RAKESH, RK-55 TRACTOR OPERATED BOOM 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

Website: http://nrfmtti.gov.in/
E-mail: fmti-nr@nic.in
Tel./FAX: 01662-276984
<table>
<thead>
<tr>
<th>xxv)</th>
<th>Piston rod guide</th>
<th>Brass, Aluminum alloy, Gunmetal, Nylon</th>
<th>N.A.</th>
<th>---</th>
</tr>
</thead>
<tbody>
<tr>
<td>xxvi)</td>
<td>Connecting rod</td>
<td>Carbon steel</td>
<td>Aluminum Alloy</td>
<td>Does not conform</td>
</tr>
<tr>
<td>xxvii)</td>
<td>Gudgeon pin</td>
<td>Carbon steel</td>
<td>Carbon steel</td>
<td>Conforms</td>
</tr>
<tr>
<td>xxviii)</td>
<td>Big end bearing</td>
<td>Steel coated with tin base white metal</td>
<td>Steel coated with tin base white metal</td>
<td>Conforms</td>
</tr>
<tr>
<td>xxix)</td>
<td>Small end bush</td>
<td>Gunmetal</td>
<td>N.A.</td>
<td>---</td>
</tr>
<tr>
<td>xxx)</td>
<td>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.</td>
<td></td>
<td>Declared</td>
<td>Conforms</td>
</tr>
</tbody>
</table>

### 5. TEST FOR DISCHARGE RATE OF PUMP

[vide Clause 8.3 of IS- 11313: 2007]

1. Date of test : 22.10.2019
2. Atmospheric conditions
   a) Temperature : 39°C
   b) Relative humidity : 24%
   c) Pressure : 98.4 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>
<th>Hydraulic power (kW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>799</td>
<td>20</td>
<td>1</td>
<td>37600</td>
<td>Nil</td>
<td>37570.0</td>
<td>37570.0</td>
<td>1.81</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2</td>
<td>37500</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>3</td>
<td>37380</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>4</td>
<td>37800</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>796</td>
<td>25</td>
<td>1</td>
<td>36800</td>
<td>Nil</td>
<td>36950.0</td>
<td>36950.0</td>
<td>2.04</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2</td>
<td>36900</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>3</td>
<td>37100</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>4</td>
<td>37000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>794</td>
<td>30</td>
<td>1</td>
<td>36600</td>
<td>Nil</td>
<td>36557.5</td>
<td>36557.5</td>
<td>2.45</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2</td>
<td>36500</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>3</td>
<td>36560</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>4</td>
<td>36570</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>792</td>
<td>35</td>
<td>1</td>
<td>36250</td>
<td>Nil</td>
<td>36310.0</td>
<td>36310.0</td>
<td>2.70</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2</td>
<td>36340</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>3</td>
<td>36350</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>4</td>
<td>36300</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Minimum discharge rate = 36310.0 ml/min at 35 kg/cm²
Maximum discharge rate = 37570.0 ml/min at 20 kg/cm²
Discharge at Rated pressure = 37570.0 ml/min at 20 kg/cm²
6. TEST FOR VOLUMETRIC EFFICIENCY OF PUMP
(Vide clause 8.4 of IS-11313: 2007)

- Rated pressure, kg/cm²: 20
- Rated rpm of pump: 800
- Theoretical Volume, ml: 48.77
- Actual volume at rated rpm & rated pressure, ml: 47.02
- Volumetric efficiency %: 96.0

7. POWER REQUIREMENT
(Vide Clause 6.3 of IS-11313: 2007)

The pump power requirement of the sprayer has been given as 5 hp (3.68 kW).
The test for power required for operating the sprayer was conducted as per clause 8.5 of IS: 11313-2007 and data recorded is reported herewith.

<table>
<thead>
<tr>
<th>Test No.</th>
<th>Pressure (kg/cm²)</th>
<th>Dynamometer reading</th>
<th>Pump speed (rpm)</th>
<th>Required power (kW)</th>
<th>Discharge (liter/min)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Speed (rpm)</td>
<td>Torque (Nm)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>20</td>
<td>292</td>
<td>58.7</td>
<td>799</td>
<td>1.81</td>
</tr>
<tr>
<td>2</td>
<td>25</td>
<td>290</td>
<td>66.4</td>
<td>796</td>
<td>2.04</td>
</tr>
<tr>
<td>3</td>
<td>30</td>
<td>289</td>
<td>83.5</td>
<td>794</td>
<td>2.45</td>
</tr>
<tr>
<td>4</td>
<td>35</td>
<td>289</td>
<td>88.3</td>
<td>792</td>
<td>2.70</td>
</tr>
</tbody>
</table>

Remark:
- i) The power requirement was observed from 1.81 to 2.70 kW throughout the range of pressure against the declaration of 5 (3.68 kW).
- ii) At rated speed and pressure of pump the power requirement is observed as 1.81 kW.

8. PRESSURE ADJUSTMENT TEST
(Vide Clause 8.7.1 of IS: 11313-2007)

1. Date of test: 22.10.2019
2. Atmospheric conditions:
   a. Temperature: 39 °C
   b. Relative humidity: 24%
   c. Pressure: 98.5 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>
<tr>
<td>1.</td>
<td>20</td>
<td>NIL</td>
<td>NIL</td>
<td>--</td>
</tr>
<tr>
<td>2.</td>
<td>25</td>
<td>NIL</td>
<td>NIL</td>
<td>--</td>
</tr>
<tr>
<td>3.</td>
<td>30</td>
<td>NIL</td>
<td>NIL</td>
<td>--</td>
</tr>
<tr>
<td>4.</td>
<td>35</td>
<td>NIL</td>
<td>NIL</td>
<td>--</td>
</tr>
</tbody>
</table>

4. Resistance of pressure: Yes

9. TEST FOR HYDRAULIC SPRAY GUN
[Vide Clause 7.3(b) of IS-11313: 2007 & Annex E of IS-3652: 1995]

Date of test: 22.10.2019
Type of gun: Screw type
18. COMMENTS AND RECOMMENDATIONS

18.1 The make, model and year of manufacturer of sprayer are not marked. It MUST be looked into.

18.2 The serial No. and year of manufacturer of pump is not marked. It MUST be looked into.

18.3 The three point linkage and power input a connection dimension does not meet the requirement of Indian Standard. It MUST be improved.

18.4 The spray gun provided with sprayer is not designated and marked by its identification mark. The identification mark as specified by relevant Indian Standard needs to be provided.

18.5 The manufacturer’s name or recognized trade mark and batch or code number is not marked on spray gun. It MUST be marked.

18.6 A suitable pressure gauge/ pressure indicator needs to be provided on sprayer as per the specifications specified by Indian Standard.

18.7 The discharge rate for fine cone spray pattern and jet spray pattern of nozzle at the pressure of 300 kPa does not specified by manufacture. It MUST be specified.

18.8 The spray angle for fine cone spray pattern of nozzle at a pressure of 300 kPa does not specified by manufacture. It MUST be specified.

18.9 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.

18.10 The nozzle batch or code number is not marked on nozzle. It MUST be looked into.

18.11 Necessary tools are not provided. It should be provided.

18.12 Suction strainer aperture size does not meeting requirement of relevant code/standard. It MUST be looked into.

18.13 Strainer at filling hole is not provided. This is Critical parameter and therefore it MUST be provided.

18.14 Safety guard on P.T.O. drive shaft is not provided. This is Critical parameter and therefore it MUST be provided.

18.15 The power input connection dimensions does not meet the requirement of Indian standard. It MUST be improved.

18.16 The length of spray gun does not meet the requirement of relevant code/standard. It MUST be looked in to.

18.17 The guard on belt pulley drive is not provided. This is Critical parameter and therefore it MUST be provided.

18.18 The length of spray boom does not meet the requirement of critical technical specification. It MUST be looked into.

18.19 The hole covered cap of chemical tank does not provided. It MUST be provided.

18.20 The suitable drain plug in chemical tank does not provided. It MUST be provided.

18.21 The material of connecting rod does not meet the requirement of relevant code/standard. It MUST be looked into.
18.22 A suitable labeling plate 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. Recommended tractor horse power

18.23 Safety provision/safety wear
   i) Safety wear does not provided during the test. It MUST be provided.
   ii) Safety instructions before, during and after spraying operation must be provided on sprayer.

19. TECHNICAL LITERATURE
No literatures are provided with sprayer for guidance to the user.
The following literature MUST be provided as per IS: 8132-1999.
   1. Operators manual of sprayer
   2. Service manual of sprayer.

TESTING AUTHORITY

MAAN SINGH
SENIOR TECHNICAL ASSISTANT

P. K. PANDEY
DIRECTOR

20. APPLICANT’S COMMENTS
No comments received from the applicant.