व्यावसायिक परीक्षण रिपोर्ट
COMMERCIAL TEST REPORT

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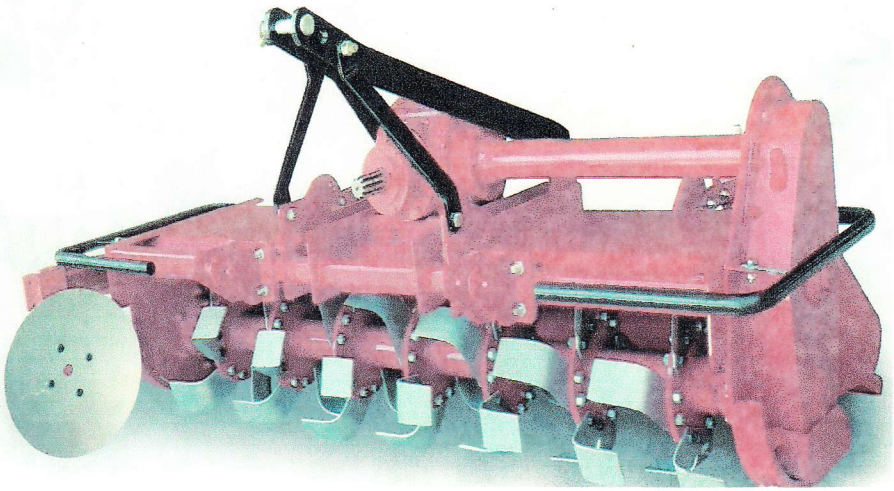

ROTAVATOR
"KISAN"

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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4.11 Overall Dimensions, mm (Ref. Fig.4)

	Length	:	1820
	Width	:	1200
	Height	:	1150
4.11.1	Mass, kg	:	340

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-Jan. 2007 (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	40	38	**Does not conform**	**Does not conform**

5.2 Chemical composition

The chemical composition of blades is tabulated in Table-2

TABLE-2

Sl. No.	Material	Requirement as per IS:6690-Jan. 2007 (% by weight)	As observed (% by weight)	Remark
1.	Carbon I	0.50 to 0.60	0.47	**Does not conforms**
2.	Silicon(Si)	1.50 to 2.00	1.72	Conforms
3.	Manganese (Mn)	0.50 to 1.00	0.79	Conforms
4.	Sulphur (S)	0.05 (max)	0.015	Conforms
5.	Phosphorous (P)	0.05 (max)	0.022	Conforms

:: 1 value of chemical composition of Rotavator blades out of 5 are not conforming to Indian Standard.

6. FIELD TEST

The field tests of the implement comprising of dry and wet land operation 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 540 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	Mahindra & Mahindra B -275 DI	
ii)	Type of soil	Clay Loam	
iii)	Av. Soil moisture, %	6.9 to 8.0	-
iv)	Depth of standing water, cm	-	7.3 to 8.6
v)	Field efficiency, %	68.2 to 80.3	-
vi)	Puddling Index, %	-	76.8 to 80.1
vii)	Av. Speed of operation, kmph	4.04 to 4.09	2.41 to 2.45
viii)	Av. Depth of cut, cm	8.0 to 8.4	-
ix)	Av. depth of puddle, cm	-	13.0 to 16.0
x)	Av. Working width, m	1.62 to 1.66	-
xi)	Area covered, ha/h	0.45 to 0.53	-
xii)	Time required for one hectare, h	1.89 to 2.22	-
xiii)	Fuel consumption		
	- l/h	4.30 to 4.60	4.10 to 4.60
	- l/ha	8.51 to 9.55	-

6.1 Rate of Work

6.1.1 Dry land operation

-The rate of work in clay loam soil was recorded as 0.45 to 0.53 ha/h and the forward speed as 4.04 to 4.09 kmph.

-The time required to cover one hectare area was recorded as 1.89 to 2.22 h.

6.1.2 Wet land operation

-Speed of operation varied from 2.41 to 2.45 kmph.

6.2 Quality of work

6.2.1 Dry land operation

-The depth of operation was recorded as 8.0 to 8.4 cm.
-The field efficiency was recorded as 68.2 to 80.3 %.

6.2.2 Wet land operation

-Depth of puddle was recorded as 13.0 to 16.0 cm.
-Puddling index was recorded as 76.8 to 80.1 %.

8. EASE OF OPERATION, ADJUSTMENTS & SAFETY

8.1 Propeller shaft is provided with safety bolt as an 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. 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 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 Dimensions of input shaft of rotavator does 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 40 HRC and 38 HRC respectively against the requirement of 53 to 59 HRC (edge portion) and 37 to 45 HRC (on shank portion) 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 from3.60 to 8.46 % which is considered to be normal.

10.7 The percentage wear of hatchet blades on dimensional basis after field operation 40.0 h, ranged from 3.42 to 6.21 % and 3.68 to 5.92 % respectively at edge and at 65 mm from edge.

10.8 The content of carbon in rotavator blade is not conforming IS: 6690-Jan. 2007 requirements.

10.9 The specification of propeller shaft does not conform to IS: 4931-Oct. 2004. This should be modified according to IS requirement.

10.10 The PTO power requirement of rotavator was observed from 17.9 to 18.8 kW (24.3 to 25.6 Ps) in dry land operation. Thus, 89.5 to 94.0 % of tractor pto power was used during the test.

11. LITERATURE

The manufacturer has developed operating manual in bilingual (i.e. in Hindi and English) which contains the specification of the implement, operating, maintenance and the safety instructions and also the spare parts list. The literature as developed is found to be inadequate for the guidance of users and service personnel. Therefore, it needs to developed as per IS:8132-1983.

TESTING AUTHORITY

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(A. N. MESHRAM) **- DIRECTOR -**	

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

APPLICANT'S COMMENTS

Received and added in test report.