व्यावसायिक परीक्षण रिपोर्ट
**COMMERCIAL TEST REPORT**

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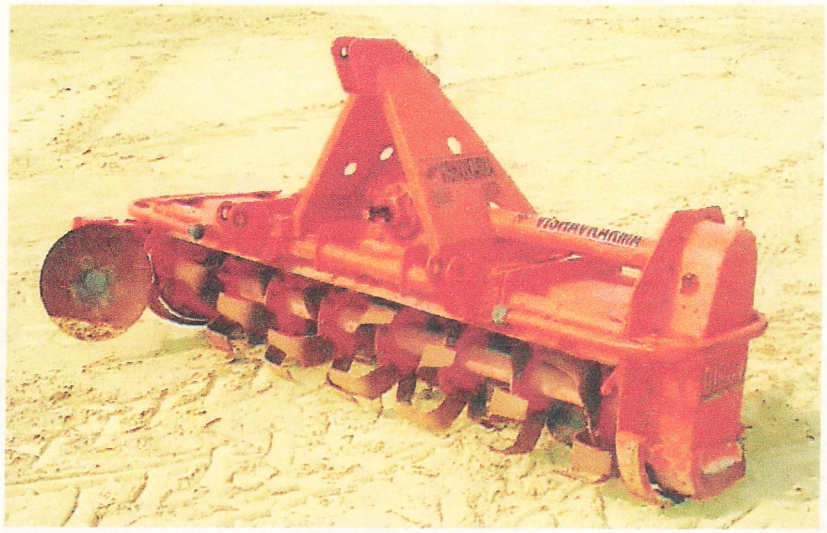

# ROTAVATOR
# 'NEW VISHWAKARMA-851'

भारत सरकार
कृषि मंत्रालय
(कृषि एवं सहकारिता विभाग)

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


उत्तरी क्षेत्र कृषि मशीनरी प्रशिक्षण एवं परीक्षण संस्थान
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4.8.6 Safety clutch/device : Not provided
4.9 Rotavator Stand : Not Provided
4.10 Furrow wheel : Provided

4.11 **Overall Dimensions, mm (Ref. Fig.4)**
Length : 2190
Width : 1035
Height : 1010
4.11.1 Mass, kg : 450.0

## 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-1**

| As per IS:6690-2002 ( HRC ) | | Hardness as observed ( HRC ) | | Remark | |
|---|---|---|---|---|---|
| Edge portion | Shank portion | On Edge portion | On shank portion | On Edge portion | On shank portion |
| 53 to 59 | 37 to 45 | 49 | 37 | **Does not conform** | Conforms |

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

**TABLE-2**

| Sl. No. | Material | Requirement as per IS:6690-2002 ( % by weight ) | As observed (% by weight ) | Remark |
|---|---|---|---|---|
| 1. | Carbon I | 0.50 to 0.60 | 0.27 | **Does not conform** |
| 2. | Silicon(Si) | 1.50 to 2.00 | 0.38 | **Does not conform** |
| 3. | Manganese (Mn) | 0.50 to 1.00 | 1.08 | **Does not conform** |
| 4. | Sulphur (S) | 0.05 (max) | 0.043 | Conforms |
| 5. | Phosphorous (P) | 0.05 (max) | 0.051 | **Does not conform** |

**:: 3 elements of total 5 elements (60%) are not conforming to BIS standard.**

## 6. FIELD TEST

The field tests of the implement comprising of dry and wet land operations were conducted for 25.0 & 15.0 hours 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 1000 rpm. The performance of implement is reported in Annexure-II and summarized in Table-3.

**TABLE-3**

**Summary of field performance**

| Sl.No. | Parameters | Dry land operation | Wet land operation ( puddling ) |
|---|---|---|---|
| i) | Tractor used | Swaraj – 855 | |
| ii) | Type of soil | Clay Loam | |
| iii) | Av. Soil moisture, % | 6.0 to 8.0 | - |
| iv) | Depth of standing water, cm | - | 7.0 to 8.5 |
| v) | Field efficiency, % | 64.3 to 86.7 | - |
| vi) | Puddling Index, % | - | 79.8 to 83.4 |
| vii) | Av. Speed of operation, kmph | 3.17 to 3.24 | 3.10 to 3.22 |
| viii) | Av. Depth of cut, cm | 8.1 to 9.7 | - |
| ix) | Av. depth of puddle, cm | - | 16.0 to 17.13 |
| x) | Av. Working width, m | 1.73 to 1.84 | - |
| xi) | Area covered, ha/h | 0.36 to 0.52 | - |
| xii) | Time required for one hectare, h | 1.92 to 2.78 | - |
| xiii) | Fuel consumption | | |
| | - l/h | 5.9 to 6.5 | 5.0 to 5.7 |
| | - l/ha | 12.48 to 16.96 | - |

**6.1 Rate of Work**

**6.1.1 Dry land operation**

-The rate of work in clay loam soil was recorded as 0.36 to 0.52 ha/h and the forward speed as 3.17 to 3.24 kmph.

-The time required to cover one hectare area was recorded as 1.92 to 2.78 h.

**6.1.2 Wet land operation**

-Speed of operation varied from 3.10 to 3.22 kmph.

**6.2 Quality of work**

**6.2.1 Dry land operation**

-The depth of operation was recorded as 8.1 to 9.7 cm.

-The field efficiency was recorded as 64.3 to 86.7 %.

**6.2.2 Wet land operation**

-Depth of puddle was recorded as 16.0 to 17.1 cm.

-Puddling index was recorded as 79.8 to 83.4 %.

**6.3 Wear of blades**

**6.3.1 On Mass basis**

Wear of hatchet blades ( mass basis ) after 40.0 hrs. of field operation is tabulated in Table-4.

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. SOUNDNESS OF CONSTRUCTION

No breakdown occurred during 40.00 hrs of operation in the field.

## 10. COMMENTS & RECOMMENDATIONS

10.1 The dimensions of three point linkage of the implement do not conform to IS:4468-2001(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 Dimensions of input shaft of rotavator does not conform to IS: 4931-2004. This should be incorporated at production level.

10.5 The hardness of edge portion of hatchet blades is not conforming to IS: 6690-2002

10.6 The percentage wear of hatchet blades on mass basis during field operation of 40.00 hrs, ranged from 3.84 to 7.15% which is normal.

10.7 The percentage wear of hatchet blades on dimensional basis after field operation of 40.0 hrs, ranged from 6.71 to 12.95 % and 5.08 to 9.49 % respectively at edge and at 65 mm from edge.

10.8 The chemical composition of the primary elements in rotavator blade are not as per IS: 6690-2002. The blades conforming to BIS standard should be used in regular production models.

10.9 The specification of propeller shaft hub does not conform to IS: 4931-1999. This should be modified according to the above said BIS code.

10.10 The PTO power requirement of rotavator was observed from 22.8 to 24.0 kW (31.0 to 32.6 Ps) in dry land operation and is within the recommended range.

10.11 Identification plate should be provided as per IS:10273-1987.