNICAL LITERATURE

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

The following literature MUST be provided with the sprayer:
   i) Operator’s 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

18. APPLICANT’S COMMENTS

No comments received from applicant.