



**ROTAVATOR  
'MAKHAN GHARACHON DELUXE'**



सत्यमेव जयते

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  
ट्रैक्टर नगर, सिरसा रोड़, हिसार- 125001 हरियाणा)

**NORTHERN REGION FARM MACHINERY TRAINING AND TESTING INSTITUTE TRACTOR NAGAR, SIRSA  
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2.	Silicon(Si)	1.50 to 2.00	0.4276	Does not conform
3.	Manganese (Mn)	0.50 to 1.00	1.1594	Does not conform
4.	Sulphur (S)	0.05 (max)	0.0115	Conforms
5.	Phosphorous (P)	0.05 (max)	0.0210	Conforms

#### 6. FIELD TEST

The field tests of the implement comprising of dry and wet land operations were conducted for 20.41 & 15.58 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.

**TABLE-3**

#### Summary of field performance

Sl.No.	Parameters	Dry land operation	Wet land operation ( puddling )
i)	Tractor used	Farmtrac- 60 EPI	
ii)	Type of soil	Sandy loam	Clay loam
iii)	Av. Soil moisture, %	7.5 to 9.4	--
iv)	Depth of standing water, cm	--	6.4 to 7.7
v)	Field efficiency, %	69.9 to 86.6	--
vi)	Puddling Index, %	--	76.8 to 80.8
vii)	Av. Speed of operation, kmph	3.22 to 3.52	2.21 to 2.25
viii)	Av. Depth of cut, cm	7.6 to 9.9	--
ix)	Av. depth of puddle, cm	--	13.3 to 13.7
x)	Av. Working width, m	1.93 to 2.06	--
xi)	Area covered, ha/h	0.51 to 0.62	--
xii)	Time required for one hectare, h	1.61 to 1.96	--
xiii)	Fuel consumption		
	- l/h	4.25 to 5.0	4.22 to 4.70
	- l/ha	6.97 to 9.80	--



1.	82.4	84.0	79.0	80.8	4.13	3.81
2.	82.6	84.4	80.0	82.5	3.15	2.25
3.	81.4	83.6	77.9	80.7	4.30	3.47
4.	82.8	83.4	79.4	80.7	4.11	3.24
5.	82.0	83.9	78.0	80.7	4.88	3.81
6.	81.5	84.3	76.3	81.8	6.38	2.97
7.	81.8	82.4	77.3	80.9	5.50	1.82
8.	82.4	84.0	78.0	82.0	5.34	2.38
9.	82.6	84.0	78.5	82.1	4.96	2.26
10.	82.0	83.7	76.0	81.4	7.32	2.75

**7. EFFECTIVENESS OF SEALINGS**

After completion of field test in wet land operation for 15.58 hrs., the implement was dismantled for checking effectiveness of sealing provided against ingress of dust and water/mud in various sub-assemblies and also to check the condition of components of the rotavator.

Sl.No.	Location	Whether ingress of mud and/or water was observed
1.	Primary reduction gear box.	No
2.	Secondary reduction chain; drive	No
3.	Hub of rotor assembly	No

**8. 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. SOUNDNESS OF CONSTRUCTION**

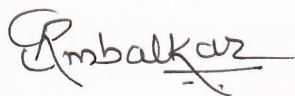


No breakdown occurred during 35.99 hrs of operation in the field.

**10. COMMENTS & RECOMMENDATIONS**

- 10.1 The dimensions of three point linkage of the implement partly conform to IS: 4468-March 2007(Part-I). 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-Oct. 2004. 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 51 to 54 HRC and 26 to 28 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 for hardness of blade at its shank portion.
- 10.6 The percentage wear of hatchet blades on mass basis during field operation 35.99 hrs, ranged from 0.75 to 1.59 % which is normal.
- 10.7 The percentage wear of hatchet blades on dimensional basis after field operation 35.99 hrs, ranged from 3.15 to 7.32 % and 1.82 to 3.81 % respectively at edge and at 65 mm from edge.
- 10.8 The PTO power requirement of rotavator was observed from 8.14 to 11.04 kW in dry land operation; however tractor of pto power as 31.5 kW (corresponding to 540 rpm) was used during field test. Hence, 25.8 to 35.0 % of pto power was utilized.
- 10.9 An identification plate is provided on chassis of rotavator.
- 10.10 The propeller shaft is incorporated with safety bolt to protect the overloading.
- 10.11 Carbon & Silicon content of rotavator blade are lower whereas Manganese content is higher than the limit as specified in their relevant codes, hence these should be looked into in future at regular production level.
11. **LITERATURE** The manufacturer has developed the literature of machine in a single booklet wherein detailed repair adjustments, parts catalogue & off season storage technique are not there. Therefore, the manufacturer should modify the literature in Hindi or English & other regional languages as per IS: 8132-1983 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, Senior Technical Assistant**

### 12. APPLICANT'S COMMENTS

No comments received from applicant