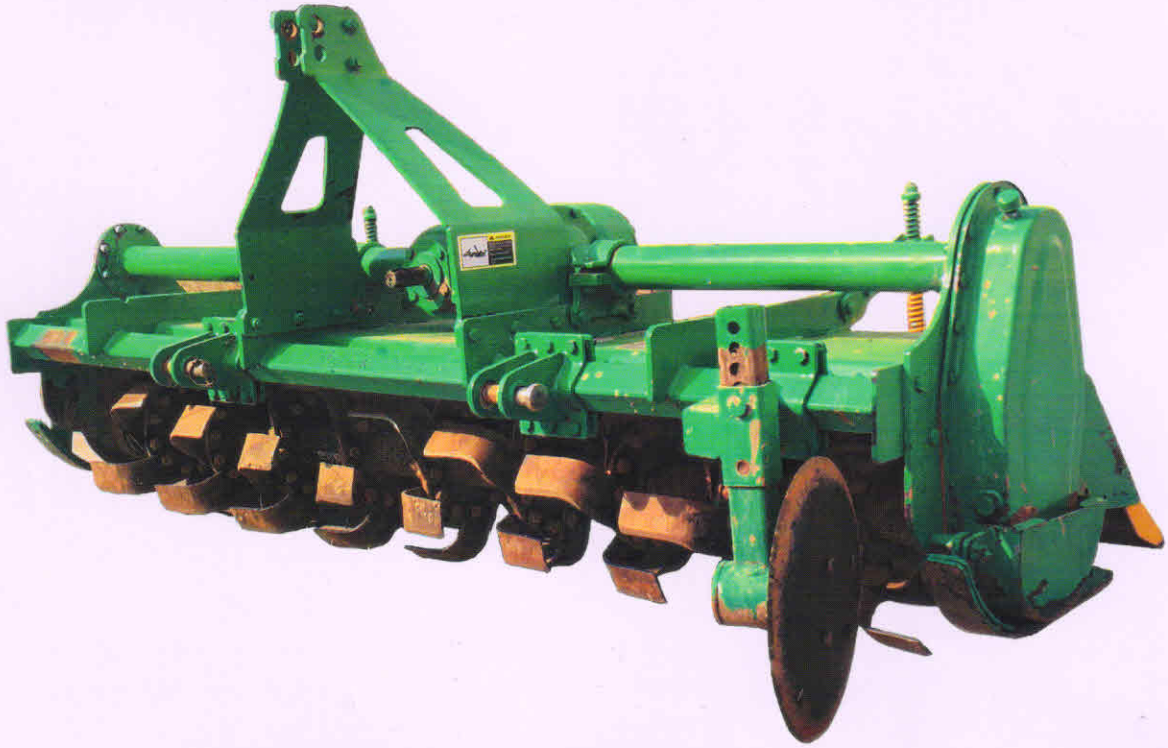
व्यावसायिक परीक्षण रिपोर्ट
COMMERCIAL TEST REPORT

संख्या/ **No.: ROTAVATOR-315/2584/2020**
माह/**Month: November, 2020**

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



RAJINDRA, 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
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4.11 Lubricants:

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

5. RUNNING – IN

Rotavator was run in for 1.10 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	46.18	**Does not conform**
On shank portion	37 to 45	47.83	**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	0.1049	**Does not conform**
Silicon (Si)	0.10 -0.40	1.50-2.00	0.3355	Conforms to carbon steel
Manganese (Mn)	0.50 -1.0	0.50-1.00	0.9544	Conforms
Sulphur (S)	0.05(max)	0.05(max)	0.0551	**Does not conform**
Phosphorous (P)	0.05(max)	0.05(max)	0.0396	Conforms

7. FIELD PERFORMANCE TEST

The field tests of the rotavator comprising of dry land and wet land operation were conducted for 25 and 10 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	Swaraj 855	
2.	Gear used	L-1	L-1
3.	Type of soil	Sandy loam	
4.	Average soil moisture (%)	7.5 to 10.17	--
5.	Average depth of standing water (cm)	--	11.70 to 12.20
6.	Bulk density of soil (g/cc)	1.620 to 1.670	--
7.	Average speed of operation (kmph)	2.29 to 2.37	2.06 to 2.12
8.	Avg. travel reduction (%)	--	- 1.07 to -0.68
9.	Avg. wheel slip (%)	-3.44 to -1.99	--
10.	Average depth of puddle (cm)	--	26.9 to 27.8
11.	Average depth of cut (cm)	7.28 to 7.89	--
12.	Avg. effective width (cm)	184 to 199	--
13.	Area covered (ha/h)	0.365 to 0.396	--
14.	Time required for one ha (h)	2.53 to 2.74	--
15.	Field efficiency (%)	83 to 89	--
16.	Puddling index (%)	--	78 to 82
17.	Fuel consumption		
	l/h	4.63 to 5.88	3.19 to 3.50
	l/ha	13.43 to 15.51	--

7.1 Dry land operation

7.1.1 Rate of work

i) The rate of work was recorded as 0.365 to 0.396 ha/h, and the speed of operation varies from 2.29 to 2.37 kmph.

ii) The time required to cover one hectare was recorded as 2.53 to 2.74 h

7.1.2 Quality of work

i) The depth of operation was recorded as 7.28 to 7.89 cm.

ii) Average effective width was observed as 184 to 199 cm.

iii) Field efficiency was observed as 83 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 26.90 to 27.8 cm.

iii) The puddling index was recorded as 78 to 82 %.

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 36.98 hr. of operation (g)	Difference of weight (g)	Percentage of wear (%) after 36.98 hr.	Percentage of wear on hour basis (%)
1.	1040.3	1006.9	33.4	3.21	0.09
2.	1045.8	998.8	47	4.49	0.12
3.	1004.4	923.3	81.1	8.07	0.22
4.	999.2	925.6	73.6	7.37	0.20
5.	998.7	927.0	71.7	7.18	0.19
6.	997.4	923.8	73.6	7.38	0.20
7.	967.0	901.7	65.3	6.75	0.18
8.	998.2	911.5	86.7	8.69	0.23
9.	1015.2	926.3	88.9	8.76	0.24

8. EFFECTIVENESS OF SEALINGS

After completion of wet land operation for 10 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 The Dimensions of PIC Yoke bore 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 oil change period in primary & secondary reduction is not specified. It **MUST** be specified.

12.5 The guard over propeller shaft is not provided. It **MUST** be provided.

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

12.7 The stand is not provided. It **MUST** be provided.

12.8 The hardness of blades does not conform to the requirements of IS: 6690-1981. This needs to be looked into for corrective action.

12.9 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.

12.10 The labeling plate should be provided on the machine with the following information.

1) Name and address of manufacturer,
ii) Country of origin
iii) Make
iv) Model
v) Year of manufacturer
vi) Serial number
vii) Type
viii) Size
ix) Required size of prime mover (kW)

12.11 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**	

Draft test report compiled by Girdhari Lal, Technician

13. APPLICANT'S COMMENTS

No comments received from the applicant.