

व्यावसायिक परीक्षण रिपोर्ट

COMMERCIAL TEST REPORT

संख्या/ No.: ROTAVATOR-269/2451/2020

माह/Month : February, 2020

THIS TEST REPORT VALID UP TO : 28th FEBRUARY, 2027



**SOILTECH, HD-210 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

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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	EP-140	
3	Rotor Hub	Not specified	Servo M.P grease
4	Propeller Shaft	Not specified	Servo M.P grease

5. RUNNING – IN

Rotavator was run in for 0.88 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	47.9 to 50.1	Does not conform
On shank portion	37 to 45	47.9 to 50.1	Does not conform

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	0.1443	Does not conform
Silicon (Si)	0.10 -0.40	1.50-2.00	0.3434	Conforms
Manganese (Mn)	0.50 -1.0	0.50-1.00	0.7246	Conforms
Sulphur (S)	0.05(max)	0.05(max)	0.0370	Conforms
Phosphorous (P)	0.05(max)	0.05(max)	0.0137	Conforms

7. FIELD PERFORMANCE TEST

The field tests of the rotavator comprising of wet land and dry land operation were conducted for 10.70 and 25.71 hours respectively to assess the performance of the rotavator. The performance of rotavator is reported in **Annexure-I & III** for wet land and dry land operations respectively.

Observations of field performance test are 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	Sonalika DI-60 MM Super	
2.	Gear used	L-2	L-2
3.	Type of soil (Refer IS:7926-1975)	Sandy loam	
4.	Average soil moisture (%)	-	9.1 to 16.26
5.	Average depth of standing water (cm)	8.56 to 9.33	
6.	Bulk density of soil (g/cc)		1.46 to 1.63
7.	Average speed of operation (kmph)	2.37 to 2.74	2.65 to 2.86
8.	Avg. travel reduction /Avg. wheel slip (%)	-2.8 to -1.48	-1.78 to 0.64
9.	Average depth of puddle/ Average depth of cut (cm)	25.1 to 27.11	10.89 to 12.56
10.	Avg. working width (cm)	--	196 to 204
11.	Area covered (ha/h)	--	0.467 to 0.505
12.	Time required for one ha (h)	--	1.980 to 21.40
13.	Field efficiency (%)	--	84.87 to 89.98
14.	Puddling index (%)	3.21 to 3.52	
15.	Fuel consumption		
	l/h	3.21 to 3.52	4.19 to 5.09
	l/ha	--	8.30 to 10.36
16.	Average PTO power utilized (kW)	--	21.8

7.1 Wet Land operation

7.1.1 The tractor was fitted with half cage wheel on rear pneumatic traction wheel for conducting the paddling 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 25.1 to 27.11 cm.
- ii) The puddling index was recorded as 76.47 to 79.31 %.

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

- i) The rate of work was recorded as 0.467 to 0.505 ha/h, and the speed of operation varies from 2.65 to 2.86 kmph.
- ii) The time required to cover one hectare was recorded as 1.98 to 2.14 h.

7.2.2 Quality of work

- i) The depth of operation was recorded as 10.89 to 12.56 cm.
- ii) Average working width was observed as 196 to 204 cm.
- iii) Field efficiency was observed as 84.87 to 89.98 %.

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 36.55 hr. of operation (g)	Difference of weight (g)	Percentage of wear (%) after 36.55 hr.	Percentage of wear on hour basis (%)
1.	1000.4	959.5	40.9	4.09	0.11
2.	999.0	955.3	43.7	4.37	0.12
3.	991.2	958.6	32.6	3.29	0.09
4.	997.9	966.2	31.7	3.18	0.09
5.	1012.9	980.8	32.1	3.17	0.09
6.	997.7	976.2	21.5	2.16	0.06
7.	1005.2	967.9	37.3	3.71	0.10
8.	998.6	967.4	31.2	3.12	0.08

8. EFFECTIVENESS OF SEALINGS

After completion of wet land operation for 10.70 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 36.41 hours of field operation.

11. CRITICAL TECHNICAL SPECIFICATIONS

(Vide Ministry's communication F. No 9-1/2019- M&T (I&P) dated 20.08.2019)

Sr. No.	Parameters	Specification	Observation	Remarks
1	Working width (mm)	2078	1980	Conforms
2	Type of blade	C/L/J shape as per demand, Hatchet Blade	L shape	Conforms
3	Thickness of blade (mm)	7-8 (Min.)	7.0	Conforms


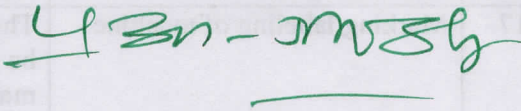
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4	No. of blades	30 (Min.)	48	Conforms
5	Total number of flanges	5 (Min.)	8	Conforms
6	Number of blades per flange	6 (Max.)	6	Conforms
7	Outer Diameter of rotor shaft, mm	75-90	90	Conforms
8	Rotor diameter, including flange and blade mounted on flange, mm	425 (Min.)	460	Conforms
9	Side drive	Gear drive/chain drive (optional)	Gear drive	Conforms
10	Depth control mechanism	Arc shaped skid on both side of rotavator	Provided	Conforms
11	Material of blades	Boron 27/28/30Mn (28MnCrB5)/High Carbon Steel of grade EN42/EN45/EN47	Boron (MnCrB5) (apa)	Conforms
12	Hardness of blade material, HRC	38 (Min.)	Average 49.0	Does not conform
13	Safety clutch/device (shear bolt) in PTO drive shaft	Must be provided	Provided	Conforms
14	Rotavator stand	Must be provided	Provided	Conforms
15	Guard over propeller shaft	Must be provided	Provided	Conforms
16	Sheet metal	AS36/IS 2062	Not specified	--
17	Marking/labeling of machine	The labeling plate should be riveted on the body of machine having Name and address of manufacturer, County of origin, Make, Model, Year of manufacture, Serial number, Type, Size, required size of prime mover (kW)	Size is not specified	Does not conform in toto
18	Literature	Operator manual, service manual and parts catalogue should be provided	Provided	Conforms

12. COMMENTS AND RECOMMENDATIONS

- 12.1** The marking/labeling of machine **does not meet the requirement of critical technical specification. It MUST be looked into.**
- 12.2** The sheet metal is not specified. **This is critical parameter and therefore it MUST be specified.**
- 12.3** The specifications of implement hitch, does not conform in toto to the 4468 (Part-1)-1997. Hence, it is recommended that implement should be provided with the hitch conforming to relevant Indian Standards.

- 12.4 Dimensions of PIC of implement do not conform in toto to IS: 4931-1995 and therefore, it should be looked in to for corrective action.
- 12.5 The grade of grease does not specified. It should be specified.
- 12.6 The provision to check oil lubricant level in Secondary reduction does not provided. It should be provided.
- 12.7 The chemical composition of blades does not conform to as per IS: 6690-1981. This needs to be looked into for corrective action at production level.
- 12.8 **Technical literature:-**
Operator cum service manual with parts catalogue supplied with the rotavator during testing.
However, the operator cum service manual should be updated as per IS-8132-1999.

TESTING AUTHORITY

MAAN SINGH SENIOR TECHNICAL ASSISTANT	
P. K. PANDEY DIRECTOR	

Test report compiled by C.Veeranjaneyulu, Sr. Technician.

13. APPLICANT'S COMMENTS

Para No	Our reference	Applicants comment's
13.1	12.2	Sietz Technologies ensures to provide sheet metal details on the product specification sheets & product manuals.
13.2	12.3 & 12.4	Sietz Technologies ensures corrective action to correct this dimension in regular production.
13.3	12.5	Sietz will specify the Grade of grease in it's Rotavator Manual & other literatures.
13.4	12.6	Sietz ensures to provide the oil level indicator in the secondary reduction gear box on all the rotavators.
13.5	12.7	Sietz ensures to use Rotavator blades qualifying the required parameters of chemicals composition.
13.6	12.8	Sietz will update its Rotavator manual as per the recommended standards.