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



संख्या/No.: Machine 93/464 माह / Month: July 2023

## THIS TEST REPORT IS VALID UPTO 31.07.2028



## **VST 4S36 HD BRUSH CUTTER**



भारत सरकार GOVT OF INDIA

कृषि एवं किसान कल्याण मंत्रालय

MINISTRY OF AGRICULTURE & 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 विश्वनाथ चारिआलि, जिला- शोणितपुर (असम) BISWANATH CHARIALI: SONITPUR: ASSAM, PIN - 784 176 [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

The test sample was selected by the testing authority through random selection. The following test samples were presented by the applicant during the random selection at Applicant's site.

SI.	Serial No. of test	SI.	Serial No. of test	Remarks
No	sample	No	sample	
1	072022000193	6	072022000192	a
2	072022000188	7	072022000202	Out of 10 samples Sr.
3	072022000191	8	072022000196	No. 01 sample has been
4	072022000189	9	072022000206	randomly selected.
5	072022000190	10	072022000201	

#### 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. <u>SPECIFICATIONS</u>

## 4.1 General

Name of the Machine

Name and address of the manufacturer

- : Brush Cutter
- : M/s MTD Machinery Suzhou Co. Ltd., No. 18 Ruipu Roaad, EPZ ZONE B Suzhou, Jiangsu, Province, CHINA

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Machir	ne 93/464	VST 4836 HI	) BRUSH	CUTTER	COMMERCIAL (INITIAL)
	Name &	Address of Applicant	:	<b>M/s VST Tillers Trac</b> Plot No 222-224 & 2 KIADB Industrial A District, Karnataka- 56	etors Ltd., 29-232, 3 <sup>rd</sup> Phase, rea, Malur, Kolar 53 130
	Make		:	VST	
	Model		:	4S36 HD	
	Serial No	).	:	072022000193	
	Туре		:	Engine operated mach	ine
	Type of c	cutting attachment	:	Nylon rope and Circul	ar blade
	Year of n	nanufacture	:	2022	ŕ
	Country	oforigin	:	CHINA	
	Type of c	crops/bush recommended	:	All kinds of weeds/Bu	shes.
4.2	Constru	ctional details :			



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#### **10. HARDNESS AND CHEMICAL COMPOSITION**

#### 10.1 Hardness of Circular blade

Sl. No.	Hardness as per IS: 6025 – 1982 (HRC)	Hardness as measured (HRC)	Remarks
1	48 to 58	38.62	Does not Conform

## 10.2 Chemical composition of Circular Blade:

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

Constituent	As per IS: 6025 –	Composition As	Remarks
	1982 (%)	observed (% by weight)	
Carbon (C)	0.70 to 0.95	0.077	<b>Does not Conform</b>
Manganese (Mn)	0.3 to 0.5	0.366	Conforms
Silicon (Si)		0.160	
Sulphur (S)		0.020	/
Phosphorous (P)		0.018	

## 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
Circular blade	10.85	374.5	371.0	3.5	0.93	0.09

## 12. FIELD PERFORMANCE TEST

Field tests were conducted for total of 31.1 hours duration. Grass/weeds cutting with nylon rope and bush cutting using Circular blade attachments were carried out for 20.25 hours and 10.85 hours, respectively. A total of six 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

SI. No.	Parameters	Grass/weeds cutting	Bush cutting
1	2	3	4
1	Field Condition	Level	
2	Thickness of stem of Grasses/Bush at cutting height (mm)	2.16 to 2.44	12.46 to 27.83
3	• Average number of Grass/Bush in 1m <sup>2</sup>	370 to 416	21 to 23
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1	2	3	4
4	Average height of Grasses/Bush (mm)	208 to 272	818 to 1880
5	Mass of Grass/Bush cut (kg/h)	119.6 to 215.1	467.87 to 1107.18
6	Mass of Grass/Bush cut (kg/ha)	4040 to 5572	19660 to 40700
7	Rate of work (ha/h)	0.029 to 0.039	0.023 to 0.027
8	Time required for one hectare (h)	25.91 to 33.78	36.76 to 42.02
9	Fuel consumption		
	-1/h	0.600 to 0.647	0.713 to 0.725
	-l/ha	16.22 to 21.08	26.21 to 30.46

## 12.1 Grass/Weeds cutting using nylon rope

## 12.1.1 Rate of work

- The area of cut was recorded as 0.029 to 0.039 ha/h.
- Time required for one hectare was recorded as 25.91 to 33.78 hours.
- Mass of weeds cut was 119.6 to 215.1 kg/h.

## 12.1.2 Fuel consumption

- Fuel consumption was observed as 0.600 to 0.647 l/h and 16.22 to 21.08 l/ha.

## 12.2 Bush cutting using Circular blade

#### 12.2.1 Rate of work

- The area of cut was recorded as 0.023 to 0.027 ha/h.
- Time required for one hectare was recorded as 36.76 to 42.02 hours.
- Mass of bush cut was 467.87 to 1107.18 kg/h.

## 12.2.2 Fuel consumption

- Fuel consumption was observed as 0.713 to 0.725 1/h and 26.21 to 30.46 1/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.

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#### Big end bearing:

Bearing No.	Clearance, mm		Max. permissible clearance limit, mm	
Dearing 1.0.	Diametrical	Axial	Diametrical	Axial
1	Needle		NA	NA
	bearing			

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

## 15.2 Valve, guide and timing gear:-

Any marked sign of overheating of valves:Pitting of seat/faces of valves:Any visual damage of teeth of timing gears:Condition of ignition coil & magneto:Transmission system::

: None : None : None : Normal

Transmission system:

. Norma

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 0.81 kW against declared value of 0.90 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 631 g/kWh against declared value of 600 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). Also, labeling plate/sticker should be provided on machine with details such as name of machine, engine rated speed & power, machine serial number, make & model etc. 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
  7 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

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- 16.6 The Hardness & Chemical composition of circular blade does not conform to Indian Standard IS 6025:1982. This should be looked into for corrective action.
- 16.7 The applicant has strictly advised to provide the safety kit viz. safety wear, safety shoes, goggles (safety glass), helmet, hand gloves, ear plug & mask etc. along with each machine for the safety of operator.

## 16.8 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 1S: 8132-1999.

## TESTING AUTHORITY

(M.R. PATIL) AGRICULTURAL ENGINEER

(S.G. PAWAR) AGRICULTURAL ENGINEER

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

#### **17. APPLICANT'S COMMENTS**

Sr. No. Page No. /Clause No.

**Applicant's Comments** 

17.1 16.1 to 16.7

Observation will be studied, and necessary corrective action will be taken for quality improvement in products. Parameter will be studied & necessary action will be initiated.

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