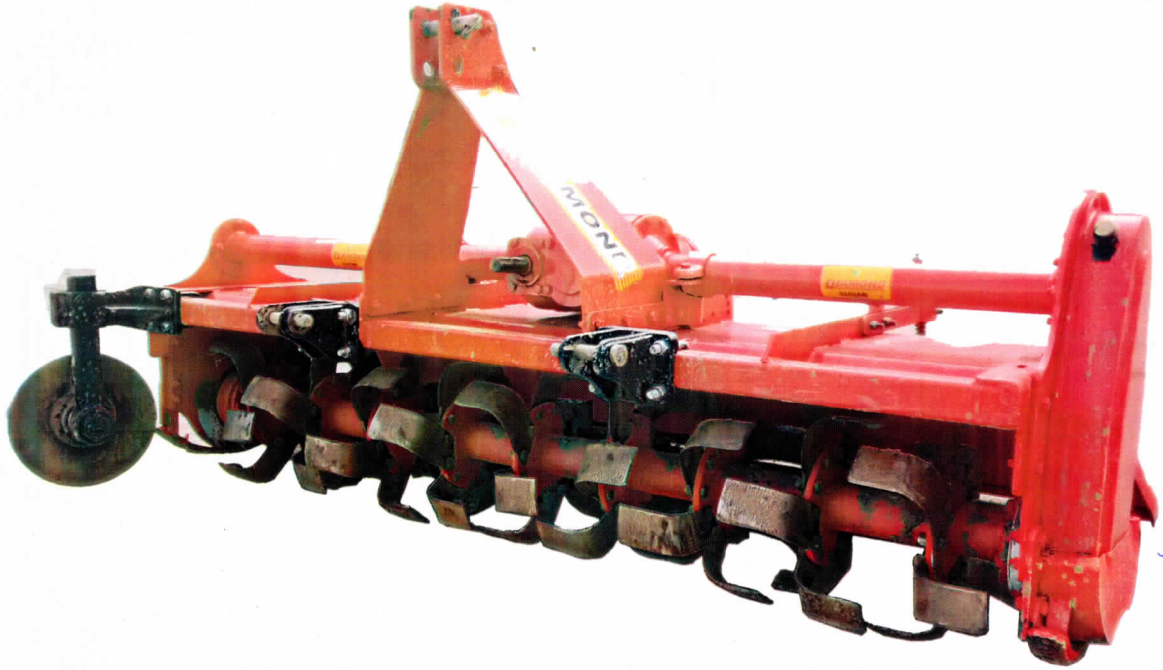


व्यावसायिक परीक्षण रिपोर्ट  
COMMERCIAL TEST REPORT

संख्या/ No.: ROTAVATOR-317/2609/2020  
माह/Month: December, 2020

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



**DIAMOND GAJRAJ 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-317/2609/2020	DIAMOND GAJRAJ 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	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 1.33 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	<b>Does not conform</b>
On shank portion	37 to 45	48	<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	0.1049	<b>Does not conform</b>
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	Conforms
Phosphorous (P)	0.05(max)	0.05(max)	0.396	Conforms

#### 7. FIELD PERFORMANCE TEST

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



ROTAVATOR-317/2609/2020	<b>DIAMOND GAJRAJ ROTA VATOR (TRACTOR MOUNTED) (COMMERCIAL)</b>
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**Summary of Field Performance Test**

Sl. No.	Parameters/operations	Dry land operation	Wet land operation (Puddling)
I	II	III	IV
1.	Tractor used	Farmtrac FT 60 LHL	
2.	Gear used	L-1	L-1
3.	Type of soil	Sandy loam	
4.	Average soil moisture (%)	9.33 to 17.83	--
5.	Average depth of standing water (cm)	--	10.40 to 10.70
6.	Bulk density of soil (g/cc)	1.390 to 1.680	--
7.	Average speed of operation (kmph)	2.37 to 2.43	2.36 to 2.38
8.	Avg. travel reduction (%)	--	-0.65 to -0.11
9.	Avg. wheel slip (%)	-3.94 to -0.80	--
10.	Average depth of puddle (cm)	--	27.9 to 31.9
11.	Average depth of cut (cm)	9.44 to 10.11	--
12.	Avg. effective width (cm)	190 to 194	--
13.	Area covered (ha/h)	0.398 to 0.444	--
14.	Time required for one ha (h)	2.25 to 2.51	--
15.	Field efficiency (%)	88 to 95	--
16.	Puddling index (%)	--	79 to 81
17.	Fuel consumption		
	l/h	6.08 to 6.48	3.20 to 3.39
	l/ha	14.51 to 15.99	--

**7.1 Dry land operation**

**7.1.1 Rate of work**

- i) The rate of work was recorded as 0.398 to 0.444 ha/h, and the speed of operation varies from 2.37 to 2.43 kmph.
- ii) The time required to cover one hectare was recorded as 2.25 to 2.51 h

**7.1.2 Quality of work**

- i) The depth of operation was recorded as 9.44 to 10.11 cm.
- ii) Average effective width was observed as 190 to 194 cm.
- iii) Field efficiency was observed as 88 to 95 %.

**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 27.9 to 31.9 cm.
- ii) The puddling index was recorded as 79 to 81 %.

**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 37.43 hr. of operation (g)	Difference of weight (g)	Percentage of wear (%) after 37.43 hr.	Percentage of wear on hour basis (%)
1.	996.8	968.3	28.5	2.86	0.08
2.	1032.7	957.1	75.6	7.32	0.20
3.	1002.6	985.4	17.2	1.72	0.05
4.	984	953.9	30.1	3.06	0.08
5.	997.5	980.9	16.6	1.66	0.04
6.	1015.6	1001.4	14.2	1.40	0.07
7.	1014.7	998.8	15.9	1.57	0.04
8.	999.6	978.8	20.8	2.08	0.06
9.	991.5	958.9	32.6	3.29	0.09

**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**

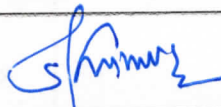
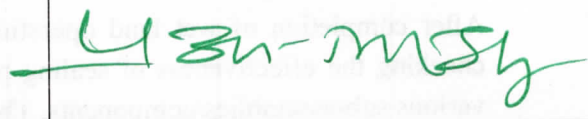
Deferred till 31.03.2021 vide Ministry O.M. No 13-13/2020 M&T, (I&P) dated 22.12.2020.



**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.
- 12.4 Provision against overload on P.T.O drive shaft is not provided. It **MUST** be provided..
- 12.5 The grade of grease is not specified. It **MUST** be specified.
- 12.6 The stand is not provided. It **MUST** be provided.
- 12.7 The hardness of blades does not conform, to the requirements of IS: 6690-1981. This needs to be looked into for corrective action.
- 12.8 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.
- 12.9 **Technical Literature:**  
One booklet entitled "operator's manual" was provided for reference during test. The same, however, needs to be updated as per IS: 8132-1999.

**TESTING AUTHORITY**

SANJAY KUMAR AGRICULTURAL ENGINEER	
P. K. PANDEY DIRECTOR	

Draft test Report compiled by Girdhari Lal, Technician.

**13. APPLICANT'S COMMENTS**

Para No.	Our Ref.	Applicant Comments
13.1	12.1	We will update definitely lower hitch point and pin according to IS: 4468 (Part-1)- 1997.
13.2	12.2&12.3	We will use PIC and PIC Yoke bore according to IS: 4931-1995.
13.3	12.4	We will use PTO which has provision of over loaded.
13.4	12.6	We will provide stand with rotavator.
13.5	12.7&12.8	We should use blade according to IS: 6690-1981.