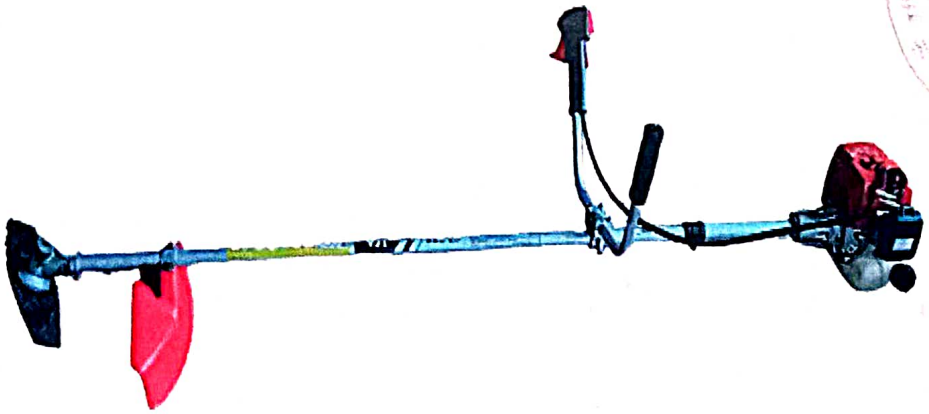
व्यावसायिक परीक्षण रिपोर्ट (प्रारंभिक)
COMMERCIAL TEST REPORT (Initial)

संख्या/No.: Machine 70/441
माह / Month: August 2022

THIS TEST REPORT IS VALID UPTO 31.08.2027



226 LD VST BRUSH CUTTER

सत्यमेव जयते

भारत सरकार
GOVT OF INDIA
कृषि एवं किसान कल्याण मंत्रालय
MINISTRY OF AGRICULTURE & FARMERS WELFARE

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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1. SCOPE OF TEST

1.1 LABORATORY TEST

a) Checking of specifications
b) Mechanical vibration measurement
c) Noise measurement
d) Wear assessment of critical components
e) Engine performance test

1.2 FIELD TEST

a) Rate of work
b) Quality of work
c) Labour requirement
d) Adequacy of prime mover power
e) Ease of operation, adjustment & safety provisions
f) Defects, breakdowns and repairs

2. METHOD OF SELECTION

As per Govt. of India, OM No. 13-1/2021-M&T (I&P), dated 03.02.2022, the selection of sample for test was exempted. Hence, the machine was directly submitted by the applicant at this Institute for test.

3. TEST CODE AND PROCEDURE

There is no Indian Standard Test Code available for testing of brush cutter as such. However, for engine performance test, IS 7347-1974 (Amended 2011) was referred.

4. SPECIFICATIONS

4.1 General

Name of the Machine	:	Brush Cutter
Name and address of the manufacturer	:	**FARMECH ENTERPRISE CO., LTD** No.15, Lane 1265, Chung-Cheng Road, Wu-Fong District, Taichung City 41350, Taiwan
Name & Address of Applicant	:	**VST TILLERS TRACTORS LTD** Plot No 222-224 & 229-232, 3rd Phase, KIADB Industrial Area, Malur, Kolar District, Karnataka-563 130

Model	:	226 LD
Serial No.	:	262105421
Type	:	Engine operated machine
Type of cutting attachment	:	Nylon rope and straight blade
Year of manufacture	:	2022
Country of origin	:	**TAIWAN**
Type of crops/bush recommended	:	All kinds of weeds

4.2 Constructional details :

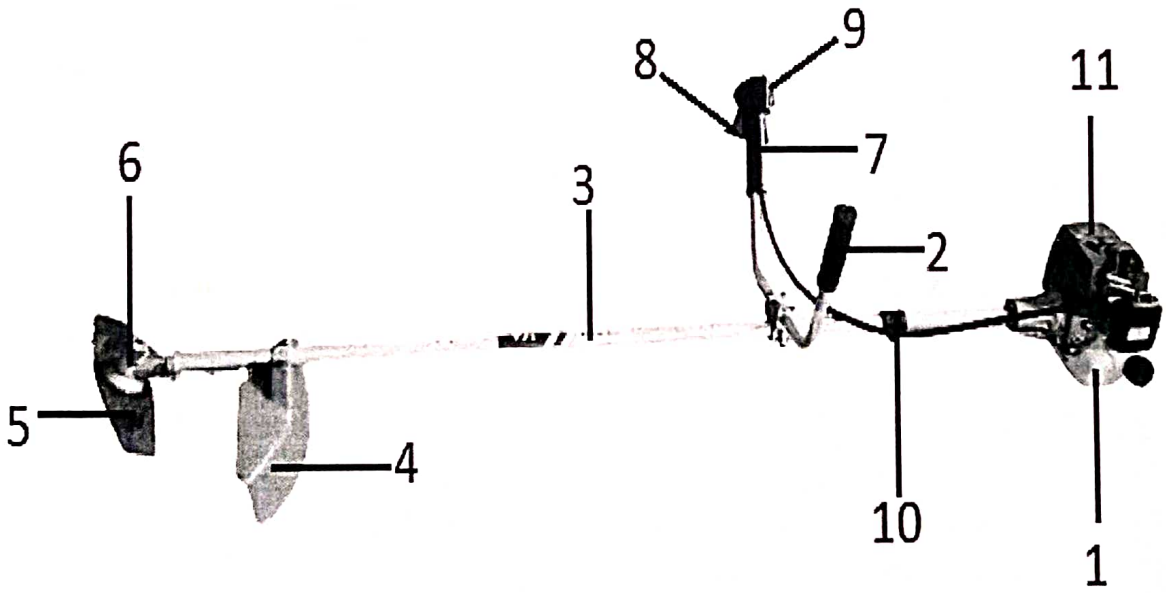

Fig. 1 : VST BRUSH CUTTER, MODEL: 226 LD

Keywords:

1. Fuel tank
2. LHS handle
3. Transmission cover pipe
4. Deflector
5. Straight blade
6. Gear case
7. RHS handle
8. Throttle cum clutch trigger
9. Engine stopping switch
10. Shoulder strap
11. Engine

10. HARDNESS AND CHEMICAL COMPOSITION

10.1 Hardness of Straight blade

Sl. No.	Hardness as per IS: 6025 – 1982 (HRC)	Hardness as measured (HRC)	Remarks
1	48 to 58	32.9	**Does not Conform**

10.2 Chemical composition of Straight Blade:

The results of chemical analysis test of straight blade were as under.

Constituent	As per IS: 6025 – 1982 (%)	Composition As observed (% by weight)	Remarks
Carbon (C)	0.70 to 0.95	0.111	**Does not Conform**
Manganese (Mn)	0.3 to 0.5	2.056	**Does not Conform**
Silicon (Si)	---	0.262	---
Sulphur (S)	---	0.009	---
Phosphorous (P)	---	0.016	---

11. WEAR ANALYSIS OF CRITICAL COMPONENTS

Component	Duration of operation (h)	Initial mass (g)	Mass after operation (g)	Loss of mass (g)	Percentage of wear	Percentage of wear on hourly basis
Straight blade	13.25	269	264.5	4.5	1.67	0.13

12. FIELD PERFORMANCE TEST

Field tests were conducted for total of 26.41 hours duration. Grass/weeds cutting with nylon rope and bush cutting using straight blade attachments were carried out for 13.16 hours and 13.25 hours, respectively. A total of five test trials were conducted at rated speed of 8000±150 rpm. Detailed results of field tests are shown in ANNEXURE-I & II and summarized in the ensuing table. Details of the operator have been given in ANNEXURE-III.

SUMMARY OF FIELD PERFORMANCE TEST

Sl. No.	Parameters	Grass/weeds cutting	Bush cutting
1	2	3	4
1	Field Condition	Level	
2	Thickness of Grasses/Bush (mm)	0.92 to 1.35	12.48 to 13.68
3	Average number of Grass/Bush in 1m²	401.2 to 414.2	22.8 to 26.2

1	2	3	4
4	Average height of Grasses/Bush (mm)	176.5 to 186.2	1600 to 1640
5	Mass of Grass/Bush (kg/h)	430.13 to 468.81	2317.8 to 2883.9
6	Mass of Grass/Bush (kg/ha)	5188 to 5364	25840 to 29428
7	Rate of work (ha/h)	0.082 to 0.087	0.089 to 0.098
8	Time required for one hectare (h)	11.44 to 12.14	10.2 to 11.15
9	Fuel consumption		
	-l/h	0.64 to 0.68	0.89 to 0.95
	-l/ha	7.44 to 8.08	9.08 to 10.59

12.1 Grass/Weeds cutting using nylon rope

12.1.1 Rate of work

- The area of cut was recorded as 0.082 to 0.087 ha/h.
- Time required for one hectare was recorded as 11.44 to 12.14 hours.
- Mass of weeds cut was 430.13 to 468.81 kg/h.

12.1.2 Fuel consumption

- Fuel consumption was observed as 0.64 to 0.68 l/h and 7.44 to 8.08 l/ha.

12.2 Bush cutting using straight blade

12.2.1 Rate of work

- The area of cut was recorded as 0.089 to 0.098 ha/h.
- Time required for one hectare was recorded as 10.2 to 11.15 hours.
- Mass of bush cut was 2317.8 to 2883.9 kg/h.

12.2.2 Fuel consumption

- Fuel consumption was observed as 0.89 to 0.95 l/h and 9.08 to 10.59 l/ha.

12.3 Labour/operator requirement :

It was observed that an averagely built person can able to operate the brush cutter for 40 to 45 minutes at a stretch. Hence, two operators are required for continuous operation of the brush cutter.

12.4 Adequacy of power of prime mover :

The power of prime mover was found adequate.

13. EASE OF OPERATION AND ADJUSTMENTS

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

14. DEFECTS, BREAKDOWNS AND REPAIRS

No breakdown was occurred during 26.41 hours of field operation and 9.5 hours of engine test.

Big end bearing:

Bearing No.	Clearance, mm		Max. permissible clearance limit, mm	
	Diametrical	Axial	Diametrical	Axial
1	Needle bearing	--	NA	NA

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. COMMENTS & RECOMMENDATIONS

16.1 The average rated power in rating test of engine was observed as 0.6 kW against declared value of 0.87 kW by the manufacturer. This should be looked into for corrective action.

16.2 The specific fuel consumption (SFC) in rating test of engine was observed as 1041.6 g/kWh against declared value of 764 g/kWh by the manufacturer which exceeded by more than 5 percent of that declared by the manufacturer and hence does not fulfill the requirement of IS 7347-1974 (Amended 2011). This should be looked into for corrective action.

16.3 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 2011). This may be looked into.

16.4 Noise at operator's ear level was observed on higher side against danger limit of 90 dB(A) as specified by ILO for continuous exposure of 8 hours per day. This calls for reduction in noise level to improve the operational comfort and safety.

16.5 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.

16.6 The Hardness & Chemical composition of straight blade does not conform to Indian Standard IS 6025:1982. This should be looked into for corrective action.

16.7 The mentioned values of rated power and rated speed (rpm) of engine on the labeling sticker of the machine was not matching with the observed values during engine test. This may be looked into.

16.8 **As a safety wear, safety shoes & goggles (safety glass) only were provided with the machine. The applicant has strictly advised to provide the safety kit viz. helmet, hand gloves, ear plug, mask etc. along with each machine for the safety of operator.**

16.9 Though country of origin is TAIWAN, on the labeling sticker of the machine it was mentioned as INDIA, this shall be looked into for corrective action.

16.10 **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: 8132-1999.

TESTING AUTHORITY

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AGRICULTURAL ENGINEER

(Dr. P.P. RAO)
DIRECTOR

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