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

स्वच्छ भारत
एक कदम स्वच्छता की ओर

संख्या/No.: Machine 94/465
माह / Month: July 2023

THIS TEST REPORT IS VALID UPTO 31.07.2028

VST FT 35 GE POWER WEEDER

सत्यमेव जयते

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

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1. SCOPE OF TEST

The scope of test was limited to check and assess the following:

1.1 Specification and other data furnished by the applicant.
1.2 Engine performance
1.3 Vibration Measurement
1.4 Noise measurement
1.5 Hardness & chemical composition
1.6 Field performance
1.7 Wear analysis of rotor blades
1.8 Ease of operation and adjustments
1.9 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 self-propelled power weeder as such. The guidelines, however, have been taken from the following:

IS 9935 : 2002 (Reaffirmed 2012)	:	Power Tiller - Test code
IS 9980 : 1999 (Reaffirmed 2004)	:	Guidelines for field performance and haulage tests of power tillers
IS: 7347-1974 (Reaffirmed 2006)	:	Specification for Performance of Small Size Spark Ignition Engines.
IS 1976 : 1976 (Reaffirmed 2009)	:	Specification for Rotary paddy weeder, manually operated
IS 6690 : 1981 (Reaffirmed 2012)	:	Specification for Blades for Rotavator for Power Tillers

4. SPECIFICATIONS

4.1 General:

Make	:	VST
Model	:	FT 35 GE
Name and address of manufacturer	:	**M/s Chongqing Hwasdan Machinery Manufacturing Company Ltd.,** Xipeng Industry Zone, Jiulongpo Dist, Changing-401326, CHINA

Name and address of applicant	:	**M/s VST Tillers Tractors Ltd.,** Plot No 222-224 & 229-232, 3rd Phase, KIADB Industrial Area, Malur, Kolar District, Karnataka, 563130
Name of machine	:	Power weeder
Type of machine	:	Self propelled, Walk behind
Working size of machine (mm)	:	640
Year of manufacture	:	2022
Serial no. of machine	:	**Not Provided**

4.2 Details of prime mover:

Make	:	M/s Chongqing Hwasdan Machinery Manufacturing Company Ltd.
Model	:	HP175
Type	:	4 stroke, Single cylinder, Air cooled
Year of manufacture	:	2022
Serial Number	:	2102100004
Country of origin	:	**CHINA**
Recommended high idle speed (rpm)	:	3800±50
Recommended low idle speed (rpm)	:	2000
Recommended rated speed (rpm)	:	3600
Rated power observed (kW)	:	1.32

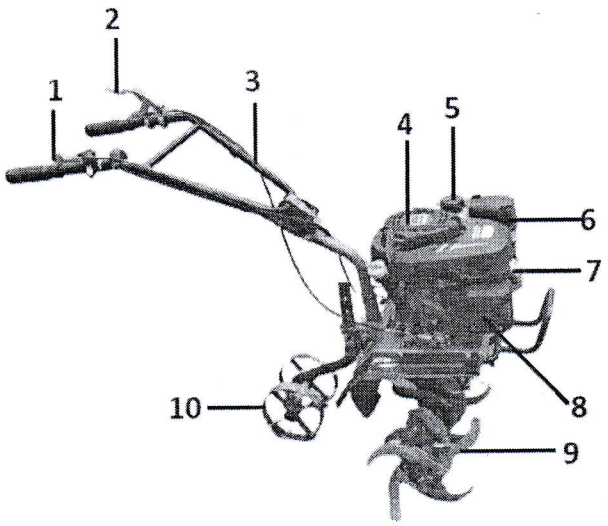

Fig.1 VST POWER WEEDER, MODEL: FT 35 GE

10. LABORATORY TEST

10.1 Hardness of rotor blades :

The surface hardness of blade was recorded as under :

	As per IS 6690:1981 (Reaffirmed 2012)	As observed (HRC)	Remarks
At edge portion	56 ±3 HRC	47.3	**Does not Conform**
At shank portion	37 to 45 HRC	46.2	**Does not Conform**

10.2 Chemical composition of rotor blades :

Constituents	As per IS 6690:1981 (Reaffirmed 2012)		Composition as observed (% by weight)	Remarks
	Carbon Steel (%)	Silicon Manganese Steel (%)		
Carbon (C)	0.70 -0.85	0.50-0.60	0.731	Conforms
Silicon (Si)	0.10 - 0.40	1.50-2.00	0.212	Conforms
Manganese (Mn)	0.50 -1.0	0.50-1.00	1.026	Does not Conform
Sulphur (S)	0.05(max)	0.05(max)	0.004	Conforms
Phosphorous (P)	0.05(max)	0.05(max)	0.014	Conforms

11. FIELD PERFORMANCE TEST

The field tests were conducted for 25.09 hours of field operation for testing the said Power Weeder. The field tests were conducted at rated speed of 3600 rpm. The detailed test results are represented in the Annexure and summarized in the ensuing table:

Sl .No.	Parameters		Observations
1	Type of soil	:	Light
2	Soil moisture (%)	:	12.5 to 14.4
3	Bulk density of soil (g/cc)	:	1.55 to 1.62
4	Forward Speed of operation (kmph)	:	0.520 to 0.524
5	Depth of cut (cm)	:	3.40 to 3.93
6	Width of cut (m)	:	0.638 to 0.650
7	Area covered (ha/h)	:	0.025 to 0.027
8	Time required for one ha (h)	:	37.0 to 40.0
9	Field efficiency (%)	:	75.76 to 79.41
10	Weeding efficiency (%)	:	73.03 to 80.0
11	Fuel consumption		
	l/h	:	0.533 to 0.727
	l/ha	:	19.74 to 27.48

11.1 Rate of work:

- Rate of work was recorded as 0.025 to 0.027 ha/h and the forward speed of operation varied from 0.520 to 0.524 kmph.
- Time required to cover one hectare was recorded as 37.0 to 40.0 h.

11.2 Quality of work:

- Depth of cut was recorded as 3.40 to 3.93 cm.
- Working width was observed as 0.638 to 0.650 m.
- Field efficiency was found as 75.76 to 79.41 %.
- Weeding efficiency was found as 73.03 to 80.0 %.

11.3 Adequacy of power of prime mover:

The power of prime mover was found adequate.

11.4 Wear Analysis of rotor blades:

Sl. No	Initial mass (g)	Final mass (g)	Loss of mass (g)	Percentage wear of rotor blades	
				After 25.09 h	Per hour
L-1	197.0	192.0	5.0	2.54	0.10
L-2	192.5	188.5	4.0	2.08	0.08
L-3	193.0	188.5	4.5	2.33	0.09
R-1	192.5	187.5	5.0	2.60	0.10
R-2	200.0	195.5	4.5	2.25	0.09
R-3	197.0	193.0	4.0	2.03	0.08

The hourly rate of wear of blade on mass basis after field operations was recorded as 0.08 to 0.10 %.

12. EASE OF OPERATION & ADJUSTMENTS

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

13. DEFECTS, BREAKDOWNS AND REPAIRS

1. Re-coil starter spring was broken during the test. On the request of the Applicant re-coil starter set was changed with new one.

14. COMPONENTS / ASSEMBLY INSPECTION AND ASSESSMENT OF WEAR

14.1 Engine:

The Engine and other assemblies were dismantled after 34.59 hours of operation.

14.1.1 Cylinder:

Cylinder	Cylinder bore dia (mm)						Max. Permissible wear limit (mm)
	Top position		Middle positon		Bottom position		
1	Thrust side	Non Thrust side	Thrust side	Non Thrust side	Thrust side	Non Thrust side	
	68.01	68.01	68.02	68.01	68.01	68.01	Not Specified

14.1.7 Valve guide clearance

Valve guide diameter (mm)		Valve stem diameter (mm)		Valve guide clearance (mm)		Max. Permissible wear limit (mm)	
Inlet	Exhaust	Inlet	Exhaust	Inlet	Exhaust	Inlet	Exhaust
5.45	5.48	5.40	5.44	0.05	0.04	Not specified	Not specified

Valve, guide and timing gear:-

Any marked sign of overheating of valves	:	None
Pitting of seat/faces of valves	:	None
Any visual damage of teeth of timing gears	:	None
Condition of ignition coil & magneto	:	Normal

14.2 Clutch: No noticeable defects observed

14.3 Transmission gears: No noticeable defects observed

14.4 Rotary drive unit:

The rotary drive unit was dismantled and all the components were found in normal condition.

15. COMMENTS & RECOMMENDATIONS

15.1 The average rated power in rating test of engine was observed as 1.32 kW against declared value of 2.7 kW by the manufacturer. This should be looked into for corrective action.

15.2 The specific fuel consumption (SFC) in rating test of engine was observed as 514.6 g/kWh against declared value of 380 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.

15.3 It was observed that re-coil starter spring was broken during the test. Re-coil starter set was changed with new one. This shall be looked into for improvement.

15.4 Transport wheels were not provided with the machine. It should be provided for easy transportation of machine.

15.5 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.

15.6 The hardness and chemical composition of rotary blades does not conform to the requirement of IS 6690:1981 (Reaffirmed 2012). This may be looked into for corrective action.

15.7 Noise at operator's ear level was observed same as that of warning limit of 85 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 operator's comfort & safety.

15.8 The amplitude of mechanical vibration marked as (*) is on drastically higher side and is directly concerned with operator's health, safety and comfort. Besides, it is also adversely affect the useful life of machine components. In view of above, this deserves to be given top priority for corrective action.

15.9 Machine model number was wrongly mentioned on the labelling plate of the machine and also Machine Serial No. was not mentioned on the labelling plate of the machine. It should be looked into.

15.10 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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