COMMERCIAL TEST REPORT

AMBICA ROTAVATOR
"MODEL ART-6"

GOVERNMENT OF INDIA
MINISTRY OF AGRICULTURE
(DEPARTMENT OF AGRICULTURE & COOPERATION)

NORTHERN REGION FARM MACHINERY TRAINING AND TESTING INSTITUTE
TRACTOR NAGAR, SIRSA ROAD, HISAR-125001 (HARYANA)

Website: http://dacnet.nic.in/nrfmtti
4.8.5 Safety clutch/device : One safety bolt provided
4.9 Rotavator Stand : provided
4.10 Furrow wheel : Not provided
4.10 Overall Dimensions (Ref. Fig.4)
Length, mm : 2060
Width, mm : 1010
Height, mm : 1190
Mass, kg : 377

5. LABORATORY TEST
5.1 The hardness of blades was determined at edge and shank portion. The results of hardness test are tabulated in Table-I.

<table>
<thead>
<tr>
<th>Hardness as observed (HRC)</th>
<th>As per IS:6690-2002 (HRC)</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>Edge portion</td>
<td>Shank portion</td>
<td>On Edge portion</td>
</tr>
<tr>
<td>54 to 57</td>
<td>38 to 42</td>
<td>56 ± 3</td>
</tr>
</tbody>
</table>

5.2 Chemical composition
The chemical composition of blades is tabulated in Table-2.

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Material</th>
<th>Requirement as per IS:6690-2002 (% by weight)</th>
<th>As observed (% by weight)</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Carbon</td>
<td>0.50 to 0.60</td>
<td>0.50</td>
<td>Conforms</td>
</tr>
<tr>
<td>2.</td>
<td>Silicon</td>
<td>1.50 to 2.00</td>
<td>1.85</td>
<td>Conforms</td>
</tr>
<tr>
<td>3.</td>
<td>Manganese (Mn)</td>
<td>0.50 to 1.00</td>
<td>0.80</td>
<td>Conforms</td>
</tr>
<tr>
<td>4.</td>
<td>Sulphur (s)</td>
<td>0.05 (max)</td>
<td>0.029</td>
<td>Conforms</td>
</tr>
<tr>
<td>5.</td>
<td>Phosphorous (p)</td>
<td>0.05 (max)</td>
<td>0.025</td>
<td>Conforms</td>
</tr>
</tbody>
</table>

6. FIELD TEST
The field tests of the implement comprising of dry and wet land operation were conducted for 24.22 & 16.75 hours respectively in different soil moisture conditions to assess the performance of the implement. The details of tractor used for field operations are given in Annexure-III.

The tractor PTO speed was maintained at 540 rpm. The performance of implement is reported in Annexure-II and summarized in Table-3.
Summary of field performance

<table>
<thead>
<tr>
<th>Sl.No.</th>
<th>Parameters</th>
<th>Dry land operation</th>
<th>Wet land operation (puddling)</th>
</tr>
</thead>
<tbody>
<tr>
<td>i)</td>
<td>Tractor used</td>
<td>Eicher -480</td>
<td></td>
</tr>
<tr>
<td>ii)</td>
<td>Type of soil</td>
<td>Black cotton</td>
<td></td>
</tr>
<tr>
<td>iii)</td>
<td>Av. Soil moisture, %</td>
<td>12.0 to 17.5</td>
<td></td>
</tr>
<tr>
<td>iv)</td>
<td>Depth of standing water, cm</td>
<td>--</td>
<td>12.0 to 14.8</td>
</tr>
<tr>
<td>v)</td>
<td>Field efficiency, %</td>
<td>75.6 to 85.2</td>
<td>--</td>
</tr>
<tr>
<td>vi)</td>
<td>Puddling Index, %</td>
<td>78.0 to 82.0</td>
<td>78.0 to 82.0</td>
</tr>
<tr>
<td>vii)</td>
<td>Av. Speed of operation, kmph</td>
<td>2.84 to 3.75</td>
<td>2.98 to 3.46</td>
</tr>
<tr>
<td>viii)</td>
<td>Av. Depth of cut, cm</td>
<td>10.7 to 11.8</td>
<td>--</td>
</tr>
<tr>
<td>ix)</td>
<td>Depth of puddle, cm</td>
<td></td>
<td>14.8 to 17.6</td>
</tr>
<tr>
<td>x)</td>
<td>Av. Working width, m</td>
<td>1.75 to 1.77</td>
<td></td>
</tr>
<tr>
<td>xi)</td>
<td>Area covered, ha/h</td>
<td>0.408 to 0.515</td>
<td>--</td>
</tr>
<tr>
<td>xii)</td>
<td>Time required for one hectare, h</td>
<td>1.95 to 2.46</td>
<td>--</td>
</tr>
<tr>
<td>xiii)</td>
<td>Fuel consumption</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- l/h</td>
<td>5.75 to 6.23</td>
<td>5.27 to 5.66</td>
</tr>
<tr>
<td></td>
<td>- l/ha</td>
<td>11.20 to 14.79</td>
<td>--</td>
</tr>
<tr>
<td>xiv)</td>
<td>Bulk density, g/cc</td>
<td>1.60 to 1.91</td>
<td>--</td>
</tr>
</tbody>
</table>

6.1 Rate of Work

6.1.1 Dry land operation
- The rate of work in sandy loam soil was recorded as 0.408 to 0.515 ha/h and the forward speed as 2.84 to 3.75 kmph.
- The time required to cover one hectare area was recorded as 1.95 to 2.46 h.

6.1.2 Wet land operation
- Speed of operation varied from 2.98 to 3.46 kmph.

6.2 Quality of work

6.2.1 Dry land operation
- The depth of operation was recorded as 10.7 to 11.8 cm.
- The field efficiency was recorded as 75.6 to 85.2 %.

6.2.2 Wet land operation
- Depth of puddle was recorded as 14.8 to 17.6 cm.
- Puddling index was recorded as 78 to 82 %.
8. EASE OF OPERATION, ADJUSTMENTS & SAFETY

8.1 The drive shaft (universal coupling shaft) is provided with shear bolt for safety.

8.2 The propeller shaft has telescopic sections with universal joints, to adjust the length of drive shaft, which is adequate.

8.3 Depth adjustment can be made by raising or lowering the skids.

8.4 Implement does not have provision to vary rotor shaft speed to cater to different soil and moisture conditions.

9.0 DEFECTS, BREAKDOWNS AND REPAIRS

No breakdown occurred during 41.00 hrs operation in the field.

10. COMMENTS & RECOMMENDATIONS

10.1 The dimensions of three point linkage of the implement conforms to IS:4468-2001(Part-1)

10.2 The propeller shaft provided with shearing bolt for safety of the machine.

10.3 It is recommended to have provision for change in rotor speed to suit wider range of soil and soil moisture conditions.

10.4 Maneuverability of tractor with Rotavator was found to be satisfactory. The quality of work was observed to be satisfactory.

10.5 Dimensions of splined end of pinion shaft do not conform to IS : 4931 -2004. This should be incorporated at production level.

10.6 Chemical composition of Rotavator blade is conforming to Indian Standard.

10.7 Rotavator stand should be provided with implements.

10.8 HARDNESS

The hardness of hatchet blades is within the required limit as per IS : 6690-2002
10.9 Wear of blades:
   a) The percentage wear of hatchet blades on mass basis during field operation (41.00 hrs.) ranged from 1.77 to 3.60%, it is considered to be normal.
   b) The percentage wear of hatchet blades on dimensional basis during field operation (41.00 hrs.) ranged from 8.77 to 11.09% and 2.22 to 5.03% respectively at edge and at 65 mm from edge.

10.10 The PTO power requirement of rotavator was observed from 25.9 to 26.3 kW (35.2 to 35.8 Ps) in dry land operation which is 88.6% to 99.0% of the tractor pto power.

10.11 A identification plate should be provided on each Rotavator at regular production level.

11. LITERATURE:
   A manual is provided with inadequate material therein. Therefore, this manual with adequate material should be modified as per IS8132-1983 in Hindi or English and other regional languages for the use and guidance of the operators, technician etc.

TESTING AUTHORITY

(J.P. MANDAL)
AGRICULTURE ENGINEER

(P.K. CHOPRA)
SR. AGRICULTURE ENGINEER

(A.N. MESHRAM)
DIRECTOR

APPLICANT'S COMMENTS

NO COMMENTS RECEIVED

NORTHERN REGION FARM MACHINERY TRAINING AND TESTING INSTITUTE, HISSAR