



SHAKTI MAHAAN, SMR - 4 ROTAVATOR (GEAR DRIVE)

Ref. Copy



भारत सरकार  
GOVT OF INDIA

कृषि मन्त्रालय

MINISTRY OF AGRICULTURE

कृषि एवं सहकारिता विभाग

DEPARTMENT OF AGRICULTURE AND COOPERATION

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## 1. SCOPE OF TEST

The scope of test was to check and assess the following:

### 1.1 LABORATORY TEST:

- Checking of specifications
- Hardness of soil engaging parts (Rotavator blades)
- Chemical analysis of critical components (Rotavator blades)
- Wear analysis of critical components (Rotavator blades)

### 1.2 FIELD TEST:

- Rate of work
- Quality of work
- Ease of operation, maintenance and adjustments
- Labour requirement
- Defects, breakdowns & repairs

## 2. METHOD OF SELECTION

The implement was directly submitted by the applicant for test at this Institute, hence method of selection is not known.

## 3. TEST PROCEDURES

The implement was tested in accordance with the following Indian Standard codes:

- |   |  |
|---|--|
| i) IS: 6690-1981<br>(Reaffirmed in 2002)              | : Specifications of blades for rotavator and power tillers         |
| ii) IS: 4931 – 1995<br>(Reaffirmed in December 1999)  | : Agricultural tractors-Rear Mounted PTO shaft (Types 1, 2 & 3)    |
| iii) IS: 4468 – 1997 (Part-1)<br>(Reaffirmed in 2012) | : Agricultural wheeled Tractors- Rear Mounted three point linkage. |
| iv) IS: 11531 – 2001                                  | : Test code for puddler  |

## 4. SPECIFICATIONS

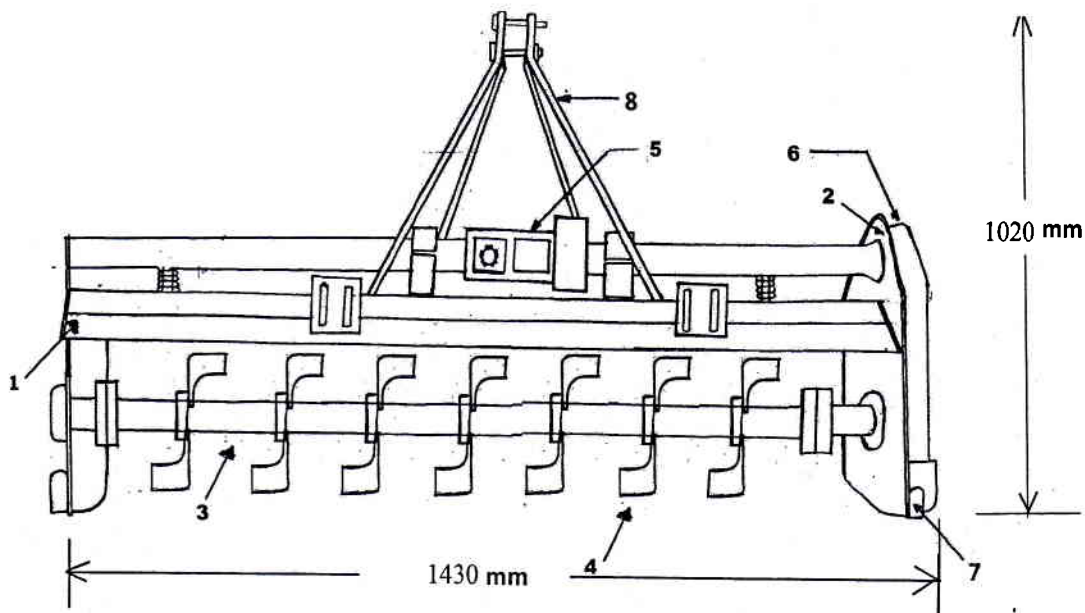
### 4.1 General:

Manufacturer	: M/s. Shakti Mahaan Agro Industries, Bye Pass Road, Sirhind-140406, Distt.-Fatehgarh, Punjab
Name of machine	: Rotavator
Make	: Shakti Mahaan Agro Industries
Model	: SMR - 4

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Type	: Tractor Mounted
Size of rotavator (mm)	: 1220 x 435
Serial number	: Not Specified
Year of manufacture	: Not Specified
Type of blade	: Hatchet (L-shaped)
Working width of implement (mm)	: 1220
Recommended power source	: 30-35 hp
Prime mover used during test	: Swaraj -855 FE Tractor (Refer Annexure-III)

**4.2 Constructional Details (Refer Fig.1):**



**Fig.1: Schematic view of Shakti Mahaan, SMR - 4 Rotavator**

**KEYWORDS:**

- |                |                                 |
|----------------|---------------------------------|
| 1. Mainframe   | 5. Primary reduction gear box   |
| 2. Side plate  | 6. Secondary reduction gear box |
| 3. Rotor shaft | 7. Skid                         |
| 4. Rotor blade | 8. Hitch pyramid                |

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Sl. No.	Initial mass of blade (g)	Mass of blade after 40.9 hours of operation (g)	Difference (g)	Percentage of wear (%) in 40.9 hours	Percentage of wear per hour (%)
1.	1019.0	966.5	52.5	5.15	0.13
2.	1058.5	978.5	80.0	7.56	0.18
3.	1033.5	977.0	56.5	5.47	0.13
4.	1006.5	958.0	48.5	4.82	0.12
5.	1052.0	962.0	90.0	8.56	0.21

**Remarks:** -The hourly percentage wear of blades on mass basis was recorded as 0.12 to 0.21 %.

#### 7.7 Service and maintenance

Required checking & tightening of all nuts & bolt of the implements especially blade, lower hitch clamps and propeller shafts bolts. The trash and soil wrapped on the rotor axle needed to be removed after the day's operation.

#### 7.8 Ease of operation & adjustments

The operator can easily adjust and control the implement from operator's seat in the field as the adjustments were within the easy reach of operator. However the operator has to get down from the tractor in order to raise/ lower the depth adjusting skid.

### 8. DEFECTS, BREAKDOWNS AND REPAIRS

Sl. No.	Defects, breakdowns and repairs	Hours
1	The bracket of trailing board got bend after running of 20.0 hours of dry operation.	20.0 hours of operation

### 9. COMMENTS AND RECOMMENDATIONS

- 9.1 The dimensions of the three point linkage (hitch pyramid) of the rotavator do not conform to Ct. I & Cat. II to IS: 4468-2012. This should be looked into for corrective action for standardization.
- 9.2 Dimensions of PIC and PIC yoke bore of implement, does not conform to IS: 4931-1995 and therefore, it should be looked into for corrective action.
- 9.3 Chemical composition of rotor blades does not conform to IS: 6690-2002. The percentage of carbon, silicon and manganese content in composition of rotavator blade material was recorded as 0.323, 0.285, and 1.148% respectively. The carbon and silicon were on lower side and manganese content on higher side when compared with the relevant Indian Standard. It is therefore, recommended that the material of rotavator blade should be improved and provided as per requirement of Indian Standard.
- 9.4 The rate of work was recorded as 0.32 to 0.45 ha/h at forward speed of 2.88 to 3.99 kmph in dry operation.

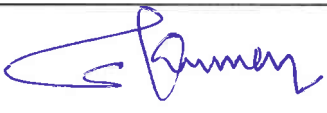

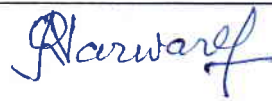


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- 9.5 The depth of operation was recorded as 4 to 6 cm with soil moisture content of 7 to 12% in medium soil and considered on lower side for dry and operation. The depth of puddle was recorded as 23 to 30 cm which is considered as normal for such operation.
- 9.6 The field performance of rotavator was evaluated in medium soil. The hourly rate of wear of blade on mass basis were recorded as 0.12 to 0.21%. The average wear of blade is considered as on higher side.
- 9.7 The bracket of trailing board got bend after running of 20.0 hours of dry operation which implies that the bracket strength was not adequate. Hence, it should be improved at production level to encounter the stress or to bear the vertical thrust.
- 9.8 Labeling plate was not provided with the implement. Hence, labeling plate along with the specifications such as-size of the implement, operating speed, make & model, sl. no., year of manufacture and power requirement are to be provided, during the commercial production of implement.
- 9.9 **Technical literature:**  
 Only one page of leaflet was provided with the implement. Hence, it is recommended to provide Owner's manual/Operator's manual and Parts list with the implement to refer by the operator and field personnel.  
 Also, it is recommended to bring out the manuals in Hindi and other vernacular languages as per IS: 8132-1999.

**TESTING AUTHORITY**

<b>SANJAY KUMAR AGRICULTURAL ENGINEER</b>	
<b>P.P.RAO SENIOR AGRICULTURAL ENGINEER</b>	
<b>J.J.R.NARWARE DIRECTOR</b>	

Test conducted and report compiled by : P.C. Dihingia, STA and Anshul Pandey , STA(I)

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### **10. APPLICANT'S COMMENTS**

The copy of draft test report was made available to applicant, but the applicant had not made any comments.