

व्यावसायिक परीक्षण रिपोर्ट
COMMERCIAL TEST REPORT

संख्या/ No.: MACHINE-55/3094/2023
माह/Month: October, 2023

THIS TEST REPORT VALID UP TO : 31st October, 2028



ROVER, R-S943 PRO BRUSH CUTTER



भारत सरकार
Government of India
कृषि एवं किसान कल्याण मंत्रालय
Ministry of Agriculture and Farmers Welfare
कृषि एवं किसान कल्याण विभाग
Department of Agriculture and Farmers Welfare
उत्तरी क्षेत्र कृषि मशीनरी प्रशिक्षण एवं परीक्षण संस्थान
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11. HARDNESS AND CHEMICAL COMPOSITION OF ROTOR BLADES**11.1 Hardness:****11.1.1 Hardness of triangular blade:**

Sr. No.	As per IS: 6025:1982 HRC	As observed (HRC)	Remarks
	48 to 58	37.0	Does not conform

11.2 Chemical composition analysis:**11.2.1 Triangular blade:**

Constituents	As per IS: 6025-1982	Composition as observed (% of weight)	Remarks
Carbon (C)	0.70-0.95	0.55	Does not conform
Manganese (Mn)	0.30 to 0.50	1.96	Does not conform
Silicon (Si)	--	0.29	--
Sulphur (S)	--	0.04	--
Phosphorous (P)	--	0.01	--

12. FIELD TEST

Field tests were conducted for 10.59 hours with straight blade attachment and 16.16 hours with Nylon rope attachment. Detailed results of field tests are shown in Annexure-I & II and summarized in the ensuing table. Details about the operator are shown in Annexure-III.

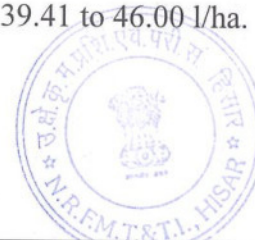
Sr. No.	Parameters	Seasonal Grass cutting	
		For nylon rope	For straight blade
1	Field condition	Leveled	Leveled
2	Intensity of grass	High	High
3	Average number of grass/weed in 1 sq.m	178 to 232	187 to 214
4	Height of grass/weed, cm	19 to 28	19.5 to 26.0
5	Diameter of grass/weed, mm	1.0 to 2.6	0.9 to 2.4
6	Mass of grass cut (kg/h)	47.76 to 54.03	49.55 to 59.13
7	Area covered (Rate of work), ha/h	0.015 to 0.017	0.017 to 0.022
8	Time required for one hectare, h	58.82 to 66.67	45.45 to 58.82
9	Fuel consumption	l/h	0.67 to 0.69
		l/ha	39.41 to 46.00
			0.63 to 0.72
			29.55 to 42.35

12.1 Cutting using nylon rope**12.1.1 Rate of work**

- The average area covered (rate of work) was observed as 0.015 to 0.017 ha/h.
- Average time required for one hectare was observed as 58.82 to 66.67 hours.
- Average numbers of perennial weed in one square meter are was 178 to 232
- Average mass of perennial weed cut was 47.76 to 54.03 kg/h.

12.1.2 Fuel consumption

Fuel consumption was observed as 0.67 to 0.69 l/h and 39.41 to 46.00 l/ha.



12.2 Cutting using straight blade**12.2.1 Rate of work**

- i) Average area covered (rate of work) was observed as 0.017 to 0.022 ha/h.
- ii) Average time required for one hectare was observed as 45.45 to 58.82 h.
- iii) Average mass of grass cut was observed as 49.55 to 59.13 kg/h.
- iv) Average No. of grass stem in one m² area was 187 to 214.

12.2.2 Fuel consumption

Average fuel consumption was observed as 0.63 to 0.72 l/h. and 29.55 to 42.35 l/ha.

12.3 Labor requirement

To ensure the cutting work without interruption, two operators are required to work alternately. Additionally, one more labour is needed to gather the collected bush/weeds.

12.4 Adequacy of power of prime mover

The power of prime mover was found adequate.

12.5 Wear analysis of critical components

Component	Duration of operation (h)	Initial length/mass (mm/g)	Length/mass after operation (mm/g)	Loss of length/mass (mm/g)	Percentage wear	Percentage wear on hour basis
Straight blade	10.59	400	382	18.0	4.5	0.42
Nylon rope	16.16	2700	1570	1130	41.85	2.59

13. EASE OF OPERATION & ADJUSTMENTS

Fatigue was observed just after half an hour of operation of the brush cutter, mainly, due to excessive mechanical vibration and noise. The operator complained about pain in different parts of his body like wrist & shoulder etc during operation.

Work-Rest cycle for this brush cutter is observed as follows

30 minutes work – 10 minutes rest – 20 minutes work - 10 minutes rest – 20 minutes work -15 minutes rest & so on.

14. ADJUSTMENT DEFECTS, BREAKDOWNS AND REPAIRS

No noticeable breakdowns were occurred during 41.70 hours of operation.

15. COMPONENTS/ASSEMBLY INSPECTION AND ASSESSMENT OF WEAR**15.1 Engine :**

The engine and other assemblies were dismantled after 41.70 hours of engine operation.

15.1.1 Cylinder :

Cylinder bore dia. (mm)						Max. permissible wear limit
Top Position		Middle position		Bottom Position		
Thrust	Non-thrust	Thrust	Non-thrust	Thrust	Non-thrust	
40.01	40.01	40.01	40.01	40.01	40.01	40.15

16. CRITICAL TECHNICAL SPECIFICATION
(Vide Ministry's communication No 13-9/2019 M & T (I&P) dated 26.04.2019)

Sr. No.	Parameters	Specification	Observed	Remarks		
1.	Type	Self propelled, portable	Self propelled	Conforms		
2.	Type of cutting attachment	Circular disc/Straight blade/nylon rope	Straight blade & nylon rope used	Conforms		
Circular blade						
3.	Material of Circular/straight blade	Alloy Steel	Circular blade is not recommended by applicant	--		
4.	No. of teeth on circular disc blade	50-100				
5.	Root diameter/Overall diameter (mm)	200-270				
6.	Thickness of disc (mm)	1.5 Min				
7.	Teeth thickness (mm)	2.0 Min				
8.	Material of Blade	M42				
9.	Hardness of Blade, HRC	68-70				
Straight blade						
10.	Diameter of straight blade (mm)	250-350			300	Conforms
11.	Width of ends/at center (mm)	50/70, Min.	90	Conforms		
12.	Thickness of straight blade (mm)	1.5 Min	2.0	Conforms		
Nylon rope						
13.	Length of nylon rope (mm)	2000-4000	Length 2700 mm	Conforms		
14.	Diameter of nylon rope (mm)	2.5 to 4.0	Diameter- 3.0 mm	Conforms		
15.	Type of engine	Compression ignition/Spark ignition	Spark Ignition	Conforms		
16.	Starting method	Manual/recoil/self-starting	Manual/Recoil Start	Conforms		
17.	Type of clutch	Cone/centrifugal	Centrifugal	Conforms		
18.	Type of gear drive	Bevel pinion	Bevel pinion	Conforms		
19.	Capacity of fuel tank (l)	1.0 (min)	1.0	Conforms		
20.	On off provision in fuel supply system	Must be provided	Provided	Conforms		
21.	Provision for easy start of engine	Must be provided	Choke is provided	Conforms		
22.	Provision for emergency stop of engine	Must be provided	Provided	Conforms		
23.	Provision for shield/cover to prevent flying of mud and stone from rotor	Must be provided	Provided	Conforms		
24.	Provision for Grass deflector at the rear of the cutting mechanism					
25.	Provision for Pad with shoulder bet to dampen the vibration	Must be provided	Provided	Conforms		
26.	Provision for cover on exhaust.	Must be provided	Provided	Conforms		
27.	Direction of exhaust emission away from operator	Must be provided	Provided	Conforms		

28.	Provision for safety kit (helmet, ear plug, mask, hand gloves, safety glass, Protective cloth, safety shoes)	Must be provided	Provided	Conforms
29.	Marking/labeling of machine	The labeling plate should be riveted on the body of machine having Name and address of manufacturer & Applicant, country of origin Make, Model, year of manufacturer, Serial Number, Engine number, Engine HP, rated rpm & SFC.	Machine Make, Country of Origin and SFC is not specified on the sticker provided on engine.	Partially conform
30.	Literature	Operator manual, Service manual and Parts catalogue should be provided.	Provided	Conforms

17. COMMENTS AND RECOMMENDATIONS

- 17.1 The amplitude of mechanical vibration marked as (*) on the relevant chapter, are on higher side. It is not just directly concerned with operator's health, safety and comfort, but also adversely affects the useful life of the components. In view of above, this deserved to be given top priority for corrective action.
- 17.2 The chemical composition of blades does not conform to the requirements of IS: 6025-1982. This needs to be looked into for corrective action.
- 17.3 The hardness of blades does not conform to the requirement of IS: 6025-1982. This needs to be looked into for corrective action.
- 17.4 Labeling plate should be riveted on machine with following information.
1. Name and address of manufacturer
 2. Name and address of applicant
 3. Country of origin
 4. Make
 5. Model
 6. Year of manufacturer
 7. Serial number
 8. Engine number
 9. Engine HP
 10. Rated rpm
 11. SFC
- 17.5 Observed engine power is just 0.44 kW against declaration of 1.25 kW.





18. TECHNICAL LITERATURE

The User's Manual was provided by the applicant during the test.
The following literature, therefore, **MUST** be provided as per IS: 8132-1999 for guidance.

- i) Service manual
- ii) Parts catalogue

TESTING AUTHORITY

Er. SANJAY KUMAR AGRICULTURAL ENGINEER	
Dr. MUKESH JAIN DIRECTOR	 06.10.2023

19. APPLICANT'S COMMENTS

We will improve in mass production.

