

व्यावसायिक परीक्षण रिपोर्ट (प्रारंभिक)
COMMERCIAL TEST REPORT (Initial)



संख्या/No.: Machine 132/506
माह / Month: October 2024

THIS TEST REPORT IS VALID UPTO 31.10.2031



BHUDEV BHRF-2.5 FEET ROTAVATOR



भारत सरकार

GOVERNMENT OF INDIA

कृषि एवं किसान कल्याण मंत्रालय

MINISTRY OF AGRICULTURE AND FARMERS WELFARE

कृषि एवं किसान कल्याण विभाग

DEPARTMENT OF AGRICULTURE AND FARMERS WELFARE

उत्तर पूर्वी क्षेत्र कृषि यंत्र प्रशिक्षण एवं परीक्षण संस्थान

NORTH EASTERN REGION FARM MACHINERY TRAINING & TESTING INSTITUTE

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Machine 132/506	BHUDEV BHRF-2.5 FEET ROTAVATOR CHAIN DRIVE, SINGLE SPEED	COMMERCIAL (INITIAL)
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4. SPECIFICATIONS

4.1 General:

Name and address of the manufacturer	: M/s. Micro Laser Pvt. Ltd., Plot No- 243, Sector No-10, PCNTDA, MIDC, Bhosari, Pimpri- Chinchwad, Maharashtra- 411026
Name and Address of Applicant	: M/s. Micro Laser Pvt. Ltd., Plot No- 243, Sector No-10, PCNTDA, MIDC, Bhosari, Pimpri- Chinchwad, Maharashtra- 411026
Name of machine	: Rotavator
Type	: Chain Drive, Single Speed
Make	: BHUDEV
Model	: BHRF-2.5 FEET
Year of manufacture	: 2024
Serial Number	: BHRF25034
Recommended power source, hp	: 18 to 35
Type of blade	: J TYPE (Hatchet)
Size (cm) {Rotor Dia. × Working width}	: 47.5Φ × 57



4.2 Prime Mover Used:

Tractor	: Kubota B2420
Chassis No./ Engine no.	: 59287JH/1FS6060
Max. PTO Power, kW (Ps)	: 13.2 kW

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8	Depth of cut / depth of puddle (cm)	7.52 to 8.2	15.2 to 16.6
9	Working width (m)	0.572 to 0.582	--
10	Area covered (ha/h)	0.074 to 0.080	0.073 to 0.076
11	Time required for one ha (h)	12.50 to 13.51	13.16 to 13.70
12	Field efficiency/ Puddling Index (%)	79.83 to 81.63	77.00 to 80.90
13	Fuel consumption		
	-l/h	2.76 to 2.90	2.64 to 2.71
	-l/ha	35.37 to 38.16	--

7.1 Dry land operation :

7.1.1 Rate of work :

- The rate of work was recorded as 0.074 to 0.080 ha/h and the speed of operation was recorded as 1.62 to 1.70 kmph.
- The time required to cover one hectare was recorded as 12.50 to 13.51 h.

7.1.2 Quality of work :

- The depth of cut was recorded as 7.52 to 8.2 cm.
- Working width was observed as 0.572 to 0.582 m.
- Field efficiency was observed as 79.83 to 81.63 %.



7.2 Wet land operation :

The tractor was operated without cage wheel for puddling operation in wet land.

7.2.1 Quality of work:

- The depth of puddle was recorded as 15.2 to 16.6 cm.
- The puddling index was recorded as 77.0 to 80.9 %.

7.3 Effectiveness of sealing for wet land operation:

After completion of field test in wet land, the rotavator was dismantled for checking the effectiveness of sealing provided against ingress of mud and/or water 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

7.4 Labour requirement :

One skilled operator is needed to operate the tractor with the rotavator.

7.5 Adequacy of power of prime mover as used during test :

The power of the prime mover as used during test was found adequate.

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7.6 Wear analysis:

7.6.1 On mass basis:

Wear analysis on mass basis was done after 35.75 hours of dry land & wet land operation and the results are as shown below,

Wet land & dry land Operation				
S.No.	Initial Mass (g)	Final Mass (g)	Percentage of Wear	
			After 35.75 hours	Per Hour
1	497.31	405.88	18.38	0.51
2	492.28	412.52	16.20	0.45
3	498.27	412.20	17.27	0.48
4	497.19	384.29	22.71	0.63
5	491.98	415.54	15.54	0.43
6	504.97	389.69	22.83	0.64
7	507.88	418.37	17.62	0.49
8	507.08	424.79	16.23	0.45
9	501.00	421.57	15.85	0.44

The hourly rate of wear of blade on mass basis after dry land and wet land operations was recorded as 0.43 to 0.64 %.

8. EASE OF OPERATION AND ADJUSTMENTS

The operator can easily adjust and control the rotavator from operator's seat in the field as the adjustments are within the easy reach of operator. No noticeable difficulty was observed during the operation and adjustment of rotavator.

9. DEFECTS, BREAKDOWNS AND REPAIRS

No defect or breakdown was observed during 35.75 hours of field performance test (wet land and dry land operation).



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10. PARAMETERS APPLICABLE FOR QUALIFYING MINIMUM PERFORMANCE CRITERIA

Sl No	Characteristics	Category Evaluative/ Non Evaluative	Requirement	Tolerance	As Observed	Whether meets the requirements (Yes/ No)
1	2	3	4	5	6	7
1	Field Performance					
i	Suitability for wet land operation	Evaluative	Should be suitable for wet land operation	--	Suitable	Yes
ii	Depth of cut in dry land operation (cm)	Evaluative	Minimum 10 cm	--	7.52 to 8.20 cm	No
iii	Depth of puddle in wet land operation(cm)	Evaluative	Minimum 12 cm	--	15.2 to 16.6 cm	Yes
iv	Field Efficiency (%)	Evaluative	Minimum 75 %	--	79.83 to 81.63	Yes
v	Puddling Index (%)	Evaluative	Minimum 65 %	--	77.00 to 80.90	Yes
2	Safety Requirements					
i	Safety considerations	Evaluative	Should meet the requirement of IS:10740 and IS:10318	--	Provided	Yes
ii	Safety Clutch/ device(shear bolt) in PTO drive shaft	Evaluative	Should be provided	--	Not provided	No
iii	Rotavator Stand	Evaluative	Should be provided	--	Not provided	No
iv	Rotavator shield to prevent flying of mud and stone	Evaluative	Should be provided	--	Provided	Yes
v	Guard over propeller shaft	Evaluative	Should be provided	--	Not provided	No



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1	2	3	4	5	6	7
3	Effectiveness of sealing (presence of ingress of dust and water/ mud in various sub-assemblies)					
i	Primary reduction gear/ box	Evaluative	No ingress of mud and water	--	No ingress of mud and water	Yes
ii	Secondary reduction gear/box	Evaluative	No ingress of mud and water	--	No ingress of mud and water	Yes
iii	Rotary axle bearing cap	Evaluative	No ingress of mud and water	--	No ingress of mud and water	Yes
4	Material of construction					
i	Hardness of blades	Evaluative	High carbon steel, boron steel	--	Boron steel (apa)	Yes
ii	Chemical composition of rotor blades	Evaluative	As per IS:6690	--	Provided as per IS:6690	Yes
5	Dimensional requirements					
i	Dimension of three point linkage	Non-Evaluative	Should meet IS:4468 (part -I)	--	Not provided	No
ii	Dimension of PIC of Implements	Non-Evaluative	Should meet IS:4931	--	Provided	Yes
iii	Dimensions of PIC yoke bore	Non-Evaluative	Should meet IS:4931	--	Provided	Yes
6	Literature (Submission to test agency)					
i	Operator cum service manual and part catalogue	Evaluative	Should be provided as per IS:8132	--	Provided	Yes
7	Labeling of Rotavator (provision of labeling plate) as mention below and should be welded on rotavator					
	Parameter					
i	Name and address of the manufacturer	Evaluative	Should be provided on rotary tiller (Rotavator)	--	Provided	Yes
ii	Make			--	Provided	Yes
iii	Model			--	Provided	Yes



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1	2	3	4	5	6	7
iv	Size, (m) {Dia of Rotor X Width of Cut}			--	Not provided	No
v	Country of origin	Evaluative	Should be provided on rotary tiller (Rotavator)	--	Provided	Yes
vi	Year of manufacture			--	Provided	Yes
vii	Chassis Serial Number			--	Provided	Yes
viii	Recommended PTO speed of Prime mover(rpm)			--	Not provided	No
ix	Maximum PTO power requirement, kW			--	Provided	Yes

8 Category of breakdowns/ defects					
	Category of breakdowns	Category Evaluative/ Non Evaluative	Requirements	As Observed	Whether meets the requirements (Yes/ No)
i	Critical breakdowns	Evaluative	No critical breakdown	None	Yes
ii	Major breakdown	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 no of breakdown should exceed four, i.e. (1 major + 3 minor) or 4 minor breakdowns	None	Yes



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11. CRITICAL TECHNICAL SPECIFICATIONS

(as per Ministry's letter No. 13-9/2019-(M&T) (I&P)-Part, dated 26.04.2019)

Sl.No.	Parameters	Specifications	Observation	Remarks
1.	Working width (mm)	1200 (Min.)	570	Does not conform
2.	Type of blade	C/L/J shape as per demand	J shaped	Conforms
3.	Overlap, mm	15 (min.)	--	--
4.	Thickness of blade (mm)	7-8 (min.)	9.2	Conforms
5.	No. of Blades	30 (Min.)	18	Does not conform
6.	Total number of flanges	5 (Min.)	18	Conforms
7.	Number of blades per flange	6 (max.)	1	Conforms
8.	Outer Diameter of rotor shaft with blade, mm	75 - 90	73.5	Does not conform
9.	Rotor diameter, including flange and blade mounted on flange, mm	425 (Min.)	475	Conforms
10.	Side Drive	Gear drive	Chain drive	Does not conform
11.	Depth control mechanism	Arc shaped skid on both side of rotavator	Provided	Conforms
12.	Material of blades	Boron (28MnCrB5) / High Carbon Steel EN 42j	Boron steel	Conforms
13.	Hardness of Blade Material, HRC	38 (Min)	50	Conforms
14.	Safety clutch / device (Shear bolt) in PTO drive shaft	Must be provided	Not provided	Does not conform
15.	Rotavator stand	Must be provided	Not provided	Does not conform
16.	Guard over propeller shaft	Must be provided	Not provided	Does not conform
17.	Sheet metal	AS36 / IS 2062	--	--
18.	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,	Provided	Conforms



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		Size, required size of prime mover (kW)		
19.	Literature	Operator manual, Service manual and Parts catalogue should be provided	Provided	Conforms

12. COMMENTS AND RECOMMENDATIONS

- 12.1 Hitch pyramid (three point linkage) was not provided with the rotavator and it is advised to provide hitch pyramid with standard specifications so that the rotavator can be easily attached to prime mover without any special attachment.
- 12.2 Hardness of rotor blades does not conform to IS: 6690-2002. It is therefore, recommended that the material of rotavator blade should be improved and shall be provided as per the requirement of Indian Standard.
- 12.3 In dry land operation depth of cut was observed as 7.52 to 8.20 cm which does not meet the requirement of Indian Standard. This should be looked into.
- 12.4 Safety Clutch/ device (shear bolt) in PTO drive shaft was not provided. This should be looked into and shall be provided for safety of the machine.
- 12.5 Rotavator stand and guard over propeller shaft were not provided and it should be provided for safety.
- 12.6 Size of rotavator (dia of rotor x width of cut) and recommended PTO speed of prime mover (rpm) should be provided in the labelling plate of the machine.

TESTING AUTHORITY


(M.R. PATIL)
SENIOR AGRICULTURAL ENGINEER


(P. KAMALABAI)
DIRECTOR



Draft test report compiled by – Shri J. Bhon Singh, STA

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13. APPLICANT'S COMMENTS

Para No.	Our Reference	Applicant's Comments
13.1	12.1	We will take the necessary action on it.
13.2	12.2	We will take the necessary action on it.
13.3	12.3	We will take the necessary action on it.
13.4	12.4	We will take the necessary action on it.
13.5	12.5	We will take the necessary action on it.
13.6	12.6	We will take the necessary action on it.

