COMMERCIAL TEST REPORT

THIS TEST REPORT VALID UP TO : 30th NOVEMBER, 2025

SWAN AGRO NSML RTUP-150, ROTAVATOR
(TRACTOR MOUNTED)

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]

Website: http://nrfmtti.gov.in/
E-mail: fmti-nr@nic.in
Tele./FAX: 01662-276984
4.11 Lubricants:

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Particulars</th>
<th>As recommended by the manufacturer</th>
<th>As used during test</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Primary Gear box</td>
<td>SAE-140</td>
<td>Oil originally filled in the machine was not changed</td>
</tr>
<tr>
<td>2</td>
<td>Secondary Gear box</td>
<td>SAE-140</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Rotor Hub</td>
<td>AP-3 Grease</td>
<td>As Recommended</td>
</tr>
<tr>
<td>4</td>
<td>Propeller Shaft</td>
<td>AP-3 Grease</td>
<td>As Recommended</td>
</tr>
</tbody>
</table>

5. RUNNING – IN

Run-in was not recommended by the applicant.

6. LABORATORY TEST

6.1 Hardness: - The surface hardness of blade was recorded as under: -

<table>
<thead>
<tr>
<th>Description</th>
<th>As per IS: 6690:1981 (HRC)</th>
<th>Hardness as observed (HRC)</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Edge portion</td>
<td>53 to 59</td>
<td>47.7 to 50.9</td>
<td>Does not conform</td>
</tr>
<tr>
<td>On shank portion</td>
<td>37 to 45</td>
<td>47.7 to 50.9</td>
<td>Does not conform</td>
</tr>
</tbody>
</table>

6.2 Chemical composition

The chemical composition of blades is tabulated as under:-

<table>
<thead>
<tr>
<th>Constituents</th>
<th>As per IS: 6690-1981</th>
<th>Composition as observed (% of weight)</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbon (C)</td>
<td>0.70-0.85</td>
<td>0.2984</td>
<td>Does not conform</td>
</tr>
<tr>
<td>Silicon (Si)</td>
<td>0.10-0.40</td>
<td>0.2454</td>
<td>Conforms</td>
</tr>
<tr>
<td>Manganese (Mn)</td>
<td>0.50-1.0</td>
<td>1.1741</td>
<td>Does not conform</td>
</tr>
<tr>
<td>Sulphur (S)</td>
<td>0.05(max)</td>
<td>0.0000</td>
<td>Conforms</td>
</tr>
<tr>
<td>Phosphorous (P)</td>
<td>0.05(max)</td>
<td>0.0173</td>
<td>Conforms</td>
</tr>
</tbody>
</table>

7. FIELD PERFORMANCE TEST

The field tests of the implement comprising of wet land and dry land operation were conducted for 15.44 and 27.06 hours respectively to assess the performance of the implement. The performance of implement is reported in Annexure-I & II for wet land and dry land operations respectively.

Observations of field performance test are summarized in the ensuing table:
### Summary of Field Performance Test

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Parameters/operations</th>
<th>Wet land operation (Puddling)</th>
<th>Dry land operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td></td>
<td>Wet land operation (Puddling)</td>
<td>Dry land operation</td>
</tr>
<tr>
<td>I</td>
<td>Tractor used</td>
<td>PREET-4549</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Gear used</td>
<td>L-1</td>
<td>L-2</td>
</tr>
<tr>
<td>3.</td>
<td>Type of soil (Refer IS:7926-1975)</td>
<td>Sandy loam</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>Average soil moisture (%)</td>
<td>--</td>
<td>8.2 to 9.4</td>
</tr>
<tr>
<td>5.</td>
<td>Average depth of standing water (cm)</td>
<td>11.7 to 13.6</td>
<td>--</td>
</tr>
<tr>
<td>6.</td>
<td>Bulk density of soil (g/cc)</td>
<td>--</td>
<td>0.7 to 1.32</td>
</tr>
<tr>
<td>7.</td>
<td>Average speed of operation (kmph)</td>
<td>1.98 to 2.03</td>
<td>2.53 to 2.65</td>
</tr>
<tr>
<td>8.</td>
<td>Avg. travel reduction /Avg. wheel slip (%)</td>
<td>-0.89 to -1.88</td>
<td>-2.70 to 0.49</td>
</tr>
<tr>
<td>9.</td>
<td>Average depth of puddle/Average depth of cut (cm)</td>
<td>7.83 to 12.6</td>
<td>6.30 to 6.44</td>
</tr>
<tr>
<td>10.</td>
<td>Avg. working width (cm)</td>
<td>--</td>
<td>150 to 177</td>
</tr>
<tr>
<td>11.</td>
<td>Area covered (ha/h)</td>
<td>--</td>
<td>0.324 to 0.402</td>
</tr>
<tr>
<td>12.</td>
<td>Time required for one ha (h)</td>
<td>--</td>
<td>2.46 to 3.09</td>
</tr>
<tr>
<td>13.</td>
<td>Field efficiency (%)</td>
<td>--</td>
<td>80.0 to 92.27</td>
</tr>
<tr>
<td>14.</td>
<td>Puddling index (%)</td>
<td>73.7 to 82.11</td>
<td>--</td>
</tr>
<tr>
<td>15.</td>
<td>Fuel consumption</td>
<td>l/h 2.54 to 3.16</td>
<td>4.140 to 4.800</td>
</tr>
<tr>
<td></td>
<td></td>
<td>l/ha --</td>
<td>10.30 to 14.81</td>
</tr>
<tr>
<td>16.</td>
<td>Average PTO power utilized (kW)</td>
<td>--</td>
<td>13.03</td>
</tr>
</tbody>
</table>

#### 7.1 Quality of work
- The depth of puddle was recorded as 7.83 to 12.6 cm.
- The puddling index was recorded as 73.7 to 82.11 %.

#### 7.2 Dry land operation

##### 7.2.1 Rate of work
- The rate of work was recorded as 0.324 to 0.402 ha/h, and the speed of operation varies from 2.53 to 2.65 kmph.
- The time required to cover one hectare was recorded as 2.46 to 3.09 h.

##### 7.2.2 Quality of work
- The depth of operation was recorded as 6.30 to 6.44 cm.
- Average working width was observed as 150 to 177 cm.
- Field efficiency was observed as 80.0 to 92.27 %.

#### 7.3 Labour requirement
In all, two skilled operators are needed to ensure continuous operation of machine for day long period.

#### 7.4 Wear analysis (on mass basis)
Wear of hatchet blades (on mass basis) was measured and recorded in ensuing table:
Percentage wear of rotavator blades on mass basis:

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Initial mass of blade (g)</th>
<th>Mass of blade after 42.50 hr. of operation (g)</th>
<th>Difference of weight (g)</th>
<th>Percentage of wear (%) after 42.50 hr.</th>
<th>Percentage of wear on hour basis (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1031.9</td>
<td>953.6</td>
<td>78.3</td>
<td>7.58</td>
<td>0.17</td>
</tr>
<tr>
<td>2</td>
<td>1038.4</td>
<td>980.9</td>
<td>94.4</td>
<td>9.09</td>
<td>0.21</td>
</tr>
<tr>
<td>3</td>
<td>1032.8</td>
<td>974.1</td>
<td>58.7</td>
<td>5.68</td>
<td>0.13</td>
</tr>
<tr>
<td>4</td>
<td>1023.4</td>
<td>958.5</td>
<td>64.9</td>
<td>6.34</td>
<td>0.15</td>
</tr>
<tr>
<td>5</td>
<td>1034.0</td>
<td>970.3</td>
<td>63.7</td>
<td>6.16</td>
<td>0.14</td>
</tr>
<tr>
<td>6</td>
<td>1012.0</td>
<td>930.7</td>
<td>82.0</td>
<td>8.10</td>
<td>0.19</td>
</tr>
</tbody>
</table>

8. EFFECTIVENESS OF SEALINGS

After completion of wet land operation for 15.44 hours, the implement was dismantled for checking the effectiveness of sealing provided against ingress of dust, and water/mud in various sub-assemblies/components. The observations are given in ensuing table:-

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Location</th>
<th>Whether ingress of mud and/or water was observed (Yes/No)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Primary reduction gear box</td>
<td>No</td>
</tr>
<tr>
<td>2</td>
<td>Secondary reduction gear box</td>
<td>No</td>
</tr>
<tr>
<td>3</td>
<td>Rotor assembly (hub)</td>
<td>No</td>
</tr>
</tbody>
</table>

9. EASE OF OPERATION & ADJUSTMENTS

No noticeable difficulty was observed during the operation and adjustment of rotavator.

10. DEFECTS, BREAKDOWN AND REPAIRS

No noticeable defect or breakdown was observed during 42.50 hours of field operation.

11. COMMENTS AND RECOMMENDATIONS

11.1 Dimensions of PIC of implement does not conform in toto to IS: 4931-1995 and therefore, it should be looked into for corrective action.

11.2 Hardness of the blade does not conform to IS: 6690:1981. This needs to be looked into for corrective action at production level.

11.3 The chemical composition of blades does not conform to as per IS: 6690-1981. This needs to be looked into for corrective action at production level.
11.4 Technical literature:
Only Operator manual is supplied with the rotavator for reference during testing. The following literature should be developed & supplied with the rotavator.
   (i) Service manual
   (ii) Part’s catalogue
The operator manual should 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>

Draft test report compiled by: V.S. Shinde, S.T.A

12. APPLICANT’S COMMENTS

No specific comment received from applicant.