



THIS TEST REPORT IS VALID UPTO 31.08.2027

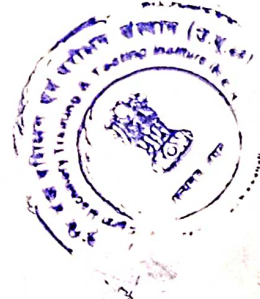


55 DLX-KW VST SELF PROPELLED REAPER



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 Specifications and other data furnished by the applicant.
- 1.2 Engine Performance test
- 1.3 Vibration measurement
- 1.4 Noise measurement
- 1.5 Tuning Ability
- 1.6 Wear analysis of critical components (cutter bar knife section)
- 1.7 Hardness and chemical analysis (cutter bar knife section)
- 1.8 Field performance
- 1.9 Ease of operation and adjustments
- 1.10 Defects, breakdowns and repair

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/PROCEDURE

There is no Indian Standard Test Code available for testing of reaper as such. The guidelines, however, have been taken from the following:

1. IS: 11467:1985 (Reaffirmed 2012) : Test code for cereal harvesting machines.
2. IS: 6025:1982 (Reaffirmed 1999) : Specification for knife sections for harvesting machine.
3. IS: 10378:1982 (Reaffirmed 2001) : Specification for knife back for harvesting machine.
4. IS: 7347:1974 (Amended 2011) : Specification for Performance of Small Size Spark Ignition Engines.

4. SPECIFICATIONS**4.1 General:**

- | | | |
|--------------------------------------|---|---|
| Name and address of the manufacturer | : | VST TILLERS TRACTORS LTD.
Plot No -1, Dyavasandra Industrial Layout,
Whitefield Road, Mahadevpura post,
Bengaluru Urban, Karnataka- 560 048 |
| Name & Address of Applicant | : | VST TILLERS TRACTORS LTD
Plot No 222-224 & 229-232, 3 rd Phase,
KIADB Industrial Area, Malur, Kolar
District, Karnataka- 563 130 |
| Name of machine | : | Reaper |
| Type | : | Self-Propelled, Walk behind |



Make : VST
 Model : 55 DLX-KW
 Year of manufacture : 2022
 Serial Number : AAKTDE002897
 Country of origin : INDIA
 Size of reaper (mm) : 1190
 Name of crop recommended by applicant : Paddy
 Name of crop in which the test was conducted : Paddy

4.2 Details of Prime Mover Used:

Name and address of the manufacturer : **Not Specified**

Make : KOHLER
 Model : CH270
 Type : 4 Stroke Petrol Engine, Single cylinder, Air cooled
 Year of manufacture : 2021
 Serial Number : 5105610968
 Country of origin : **Not Specified**
 Recommended high idle speed (rpm) : 1950 ± 75 (at PTO)
 Recommended low idle speed (rpm) : 700+100/-75 (at PTO)
 Recommended rated speed (rpm) : 1800 (at PTO)
 Recommended speed for field test (rpm) : 1800 (at PTO)
 Rated power observed (kW) : 3.5

11.3 Chemical composition of Knife section (Movable):

The material of reaper knife section was got analyzed for chemical composition. The results of chemical analysis test are as under:-

Constituents	As per IS: 6025-1982	Composition as observed (% of weight)	Remarks
Carbon (C)	0.70 -0.95	0.566	Does not Conform
Manganese (Mn)	0.3 – 0.50	0.676	Does not Conform

11.4 Chemical composition of Knife section (Stationery):

The material of reaper knife section was got analyzed for chemical composition. The results of chemical analysis test are as under:-

Constituents	As per IS: 6025-1982	Composition as observed (% of weight)	Remarks
Carbon (C)	0.70 -0.95	0.566	Does not Conform
Manganese (Mn)	0.3 – 0.50	0.676	Does not Conform

11. FIELD PERFORMANCE TEST

The machine was tested for 25.38 hours for harvesting the Paddy crop. The performance of the machine was assessed with regard to quality of work, rate of work, fuel consumption, safety and soundness of construction. The detailed test results have been given in Annexure-I & II and summarized in Table 1 & 2 below.

SUMMARY OF CROP PARAMETERS

Table-1

S. No.	Parameters/operations	Range
1	Variety of crop	Jaya
2	Straw moisture content (wb) (%)	38.9 to 44.1
3	Grain moisture content (wb) (%)	17.5 to 19.2
4	Plant height (cm)	87.6 to 98.2
5	Length of ear head (mm)	184 to 195.6
6	Number of grains per ear head	181 to 203
7	Number of hills per square meter	29 to 32
8	Number of tillers per hill	12 to 23
9	Straw-grain ratio	2.95:1 to 3.06:1

SUMMARY OF FIELD PERFORMANCE

Table-2

S. No.	Parameters/operations	Range
1	Forward speed (kmph)	3.03 to 3.08
2	Width of cut (cm)	110 to 114
3	Stubble height (mm)	58.9 to 69.6
4	Losses (Percentage of total grain yield)	
	-Pre-harvest loss	Nil to 0.015
	-Post harvest loss (Cutter bar)	0.02 to 0.42
	- Conveyor loss/shattering loss	0.41 to 0.71
5	Area harvested (ha/h)	0.251 to 0.268
6	Field efficiency (%)	74.11 to 79.68
7	Time required for one hectare (h)	3.73 to 3.98
8	Fuel consumption	
	- l/h	1.11 to 1.15
	- l/ha	4.17 to 4.48

12.1 Rate of work

- The forward speed of machine was observed as 3.03 to 3.08 kmph.
- The area harvested by the machine was recorded as 0.251 to 0.268 ha/h.

12.2 Quality of work

- Field efficiency was observed as 74.11 to 79.68 %.
- The post-harvest loss (cutter bar) was observed as 0.02 to 0.42 % of total grain yield.
- The conveyor loss/shattering loss was observed as 0.41 to 0.71 % of total grain yield.
- The stubble height was recorded as 58.9 to 69.6 mm.
- Machine leaves the harvested crop in windrows.

12.3 Labour requirement

- Two unskilled labours were required for cutting the crop manually at corner and sides of each plot.
- Two skilled labours were required for operating the machine continuously.

12.4 Operator's comfort, safety and ease of operation

- All the controls were within the easy reach of the operator.
- The machine was provided with main clutch for stopping forward motion of the machine and cutter bar operation at the same time.

15.1.6 Main bearing: Two Nos. of ball bearing 6205 were used.

Bearing No.	Diametrical clearance, (mm)	Crankshaft end float, (mm)	Max. permissible clearance limit,(mm)	
			Diametrical clearance	Crankshaft end float
1.	Ball bearing	0.25	NA	0.254
2.	Ball bearing			

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
5.49	5.47	5.44	5.44	0.05	0.03	Not specified	Not specified

Valve, guide and timing gear:-

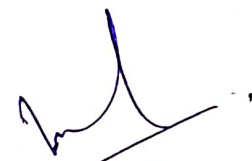
Any marked sign of overheating of valves	: None
Pitting of seat/faces of valves	: None
Any visual damage of teeth of timing gears	: None
Condition of ignition coil & magneto	: Normal

16. COMMENTS AND RECOMMENDATIONS

- 16.1 During field test clogging of crop at cutter bar was observed several times which resulted in breakage of safety pin. This shall be looked into for improvement.
- 16.2 Rated power of the engine was observed as 3.5 kW against declared value of 3.7 kW by the manufacturer. It should be looked into for corrective action.
- 16.3 The specific fuel consumption (SFC) in rating test of engine was observed as 385.2 g/kWh against declared value of 360 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 (reaffirmed 2006). This should be looked into for corrective action.
- 16.4 The amplitude of mechanical vibration marked as (*) was 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.
- 16.5 Noise at operator's ear level was observed on higher side against warning limit of 85 dB (A) as specified by ILO for continuous exposure of 8 hours per day. This calls for reduction in noise level to improve operator's comfort & safety.
- 16.6 Specification of knife sections of the cutter bar does not conform to IS 6025:1982 (Reaffirmed 1999) and it should be looked into for corrective action.

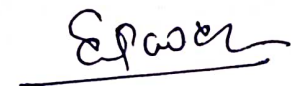
- 16.7 Specification of knife section back of the machine does not conform to IS 10378-1982 (Reaffirmed 2001) and it should be looked into for corrective action.
- 16.8 The hardness and chemical composition of knife sections (both movable and stationary) does not conform to the requirement of IS 6025-1982 (Reaffirmed 1999). It should be looked into for improvement.
- 16.9 The mentioned value of Rated power 5 kW of engine on the marking/labeling plate of the machine was not matching with the observed value during engine test. This may be looked into.
- 16.10 The engine was not marked with Manufacturer name or trade-mark, Serial No of engine, 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.
- 16.11 Big end bearing axial clearance was observed as 0.45 mm against 0.10 mm of maximum permissible wear limit as declared by the applicant. It should be looked into for corrective action.
- 16.12 Provision for main gearbox oil level check was not provided. It should be looked into for corrective action.
- 16.13 **Technical literature:**
Operator cum Service Manual & Parts Catalogue was provided along with the machine during the course of testing. It is further recommended to bring out these manuals in Hindi and other vernacular languages as per IS: 8132-1999.

TESTING AUTHORITY



(M.R. PATIL)

AGRICULTURAL ENGINEER



(S.G. PAWAR)

AGRICULTURAL ENGINEER



(Dr. P.P. RAO)

DIRECTOR

Draft test report compiled by - **Shri Khagendra Bora**
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