COMMERCIAL TEST REPORT

Telephone: 01662-276824, 276112
Website: http://dacnet.nic.in/nrfmtti
Telefax No.: 01662-276984
E-Mail: fmti-nr@nic.in

ROTAVATOR
‘THIND-642’

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)
5.1 The hardness of blades was determined at edge and shank portion. The results of hardness test are tabulated in Table-1.

**TABLE-1**

<table>
<thead>
<tr>
<th>As per IS:6690-2002 (HRC)</th>
<th>Hardness as observed (HRC)</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>Edge portion</td>
<td>Shank portion</td>
<td></td>
</tr>
<tr>
<td></td>
<td>On Edge portion</td>
<td>On shank portion</td>
</tr>
<tr>
<td>53 to 59</td>
<td>37 to 45</td>
<td>59</td>
</tr>
</tbody>
</table>

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

**TABLE-2**

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Material</th>
<th>Requirement as per IS:6690 Jan. 2007 (% by weight)</th>
<th>As observed (% by weight)</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Carbon 1</td>
<td>0.50 to 0.60</td>
<td>0.63</td>
<td>Does not conform</td>
</tr>
<tr>
<td>2.</td>
<td>Silicon (Si)</td>
<td>1.50 to 2.00</td>
<td>1.96</td>
<td>Conform</td>
</tr>
<tr>
<td>3.</td>
<td>Manganese (Mn)</td>
<td>0.50 to 1.00</td>
<td>0.78</td>
<td>Conform</td>
</tr>
<tr>
<td>4.</td>
<td>Sulphur (S)</td>
<td>0.05 (max)</td>
<td>0.037</td>
<td>Conform</td>
</tr>
<tr>
<td>5.</td>
<td>Phosphorous (P)</td>
<td>0.05 (max)</td>
<td>0.033</td>
<td>Conform</td>
</tr>
</tbody>
</table>

1 out of 5 primary elements (20%) content of primary element carbon is not conforming IS: 6690-Jan. 2007.

6. FIELD TEST
The field tests of the implement comprising of dry and wet land operations were conducted for 25.0 & 15.0 hours at different soil moisture conditions to assess the performance of the implement. The details of tractor used for field operations are given in annexure-I.

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

<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>New Holland Ford -3630</td>
<td>-</td>
</tr>
<tr>
<td>ii)</td>
<td>Type of soil</td>
<td>Clay Loam</td>
<td>-</td>
</tr>
<tr>
<td>iii)</td>
<td>Av. Soil moisture, %</td>
<td>9.8 to 10.5</td>
<td>-</td>
</tr>
<tr>
<td>iv)</td>
<td>Depth of standing water, cm</td>
<td>-</td>
<td>5.5 to 7.9</td>
</tr>
<tr>
<td>v)</td>
<td>Field efficiency, %</td>
<td>60.9 76.8</td>
<td>-</td>
</tr>
<tr>
<td>vi)</td>
<td>Puddling Index, %</td>
<td>-</td>
<td>78.2 to 82.2</td>
</tr>
<tr>
<td>vii)</td>
<td>Av. Speed of operation, kmph</td>
<td>3.54 to 3.56</td>
<td>2.07 to 2.11</td>
</tr>
<tr>
<td>viii)</td>
<td>Av. Depth of cut, cm</td>
<td>10.3 to 11.0</td>
<td>-</td>
</tr>
<tr>
<td>ix)</td>
<td>Av. Depth of puddle, cm</td>
<td>-</td>
<td>16.3 to 17.0</td>
</tr>
<tr>
<td>x)</td>
<td>Av. Working width, m</td>
<td>1.93 to 1.94</td>
<td>-</td>
</tr>
<tr>
<td>xi)</td>
<td>Area covered, ha/h</td>
<td>0.42 to 0.53</td>
<td>-</td>
</tr>
<tr>
<td>xii)</td>
<td>Time required for one hectare, h</td>
<td>1.89 to 2.38</td>
<td>-</td>
</tr>
<tr>
<td>xiii)</td>
<td>Fuel consumption</td>
<td>- l/h 6.20 to 7.00</td>
<td>5.50 to 5.90</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- l/ha 12.29 to 15.47</td>
<td>-</td>
</tr>
</tbody>
</table>

6.1 Rate of Work

6.1.1 Dry land operation
- The rate of work in clay loam soil was recorded as 0.42 to 0.53 ha/h and the forward speed as 3.54 to 3.56 kmph.
- The time required to cover one hectare area was recorded as 1.89 to 2.38 h.

6.1.2 Wet land operation
- Speed of operation varied from 2.07 to 2.11 kmph.

6.2 Quality of work

6.2.1 Dry land operation
- The depth of operation was recorded as 10.3 to 11.0 cm.
- The field efficiency was recorded as 60.9 to 76.8%.

6.2.2 Wet land operation
- Depth of puddle was recorded as 16.3 to 17.0 cm.
- Puddling index was recorded as 78.2 to 82.2%.
8. EASE OF OPERATION, ADJUSTMENTS & SAFETY
8.1 Neither the implement nor the drive the shaft (universal coupling shaft) is provided with any safety clutch/device.

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 meet different soil and moisture conditions.

8.5 Operator has to get down from tractor to make adjustments in rotavator

9. SOUNDNESS OF CONSTRUCTION
No breakdown occurred during 40.00 hrs of operation in the field.

10. COMMENTS & RECOMMENDATIONS
10.1 41.7% dimensions of three point linkage of the implement does not conform to IS:4468-March 2007(Part-I). This should be incorporated at production level.

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

10.3 Maneuverability of tractor with Rotavator and quality of work were observed to be satisfactory.

10.4 50% of dimensions of input shaft of Rotavator do not conform to IS:4931-Oct. 2004. This should be incorporated at production level.

10.5 The hardness of hatchet blades in the edge portion and in the shank portion was 59HRC 57HRC respectively against the requirement of 53 to 59 HRC at edge portion and 37 to 45 HRC at shank portion respectively as per IS:6690-Jan. 2007. This calls for improvement at production level.

10.6 The percentage wear of hatchet blades on mass basis during field operation 40.00 hr, ranged from 3.76 to 5.22 % which is considered to be normal.

10.7 The percentage wear of hatchet blades on dimensional basis after field operation 40.00 hr, ranged from 2.00 to 5.37 and 4.19 to 8.18 % respectively at edge and at 65 mm from edge.

10.8 Content of primary elements Phosphorous and Sulphur in blade sample are within presented limits where as the content of carbon silicon and manganese are not conforming must be as per IS: 6690-Jan. 2007.
10.9 The specification of propeller shaft hub does not conform to IS: 4931-1999. This should be modified according to BIS requirement.

10.10 The PTO power requirement of rotavator was observed from 27.8 to 31.0 kW (37.8 to 42.8 Ps) in dry land operation. Hence from 84.2 to 93.9 % of pto power (corresponding to 540 rpm) was utilized during the test.

10.11 The breather & dipsticks for oil level check, must be provided on gear, chain & sprocket box assemble.

10.12 Safety clutch or other suitable safety device should be provided to prevent overloading subsequent & breakdown of propeller shaft & other.

11. LITERATURE

The manufacture had supplied booklet on instruction manual and parts list in Hindi and English. The literature is found to be adequate for the guidance of users and service personal. However, it may be modified as per IS: 8132-1985 and brought out in other Indian regional languages for the regional requirement.

TESTING AUTHORITY

(R. M. TIWARI)
ASSISTANT ENGINEER (W/S)

(P. K. CHOPRA)
SENIOR AGRICULTURAL ENGINEER

(A. N. MESHRAM)
- DIRECTOR -

:: Test report compiled by Sh. B. N. Dixit (Tech. Asstt).

APPLICANT'S COMMENTS

No comments received.