व्यावसायिक परीक्षण रिपोर्ट | संख्या/ No.: ROTAVATOR- 332/2709/2021

COMMERCIAL TEST REPORT | माह/Month: July, 2021

THIS TEST REPORT VALID UP TO : 31st July, 2028

AMBBER INNOVATIONS PVT. LTD., FARMHEAD, RT-06 FT, ROTARY TILLER (ROTAVATOR)

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

Tractor Nagar, Sirsa Road, HISAR (Haryana)-125 001

[ISO 9001:2015 CERTIFIED]

Website: http://nrfmtti.gov.in/

E-mail: fmti-nr@nic.in Tele./FAX: 01662-276984

3.11 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	EP-140	
3	Rotor Hub	High Quality Grease	M.P. Grease
4	Propeller Shaft	High Quality Grease	

4. RUNNING – IN

Rotavator was run in for 2.17 hour before field performance test.

5. LABORATORY TEST

5.1 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	39.9 (Average)	**Does not conform**
On shank portion	37 to 45	37.5 (Average)	Conforms

5.2 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	0.2121	**Does not conform**
Silicon (Si)	0.10 -0.40	1.50-2.00	0.2759	Conforms
Manganese (Mn)	0.50 -1.0	0.50-1.00	1.5917	**Does not conform**
Sulphur (S)	0.05 (max)	0.05 (max)	0.0308	Conforms
Phosphorous (P)	0.05 (max)	0.05 (max)	0.0147	Conforms

6. FIELD PERFORMANCE TEST

The field tests of the rotavator comprising of dry land and wet land operation were conducted for 25.12 and 10.21 hours respectively to assess the performance test which 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	Farmtrac-45	
2.	Gear used	L-2	L-1
3.	Type of soil	Sandy loam	
4.	Average soil moisture (%)	14.7 to 17.1	--
5.	Average depth of standing water (cm)	--	12.0 to 12.7
6.	Bulk density of soil (g/cc)	1.57 to 1.64	--
7.	Average speed of operation (kmph)	3.27 to 3.38	2.19 to 2.23
8.	Avg. travel reduction (%)	--	-1.81 to -2.44
9.	Avg. wheel slip (%)	-0.34 to -1.93	--
10.	Average depth of puddle (cm)	--	27.0 to 28.2
11.	Average depth of cut (cm)	10.5 to 11.3	--
12.	Avg. effective width (cm)	171 to 174	--
13.	Area covered (ha/h)	0.463 to 0.535	--
14.	Time required for one ha (h)	1.87 to 2.16	--
15.	Field efficiency (%)	81.1 to 92.1	--
16.	Puddling index (%)	--	75.4 to 78.5
17.	Fuel consumption		
	l/h	5.80 to 6.30	4.29 to 4.55
	l/ha	11.54 to 12.74	--
18.	Avg. PTO power consumption, kW	18.6	--

6.1 Dry land operation

6.1.1 Rate of work

i) The rate of work was recorded 0.463 to 0.535 ha/h, and the speed of operation varies from 3.27 to 3.38 kmph.

ii) The time required to cover one hectare was recorded as 1.87 to 2.16 h

6.1.2 Quality of work

i) The depth of operation was recorded as 10.5 to 11.3 cm.

ii) Average effective width was observed as 171 to 174 cm.

iii) Field efficiency was observed as 81.1 to 92.1 %.

6.2 Wet Land operation

6.2.1 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

6.2.2 Quality of work

i) The depth of puddle was recorded as 27.0 to 28.2 cm.

ii) The puddling index was recorded as 75.4 to 78.5 %.

(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Size (m) [Dia of rotor × width of cut			-	Provided	Yes
	Country of origin			-	Provided	Yes
	Year of manufacturer [DD/MM/YYYY]			-	Provided	Yes
	Chassis Serial Number			-	Provided	Yes
	Recommended PTO speed of prime-mover, (rpm)			-	**Not provided**	**No**
	Maximum PTO power required, kW			-	Provided	Yes

8.	**Category of Breakdowns/Defects**				
	Category of Breakdown	**Category (Evaluative/ Non Evaluative)**	**Requirements**	**As Observed**	**Whether meets the Requirements (Yes/No)**
i)	Critical breakdown	Evaluative	No critical breakdown	None	Yes
ii)	Major breakdowns	Evaluative	Not more than one and neither of them should be repetitive in nature	None	Yes
iii)	Minor breakdowns	Evaluative	Not more than three and frequency of each should not be more than two	None	Yes
iv)	Total breakdowns	Evaluative	In no case, the total number of breakdowns should exceed four, that is, (1 major / 3 minor or 4 minor breakdowns.	None	Yes

11. CRITICAL TECHNICAL SPECIFICATION

(Vide Ministry's communication No 13-9/2019 M &T (I&P) dated 26.04.2019)

Si. No	Parameters	Specification	Observed	Remarks
1.	Working width (mm)	1200 (Min.)	1755	Conforms
2.	Type of blade	C/L/J shape as per demand Hatchet blade	L shape Hatchet blade	Conforms
3.	Thickness of blade (mm)	7-8 (Min.)	7.0	Conforms
4.	No. of blades	30(Min.)	48	Conforms
5.	Total Number of flanges	5 (Min.)	08	Conforms
6.	Number of blades per flanges	6 (Max.)	06	Conforms
7.	Outer diameter of rotor shaft mm	75-90	90	Conforms
8.	Rotor diameter, including flange and blade mounted on flange, mm	425 (Min.)	450	Conforms
9.	Side Drive	Gear Drive /**Chain Drive (Optional)**	Gear drive	Conforms
10.	Depth control mechanism	Arc shaped skid on both side of rotavator	Arc shaped skid on both side of rotavator	Conforms
11.	Material of blades	Boron 27/28/30 Mn (28MnCrB5) / **High Carbon steel of grade EN42/EN45/EN47**	Boron	Conforms
12.	Hardness of blade Material, HRC	38 (min)	39.9	Conforms
13.	Safety clutch/Device (Shear bolt) in PTO drive shaft	Must be provided	**Not Provided**	**Does not conform**
14.	Rotavator stand	Must be provided	Provided	Conforms
15.	Guard over propeller shaft	Must be provided	Provided	Conforms
16.	Sheet metal	AS36 / IS 2062	IS:2062	Conforms
17.	Marking/labeling of machine	The labeling plate should be riveted on the body of machine having Name and address of manufacturer, Country of Origin, Make, Model, Year of manufacturer, Serial Number, Type, size, required of prime mover (kW)	Provided	Conforms
18.	Literature	Operator manual, Service manual and Parts catalogue should be provided.	Provided	Conforms

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

12.3 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.

12.4 Provision against overload of Power take off drive shaft is not provided. It **MUST** be provided

12.5 **Technical Literature:**

One booklet entitled "operator manual, service manual, part catalogue" was provided for reference during test. The same, however, needs to be updated as per IS:8132-1999.

TESTING AUTHORITY

Er. G.R. AMBALKAR AGRICULTURAL ENGINEER	Ambalkar
Dr. MUKESH JAIN **DIRECTOR**	22.07.2021

13. APPLICANT'S COMMENTS

Para No.	Our reference	Remarks
13.1	12.1	The dimension of three point linkage of implement will be improved in our regular production.
13.2	12.2	The hardness of blades will be improved at vendor end as per IS:6690-1981.
13.3	12.3	The chemical composition of blades will be improved at vendor end as per IS: 6690-1981.
13.4	12.4	The power take off drive shaft will be provided for protection against overload condition in future delivery.
13.5	12.5	Technical literature will be update as per IS: 8132-1999.