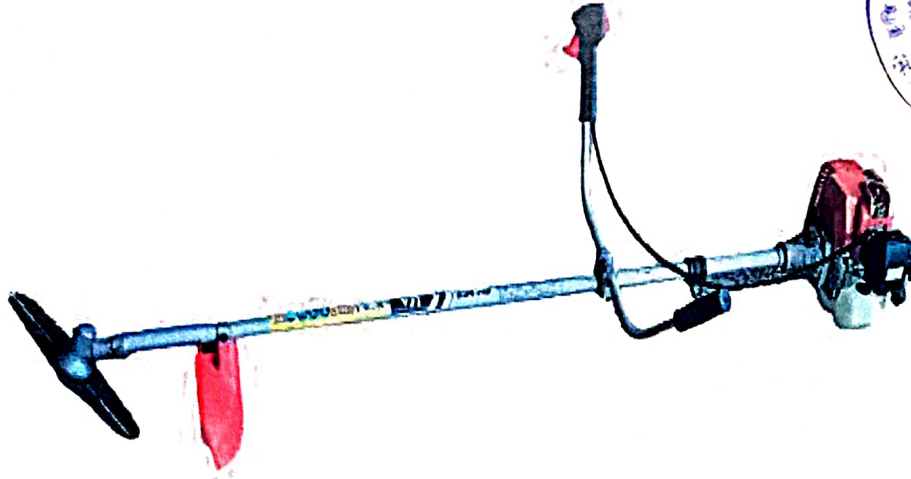


व्यावसायिक परीक्षण रिपोर्ट (प्रारंभिक)  
COMMERCIAL TEST REPORT (Initial)



संख्या/No.: Machine 71/442  
माह / Month: August 2022

THIS TEST REPORT IS VALID UPTO 31.08.2027



234 MD VST BRUSH CUTTER



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  
विश्वनाथ चारिआलि, जिला-विश्वनाथ (असम)  
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[AN ISO 9001:2015 CERTIFIED INSTITUTION]

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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	: <b>FARMECH ENTERPRISE CO., LTD</b> No.15, Lane 1265, Chung-Cheng Road, Wu-Fong District, Taichung City 41350, Taiwan
Name & Address of Applicant	: <b>VST TILLERS TRACTORS LTD</b> Plot No 222-224 & 229-232, 3 <sup>rd</sup> Phase, KIADB Industrial Area, Malur, Kolar District, Karnataka-563 130



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Model : 234 MD

Serial No. : 352100131

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 :

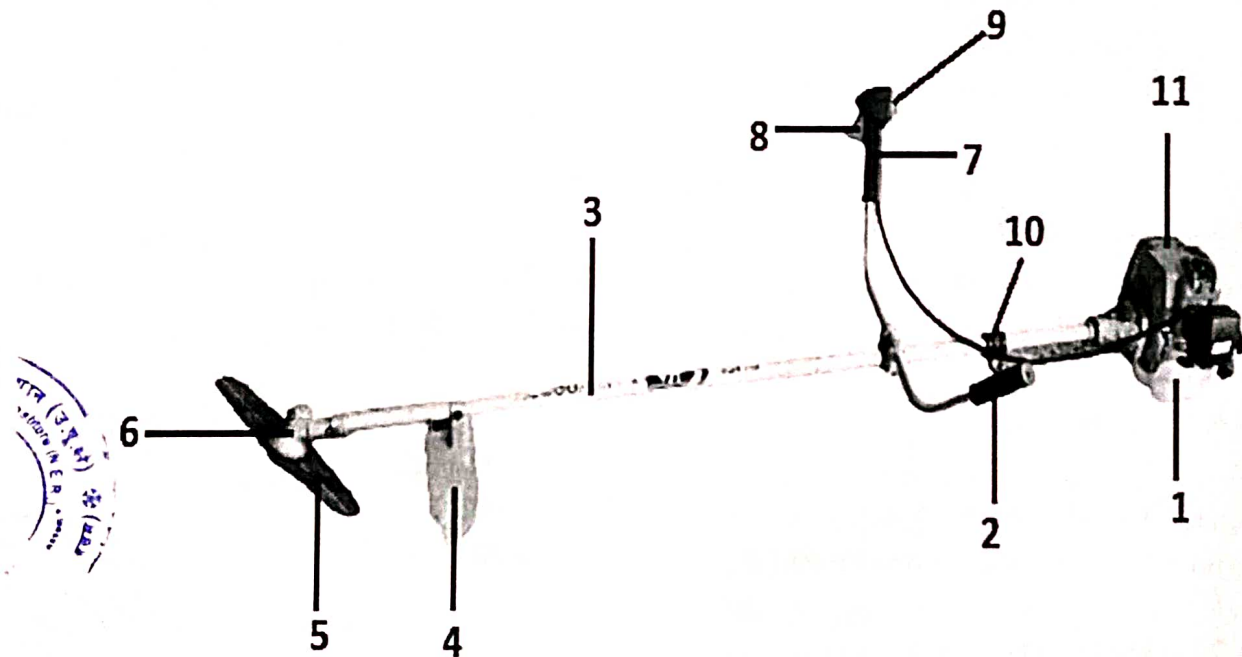


Fig. 1 : VST BRUSH CUTTER, MODEL: 234 MD

#### Keywords:

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

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## 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	36.0	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	0.522	Does not Conform
Manganese (Mn)	0.3 to 0.5	0.518	Does not Conform
Silicon (Si)	---	0.235	---
Sulphur (S)	---	0.006	---
Phosphorous (P)	---	0.019	---

## 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	13.92	253.0	249.7	3.30	1.30	0.09

## 12. FIELD PERFORMANCE TEST

Field tests were conducted for total of 27.21 hours duration. Grass/weeds cutting with nylon rope and bush cutting using straight blade attachments were carried out for 13.29 hours and 13.92 hours, respectively. A total of five test trials were conducted at rated speed of 7500±100 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)	1.33 to 1.52	12.97 to 13.20
3	Average number of Grass/Bush in 1m <sup>2</sup>	375.6 to 397.0	25.6 to 25.8

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1	2	3	4
4	Average height of Grasses/Bush (mm)	144.6 to 223.0	1630 to 1660
5	Mass of Grass/Bush (kg/h)	525.46 to 672.08	2813.97 to 2894.03
6	Mass of Grass/Bush (kg/ha)	5924 to 7250	29100 to 30560
7	Rate of work (ha/h)	0.0887 to 0.0951	0.0947 to 0.0967
8	Time required for one hectare (h)	10.51 to 11.27	10.32 to 10.56
9	Fuel consumption		
		-l/h	1.42 to 1.48
		-l/ha	15.55 to 16.00
			1.50 to 1.55
			15.48 to 16.37

### 12.1 Grass/Weeds cutting using nylon rope

#### 12.1.1 Rate of work

- The area of cut was recorded as 0.0887 to 0.0951 ha/h.
- Time required for one hectare was recorded as 10.51 to 11.27 hours.
- Mass of weeds cut was 525.46 to 672.08 kg/h.

#### 12.1.2 Fuel consumption

- Fuel consumption was observed as 1.42 to 1.48 l/h and 15.55 to 16.0 l/ha.

### 12.2 Bush cutting using straight blade

#### 12.2.1 Rate of work

- The area of cut was recorded as 0.0947 to 0.0967 ha/h.
- Time required for one hectare was recorded as 10.32 to 10.56 hours.
- Mass of bush cut was 2813.97 to 2894.03 kg/h.

#### 12.2.2 Fuel consumption

- Fuel consumption was observed as 1.50 to 1.55 l/h and 15.48 to 16.37 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

It was observed that engine was not getting started while engine performance test. On request of the applicant spark plug were changed before engine performance test.



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**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 1.0 kW against declared value of 1.28 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 933.9 g/kWh against declared value of 661 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 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.

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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**

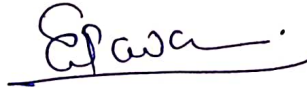
The following literature in English language was provided for reference during testing:

- 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.

16.11 It was observed that engine was not getting started while engine performance test. On request of the applicant spark plug were changed before engine performance test. This shall be looked into for improvement.

**TESTING AUTHORITY**



(S.G. PAWAR)  
AGRICULTURAL ENGINEER



(Dr. P.P. RAO)  
DIRECTOR

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