



SHAKTI MAHAAN, SMR - 5 ROTAVATOR (GEAR DRIVE)

215. 1071



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
- Chemical analysis of critical components
- Wear analysis of critical components

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
(Reaffirmed in 2002) | : Specifications of blades for rotavator and power tillers |
| ii) | IS: 4931 – 1995
(Reaffirmed in December 1999) | : Agricultural tractors-Rear Mounted PTO shaft (Types 1, 2 & 3) |
| iii) | IS: 4468 – 1997 (Part-1)
(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 Sahib, Punjab |
| Name of machine | : Rotavator |
| Make | : Shakti Mahaan Agro Industries |
| Model | : Shakti Mahaan SMR- 5 |
| Type | : Tractor Mounted |

Size of rotavator (mm)	: 1500 x 435
Serial number	: Not Specified
Year of manufacture	: Not Specified
Type of blade	: Hatchet (L-shaped)
Working width of implement (mm)	: 1500
Recommended power source	: 35 to 40 hp
Prime mover used during test	: Swaraj 855 FE tractor (Refer Annexure-III)

4.2 Constructional Details (Refer Fig.1)

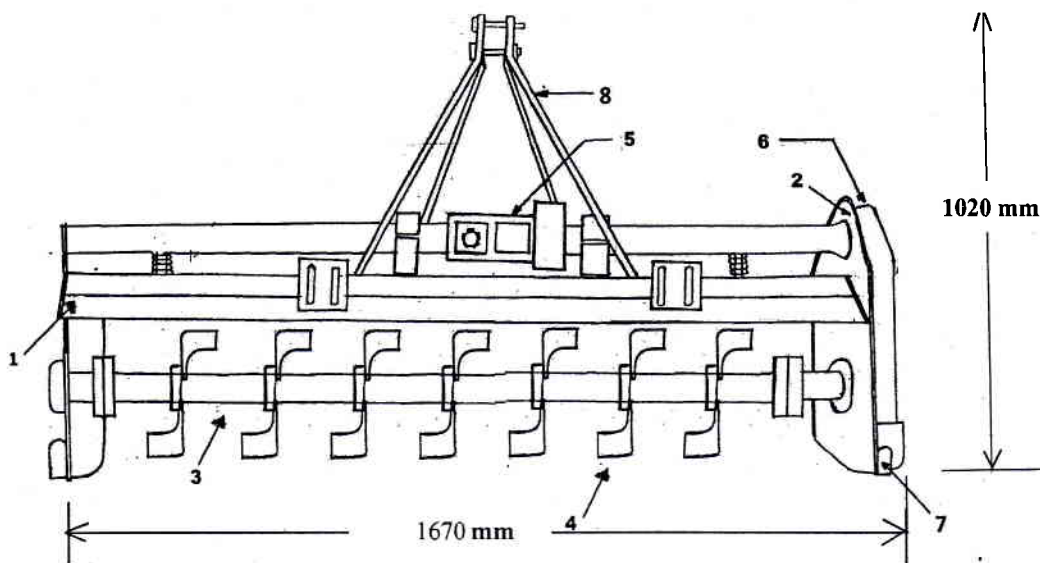


Fig.1: Schematic view of Shakti Mahaan, SMR-5 Rotavator

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 40.9hrs	Percentage of wear per hour (%)
1.	1038.0	978.5	59.5	5.73	0.14
2.	1050.5	989.0	61.5	5.85	0.14
3.	1066.5	988.5	78.0	7.31	0.18
4.	1044.0	976.0	68.0	6.51	0.16
5.	1050.0	978.5	71.5	6.81	0.17
6.	1024.0	993.5	30.5	2.98	0.07

Remarks: - The hourly percentage wear of blades on mass basis were recorded as 0.07 to 0.18 %.

7.7 Service and maintenance

Requires 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 need 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 are 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



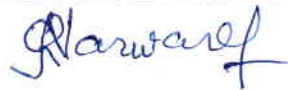
Sl. No.	Defects, breakdowns and repairs	Hours
1	No major difficulty was observed during the entire test of the implement. However, the strength of MS bracket provided for lifting the trailing board was not found adequate as it was observed got bend during operation.	15.8

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, do 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 0.32 to 0.38 ha/h at forward speed of 2.83 to 3.90 kmph in dry land operation.

- 9.5 The depth of operation in dry land field was recorded as 5.0 to 8.0 cm with soil moisture content of 10 to 14% in medium soil and considered on lower side for dry land operation. The depth of puddled was recorder as 27 to 31 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 0.07 to 0.18 %. The average wear of blade is considered as on higher side.
- 9.7 The bracket of trailing board got bend after running of 15.8 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 is 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 is 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

SANJAY KUMAR AGRICULTURAL ENGINEER	
P.P.RAO SENIOR AGRICULTURAL ENGINEER	
J.J.R. NARWARE DIRECTOR	

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.