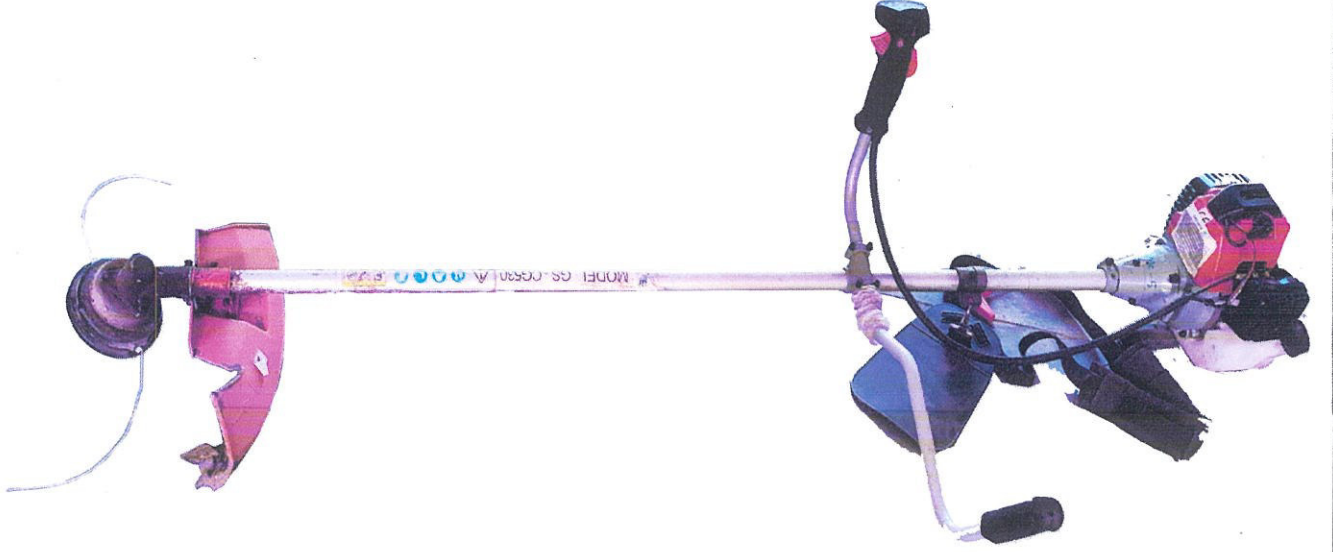


व्यावसायिक परीक्षण रिपोर्ट
COMMERCIAL TEST REPORT

संख्या/ No.: Machine- 45/2972/2023
माह/Month: February, 2023

THIS TEST REPORT VALID UP TO : 28th February, 2028



**GREAVES COTTON LTD., GREAVES GS-CG-530
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

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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	49.5	Conforms

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	0.77	Conforms
Manganese (Mn)	0.30 to 0.50	1.74	Does not conform
Silicon (Si)	--	0.18	--
Sulphur (S)	--	0.04	--
Phosphorous (P)	--	0.02	--

12. FIELD TEST

Field tests were conducted for 16.64 hours with triangular blade attachment and 9.42 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 show 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	139 to 190	144 to 178
4	Height of grass/weed, cm	20 to 72	48 to 61
5	Diameter of grass/weed, mm	1.58 to 2.15	2.83 to 3.46
6	Mass of grass cut (kg/h)	11.50 to 15.50	22.50 to 41.0
7	Area covered (Rate of work), ha/h	0.036 to 0.047	0.038 to 0.050
8	Time required for one hectare, h	21.28 to 27.78	20.00 to 26.32
9	Fuel consumption		
	l/h	0.55 to 0.76	0.45 to 0.50
	l/ha	12.50 to 19.45	9.00 to 13.16

12.1 Cutting using triangular blade**12.1.1 Rate of work**

- The average area covered (rate of work) was observed as 0.036 to 0.047 ha/h.
- Average time required for one hectare was observed as 21.28 to 27.78 hours.
- Average numbers of perennial weed in one square meter are was 139 to 190.
- Average mass of perennial weed cut was 11.50 to 15.50 kg/h.

12.1.2 Fuel consumption

Fuel consumption was observed as 0.55 to 0.76 l/h and 12.50 to 19.45 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 0.038 to 0.050 ha/h.
- ii) Average time required for one hectare was observed as 20.00 to 26.32 h.
- iii) Average mass of grass cut was observed as 22.50 to 41.00 kg/h.
- iv) Average No. of grass stem in one m² area was 144 to 178

12.2.2 Fuel consumption

Average fuel consumption was observed as 0.45 to 0.50 l/h. and 9.00 to 13.16 l/ha.

12.3 Labor requirement

To ensure the cutting work without interruption, two operators are required to work alternates. Additionally, one more labour is needed 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	16.64	250.1	247.8	2.3	0.92	0.06
Nylon rope	9.42	2500	1590	910	36.4	3.86

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 on 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 27.38 hours of operation.

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

The engine and other assemblies were dismantled after 37.1 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	40.00	40.00	40.00	40.01	--	Not specified



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	Steel	Conforms
4.	No. of teeth on circular disc blade	50-100	Circular blade is not recommended by applicant	--
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

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. Make-Greaves Cotton Ltd. Model-GS.CG 530 Month / Year mfg 05/2020 rated Power@ Speed 1.6Hp@6500 RPM Displacement 42.7 cc Stroke 2 stroke Serial No. GS210815480 Greaves Cotton Ltd , Unit No. 701, 7 th Floor, Tower 3, Equinox Business Park, LBS Marg, Kurla (W), Mumbai-400070	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 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




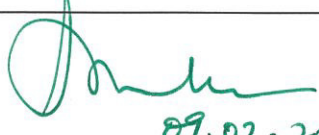
- 17.4 The discard limit of cylinder bore dia. & piston diameter is not specified. It MUST be specified.
- 17.5 The declared rated power of the engine was 1.1kW but observed power was 0.44 kW.

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) Part's catalogue

TESTING AUTHORITY

Er. SANJAY KUMAR AGRICULTURAL ENGINEER	
Dr. MUKESH JAIN DIRECTOR	 09.02.2023

The test report is compiled by Sh. Girdhari Lal, Technician

19. APPLICANT'S COMMENTS

Sr. No.	Our Reference	Applicant Comments
19.1	17.1	Suitable measures like providing Anti vibration mountings to reduce the vibration levels will be introduced during the production lot.
19.2	17.2	We will take up with our supplier to meet the requirement as per Indian Standard.
19.3	17.3	We will be implemented in the production lot.
19.4	17.4	We will be specified as per requirement.
19.5	17.5	We will check & corrective action to be taken.
19.6	18	Will be updated as per IS:8132-1999

