YANTRA YPS-20
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
[ISO 9001:2008 COMPLIANT INSTITUTION]

Website: http://nrfmtti.gov.in/
3. TEST FOR DISCHARGE RATE OF PUMP  
[vide Clause 8.3 of IS-11313: 2007]

1. Date of test : 08.08.2016
2. Atmospheric conditions :
   a) Temperature : 37.2° C
   b) Relative humidity : 57.8 %
   c) Pressure : 734.7 mm of Hg
3. Data recorded

<table>
<thead>
<tr>
<th>Specified 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 discharge from the discharge line (ml/min)</th>
<th>Discharge rate of pump (ml/min)</th>
</tr>
</thead>
<tbody>
<tr>
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<td></td>
<td>4</td>
<td>1770</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

Minimum discharge rate  = 1774 ml/min at 15 kg/cm²  
Maximum discharge rate  = 6658 ml/min at 5 kg/cm²

REMARK: Beyond the pressure of 15 kg/cm² the pump discharge & overflow got nil. The clutch burning smell observed when pressure is increased beyond 15 kg/cm². Therefore, sprayer does not meet the requirement laid down in Clause-6.4 of IS:11313-2007 with regard to maximum achievable pressure.

4 TEST FOR VOLUMETRIC EFFICIENCY OF PUMP
As applicant has not specified the rated pressure and rated speed of pump, hence volumetric efficiency could not be ascertained. as per the requirement of relevant code.
However, volumetric efficiency, so to speak, was found to be 97.92 % & 30.94 % at 5 kg/cm² and at 15 kg/cm² pressure respectively. Hence the Volumetric Efficiency was not found as much as required by the code throughout the range of working pressure declared by the applicant.
## F-6.2
The mating face of the cap, tip and nozzle body or boss, shall be finished flat so as to seal on the end face of the nozzle body or boss, a gasket may be used, if necessary. Mating faces of nozzle body is provided with gaskets to seal on the end face of nozzle body. **Conforms**

## F-6.3
The screw thread shall be well formed and the crests of the threads shall be free from burrs or any other defects which may prevent free engagement. **Satisfactory Conforms**

## F-11 Marking
Each nozzle shall be marked with following particulars:-

<table>
<thead>
<tr>
<th>Particulars</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Manufacturer’s name or recognized trade mark</td>
<td>Not marked</td>
</tr>
<tr>
<td>b) Nozzle designation.</td>
<td>Not marked</td>
</tr>
<tr>
<td>c) Batch or code number</td>
<td>Not marked</td>
</tr>
</tbody>
</table>

## Cl.9
All the components of the sprayer shall be free from burrs, pits and other visual defects which may be detrimental for their use. Nothing that may be detrimental for use was noticed **Conforms**

## Cl.10 MARKING AND PACKING (Cl.10 IS:11313-2007)

### Cl.10.1 Marking
Each sprayer shall be marked with the following particulars :-

<table>
<thead>
<tr>
<th>Particulars</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Manufacturer’s name &amp; his registered trade mark, Sl. No. and batch or code No.</td>
<td>Just a sticker on frame is provided with following information:- A Tata Product Rallis Yantra™ YPS-20 Knapsack Power Sprayer</td>
</tr>
</tbody>
</table>

## 13. 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  
  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
14. COMMENTS AND RECOMMENDATIONS

14.1 The pressure gauge is not provided on sprayer. It should be provided. Suitable pressure gauge may be provided to ensure the compliance of the relevant Indian Standard.

14.2 The diameter of connecting rod is less than the value specified in the relevant Indian Standard. It may be looked into.

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

14.4 Relevant Indian Standard must be followed with regard to marking on spray gun.

14.5 As applicant has not specified the rated pressure and rated speed of pump, hence volumetric efficiency could not be ascertained. As per the requirement of relevant code. In order to facilitate the testing in the true letter and spirit, this needs to be declared.

14.6 As the applicant has not specified the specific speed for sprayer operation, the power requirement cannot be ascertained. In order to facilitate the testing in the true letter and spirit, this needs to be declared.

14.7 As the discharge rate for fine cone spray & jet spray pattern of spray gun at the pressure of 600 ± 60kPa was not declared by the applicant, the conformity of spray angle of spray gun to Cl E 3.1 of Annexure E of IS 3652-1995 could not be ascertained. In order to facilitate the testing in the true letter and spirit, this needs to be declared.

14.8 As the spray angle for fine cone spray pattern at a pressure of 600 ± 60kPa was not declared by the applicant, the conformity of discharge to Cl E 3.2 of Annexure E of IS 3652-1995 could not be ascertained. In order to facilitate the testing in the true letter and spirit, this needs to be declared.

14.9 As the discharge rate for fine cone spray & jet spray pattern at a pressure of 300 kPa was not declared by the applicant, the conformity of discharge of nozzle to Cl F 3.1 of Annexure F of IS 3652-1995 could not be ascertained. In order to facilitate the testing in the true letter and spirit, this needs to be declared.

14.10 As the spray angle for fine cone spray pattern at a pressure of 300 kPa was not declared by the applicant, the conformity of spray angle of nozzle to Cl F 3.2 of Annexure F of IS:3652-1995 could not be ascertained. In order to facilitate the testing in the true letter and spirit, this needs to be declared.
14.11 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

14.12 Safety provision/safety wear
   i) The accessories viz. mask, hand gloves and safety goggles for operator's safety has been provided with sprayer.
   ii) Safety instructions regarding handling poisonous agro-chemical and first aid may also be added in operator's manual.

15. TECHNICAL LITERATURE

Though an operation manual was provided, the same was, however, found inadequate; as all necessary information required was not there. It needs to be updated as per IS:8132-1999.

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>

16. APPLICANT'S COMMENTS

No specific comments