TRACTOR OPERATED BOOM SPRAYER
BORASTE ADITI SPT-6A

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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E-mail: fimti-nr@nic.in
Tele./FAX: 01662-276984
### 3. TEST FOR DISCHARGE RATE OF PUMP

**[vide Clause 8.3 of IS- 11313: 2007]**

1. Date of test : 28.03.2019

2. Atmospheric conditions
   a) Temperature : 32 °C
   b) Relative humidity : 42 %
   c) Pressure : 98.9 kPa

3. Data recorded

<table>
<thead>
<tr>
<th>Speed of Pump (rpm)</th>
<th>Pressure (kg/cm²)</th>
<th>Test No.</th>
<th>Delivery from the discharge line (ml/min)</th>
<th>Avg. over flow (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>370</td>
<td>10</td>
<td>1</td>
<td>19800</td>
<td>NIL</td>
<td>19675.0</td>
<td>19675.0</td>
<td>0.32</td>
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</tr>
<tr>
<td></td>
<td></td>
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<td>19500</td>
<td></td>
<td></td>
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<tr>
<td>364</td>
<td>15</td>
<td>1</td>
<td>19100</td>
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<td>19150.0</td>
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<td>3</td>
<td>18400</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>4</td>
<td>18600</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>345</td>
<td>25</td>
<td>1</td>
<td>18000</td>
<td>NIL</td>
<td>17912.5</td>
<td>17912.5</td>
<td>0.73</td>
</tr>
<tr>
<td></td>
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<td>17750</td>
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<td></td>
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<tr>
<td></td>
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<td></td>
<td></td>
<td>4</td>
<td>17900</td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>
BORASTE ADITI SPT-6A, TRACTOR OPERATED BOOM SPRAYER
(COMMERCIAL)

Minimum discharge rate = 17912.5 ml/min at 25 kg/cm²
Maximum discharge rate = 19675.0 ml/min at 10 kg/cm²
Discharge at rated pressure = 18575.0 ml/min at 20 kg/cm²

4. TEST FOR VOLUMETRIC EFFICIENCY OF PUMP
(Vide clause 8.4 of IS-11313 : 2007)

Date of test : 27.05.2019
Rated pressure, kg/cm² : 20
Rated rpm of pump : 350
Theoretical volume, ml : 57.26
Actual volume, ml : 53.07
Volumetric efficiency % : 93

5. POWER REQUIREMENT
(Vide Clause 6.3 of IS – 11313 : 2007)
The pump power requirement of the sprayer has been marked 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 Speed (rpm)</th>
<th>Torque (Nm)</th>
<th>Pump speed (rpm)</th>
<th>Required power (kW)</th>
<th>Discharge (liter/min)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>10</td>
<td>295</td>
<td>20.00</td>
<td>370</td>
<td>0.62</td>
<td>19.68</td>
</tr>
<tr>
<td>2</td>
<td>15</td>
<td>289</td>
<td>24.83</td>
<td>364</td>
<td>0.76</td>
<td>19.15</td>
</tr>
<tr>
<td>3</td>
<td>20</td>
<td>283</td>
<td>29.67</td>
<td>350</td>
<td>0.89</td>
<td>18.58</td>
</tr>
<tr>
<td>4</td>
<td>25</td>
<td>279</td>
<td>37.17</td>
<td>345</td>
<td>1.10</td>
<td>17.91</td>
</tr>
</tbody>
</table>

Remark: The power requirement was observed from 0.62 kW to 1.10 kW throughout the range
of pressure against the declaration of 3.68 kW. At rated speed and pressure of pump
the power requirement is observed as 0.89 kW.

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

1. Date of test : 28.03.2019
2. Atmospheric conditions
   a. Temperature : 32°C
   b. Relative humidity : 42%
   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>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>10</td>
<td>NIL</td>
<td>NIL</td>
<td>--</td>
</tr>
<tr>
<td>2.</td>
<td>15</td>
<td>NIL</td>
<td>NIL</td>
<td>--</td>
</tr>
<tr>
<td>3.</td>
<td>20</td>
<td>NIL</td>
<td>NIL</td>
<td>--</td>
</tr>
<tr>
<td>4.</td>
<td>25</td>
<td>NIL</td>
<td>NIL</td>
<td>--</td>
</tr>
</tbody>
</table>

4. Resistance of pressure: Yes
### 15. CONFORMITY TO INDIAN STANDARDS

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>Does not conform in toto</th>
</tr>
</thead>
<tbody>
<tr>
<td>i)</td>
<td>IS:11313-2007 (Reaffirmed 2012)-Hydraulic power sprayer-specification</td>
<td></td>
</tr>
<tr>
<td>ii)</td>
<td>Spray nozzle and spray gun as per IS:3652-1995 (Reaffirmed 2011)</td>
<td>Does not conform in toto</td>
</tr>
<tr>
<td>iii)</td>
<td>Hose and hose connection as per IS:10134-1994</td>
<td>Conforms</td>
</tr>
<tr>
<td>iv)</td>
<td>IS: 2643-2005-Pipe threads where pressure-tight joint are not made on the threads-dimensions, tolerance and designation.</td>
<td>Conforms</td>
</tr>
<tr>
<td>v)</td>
<td>Three point linkage hitch as per IS: 4468 (Part: I/ Part II): 1997 (Reaffirmed 2012)</td>
<td>Not applicable</td>
</tr>
<tr>
<td>vi)</td>
<td>Dimensions of PIC and PIC yoke as per IS: 4931:1995 (Reaffirmed 2009)</td>
<td>Does not conform in toto</td>
</tr>
</tbody>
</table>

### 16. COMMENTS AND RECOMMENDATIONS

16.1 The Sprayer year of manufacturer is not specified. It should be specified.

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

16.3 Pump, year of manufacture and serial No is not specified. It should be specified.

16.4 The discharge rate for hollow cone nozzle (+ side) and hollow cone nozzle (-side) at a pressure of 300±30 kPa does not conform to the requirement of IS: 3652-1995. It MUST be looked into.

16.5 The spray angle for hollow 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 for further improvement.

16.6 Necessary tools are not provided with the sprayer. It MUST be provided.

16.7 The pressure gauge with full scale reading 104 bar is provided, thus it does not conform to requirement of IS: 11313-2007. It MUST be looked into.

16.8 Though a pressure regulator provided but that was not working in condition therefore its conformity to IS: 11317-2007 could not be ascertained. It MUST be looked into for corrective action.

16.9 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.

16.10 Provision against overload on P.T.O. drive shaft is not provided. It MUST be looked into.

16.11 Safety guard on P.T.O. drive shaft is not provided. It MUST be looked into.
16.12 The length of spray boom does not meet the requirement of critical technical specifications. It MUST be looked into.

16.13 The guard on belt pulley drive is not provided. It MUST be looked into.

16.14 The engaged threaded length of outlet port does not meet the requirement of relevant code/standard. It MUST be improved.

16.15 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

16.16 Safety provision/safety wears.
   (i) Gum boots MUST be added on safety wear.
   (ii) The safety instructions before during and after spraying operation MUST be provided on sprayer.

17. TECHNICAL LITERATURE

The following literatures are provided with sprayer for guidance to the user.
   1. Operator’s manual of sprayer.
   2. Service manual of sprayer.
   3. Parts catalogue of sprayers

The operator’s 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 specific comments received from applicant

NORTHERN REGION FARM MACHINERY TRAINING & TESTING INSTITUTE, HISAR
[THIS REPORT VALID UP TO: 30th June 2026]