व्यावसायिक परीक्षण रिपोर्ट

COMMERCIAL TEST REPORT

संख्या/ **No.: IMP-912/2142/2018**

माह/**Month : April, 2018**

GURNAM SINGH & SONS, (TRACTOR MOUNTED) MANJIT-5' ROTAVATOR

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

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[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	**Not specified**	Oil originally filled in the machine was not changed
2	Secondary Gear box	**Not specified**	
3	Rotor Hub	**Not specified**	Servo M.P grease
4	Propeller Shaft	**Not specified**	Servo M.P grease

5. RUNNING – IN

Run-in was not recommended by the applicant.

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	48.5 to 49.3	**Does not conform**
On shank portion	37 to 45	48.5 to 49.3	**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	0.3368	**Does not conform**
Silicon (Si)	0.10 -0.40	1.50-2.00	0.3568	Conforms
Manganese (Mn)	0.50 -1.0	0.50-1.00	1.0014	Conforms
Sulphur (S)	0.05(max)	0.05(max)	0.0087	Conforms
Phosphorous (P)	0.05(max)	0.05(max)	0.0454	Conforms

7. FIELD PERFORMANCE TEST

The field tests of the implement comprising of wet land and dry land operation were conducted for 15.82 and 27.19 hours respectively to assess the performance of the implement. The performance of implement is reported in **Annexure-I & II** 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	Jhon Deere 5204	
2.	Gear used	A-1	A-2
3.	Type of soil (Refer IS:7926-1975)	Sandy loam	
4.	Average soil moisture (%)	-	2.6 to 7.2
5.	Average depth of standing water (cm)	8.8 to 9.7	-
6.	Bulk density of soil (g/cc)	-	1.45 to 1.84
7.	Average speed of operation (kmph)	2.22 to 2.40	3.90 to 4.12
8.	Avg. travel reduction /Avg. wheel slip (%)	-0.28 to -0.52	1.34 to 3.43
9.	Average depth of puddle/ Average depth of cut (cm)	7.7 to 8.1	6.5 to 10.2
10.	Avg. working width (cm)	-	171 to 177
11.	Area covered (ha/h)	-	0.516 to 0.636
12.	Time required for one ha (h)	-	1.57 to 1.94
13.	Field efficiency (%)	-	79.0 to 92.0
14.	Puddling index (%)	82 to 91	-
15.	Fuel consumption		
	l/h	3.27 to 3.81	4.12 to 4.68
	l/ha	-	6.64 to 8.09
16.	Average PTO power utilized (kW)	-	14.92

7.1 Quality of work

i) The depth of puddle was recorded as 7.7 to 8.1 cm.

ii) The puddling index was recorded as 82 to 91 %.

7.2 Dry land operation

7.2.1 Rate of work

i) The rate of work was recorded as 0.516 to 0.636 ha/h, and the speed of operation varies from 3.90 to 4.12 kmph.

ii) The time required to cover one hectare was recorded as 1.57 to 1.94 h.

7.2.2 Quality of work

i) The depth of operation was recorded as 6.5 to 10.2 cm.

ii) Average working width was observed as 171 to 177 cm.

iii) Field efficiency was observed as 79.0 to 92.0 %.

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 43.01 hr. of operation (g)	Difference of weight (g)	Percentage of wear (%) after 43.01 hr.	Percentage of wear on hour basis (%)
1.	1061.1	1045.8	15.3	1.44	0.03
2.	1029.4	1016.8	12.6	1.22	0.03
3.	1019.1	1004.7	14.4	1.41	0.03
4.	1016.3	994.4	21.9	2.15	0.05
5.	1015.9	986.4	29.5	2.90	0.07
6.	1026.6	981.0	45.6	4.44	0.10

8. EFFECTIVENESS OF SEALINGS

After completion of wet land operation for 15.82 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 43.01 hours of field operation.

11. COMMENTS AND RECOMMENDATIONS

11.1 No labeling plate is provided on machine. The labeling plate **MUST** be provided on machine with following information :-

-Make
-Model
-Year of manufacturer
-Working width
-Recommended tractor power (KW)
-Manufacturer's address.

11.2 The specifications of implement hitch, does not conform in toto to the IS: 4468 (Part-1)-1997. Hence, it is recommended that implement should be provided with the hitch conforming to relevant Indian Standards.

11.3 Dimensions of PIC of implement does not conform in toto to IS: 4931-1995 and therefore, it should be looked into for corrective action.

11.4 Hardness of the blade does not conform to IS: 6690:1981. This needs to be looked into for corrective action at production level.

11.5 The chemical composition of blades does not conform in toto to the IS: 6690-1981. This needs to be looked into for corrective action at production level.

11.6 The safety device should be provided in propeller shaft against overload.

11.7 The recommended grade of lubrication for primary and secondary gear box **MUST** be specified on rotavator.

11.8 **Technical literature:-**

No literature was supplied with the rotavator for reference during testing. The applicant **MUST** have to provide the following literature with machine.

(i) Operator's manual
(ii) Spare parts catalogue
(iii) Service manual

TESTING AUTHORITY

R. K. NEMA SENIOR AGRICULTURAL ENGINEER	
P. K. PANDEY **DIRECTOR**	

12. APPLICANT'S COMMENTS

Para No	Our reference	Applicant's comment
12.1	11.1	We will provide labeling plate in future production.
12.2	11.7	In response to draft test report, the applicant has specified the following for gear box. i) Oil capacity 3.5 liters ii) Oil grade SAE 140 iii) Oil change period 250 hrs.