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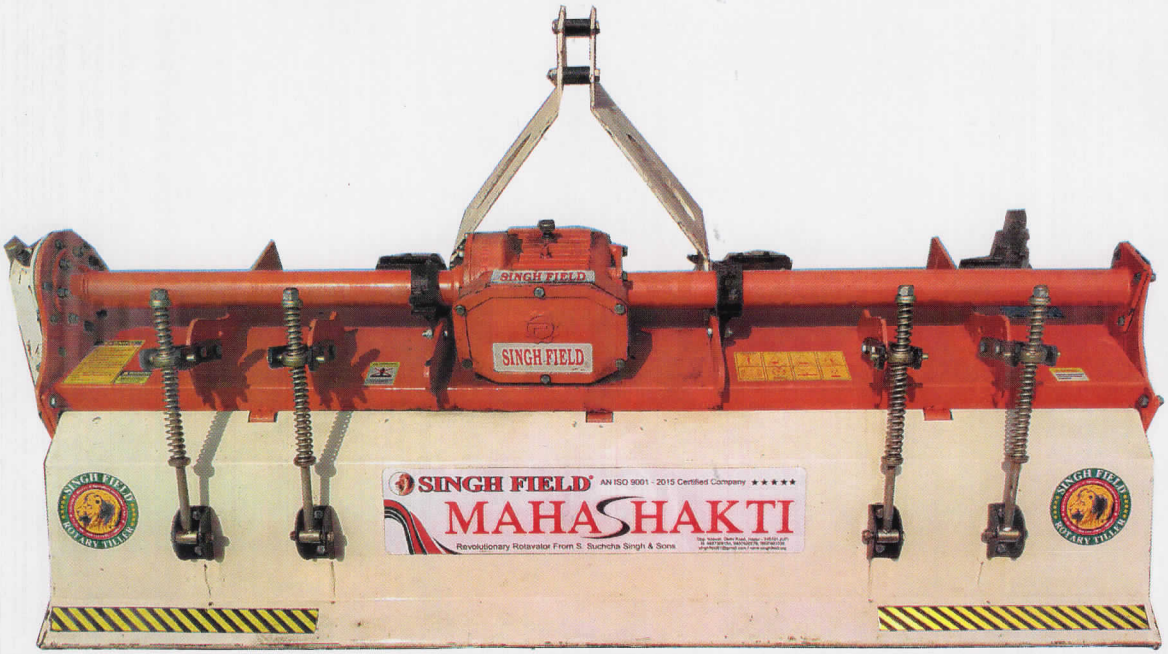
व्यावसायिक परीक्षण रिपोर्ट
COMMERCIAL **TEST REPORT**

संख्या/ **No: ROTAVATOR-253/2432/2020**
माह/**Month : January,2020**

THIS TEST REPORT VALID UP TO : 31st JANUARY, 2027



SINGH FIELD MAHA SHAKTI, SFRM-G-200 ROTAVATOR (TRACTOR MOUNTED)

सत्यमेव जयते

भारत सरकार
Government of India
कृषि एवं किसान कल्याण मंत्रालय
Ministry of Agriculture and Farmers Welfare
कृषि, सहकारिता एवं किसान कल्याण विभाग
Department of Agriculture, Cooperation and Farmers Welfare
उत्तरी क्षेत्र कृषि मशीनरी प्रशिक्षण एवं परीक्षण संस्थान
Northern Region Farm Machinery Training and Testing Institute
ट्रैक्टर नगर, सिरसा रोड, हिसार, (हरियाणा) - 125 001
Tractor Nagar, Sirsa Road, HISAR (Haryana)-125 001
[ISO 9001:2015 CERTIFIED]

Website: http://nrfmtti.gov.in/
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4.11 Lubricants:

Sl. No.	Particulars	As recommended by the manufacturer	As used during test
1	Primary Gear box	SAE 140	Oil originally filled in the rotavator was not changed
2	Secondary Gear box	SAE 140	
3	Rotor Hub	**Not specified**	Servo M.P grease
4	Propeller Shaft	**Not specified**	Servo M.P grease

5. RUNNING – IN

Rotavator was run in for 0.72 hour before field performance test.

6. LABORATORY TEST

6.1 Hardness: - The surface hardness of blade was recorded as under: -

Description	As per IS: 6690:1981 (HRC)	Hardness as observed (HRC)	Remarks
Edge portion	53 to 59	48.2 to 53.2	**Does not conform**
On shank portion	37 to 45	48.2 to 53.2	**Does not conform**

6.2 Chemical composition

The chemical composition of blades is tabulated as under:-

Constituents	As per IS: 6690-1981		Composition as observed (% of weight)	Remarks
	Carbon Steel	Silicon Manganese steel		
Carbon (C)	0.70 -0.85	0.50-0.60	0.0932	**Does not conform**
Silicon (Si)	0.10 -0.40	1.50-2.00	0.3567	**Does not conform**
Manganese (Mn)	0.50 -1.0	0.50-1.00	0.4264	**Does not conform**
Sulphur (S)	0.05(max)	0.05(max)	0.0697	**Does not conform**
Phosphorous (P)	0.05(max)	0.05(max)	0.0365	Conforms

7. FIELD PERFORMANCE TEST

The field tests of the rotavator comprising of wet land and dry land operation were conducted for 10.70 and 26.31 hours respectively to assess the performance of the rotavator. The performance of rotavator is reported in **Annexure-I & III** for wet land and dry land operations respectively.

Observations of field performance test are summarized in the ensuing table:

Summary of Field Performance Test

Sl. No.	Parameters/operations	Wet land operation (Puddling)	Dry land operation
I	II	III	IV
1.	Tractor used	Sonalika DI 60 mm super	
2.	Gear used	L-1	L-1
3.	Type of soil (Refer IS:7926-1975)	Sandy loam	
4.	Average soil moisture (%)	--	13.1 to 20.3
5.	Average depth of standing water (cm)	7.5 to 8.5	--
6.	Bulk density of soil (g/cc)	--	1.480 to 1.723
7.	Average speed of operation (kmph)	2.06 to 2.07	2.18 to 2.30
8.	Avg. travel reduction /Avg. wheel slip (%)	0.18 to 0.25	-1.27 to -0.65
9.	Average depth of puddle/ Average depth of cut (cm)	25.5 to 29.5	10.33 to 10.87
10.	Avg. working width (cm)	--	191.6 to 200.0
11.	Area covered (ha/h)	--	0.335 to 0.390
12.	Time required for one ha (h)	--	2.56 to 2.99
13.	Field efficiency (%)	--	77.4 to 85.7
14.	Puddling index (%)	77.9 to 83.2	--
15.	Fuel consumption		
	l/h	3.23 to 3.29	4.27 to 5.01
	l/ha	--	11.96 to 14.60
16.	Average PTO power utilized (kW)	--	15.04

7.1 Wet Land operation

7.1.1 The tractor was fitted with half cage wheel on rear pneumatic traction wheel for conducting the paddling operation. The brief specification of half cage wheel is given in Annexure-II

7.1.2 Quality of work

i) The depth of puddle was recorded as 25.5 to 29.5 cm.

ii) The puddling index was recorded as 77.9 to 83.2 %.

7.2 Dry land operation

7.2.1 Rate of work

i) The rate of work was recorded as 0.335 to 0.390 ha/h, and the speed of operation varies from 2.18 to 2.30 kmph.

ii) The time required to cover one hectare was recorded as 2.56 to 2.99 h.

7.2.2 Quality of work

i) The depth of operation was recorded as 10.33 to 10.87 cm.

ii) Average working width was observed as 191.6 to 200.00 cm.

iii) Field efficiency was observed as 77.4 to 85.7 %.

7.3 Labour requirement

In all, two skilled operators are needed to ensure continuous operation of rotavator for day long period.

7.4 Wear analysis (on mass basis)

Wear of hatchet blades (on mass basis) was measured and recorded in ensuing table:

Percentage wear of rotavator blades on mass basis:

Sl. No.	Initial mass of blade (g)	Mass of blade after 37.73 hr. of operation (g)	Difference of weight (g)	Percentage of wear (%) after 37.73 hr.	Percentage of wear on hour basis (%)
1.	1015.7	1002.8	12.9	1.27	0.03
2.	1046.9	1032.6	14.3	1.37	0.04
3.	1046.9	1032.8	14.1	1.35	0.04
4.	1043.3	1027.0	16.3	1.56	0.04
5.	1040.4	1026.9	13.5	1.30	0.03
6.	1032.7	1012.4	20.3	1.97	0.05
7.	1063.5	1052.1	11.4	1.07	0.03
8.	1049.2	1032.9	16.3	1.55	0.04

8. EFFECTIVENESS OF SEALINGS

After completion of wet land operation for 10.70 hours, the rotavator was dismantled for checking the effectiveness of sealing provided against ingress of dust, and water/mud in various sub-assemblies/components. The observations are given in ensuing table:-

Sl. No.	Location	Whether ingress of mud and/or water was observed (Yes/No)
1.	Primary reduction gear box	No
2.	Secondary reduction gear box	No
3.	Rotor assembly (hub)	No

9. EASE OF OPERATION & ADJUSTMENTS

No noticeable difficulty was observed during the operation and adjustment of rotavator.

10. DEFECTS, BREAKDOWN AND REPAIRS

No noticeable defect or breakdown was observed during 37.01 hours of field operation.

11. CRITICAL TECHNICAL SPECIFICATIONS

(Vide Ministry's communication F. No 9-1/2019- M&T (I&P) dated 20.08.2019)

Sr. No.	Parameters	Specification	Observation	Remarks
1	Working width (mm)	1200 (Min.)	2035	Conforms
2	Type of blade	C/L/J shape as per demand, Hatchet Blade	L shape	Conforms
3	Thickness of blade (mm)	7-8 (Min.)	7.0	Conforms

12. COMMENTS AND RECOMMENDATIONS

12.1 The marking/labeling of machine **does not meet the requirement of critical technical specification. It must be looked into.**

12.2 The sheet metal is not specified. **This is critical parameter and therefore it must be specified.**

12.3 The specifications of rotavator hitch, does not conform in toto to the 4468 (Part-1)-1997. Hence, it is recommended that rotavator should be provided with the hitch conforming to relevant Indian Standards.

12.4 Dimensions of PIC of implement do not conform in toto to IS: 4931-1995 and therefore, it should be looked in to for corrective action.

12.5 The chemical composition of blades does not conform to as per IS: 6690-1981. This needs to be looked into for corrective action at production level.

12.6 The grade of grease is not specified by the applicant. It **MUST** be specified

12.7 **Technical literature :-**

The following literature supplied with rotavator during the test :-

i. Operator manual cum Service manual cum parts catalogue.

Operator manual of rotavator need to be updated as per IS: 8132-1999.

TESTING AUTHORITY

MAAN SINGH SENIOR TECHNICAL ASSISTANT	
P. K. PANDEY **DIRECTOR**	

Test report compiled by C.Veeranjaneyulu, Senior Technician.

13. APPLICANT'S COMMENTS

We will improve our mistakes in future production.