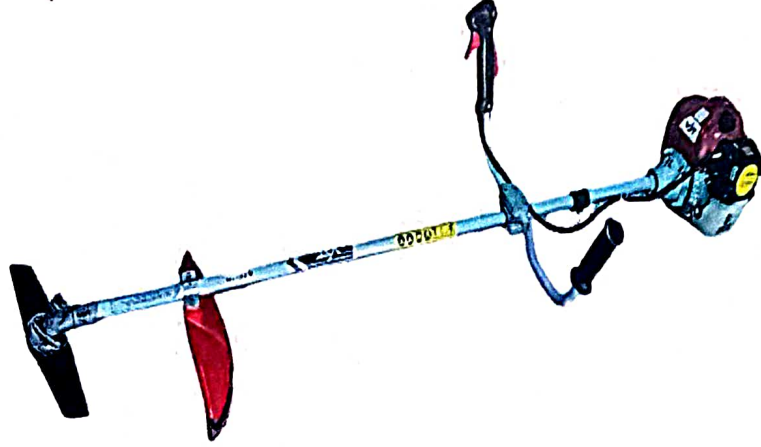


व्यावसायिक परीक्षण रिपोर्ट (प्रारंभिक)  
COMMERCIAL TEST REPORT (Initial)



संख्या/No.: Machine 72/443  
माह / Month: September 2022

THIS TEST REPORT IS VALID UPTO 30.09.2027



243 HD 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

- Checking of specifications
- Mechanical vibration measurement
- Noise measurement
- Wear assessment of critical components
- Engine performance test

### 1.2 FIELD TEST

- Rate of work
- Quality of work
- Labour requirement
- Adequacy of prime mover power
- Ease of operation, adjustment & safety provisions
- 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

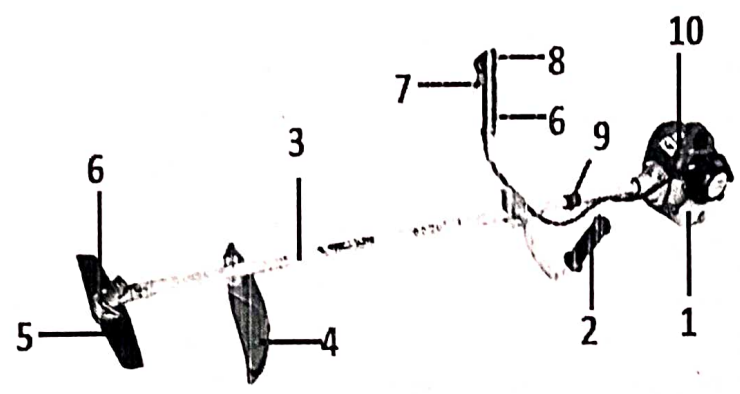
Name of the Machine	: Brush Cutter
Name and address of the manufacturer	: M/s MTD Machinery Suzhou Co. Ltd. No. 18 Ruipu Road, EPZ ZONE B Suzhou, Jaingsu, Province, China
Name & Address of Applicant	: VST TILLERS TRACTORS LTD Plot No 222-224 & 229-232, 3 <sup>rd</sup> Phase, KIADB Industrial Area, Malur, Kolar District, Karnataka- 563 130, INDIA

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Model : 243 HD  
 Make : VST  
 Serial No. : 243210800105  
 Type : Engine operated  
 Type of cutting attachment : Nylon rope and straight blade  
 Year of manufacture : 2022  
 Country of origin : CHINA  
 Type of crops/bush recommended : All kinds of weeds



**4.2 Constructional details :**



**Fig. 1 : VST BRUSH CUTTER, MODEL: 243 HD**

**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	41.8	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	0.425	Does not Conform
Manganese (Mn)	0.3 to 0.5	0.660	Does not Conform
Silicon (Si)	---	0.231	---
Sulphur (S)	---	0.008	---
Phosphorous (P)	---	0.015	---

## 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	14.08	341.0	337.7	3.3	0.97	0.07

## 12. FIELD PERFORMANCE TEST

Field tests were conducted for total of 27.42 hours duration. Grass/weeds cutting with nylon rope and bush cutting using straight blade attachments were carried out for 13.34 hours and 14.08 hours, respectively. A total of five test trials were conducted at rated speed of 7000 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)	1.32 to 1.35	9.6 to 10.4
3	Average number of Grass/Bush in 1m <sup>2</sup>	395 to 413	25 to 27.6

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1	2	3	4
4	Average height of Grasses/Bush (mm)	129 to 157.7	1320 to 1500
5	Mass of Grass/Bush (kg/h)	303.62 to 358.6	1926.0 to 1984.3
6	Mass of Grass/Bush (kg/ha)	4722 to 5692	26834 to 28884
7	Rate of work (ha/h)	0.062 to 0.064	0.0687 to 0.0718
8	Time required for one hectare (h)	15.55 to 16.13	13.93 to 14.56
9	Fuel consumption		
	-l/h	0.760 to 0.800	1.09 to 1.11
	-l/ha	12.06 to 12.90	15.46 to 15.87

### 12.1 Grass/Weeds cutting using nylon rope

#### 12.1.1 Rate of work

The area of cut was recorded as 0.062 to 0.064 ha/h.

Time required for one hectare was recorded as 15.55 to 16.13 hours.

Mass of weeds cut was 303.62 to 358.6 kg/h.

#### 12.1.2 Fuel consumption

Fuel consumption was observed as 0.760 to 0.800 l/h and 12.06 to 12.90 l/ha.

### 12.2 Bush cutting using straight blade

#### 12.2.1 Rate of work

The area of cut was recorded as 0.0687 to 0.0718 ha/h.

Time required for one hectare was recorded as 13.93 to 14.56 hours.

Mass of bush cut was 1926.0 to 1984.3 kg/h.

#### 12.2.2 Fuel consumption

Fuel consumption was observed as 1.09 to 1.11 l/h and 15.46 to 15.87 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 noticeable defect or breakdown was observed during 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 0.73 kW against declared value of 1.25 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 805.3 g/kWh against declared value of 589 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 value of rated power of engine on the labeling sticker on 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 CHINA, on the labeling sticker of the machine it was mentioned as INDIA, this shall be looked into for corrective action.

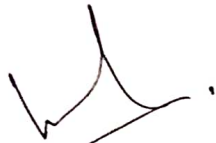
**16.10 Adequacy of Literature**

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

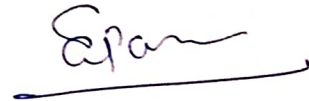
- Operator's/ Service manual
- Parts catalogue

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



(S.G. PAWAR)  
AGRICULTURAL ENGINEER



(Dr. P.P. RAO)  
DIRECTOR

Draft test report compiled by - **Shri Khagendra Bora**  
Sr. Technical Assistant