

व्यावसायिक परीक्षण रिपोर्ट
COMMERCIAL TEST REPORT

संख्या/ No.: ROTAVATOR-313/2582/2020
माह/Month: November, 2020

THIS TEST REPORT VALID UP TO : 30th November, 2027



**SHIV SHAKTI, S4 ROTAVATOR
(TRACTOR MOUNTED)**



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

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ROTAVATOR-313/2582/2020	SHIV SHAKTI, S4 ROTAVATOR (TRACTOR MOUNTED) (COMMERCIAL)
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4.11 Lubricants:

Sl. No.	Particulars	As recommended by the manufacturer	As used during test
1	Primary Gear box	EP-140 with Grease	Oil originally filled in the rotavator was not changed
2	Secondary Gear box	SAE-90 with Grease	
3	Rotor Hub	Not specified	M.P. Grease
4	Propeller Shaft	Not specified	

5. RUNNING – IN

Rotavator was run in for 1.67 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	37	Does not conform
On shank portion	37 to 45	41	Conforms

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	0.3616	Does not conform
Silicon (Si)	0.10 -0.40	1.50-2.00	0.3949	Conforms to carbon steel
Manganese (Mn)	0.50 -1.0	0.50-1.00	1.0960	Does not conform
Sulphur (S)	0.05(max)	0.05(max)	0.0634	Conforms
Phosphorous (P)	0.05(max)	0.05(max)	0.0391	Conforms

7. FIELD PERFORMANCE TEST

The field tests of the rotavator comprising of Dry land and Wet land operation were conducted for 28 and 11 hours respectively to assess the performance test is reported in **Annexure-I & II** for Dry land and Wet land operation respectively.

Observations of field performance test is summarized in the ensuing table:-

Summary of Field Performance Test

Sl. No.	Parameters/operations	Dry land operation	Wet land operation (Puddling)
I	II	III	IV
1.	Tractor used	ACE, DI 550	
2.	Gear used	L-2	L-2
3.	Type of soil	Sandy loam	
4.	Average soil moisture (%)	2.1 to 3.5	--
5.	Average depth of standing water (cm)	--	10.67 to 10.89
6.	Bulk density of soil (g/cc)	1.560 to 1.715	--
7.	Average speed of operation (kmph)	2.34 to 2.72	2.44 to 2.57
8.	Avg. travel reduction (%)	--	0.0 to 2.25
9.	Avg. wheel slip (%)	-5.28 to 0.25	--
10.	Average depth of puddle (cm)	--	26.00 to 26.56
11.	Average depth of cut (cm)	10.56 to 11.72	--
12.	Avg. effective width (cm)	196 to 198	--
13.	Area covered (ha/h)	0.377 to 0.473	--
14.	Time required for one ha (h)	2.11 to 2.65	--
15.	Field efficiency (%)	80 to 89	--
16.	Puddling index (%)	--	83 to 93
17.	Fuel consumption		
		l/h	5.0 to 7.7
		l/ha	2.84 to 3.49
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7.1 Dry land operation

7.1.1 Rate of work

- i) The rate of work was recorded as 0.377 to 0.473 ha/h, and the speed of operation varies from 2.34 to 2.72 kmph.
- ii) The time required to cover one hectare was recorded as 2.11 to 2.65 h

7.1.2 Quality of work

- i) The depth of operation was recorded as 10.56 to 11.72 cm.
- ii) Average effective width was observed as 196 to 198 cm.
- iii) Field efficiency was observed as 80 to 89 %.

7.2 Wet Land operation

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

7.2.2 Quality of work

- i) The depth of puddle was recorded as 26.00 to 26.56 cm.
- ii) The puddling index was recorded as 83 to 93 %.

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 40.63 hr. of operation (g)	Difference of weight (g)	Percentage of wear (%) after 40.63 hr.	Percentage of wear on hour basis (%)
1.	951.8	835.6	116.2	12.21	0.30
2.	967.7	851.5	116.2	12.01	0.30
3.	962.3	819.3	143.0	14.86	0.37
4.	955.1	801.5	153.6	16.08	0.40
5.	967.1	817.9	149.2	15.43	0.38
6.	961.8	812.3	149.5	15.54	0.38
7.	953.3	813.4	139.9	14.68	0.36
8.	956.6	824.5	132.1	13.81	0.34
9.	957.2	783.1	174.1	18.19	0.45

8. EFFECTIVENESS OF SEALINGS

After completion of wet land operation for 11 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 the test.

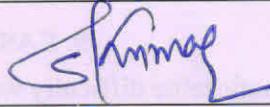
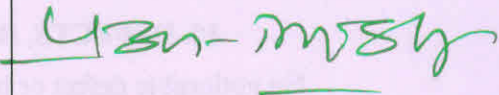
11. CRITICAL TECHNICAL SPECIFICATION

Deferred till 31.12.2020 vide Ministry O.M. No 13-13/2020 M&T, (I&P) dated 24.04.2020

12. COMMENTS AND RECOMMENDATIONS

- 12.1 The Dimension of three point linkage of implement does not conform, in toto, to the requirements of IS: 4468(Part-1)-1997 and therefore, it may be looked into for corrective action.
- 12.2 The Dimensions of PIC of implement does not conform, in toto, to the requirements of IS: 4931-1995 and therefore, it may be looked into for corrective action.
- 12.3 Provision against overload on P.T.O drive shaft is not provided. It **MUST** be provided.
- 12.4 The grade of grease is not specified. It **MUST** be specified.
- 12.5 The stand is not provided. It **MUST** be provided.
- 12.6 The hardness of blades does not conform, in toto, to the requirements of IS: 6690-1981. This needs to be looked into for corrective action.
- 12.7 The chemical composition of blades does not conform, in toto, to the requirements of IS: 6690-1981. This needs to be looked into for corrective action.
- 12.8 Applicant has recommended the suitable tractor size as "45 hp and above" however the labeling plate of the tractor provided by manufacturer has not declared the maximum P.T.O power in it. Necessary action may be taken for guidance's of users.
- 12.9 The labeling plate should be provided on the machine with the following information
- i) Name & address of manufacturer
 - ii) Country of origin
 - iii) Make
 - iv) Model
 - v) Year of manufacturing
 - vi) Serial Number
 - vii) Type
 - viii) Size
 - ix) Required size of prime mover (kW)
- 12.10 **Technical Literature:**
No technical literature provided by the applicant during the test.
The following literature, therefore, **MUST** be provided as per IS: 8132-1999 for guidance of users.
- i) Operator's manual
 - ii) Service manual
 - iii) Part's catalog

TESTING AUTHORITY

SANJAY KUMAR AGRICULTURAL ENGINEER	
P. K. PANDEY DIRECTOR	

13. APPLICANT'S COMMENTS

No comments received from the applicant.