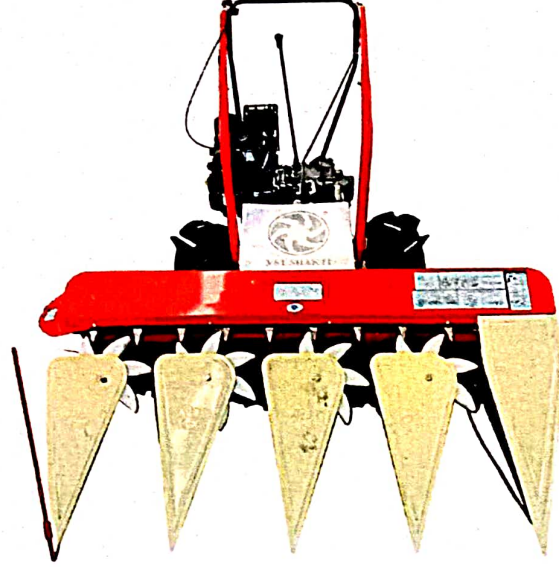


व्यावसायिक परीक्षण रिपोर्ट (प्रारंभिक)  
COMMERCIAL TEST REPORT (INITIAL)



संख्या/No.: Machine 62/433  
माह / Month: July 2022

THIS TEST REPORT IS VALID UPTO 31.07.2027



VST SHAKTI 5PR-KW SELF PROPELLED REAPER



भारत सरकार

GOVT OF INDIA

कृषि एवं किसान कल्याण मंत्रालय

MINISTRY OF AGRICULTURE & FARMERS WELFARE

कृषि एवं किसान कल्याण विभाग

DEPARTMENT OF AGRICULTURE & FARMERS WELFARE

उत्तर पूर्व 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 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 <sup>rd</sup> Phase, KIADB Industrial Area, Malur, Kolar District, Karnataka- 563 130
Name of machine	:	Reaper
Type	:	Self-Propelled, Walk behind
Make	:	VST SHAKTI
Model	:	5PR-KW

Year of manufacture : 2022  
 Serial Number : AAKTDE002895  
 Country of origin : **INDIA**  
 Size of reaper (mm) : 1170  
 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 : Chongqing Kohler Engines Ltd., No. 1000 Konggang Road, Chongqing Airport Industrial Park, Yubei District, Chongqing, China

Make : Chongqing Kohler Engines Ltd  
 Model : CH270  
 Type : 4 Stroke Petrol Engine, Single cylinder, Air cooled

Year of manufacture : 2021  
 Serial Number : 5105611048  
 Country of origin : **CHINA**  
 Recommended high idle speed (rpm) : 1850 ± 50 (at PTO)  
 3700 ± 50 (at Engine)  
 Recommended low idle speed (rpm) : 850 ± 50 ( at PTO )  
 1700 ± 50 (Crank shaft)  
 Recommended rated speed (rpm) : 1800 (at PTO)  
 3600 (at Engine)  
 Recommended speed for field test (rpm) : 1700-1800 (at PTO)  
 3400-3600 (at Engine)  
 Rated power observed (kW) : 2.4



**11.2 Hardness of Knife section (Stationery):**

The surface hardness of knife section was recorded as under:-

Sl. No	Hardness				Remarks	
	As per IS: 6025-1982		As observed (HRC)		Hardened Zone	Remainder Zone
	Hardened Zone	Remainder Zone	Hardened Zone	Remainder Zone		
1	(48-58) HRC	(20-35) HRC	24.7 to 41.2	84.2 HRBW	Does not Conform	Does not Conform

**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	0.708	Conforms
Manganese (Mn)	0.3 – 0.50	0.578	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	0.708	Conforms
Manganese (Mn)	0.3 – 0.50	0.578	Does not Conform

## 12. FIELD PERFORMANCE TEST

The machine was tested for 26.59 hours for harvesting the Paddy crop. The test was performed to assess the performance of machine 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	Sona Masoori
2	Straw moisture content (wb) (%)	40.5 to 46.8
3	Grain moisture content (wb) (%)	13.5 to 15.1
4	Plant height (cm)	89 to 98
5	Length of ear head (mm)	160 to 204
6	Number of grains per ear head	182 to 200
7	Number of hills per square meter	28.0 to 32.0
8	Number of tillers per hill	12 to 17
9	Straw-grain ratio	2.25:1 to 3.09:1

## SUMMARY OF FIELD PERFORMANCE

Table-2

S. No.	Parameters/operations	Range
1	Forward speed (kmph)	2.91 to 2.99
2	Width of cut (cm)	114 to 116
3	Stubble height (mm)	121.5 to 143.7
4	Losses (Percentage of total grain yield)	
	-Pre-harvest loss	Nil to 0.01
	-Post harvest loss (Cutter bar)	0.70 to 1.02
	- Conveyor loss/shattering loss	0.21 to 0.32
5	Area harvested (ha/h)	0.237 to 0.254
6	Field efficiency (%)	70.29 to 74.34
7	Time required for one hectare (h)	3.94 to 4.21
8	Fuel consumption	
	- l/h	1.13 to 1.24
	- l/ha	4.61 to 5.22

## 12.1 Rate of work

- The forward speed of harvesting ranged between 2.91 to 2.99 kmph.
- The area harvested was recorded as 0.237 to 0.254 ha/h.

## 12.2 Quality of work

- Field efficiency was observed as 70.29 to 74.34%.
- The post-harvest loss (cutter bar) was observed as 0.70 to 1.02 % of total grain yield.
- The conveyor loss/shattering loss was observed as 0.21 to 0.32 % of total grain yield.
- The stubble height was recorded as 121.5 to 143.7 mm.
- Machine leaves the harvested crop in windrows.

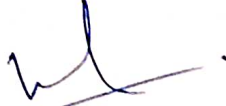
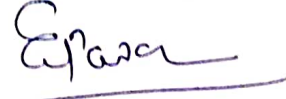


**16. COMMENTS AND RECOMMENDATIONS**

- 16.1 Rated power of the engine was observed as 2.4 kW against declared value of 5.0 kW by the manufacturer. It should be looked into for corrective action.
- 16.2 Specific fuel consumption (SFC) of engine corresponding to rated power as observed during test was exceeded 5 % of the declared value by the manufacturer. This does not fulfill the requirement of IS 7347-1974 (Amended 2011) and should be looked into for corrective action.
- 16.3 The amplitude of mechanical vibration marked as (\*) was on drastically higher side which directly concerned with operator's health, safety and comfort. Besides, it is also adversely affect the useful life of the component. In view of above this deserves to be given top priority for corrective action.
- 16.4 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 the operator's comfort & safety.
- 16.5 Specification of knife sections of cutter bar does not conform to IS 6025:1982 (Reaffirmed 1999) and it should be looked into for corrective action.
- 16.6 Specification of knife section back of cutter bar does not conform to IS 10378-1982 (Reaffirmed 2001) and it should be looked into corrective action.
- 16.7 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.
- 16.8 The mentioned values of Rated power (5 kW) and SFC (405 g/kWh) of engine on the marking/labeling plate of the machine was not matching with the observed values during engine test. This may be looked into.
- 16.9 The engine was not marked with rated power and rated speed which does not fulfill the requirement of IS 7347-1974 (Amended 2011). This may be looked into.
- 16.10 Big end bearing axial clearance was observed as 0.35 mm against 0.10 mm of maximum permissible wear limit as declared by the applicant. It should be looked into for corrective action.
- 16.11 Provision for main gearbox oil level check was not provided. It should be looked into for corrective action.

**16.12 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. Pankaj Sethi, Technical Assistant

**17. APPLICANT'S COMMENTS**

<b>Sr. No.</b>	<b>Page No./Clause No.</b>	<b>Applicant's Comments</b>
1.	Page No. 24/16.1, 16.2, 16.3, 16.5, 16.6, 16.10, 16.11	The necessary corrective action will be taken and will be incorporated in further production models.
2.	Page No. 24/16.4, 16.7, 16.8, 16.9 Page No. 25/16.12	Suggestion and recommendation will be incorporated for the quality of product and necessary corrective action will be taken. This will be implemented immediately.