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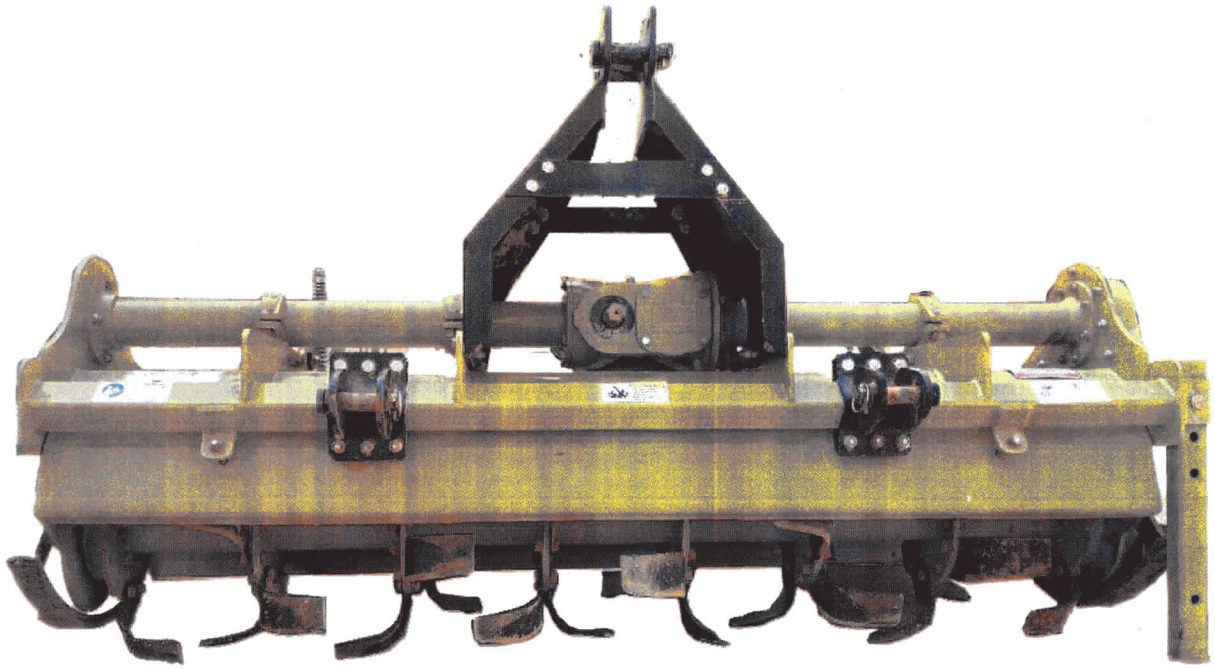
व्यावसायिक परीक्षण रिपोर्ट
COMMERCIAL TEST REPORT

संख्या/ **No.: ROTAVATOR-304/2555/2020**
माह/**Month: October, 2020**

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



BALWAN, PL 6 HDMS 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
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	EP-140	Oil originally filled in the rotavator was not changed
2	Secondary Gear box	**Not specified**	
3	Rotor Hub	**Not specified**	M.P. Grease
4	Propeller Shaft	**Not specified**	

5. RUNNING – IN

Rotavator was run in for 1.45 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	45	**Does not conform**
On shank portion	37 to 45	46	**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	0.1882	**Does not conform**
Silicon (Si)	0.10 -0.40	1.50-2.00	0.4545	**Does not conform**
Manganese (Mn)	0.50 -1.0	0.50-1.00	1.0763	**Does not conform**
Sulphur (S)	0.05(max)	0.05(max)	0.0418	Conforms
Phosphorous (P)	0.05(max)	0.05(max)	0.0245	Conforms

7. FIELD PERFORMANCE TEST

The field tests of the rotavator comprising of Wet land and dry land operation were conducted for 10 and 27 hours respectively to assess the performance test is reported in **Annexure-I & III** for wet land and dry land operation respectively.

Observations of field performance test is 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	ACE, DI 550	
2.	Gear used	L-2	L-2
3.	Type of soil	Sandy loam	Sandy loam
4.	Average soil moisture (%)	--	7.2 to 17.2
5.	Average depth of standing water (cm)	6.00 to 6.46	--
6.	Bulk density of soil (g/cc)	--	1.670 to1.835
7.	Average speed of operation (kmph)	2.36 to 2.46	2.17 to 2.51
8.	Avg. travel reduction (%)	-0.21 to 1.06	--
9.	Avg. wheel slip (%)	--	-1.17 to 1.54
10.	Average depth of puddle (cm)	20.67 to 21.83	--
11.	Average depth of cut (cm)	--	11.11 to 12.61
12.	Avg. effective width (cm)	--	168 to175
13.	Area covered (ha/h)	--	0.307 to 0.373
14.	Time required for one ha (h)	--	2.68 to 3.26
15.	Field efficiency (%)	--	80 to 85
16.	Puddling index (%)	84 to 85	--
17.	Fuel consumption		
	l/h	8 to 11	4.00 to 6.86
	l/ha	--	10.72 to 19.69
18.	Average PTO power utilized (kW)	--	NR

7.1 Wet Land operation

7.1.1 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-II

7.1.2 Quality of work

i) The depth of puddle was recorded as 20.67 to 21.83 cm.

ii) The puddling index was recorded as 84 to 85 %.

7.2 Dry land operation

7.2.1 Rate of work

The rate of work was recorded as 0.307 to 0.373 ha/h, and the speed of operation varies from 2.12 to 2.51 kmph.

ii) The time required to cover one hectare was recorded as 2.68 to 3.26 h

7.2.2 Quality of work

i) The depth of operation was recorded as 11.11 to 12.61 cm.

ii) Average working width was observed as 168 to 175 cm.

iii) Field efficiency was observed as 80 to 85 %.

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 38.16 hr. of operation (g)	Difference of weight (g)	Percentage of wear (%) after 38.16 hr.	Percentage of wear on hour basis (%)
1.	987.9	918.6	69.3	7.01	0.18
2.	1001.1	932.2	68.9	6.88	0.18
3.	1009.1	940.2	68.9	6.83	0.18
4.	1007.0	946.8	60.2	5.98	0.16
5.	1007.5	946.3	61.2	6.07	0.16
6.	1008.9	943.1	65.8	6.52	0.17
7.	1003.0	927.3	75.7	7.55	0.20
8.	988.4	920.5	67.9	6.87	0.18

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 provision to check oil level in primary reduction does not provided. It **MUST** be provided.

12.3 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.

12.4 The grade of oil in secondary reduction is not specified. It **MUST** be specified.

12.5 The oil change period (h) in secondary reduction is not specified. It **MUST** be specified.

12.6 Safety guard on P.T.O drive shaft is not provided. It **MUST** be provided.

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

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.

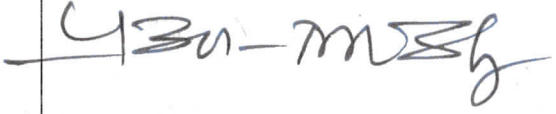
12.9 The chemical composition of blades does not conform, in toto, to the requirements of IS: 6690-1981. This needs to be looked into for corrective action.

12.10 Applicant has recommended the suitable tractor size as "50 hp and above" however the labeling plate of the tractor provided by manufacturer has not declared the maximum PTO power in it. Necessary action may be taken for guidance's of users.

12.11 **Technical literature:-**

One booklet entitled "Instruction Manual" was provided for reference during test. The same, however, needs to be updated as per IS-8132-1999.

TESTING AUTHORITY

RINKU PRASAD GUPTA TECHNICAL ASSISTANT	
P. K. PANDEY **DIRECTOR**	

13. APPLICANT'S COMMENTS

No specific comments received from applicant.