

व्यावसायिक परीक्षण रिपोर्ट
COMMERCIAL TEST REPORT

संख्या/ No.: MACHINE-53/3077/2023
माह/Month: September, 2023

THIS TEST REPORT VALID UP TO : 30th September, 2028



**XTRA POWER, XP-BC-50 (SP)
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

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

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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	29.7	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	0.48	Does not conform
Manganese (Mn)	0.30 to 0.50	0.46	Conforms
Silicon (Si)	--	0.69	--
Sulphur (S)	--	0.04	--
Phosphorous (P)	--	0.03	--

12. FIELD TEST

Field tests were conducted for 11.7 hours with triangular blade attachment and 14.52 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 triangular blade	For nylon rope
1	Field condition	Leveled	Leveled
2	Intensity of grass	High	High
3	Average number of grass/weed in 1 sq.m	77 to 172	89 to 141
4	Height of grass/weed, cm	20 to 60	35 to 70
5	Diameter of grass/weed, mm	1.88 to 3.50	1.56 to 2.28
6	Mass of grass cut (kg/h)	25.3 to 37.7	30.2 to 32.5
7	Area covered (Rate of work), ha/h	0.037 to 0.043	0.036 to 0.051
8	Time required for one hectare, h	23.26 to 27.03	19.61 to 27.27
9	Fuel consumption l/h l/ha	0.43 to 0.53 10.00 to 14.33	0.45 to 0.50 9.81 to 12.27

12.1 Cutting using triangular blade

12.1.1 Rate of work

- i) The average area covered (rate of work) was observed as 0.037 to 0.043 ha/h.
- ii) Average time required for one hectare was observed as 23.26 to 27.03 hours.
- iii) Average numbers of perennial weed in one square meter are was 77 to 172
- iv) Average mass of perennial weed cut was 25.3 to 37.7 kg/h.

12.1.2 Fuel consumption

Fuel consumption was observed as 0.43 to 0.53 l/h and 10.00 to 14.33 l/ha.

12.2 Cutting using nylon rope assembly**12.2.1 Rate of work**

- i) Average area covered (rate of work) was observed as 0.036 to 0.051 ha/h.
- ii) Average time required for one hectare was observed as 19.61 to 27.27 h.
- iii) Average mass of grass cut was observed as 30.20 to 32.50 kg/h.
- iv) Average No. of grass stem in one m² area was 89 to 141.

12.2.2 Fuel consumption

Average fuel consumption was observed as 0.45 to 0.50 l/h. and 9.81 to 12.27 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
Triangular blade	11.2	250.4	245	2.16	0.86	0.08
Nylon rope	14.5	2500	1590	910	36.40	2.51

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 31.98 hours of operation.

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

The engine and other assemblies were dismantled after 31.98 hours of engine operation.

15.1.1 Cylinder :

Cylinder bore dia. (mm)						
Top Position		Middle position		Bottom Position		Max. permissible wear limit
Thrust	Non-thrust	Thrust	Non-thrust	Thrust	Non-thrust	
40.03	43.02	43.02	43.02	43.02	43.02	

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	254	Conforms
11.	Width of ends/at center (mm)	50/70, Min.	51/68	Conforms
12.	Thickness of straight blade (mm)	1.5 Min	1.6	Conforms
Nylon rope				
13.	Length of nylon rope (mm)	2000-4000	Length 2500 mm	Conforms
14.	Diameter of nylon rope (mm)	2.5 to 4.0	Diameter- 2.5 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)	1.2	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

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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.	Just a sticker and not proper labeling plate is provided on the machine with following information. Manufacturer: VSM International Pvt. Ltd. Plot no. Sec.1, Marvel city, Hisar, Country of origin: India, Make Xtra Power, Model: XP-BC-50, Engine No. GX50201021, Rated rpm: 6500, Engine model: GX50	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 drastically 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 in toto, 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

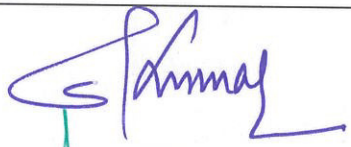
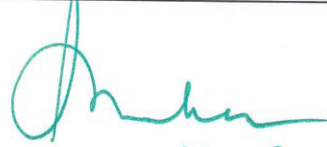
- 17.5 The discard limit of piston diameter, valve guide clearance, valve spring stiffness is not specified. It **MUST** be specified.
- 17.6 The declared rated power of the engine was 1.3 kW but observed power was 0.68 kW.

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	 12.09.2023

19. APPLICANT'S COMMENTS

No specific comments received from the applicant.