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व्यावसायिक परीक्षण रिपोर्ट
COMMERCIAL TEST REPORT

संख्या/ No.: ROTAVATOR-316/2585/2020
माह/Month: November, 2020

THIS TEST REPORT VALID UP TO : 30th November, 2027



**VEER, 8 FEET 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

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|-------------------------|--|
| ROTAVATOR-316/2585/2020 | VEER, 8 FEET ROTAVATOR (TRACTOR MOUNTED) (COMMERCIAL) |
|-------------------------|--|

4.11 Lubricants:

| Sl. No. | Particulars | As recommended by the manufacturer | As used during test |
|---------|--------------------|------------------------------------|--|
| 1 | Primary Gear box | CL-140 | Oil originally filled in the rotavator was not changed |
| 2 | Secondary Gear box | CL-140 | |
| 3 | Rotor Hub | Not specified | M.P. Grease |
| 4 | Propeller Shaft | Not specified | |

5. RUNNING – IN

Rotavator was run in for 1.58 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 | 45.53 | Does not conform |
| On shank portion | 37 to 45 | 48.95 | 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 | 0.2169 | Does not conform |
| Silicon (Si) | 0.10 -0.40 | 1.50-2.00 | 0.3715 | Conforms to carbon steel |
| Manganese (Mn) | 0.50 -1.0 | 0.50-1.00 | 0.8991 | Conforms |
| Sulphur (S) | 0.05(max) | 0.05(max) | 0.0451 | Conforms |
| Phosphorous (P) | 0.05(max) | 0.05(max) | 0.0275 | Conforms |

7. FIELD PERFORMANCE TEST

The field tests of the rotavator comprising of dry land and wet land operation were conducted for 26 and 11 hours respectively to assess the performance test 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 | SONALIKA DI 60 MM SUPER | |
| 2. | Gear used | L-1 | L-1 |
| 3. | Type of soil | Sandy loam | |
| 4. | Average soil moisture (%) | 7.25 to 12.33 | -- |
| 5. | Average depth of standing water (cm) | -- | 11.30 to 12.10 |
| 6. | Bulk density of soil (g/cc) | 1.620 to 1.720 | -- |
| 7. | Average speed of operation (kmph) | 2.05 to 2.33 | 2.01 to 2.06 |
| 8. | Avg. travel reduction (%) | -- | -0.83 to -0.09 |
| 9. | Avg. wheel slip (%) | -1.89 to 1.04 | -- |
| 10. | Average depth of puddle (cm) | -- | 27.50 to 28.50 |
| 11. | Average depth of cut (cm) | 7.33 to 9.00 | -- |
| 12. | Avg. effective width (cm) | 214 to 219 | -- |
| 13. | Area covered (ha/h) | 0.380 to 0.432 | -- |
| 14. | Time required for one ha (h) | 2.31 to 2.63 | -- |
| 15. | Field efficiency (%) | 76 to 93 | -- |
| 16. | Puddling index (%) | -- | 81 to 85 |
| 17. | Fuel consumption | | |
| | | l/h | 4.50 to 5.30 |
| | | l/ha | 10.82 to 13.58 |
| | | | 3.49 to 3.81 |
| | | | -- |

7.1 Dry land operation**7.1.1 Rate of work**

- i) The rate of work was recorded as 0.380 to 0.432 ha/h, and the speed of operation varies from 2.05 to 2.33 kmph.
- ii) The time required to cover one hectare was recorded as 2.31 to 2.63 h

7.1.2 Quality of work

- i) The depth of operation was recorded as 7.33 to 9.00 cm.
- ii) Average effective width was observed as 214 to 219 cm.
- iii) Field efficiency was observed as 76 to 93 %.

7.2 Wet Land operation

7.2.1 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

7.2.2 Quality of work

- i) The depth of puddle was recorded as 27.50 to 28.50 cm.
- ii) The puddling index was recorded as 81 to 85 %.

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 38.42 hr. of operation (g) | Difference of weight (g) | Percentage of wear (%) after 38.42 hr. | Percentage of wear on hour basis (%) |
|---------|---------------------------|--|--------------------------|--|--------------------------------------|
| 1. | 1012.5 | 918.3 | 94.2 | 9.30 | 0.24 |
| 2. | 1053.6 | 962.7 | 90.9 | 8.63 | 0.25 |
| 3. | 1030.2 | 911.9 | 118.3 | 11.48 | 0.30 |
| 4. | 1028 | 926.6 | 101.4 | 9.86 | 0.26 |
| 5. | 1023.7 | 827.9 | 95.8 | 9.36 | 0.24 |
| 6. | 1048.7 | 966.9 | 81.8 | 7.8 | 0.20 |
| 7. | 1038.1 | 934.2 | 103.9 | 10 | 0.26 |
| 8. | 1018.4 | 984.5 | 33.9 | 3.33 | 0.09 |
| 9. | 1073.4 | 940.5 | 132.9 | 12.38 | 0.32 |
| 10. | 1031.0 | 955.9 | 75.1 | 7.28 | 0.19 |

8. EFFECTIVENESS OF SEALINGS

After completion of wet land operation for 11 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 the test.

11. CRITICAL TECHNICAL SPECIFICATION

Deferred till 31.12.2020 vide Ministry O.M. No 13-13/2020 M&T, (I&P) dated 24.04.2020





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 Dimensions of PIC & PIC yoke bore of implement does not conform, in toto, to the requirements of IS: 4931-1995 and therefore, it may be looked into for corrective action.
- 12.3 Provision against overload on P.T.O drive shaft is not provided. It **MUST** be provided.
- 12.4 The grade of grease is not specified. It **MUST** be specified.
- 12.5 The stand is not provided. It **MUST** be provided.
- 12.6 The hardness of blades does not conform to the requirements of IS: 6690-1981. This needs to be looked into for corrective action.
- 12.7 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.
- 12.8 The guard over propeller shaft is not provided. It **MUST** be provided.
- 12.9 The observed Model –VEER as per labeling plate against Model -Rotavator 8 feet as per application. **It must be looked into for corrective action.**
- 12.10 **Technical Literature:**

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

TESTING AUTHORITY

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|---------------------------------------|--|
| SANJAY KUMAR AGRICULTURAL ENGINEER |  |
| P. K. PANDEY DIRECTOR |  |

Draft test report compiled by Girdhari Lal, Technician

13. APPLICANT'S COMMENTS

No comments received from the applicant.

