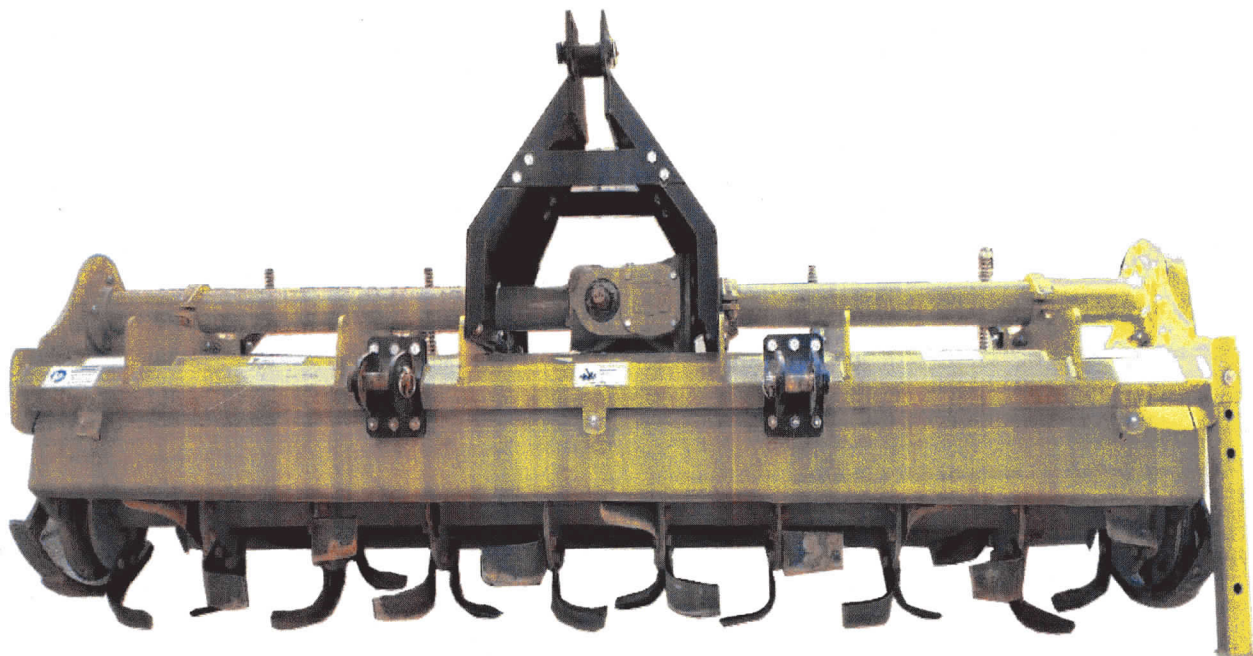


व्यावसायिक परीक्षण रिपोर्ट  
COMMERCIAL TEST REPORT

संख्या/ No.: ROTAVATOR-305/2556/2020  
माह/Month: October, 2020

**THIS TEST REPORT VALID UP TO : 31<sup>st</sup> October, 2027**



**BALWAN, PL 8 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-305/2556/2020	BALWAN, PL 8 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	<b>Not specified</b>	
3	Rotor Hub	<b>Not specified</b>	M.P. Grease
4	Propeller Shaft	<b>Not specified</b>	

#### 5. RUNNING – IN

Rotavator was run in for 1.43 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	<b>Does not conform</b>
On shank portion	37 to 45	49	<b>Does not conform</b>

##### 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	0.2183	<b>Does not conform</b>
Silicon (Si)	0.10 -0.40	1.50-2.00	0.4000	Conforms to carbon steel
Manganese (Mn)	0.50 -1.0	0.50-1.00	1.0050	<b>Does not conform</b>
Sulphur (S)	0.05(max)	0.05(max)	0.0424	Conforms
Phosphorous (P)	0.05(max)	0.05(max)	0.0282	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	Mahindra, Arjun 555 DI	
2.	Gear used	L-1	L-1
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 6.45	--
6.	Bulk density of soil (g/cc)	--	1.670 to 1.835
7.	Average speed of operation (kmph)	2.38 to 2.43	2.41 to 2.52
8.	Avg. travel reduction (%)	-1.01 to -0.63	--
9.	Avg. wheel slip (%)	--	-2.05 to 0.90
10.	Average depth of puddle (cm)	20.33 to 23.00	--
11.	Average depth of cut (cm)	--	11.00 to 12.06
12.	Avg. effective width (cm)	--	221 to 234
13.	Area covered (ha/h)	--	0.435 to 0.503
14.	Time required for one ha (h)	--	1.99 to 2.29
15.	Field efficiency (%)	--	82 to 86
16.	Puddling index (%)	84 to 91	--
17.	Fuel consumption		
		l/h	2.21 to 2.70
		l/ha	--
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 20.33 to 23.00 cm.
- ii) The puddling index was recorded as 84 to 91 %.

**7.2 Dry land operation****7.2.1 Rate of work**

The rate of work was recorded as 0.435 to 0.503 ha/h, and the speed of operation varies from 2.41 to 2.52 kmph.

- ii) The time required to cover one hectare was recorded as 1.99 to 2.29 h

**7.2.2 Quality of work**

- i) The depth of operation was recorded as 11.00 to 12.06 cm.
- ii) Average effective width was observed as 221 to 234 cm.
- iii) Field efficiency was observed as 82 to 86 %.



**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 38.02 hr. of operation (g)	Difference of weight (g)	Percentage of wear (%) after 38.02 hr.	Percentage of wear on hour basis (%)
1.	1010.0	956.8	53.2	5.27	0.14
2.	1005.0	950.1	54.9	5.46	0.14
3.	1007.6	946.7	60.9	6.04	0.16
4.	1008.3	947.6	60.7	6.02	0.16
5.	1001.9	956.7	45.2	4.51	0.12
6.	1011.2	955.8	55.4	5.48	0.14
7.	1009.1	951.9	57.2	5.67	0.15
8.	990.5	931.0	59.5	6.01	0.16
9.	996.0	935.1	60.9	6.11	0.16
10.	995.5	934.0	61.5	6.18	0.16

**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 PTO 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** **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

