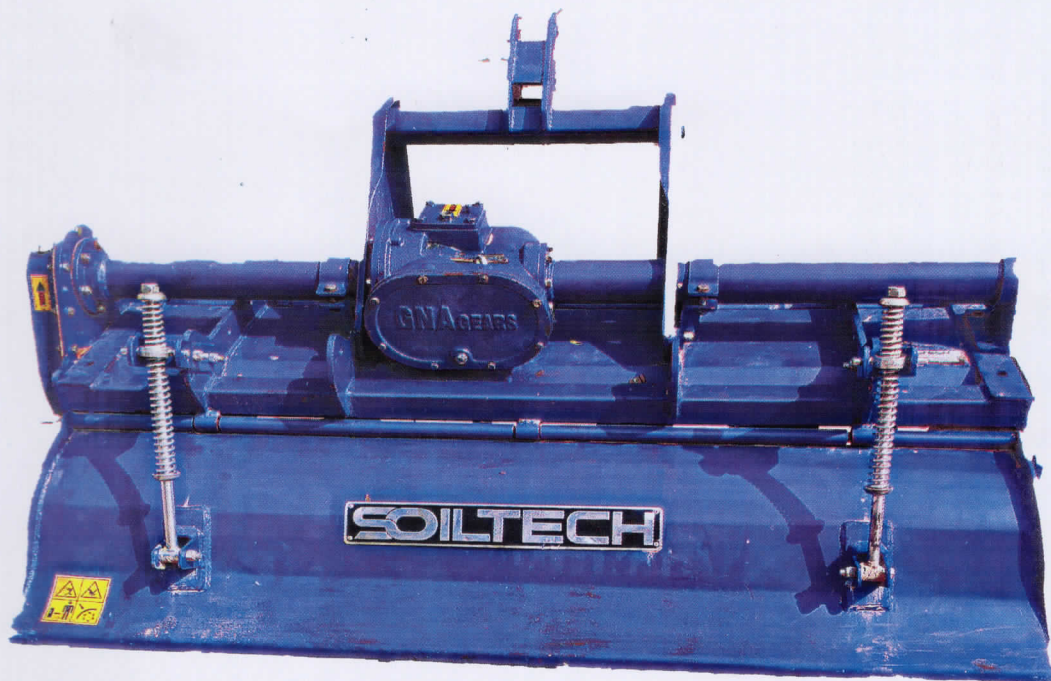


व्यावसायिक परीक्षण रिपोर्ट
COMMERCIAL TEST REPORT

संख्या/ No.: ROTAVATOR-272/2454/2020

माह/Month : February, 2020

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



**SOILTECH, HD-160 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

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

| | |
|-------------------------|--|
| ROTAVATOR-272/2454/2020 | SOILTECH, HD-160 ROTAVATOR (TRACTOR MOUNTED) (COMMERCIAL) |
|-------------------------|--|

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 0.77 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 | 43.3 to 46.0 | Does not conform |
| On shank portion | 37 to 45 | 43.3 to 46.0 | 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 | 0.2314 | Does not conform |
| Silicon (Si) | 0.10 -0.40 | 1.50-2.00 | 0.2817 | Conforms |
| Manganese (Mn) | 0.50 -1.0 | 0.50-1.00 | 1.0356 | Conforms |
| Sulphur (S) | 0.05(max) | 0.05(max) | 0.0492 | Conforms |
| Phosphorous (P) | 0.05(max) | 0.05(max) | 0.0250 | Conforms |

7. FIELD PERFORMANCE TEST

The field tests of the rotavator comprising of wet land and dry land operation were conducted for 10.60 and 25.7 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 (%) | - | 9.5 to 16.5 |
| 5. | Average depth of standing water (cm) | 6.22 to 7.44 | |
| 6. | Bulk density of soil (g/cc) | | 1.460 to 1.63 |
| 7. | Average speed of operation (kmph) | 2.85 to 2.87 | 2.69 to 2.82 |
| 8. | Avg. travel reduction /Avg. wheel slip (%) | -1.92 to -1.52 | -1.72 to -0.16 |
| 9. | Average depth of puddle/ Average depth of cut (cm) | 24.1 to 25.1 | 10.55 to 11.78 |
| 10. | Avg. working width (cm) | -- | 146 to 148 |
| 11. | Area covered (ha/h) | -- | 0.350 to 0.365 |
| 12. | Time required for one ha (h) | -- | 2.74 to 2.86 |
| 13. | Field efficiency (%) | -- | 86.85 to 90.25 |
| 14. | Puddling index (%) | 72.84 to 80.61 | |
| 15. | Fuel consumption | | |
| | l/h | 2.56 to 2.67 | 2.78 to 3.21 |
| | l/ha | -- | 7.83 to 8.79 |
| 16. | Average PTO power utilized (kW) | -- | 19.3 |

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 24.1 to 25.1 cm.
- ii) The puddling index was recorded as 72.84 to 80.61%.

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

- i) The rate of work was recorded as 0.350 to 0.365 ha/h, and the speed of operation varies from 2.69 to 2.82 kmph.
- ii) The time required to cover one hectare was recorded as 2.74 to 2.86 h.

7.2.2 Quality of work

- i) The depth of operation was recorded as 10.55 to 11.78 cm.
- ii) Average working width was observed as 146 to 148 cm.
- iii) Field efficiency was observed as 86.85 to 90.25 %.

7.3 Labour requirement

In all, two skilled operators are needed to ensure continuous operation of machine 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 37.07 hr. of operation (g) | Difference of weight (g) | Percentage of wear (%) after 37.07 hr. | Percentage of wear on hour basis (%) |
|---------|---------------------------|--|--------------------------|--|--------------------------------------|
| 1. | 992.6 | 940.7 | 51.9 | 5.23 | 0.14 |
| 2. | 992.8 | 937.9 | 54.9 | 5.53 | 0.15 |
| 3. | 1006.8 | 950.0 | 56.8 | 5.64 | 0.15 |
| 4. | 977.6 | 957.5 | 20.1 | 2.06 | 0.55 |
| 5. | 994.9 | 958.2 | 36.7 | 3.69 | 0.100 |
| 6. | 985.5 | 954.6 | 30.9 | 3.11 | 0.08 |

8. EFFECTIVENESS OF SEALINGS

After completion of wet land operation for 10.6 hours, the implement 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 36.3 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.) | 1490 | 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 |

| | |
|-------------------------|--|
| ROTAVATOR-272/2454/2020 | SOILTECH, HD-160 ROTAVATOR (TRACTOR MOUNTED) (COMMERCIAL) |
|-------------------------|--|

| | | | | |
|----|--|---|-----------------------|--------------------------|
| 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 44.9 | 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 |

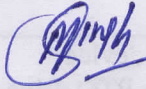
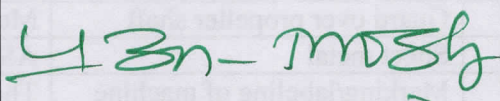
12. COMMENTS AND RECOMMENDATIONS

- 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. |

