COMMERCIAL TEST REPORT

No. : IMP-704/1700/2015
Month: January, 2015

ROTAVATOR
“NEW JASWANT-766”

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)

Phones: 01662-276172
Fax No. 01662-276984

Website: http://nrfmtti.dacnet.nic.in
E-mail: fmti-nr@nic.in
4.11 **Overall Dimensions, mm** (Ref. Fig.4)
Length : 1070
Width : 2390
Height : 1030

4.11.1 **Mass, kg** : 478

4.12 **Labeling plate** : Not provided

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>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>56 to 57</td>
<td>Conforms</td>
</tr>
<tr>
<td>On shank portion</td>
<td>37 to 45</td>
<td>24 to 26</td>
<td>Does not conform</td>
</tr>
</tbody>
</table>

**TABLE-2**

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:6690:1981 (% by weight)</th>
<th>As observed (% by weight)</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Carbon I</td>
<td>0.50 to 0.60</td>
<td>0.3186</td>
<td>Does not conform</td>
</tr>
<tr>
<td>2.</td>
<td>Silicon(Si)</td>
<td>1.50 to 2.00</td>
<td>0.2761</td>
<td>Does not conform</td>
</tr>
<tr>
<td>3.</td>
<td>Manganese (Mn)</td>
<td>0.50 to 1.00</td>
<td>1.1058</td>
<td>Does not conform</td>
</tr>
<tr>
<td>4.</td>
<td>Sulphur (S)</td>
<td>0.05 (max)</td>
<td>Nil</td>
<td>Conforms</td>
</tr>
<tr>
<td>5.</td>
<td>Phosphorous (P)</td>
<td>0.05 (max)</td>
<td>0.0148</td>
<td>Conforms</td>
</tr>
</tbody>
</table>

6. **FIELD TEST**

The field tests of the implement comprising of dry and wet land operations were conducted for 20.3 & 15.83 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-I.

The tractor pto speed was maintained at 540 rpm. The performance of implement is reported in Annexure-II and summarized in Table-3.
All dimensions in mm

1. THREE POINT LINKAGE
2. PRIMARY REDUCTION GEAR BOX
3. SIDE SUPPORT
4. SKID
5. ROTOR SHAFT
6. HATCHET BLADE
7. SECONDARY DRIVE GEAR BOX

Fig. 4: OVERALL DIMENSIONS OF ROTAVATOR (NEW JASWANT-766)
## 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>Swaraj 855 FE</td>
<td></td>
</tr>
<tr>
<td>ii)</td>
<td>Type of soil</td>
<td>Sandy loam</td>
<td>Clay loam</td>
</tr>
<tr>
<td>iii)</td>
<td>Av. Soil moisture, %</td>
<td>9.0 to 13.0</td>
<td></td>
</tr>
<tr>
<td>iv)</td>
<td>Depth of standing water, cm</td>
<td></td>
<td>5.3 to 6.9</td>
</tr>
<tr>
<td>v)</td>
<td>Field efficiency, %</td>
<td>73.77 to 84.71</td>
<td></td>
</tr>
<tr>
<td>vi)</td>
<td>Puddling Index, %</td>
<td></td>
<td>68.4 to 78.6</td>
</tr>
<tr>
<td>vii)</td>
<td>Av. Speed of operation, kmph</td>
<td>2.91 to 2.96</td>
<td>2.42 to 2.55</td>
</tr>
<tr>
<td>viii)</td>
<td>Av. Depth of cut, cm</td>
<td>8.67 to 11.11</td>
<td></td>
</tr>
<tr>
<td>ix)</td>
<td>Av. depth of puddle, cm</td>
<td></td>
<td>14.0 to 14.6</td>
</tr>
<tr>
<td>x)</td>
<td>Av. Working width, m</td>
<td>1.99 to 2.044</td>
<td></td>
</tr>
<tr>
<td>xi)</td>
<td>Area covered, ha/h</td>
<td>0.436 to 0.504</td>
<td></td>
</tr>
<tr>
<td>xii)</td>
<td>Time required for one hectare, h</td>
<td>1.98 to 2.29</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>3.85 to 4.80</td>
<td>3.33 to 3.67</td>
</tr>
<tr>
<td></td>
<td>l/ha</td>
<td>8.16 to 10.19</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 0.436 to 0.504 ha/h and the forward speed as 2.91 to 2.96 kmph.
- The time required to cover one hectare area was recorded as 1.98 to 2.29 h.

#### 6.1.2 Wet land operation
- Speed of operation varied from 2.42 to 2.55 kmph.

### 6.2 Quality of work

#### 6.2.1 Dry land operation
- The depth of operation was recorded as 8.67 to 11.11 cm.
- The field efficiency was recorded as 73.77 to 84.71%.

#### 6.2.2 Wet land operation
- Depth of puddle was recorded as 14.0 to 14.6 cm.
- Puddling index was recorded as 68.4 to 78.6%.
8.0 EASE OF OPERATION, ADJUSTMENTS & SAFETY

8.1 Propeller shaft is provided with safety bolt as its safety 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 cater to different soil and moisture conditions.
8.5 Operator has to get down from tractor to make adjustments in rotavator

9.0 SOUNDNESS OF CONSTRUCTION

No breakdown was observed during 36.13 hrs of operation in the field.

10.0 COMMENTS & RECOMMENDATIONS

10.1 The dimensions of three point linkage of the implement partly conform to IS: 4468 (Part-I):1997. Standard three point linkage system should be used at regular 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 Dimensions of power input shaft of rotavator does not conform to IS: 4931:1995. The shaft with specification comply with BIS standard under reference should be used at regular production level.
10.5 The hardness of hatchet blades in the edge portion and in the shank portion was 56 to 57 HRC and 24 to 26 HRC respectively against the requirement of 53 to 59 HRC (edge portion) and 37 to 45 HRC (on shank portion) as per IS:6690:1981. This calls for improvement at production level for hardness at shank portion of rotar blade.
10.6 The percentage wear of hatchet blades on mass basis during field operation 36.13 hrs, ranged from 2.26 to 3.56% which is normal.
10.7 The percentage wear of hatchet blades on dimensional basis after field operation 36.13 hrs, ranged from 14.20 to 24.75 % and 7.50 to 9.91 % respectively at edge and at 65 mm from edge. Wear on tip portion of blade is on higher side. This should be taken care in future at regular production level.
10.8 The PTO power requirement of rotavator was observed from 9.16 to 11.10 kW in dry land operation; however tractor of pto power as 32.4 kW (corresponding to 540 rpm) was used during field test. Hence, 28.3 to 34.3 % of pto power was utilized.
10.9 An Labelling/ identification plate with following detail should be provided on chassis of rotavator.
   i) Make
   ii) Model
   iii) Sl. No.
   iv) Year of manufacture
   v) Weight & Size

10.10 Chemical composition of rotavator blade are not conforming the limit as in IS: 6690-2007 hence these should be looked into in future at regular production level.

11. LITERATURE The manufacturer has not submitted any literature regarding repair, adjustment, parts catalogue of rotavator. Therefore the manufacturer should develop the literature in Hindi, English & other regional languages as per IS: 8132-1999 for the guidance of users & technical personnel.

TESTING AUTHORITY

G.R. AMBALKAR
Agricultural Engineer

R.K. NEMA
Senior Agricultural Engineer

HIMAT SINGH
Director

Test report compiled by: Sh. B. N. Dixit, Sr. Tech. Assitant

12. APPLICANT'S COMMENTS
No comments received from applicant.