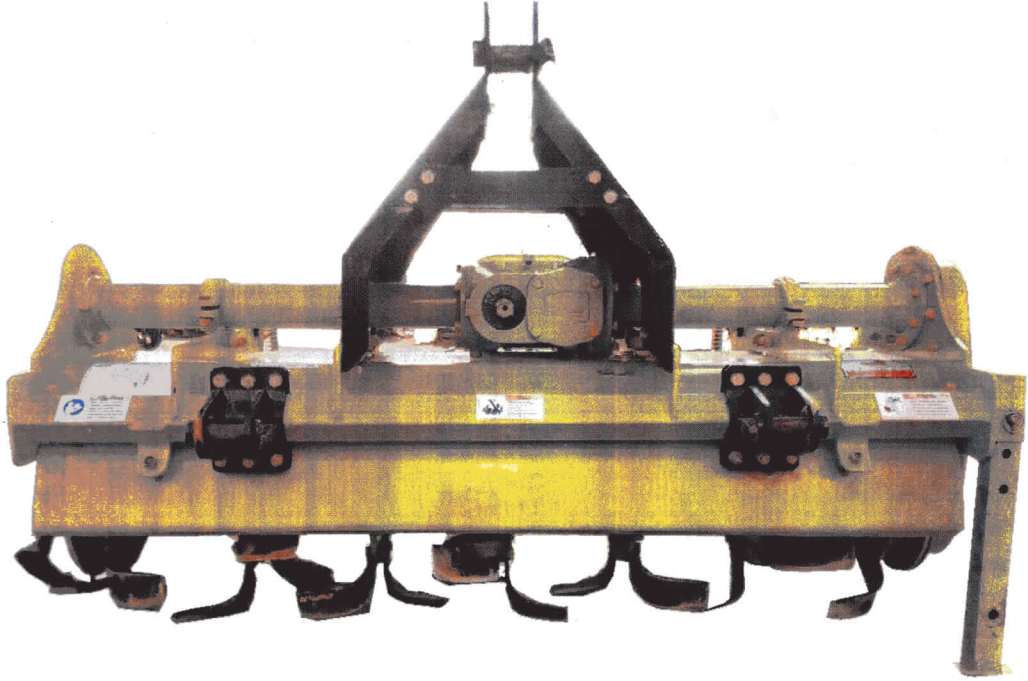


ब्यावसायिक परीक्षण रिपोर्ट
COMMERCIAL TEST REPORT

संख्या/ No.: ROTAVATOR-302/2553/2020
माह/Month: October, 2020

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



**BALWAN, PL 5 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

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ROTAVATOR-302/2553/2020	BALWAN, PL 5 HDMS 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	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 1.18 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	44	Does not conform
On shank portion	37 to 45	45	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	0.1982	Does not conform
Silicon (Si)	0.10 -0.40	1.50-2.00	0.4827	Does not conform
Manganese (Mn)	0.50 -1.0	0.50-1.00	1.0590	Does not conform
Sulphur (S)	0.05(max)	0.05(max)	0.0441	Conforms
Phosphorous (P)	0.05(max)	0.05(max)	0.0249	Conforms

7. FIELD PERFORMANCE TEST

The field tests of the rotavator comprising of Wet land and dry land operation were conducted for 10 and 26 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:-

ROTAVATOR-302/2553/2020	BALWAN, PL 5 HDMS ROTAVATOR (TRACTOR MOUNTED) (COMMERCIAL)
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Summary of Field Performance Test

Sl. No.	Parameters/operations	Wet land operation (Puddling)	Dry land operation
I	II	III	IV
1.	Tractor used	Ford 3600 And Tafe MF 5245 DI	Ford 3600
2.	Gear used	Ford 3600-L2 and Tafe -L-3	L-2
3.	Type of soil	Sandy loam	
4.	Average soil moisture (%)	--	7.2 to 17.2
5.	Average depth of standing water (cm)	6.08 to 11.13	--
6.	Bulk density of soil (g/cc)	--	1.670 to 1.835
7.	Average speed of operation (kmph)	2.70 to 4.93	2.60 to 2.85
8.	Avg. travel reduction (%)	--	--
9.	Avg. wheel slip (%)	1.07	-1.62 to 3.84
10.	Average depth of puddle (cm)	20.83 to 23.88	--
11.	Average depth of cut (cm)	--	10.6 to 12.5
12.	Avg. effective width (cm)	--	137 to 145
13.	Area covered (ha/h)	--	0.309 to 0.329
14.	Time required for one ha (h)	--	3.04 to 3.29
15.	Field efficiency (%)	--	82 to 86
16.	Puddling index (%)	82 to 86	--
17.	Fuel consumption		
	l/h	3.13 to 4.41	4.60 to 7.55
	l/ha	--	14.35 to 23.59
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 20.83 to 23.88 cm.
- ii) The puddling index was recorded as 82 to 86 %.

7.2 Dry land operation

7.2.1 Rate of work

The rate of work was recorded as 0.309 to 0.329 ha/h, and the speed of operation varies from 2.60 to 2.85 kmph.

- ii) The time required to cover one hectare was recorded as 3.04 to 3.24 h

7.2.2 Quality of work

- i) The depth of operation was recorded as 10.6 to 12.5 cm.
- ii) Average effective width was observed as 137 to 145 cm.
- iii) Field efficiency was observed as 82 to 86 %.



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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 37.67 hr. of operation (g)	Difference of weight (g)	Percentage of wear (%) after 37.67 hr.	Percentage of wear on hour basis (%)
1.	1010.4	945.2	65.2	6.45	0.17
2.	1002.2	937.6	64.6	6.45	0.17
3.	992.5	939.3	53.2	5.36	0.14
4.	1021.1	955.8	65.3	6.40	0.17
5.	1008.3	952.2	56.1	5.56	0.115
6.	1005.9	940.1	65.8	6.54	0.17
7.	1000.2	931.1	69.1	6.91	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


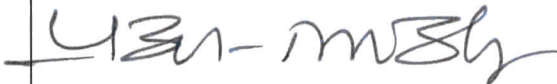
Deferred till 31.12.2020 vide Ministry O.M. No 13-13/2020 M&T, (I&P) dated 24.04.2020



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, in toto, 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 **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 comments received from the applicant

