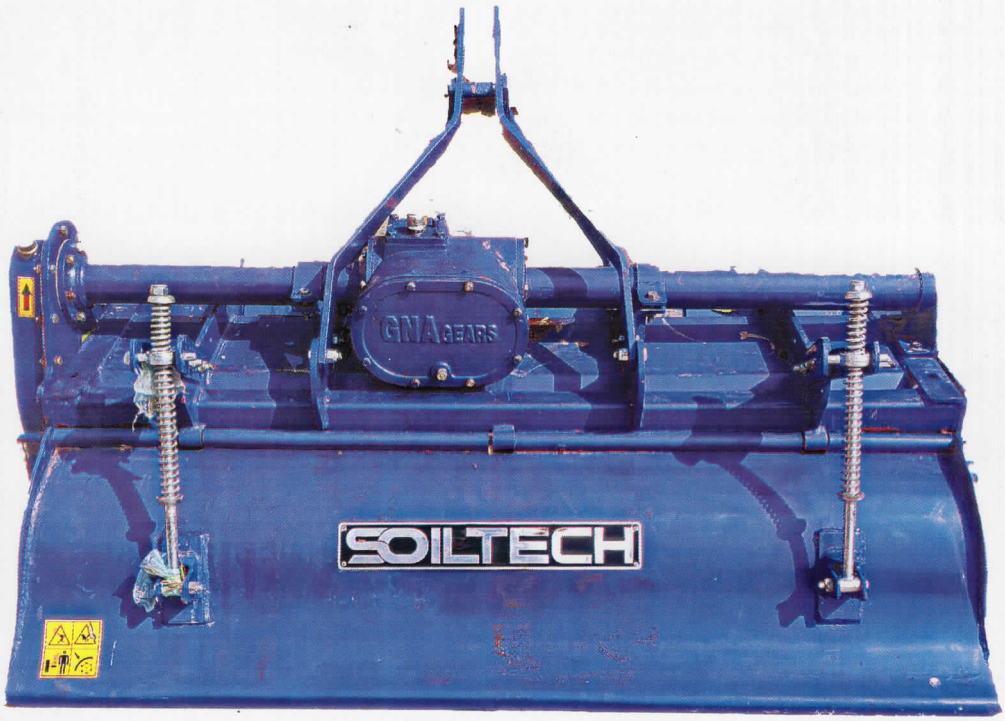
व्यावसायिक परीक्षण रिपोर्ट
COMMERCIAL **TEST REPORT**

संख्या/ **No.: ROTAVATOR-268/2450/2020**
माह/**Month** : February, 2020

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



SOILTECH, MS-160 ROTAVATOR (TRACTOR MOUNTED)

सत्यमेव जयते

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]

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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 0.79 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	44.6 to 50.9	**Does not conform**
On shank portion	37 to 45	44.6 to 50.9	**Does not conform in toto**

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	0.2033	**Does not conform**
Silicon (Si)	0.10 -0.40	1.50-2.00	0.3533	Conforms
Manganese (Mn)	0.50 -1.0	0.50-1.00	0.9180	Conforms
Sulphur (S)	0.05(max)	0.05(max)	0.0401	Conforms
Phosphorous (P)	0.05(max)	0.05(max)	0.0218	Conforms

7. FIELD PERFORMANCE TEST

The field tests of the rotavator comprising of wet land and dry land operation were conducted for 10.62 and 25.14 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	Farmtrac Champion F2 SM	
2.	Gear used	L-2	L-2
3.	Type of soil (Refer IS:7926-1975)	Sandy loam	
4.	Average soil moisture (%)	-	8.43 to 16.5
5.	Average depth of standing water (cm)	6.56 to 9.0	
6.	Bulk density of soil (g/cc)		1.450 to 1.664
7.	Average speed of operation (kmph)	3.11 o 3.15	3.09 to 3.17
8.	Avg. travel reduction /Avg. wheel slip (%)	-2.53 to -1.52	-2.55 to -0.33
9.	Average depth of puddle/ Average depth of cut (cm)	24.4 to 28.56	10.78 to 11.78
10.	Avg. working width (cm)	--	142 to 157
11.	Area covered (ha/h)	--	0.357 to 0.449
12.	Time required for one ha (h)	--	2.23 to 2.80
13.	Field efficiency (%)	--	80.22 to 92.58
14.	Puddling index (%)	76.92 to 79.29	
15.	Fuel consumption		
	l/h	2.33 to 2.50	3.02 to 4.08
	l/ha	--	7.08 to 11.43
16.	Average PTO power utilized (kW)	--	18.8

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 24.4 to 28.56 cm.

ii) The puddling index was recorded as 76.92 to 79.29%.

7.2 Dry land operation

7.2.1 Rate of work

i) The rate of work was recorded as 0.357 to 0.449 ha/h, and the speed of operation varies from 3.09 to 3.17 kmph.

ii) The time required to cover one hectare was recorded as 2.23 to 2.80 h.

7.2.2 Quality of work

i) The depth of operation was recorded as 10.78 to 11.78 cm.

ii) Average working width was observed as 142 to 157 cm.

iii) Field efficiency was observed as 80.22 to 92.58 %.

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.	1001.4	977.8	23.6	2.36	0.07
2.	996.0	978.6	17.4	1.75	0.05
3.	998.2	992.9	5.3	0.53	0.02
4.	1005.4	963.6	41.8	4.16	0.11
5.	1002.7	977.0	25.7	2.56	0.07
6.	1005.2	963.8	41.4	4.12	0.11

8. EFFECTIVENESS OF SEALINGS

After completion of wet land operation for 10.62 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 35.76 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)	1200 (Min.)	1495	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
4	No. of blades	30 (Min.)	36	Conforms
5	Total number of flanges	5(Min.)	06	Conforms
6	Number of blades per flange	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.)	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 47.4	Conforms
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 provided.	**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, Senior 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.