

व्यावसायिक परीक्षण रिपोर्ट (प्रारंभिक)
COMMERCIAL TEST REPORT (Initial)



संख्या/No.: Machine 142/516
माह / Month: January 2025

THIS TEST REPORT IS VALID UPTO 31.01.2032



SUN-MAX, SM-450, BRUSH CUTTER



सत्यमेव जयते

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

उत्तर पूर्वी क्षेत्र कृषि यंत्र प्रशिक्षण एवं परीक्षण संस्थान

NORTH EASTERN REGION FARM MACHINERY TRAINING & TESTING INSTITUTE

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Name and Address of Applicant	: M/s Suntec Agri Equipments India Pvt. Ltd. 1/1G, Ground Floor, Pipeline Road, 7 th . Cross, New Guddadahalli, Mysore Road, Bangalore - 560026
Make	: SUN-MAX
Model	: SM-450
Serial No.	: SUN221200205
Type	: Engine operated
Type of cutting attachment	: Nylon rope and straight blade
Year of manufacture	: 2024
Country of origin	: CHINA
Type of crops/bush recommended	: All kinds of weeds/bushes

4.2 Constructional details:

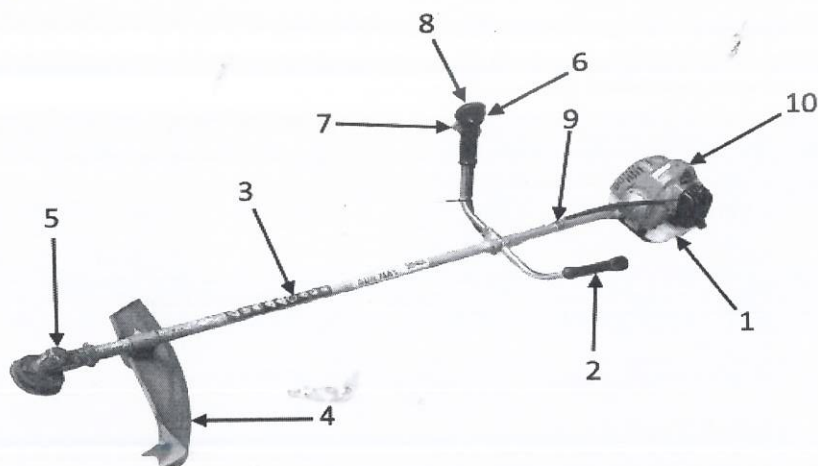


Fig. 1: BRUSH CUTTER, MODEL: SM-450

Keywords:

- | | |
|----------------------------|----------------------------------|
| 1. Fuel tank | 6. Engine stopping switch |
| 2. LHS handle | 7. Throttle cum clutch trigger |
| 3. Transmission cover pipe | 8. RHS handle |
| 4. Deflector | 9. Connection for shoulder strap |
| 5. Gear case | 10. Engine |

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SUMMARY OF FIELD PERFORMANCE TEST

Sl. No.	Parameters	Grass/weeds cutting with nylon rope	Bush cutting with straight blade
1	Field Condition	Level	
2	Thickness of stem of Grasses/Bush at cutting height (mm)	1.3 to 2.9	11.0 to 12.1
3	Number of Grass/Bush per m ²	159 to 219	92 to 97
4	Height of Grasses/Bush (mm)	176 to 254	1442 to 1690
5	Mass of Grass/Bush cut (kg/h)	94.6 to 169.2	526.6 to 719.8
6	Mass of Grass/Bush cut (kg/ha)	2900 to 4700	17100 to 18600
7	Rate of work (ha/h)	0.033 to 0.036	0.031 to 0.039
8	Time required for one hectare (h)	27.8 to 30.7	25.8 to 32.5
9	Fuel consumption:		
	-l/h	0.92 to 1.05	1.0 to 1.1
	-l/ha	27.22 to 31.07	25.84 to 35.72

12.1 Grass/Weeds cutting using nylon rope:

12.1.1 Rate of work:

The area of cut was recorded as 0.033 to 0.036 ha/h.

Time required for one hectare was recorded as 27.8 to 30.7 hours.

Mass of weeds cut was 94.6 to 169.2 kg/h.

12.1.2 Fuel consumption:

Fuel consumption was observed as 0.92 to 1.05 l/h and 27.22 to 31.07 l/ha.

12.2 Bush cutting using straight blade:

12.2.1 Rate of work:

The area of cut was recorded as 0.031 to 0.039 ha/h.

Time required for one hectare was recorded as 25.8 to 32.5 hours.

Mass of weeds cut was 526.6 to 719.8 kg/h.

12.2.2 Fuel consumption:

Fuel consumption was observed as 1.0 to 1.1 l/h and 25.84 to 35.72 l/ha.



13. EASE OF OPERATION AND ADJUSTMENTS

No difficulties were observed in operation and adjustment during the field test.

14. DEFECTS, BREAKDOWNS AND REPAIRS

No noticeable defect or breakdown was observed during test.

15. COMPONENTS/ASSEMBLY INSPECTION

The Engine was dismantled after 34.67 hours of operation.

15.1 Engine:**Cylinder bore:**

Cylinder bore dia., mm						Max. permissible wear limit, mm
Top position		Middle position		Bottom position		
Thrust side	Non-thrust side	Thrust side	Non-thrust side	Thrust side	Non-thrust side	
39.94	39.93	39.94	39.93	39.94	39.93	40.15

Piston:

Piston dia., mm				Clearance between piston & cylinder liner at the skirt of the piston, mm	Maximum permissible clearance limit, mm
Top (above top compression ring)		At skirt			
Thrust side	Non-thrust side	Thrust side	Non-thrust side		
39.68	39.76	39.90	*	0.04	0.30

*Not recorded due to piston design constraints

Ring end gap:

Rings	Ring end gap, mm			Max. permissible end gap limit, mm
	Top	Middle	Bottom	
1 st comp. ring	0.25	0.25	0.25	1.2
2 nd comp. ring	0.30	0.30	0.30	
Oil ring	NA	NA	NA	

Ring side clearance:

Rings	Ring side clearance, mm	Max. permissible clearance limit, mm
1 st comp. ring	0.05	0.25
2 nd comp. ring	0.05	
Oil ring	*	Not specified

*Not recorded due to ring design constraints

Main bearings: 6202-2 Nos.

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Bearing No.	Type of bearing	Diametrical clearance, mm	Crankshaft end float, mm	Max. permissible clearance limit, mm	
				Diametrical clearance	Crankshaft end float
1	Ball bearing	NA	0.07	NA	0.20
2	Ball bearing	NA			

Big end bearing:

Bearing No.	Clearance, mm		Max. permissible clearance limit, mm	
	Diametrical	Axial	Diametrical	Axial
1	Needle bearing	NR	Not specified	0.60

Measurement of big end bearing clearance was not possible as the piston along with connecting rod was not detachable.

15.2 Transmission system:

All the gears of the transmission system were found in normal condition.

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

Sl. No.	Parameters	Specifications	Observation	Remarks
1	2	3	4	5
1	Type	Self-propelled, portable	Self-propelled, portable	Conforms
2	Type of cutting attachment	Circular disc / Straight blade /nylon rope	Straight blade / nylon rope	Conforms
Circular blade				
3	Material of circular/straight blade	Alloy steel	NA	--
4	No. of teeth on circular disc blade	50 - 100	NA	--
5	Root diameter / Overall diameter (mm)	200 - 270	NA	--
6	Thickness of disc (mm)	1.5 Min.	NA	--
7	Teeth thickness (mm)	2.0 Min.	NA	--
8	Hardness of blade, HRC	68 - 70	NA	--




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1	2	3	4	5
Straight blade				
9	Diameter of straight blade(mm)	250 - 350	295	Conforms
10	Width at ends /at center (mm)	50 / 70, Min.	59.5 / 90.0	Conforms
11	Thickness of straight blade(mm)	1.5 Min.	1.7	Conforms
Nylon rope				
12	Length of nylon rope(mm)	2000 - 4000	3000	Conforms
13	Diameter of nylon rope(mm)	2.5 to 4.0	3.0	Conforms
14	Type of engine	Compression ignition / Spark ignition	Spark ignition	Conforms
15	Starting method	Manual / recoil / self -starting	Recoil starting	Conforms
16	Type of clutch	Cone / centrifugal	Centrifugal	Conforms
17	Type of gear drive	Bevel pinion	Bevel pinion	Conforms
18	Capacity of fuel tank (l)	1.0 (Min.)	1.0	Conforms
19	On /Off provision in fuel Supply system	Must be provided	Not provided	Does not conform
20	Provision for easy start of engine	Must be provided	Provided	Conforms
21	Provision for emergency stop of engine	Must be provided	Provided	Conforms
22	Provision for shield / cover to prevent flying of mud & stone from rotor	Must be provided	NA	--
23	Provision for Grass deflector at the rear of the cutting mechanism	Must be provided	Provided	Conforms
24	Provision for Pad with shoulder belt to dampen the vibration	Must be provided	Provided	Conforms
25	Provision for cover on exhaust	Must be provided	Provided	Conforms
26	Direction of exhaust emission away from operator	Must be provided	Provided	Conforms
27	Provision for safety kit (helmet, earplug, mask, hand gloves, safety protective cloth, safety shoes)	Must be provided	Provided except helmet, mask, safety shoes and protective cloth.	Does not conform



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1	2	3	4	5
28	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.	Only Make & Model was mentioned on the labeling sticker. Instead of labeling plate, a sticker was pasted on the machine.	Does not conform
29	Literature	Operator manual, Service manual and Parts catalogue should be provided.	Provided	Conforms

17. COMMENTS AND RECOMMENDATIONS

- 17.1 The average rated power in rating test of engine was observed as 0.53 kW against declared value of 1.35 kW by the applicant/manufacturer. This should be looked into for corrective action.
- 17.2 It was observed that during engine performance test, at full Load, engine speed was not stable at rated speed. This shall be looked into for corrective action.
- 17.3 The Hardness and Chemical composition of straight blade does not conform to Indian Standard IS 6025:2024. This should be looked into for corrective action.
- 17.4 The engine was not marked with Manufacturer name or trade-mark, Rated power, Rated speed and type of fuel used which does not fulfill the requirement of IS 7347-1974 (Amended 2021). This should be looked into.
- 17.5 The labeling plate should be riveted on the body of machine having name and address of the manufacturer, Country of origin, Make, Model, Year of manufacture, Serial number, Engine number, Engine HP, rated rpm and SFC. This should be looked into.
- 17.6 Noise at operator's ear level was observed on higher side against danger limit of 90 dB(A) as specified by International Labour Organization (ILO) for continuous exposure of 8 hours per day. This calls for reduction in noise level to improve the operational comfort and safety of operator.
- 17.7 The amplitude of mechanical vibration at various assemblies viz. steering handle, engine cover and drive shaft cover pipe was on higher side. This calls for dampening down of vibration to improve the operational comfort and service life of the components.

17.8 As a safety wear, earplug and handgloves were provided with the machine. The applicant is strictly advised to provide the entire safety kit including helmet, safety shoes, mask, protective cloth etc. along with each machine for the safety of operator.

17.9 **Adequacy of Literature:**

The following literature in English language was provided for reference during testing:

- Operator's/ Service manual
- Parts catalogue

It is recommended to bring out the manual in Hindi and other vernacular languages as per IS: 8132-2023.



TESTING AUTHORITY

(M.R. PATIL)

SENIOR AGRICULTURAL ENGINEER

(P. KAMALABAI)
DIRECTOR

Draft test report compiled by - Sh. Vithato Keyho, Sr. Technical Assistant

18. APPLICANT'S COMMENTS

Applicant's Comments

We have noted all the comments and recommendations mentioned in the draft test report of brush cutter model SM-450. We will inform the same to our manufacturer and insist them to adapt the same in future supplies.

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ANNEXURE-I

FIELD PERFORMANCE TEST

Cutting attachment : Nylon rope
Place of test : NERFMTTI field, Biswanath Chariali, Assam
Usage : Weeds/grass cutting

Sl. No.	Parameters	Test trial			
		I	II	III	
1	Date of test	18.12.2024	19.12.2024	20.12.2024	
2	Net test duration (h)	5.45	6.74	3.00	
3	Avg. height of weeds (mm)	222	254	176	
4	Thickness of stem of weeds at cutting height (mm)	2.7	2.9	1.3	
5	Avg. No. of weeds per m ²	202	159	219	
6	Avg. mass of weeds cut per m ² (g)	290	300	470	
7	Actual area cut (ha/h)	0.033	0.034	0.036	
8	Time required for one ha (h/ha)	30.7	29.6	27.8	
9	Mass of weeds cut				
		kg/h	94.6	101.4	169.2
		kg/ha	2900	3000	4700
10	Fuel consumption				
		l/h	0.92	1.05	0.98
		l/ha	28.22	31.07	27.22



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ANNEXURE-II

FIELD PERFORMANCE TEST

Cutting attachment : Straight Blade
 Place of test : NERFMTTI field, Biswanath Chariali, Assam
 Usage : Bush cutting

Sl. No.	Parameters	Test trial	
		I	II
1	Date of test	20.12.2024	23.12.2024
2	Net test duration (h)	3.55	6.85
3	Avg. height of bush (mm)	1690	1442
4	Thickness of stem of bush at cutting height (mm)	11.0	12.1
5	Avg. No. of bush per m ²	92	97
6	Avg. mass of bush cut per m ² (g)	1860	1710
7	Actual area cut (ha/h)	0.039	0.031
8	Time required for one ha (h/ha)	25.8	32.5
9	Mass of bush cut		
	kg/h	719.8	526.6
	kg/ha	18600	17100
10	Fuel consumption		
	l/h	1.0	1.1
	l/ha	25.84	35.72



ANNEXURE-III

DETAILS OF OPERATORS

Operator	:	I	II	III
Age, years	:	25	35	34
Height, cm	:	174	162	177
Weight, kg	:	85	62	72