

व्यावसायिक परीक्षण रिपोर्ट वैरिएंट (प्रथम बैच परीक्षण) संख्या / No. : T- 1572/2100/2021
COMMERCIAL TEST REPORT VARIANT (1st. BATCH TEST) माह / Month : August, 2021

(यह परीक्षण रिपोर्ट 31/08/2026 तक वैध है। / THIS TEST REPORT IS VALID UPTO: 31/08/2026)

[ONLINE TESTING]



VST SHAKTI, MT 180/JAI-2W TRACTOR



भारत सरकार

कृषि एवं किसान कल्याण मंत्रालय
(कृषि, सहकारिता एवं किसान कल्याण विभाग)

GOVERNMENT OF INDIA

MINISTRY OF AGRICULTURE AND FARMERS WELFARE
(DEPARTMENT OF AGRICULTURE, CO-OPERATION AND FARMERS WELFARE)

केन्द्रीय कृषि मशीनरी प्रशिक्षण एवं परीक्षण संस्थान

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3. ESSENTIAL TESTS

3.1 SPECIFICATIONS

3.1.1 Tractor:

Make	: VST SHAKTI
Model	: MT 180/JAI-2W
Brand name	: None
Type	: Four wheeled, Rear wheel driven, Unit construction, General purpose, Agricultural Tractor.
Month & Year of manufacture	: 10 / 20
Chassis number	: BCBTKC005113
Country of origin	: India

3.1.2 Engine:

Make	: VST Tillers Tractors Limited
Model	: V3D1
Type	: Four stroke, naturally aspirated, liquid cooled, indirect injection, diesel engine.
Serial number	: BCAEKC065963
Year of manufacture	: 2020 (apa)
Country of origin	: India

3.1.2.1 Engine speed (rpm), (Manufacturer's recommended production settings):

- Maximum speed at no load	: 2875 to 2925
- Low idle speed	: 800 to 900
- Speed at maximum torque	: 2000 to 2100

Rated speed, (rpm):

- For PTO use	: 2700
- For drawbar use	: 2700

3.1.3 Cylinder & Cylinder Head:

Number	: Three
Disposition	: Vertical, Inline
Bore/stroke, (mm)	: 73 / 78
Capacity as specified by the applicant, (cc)	: 979.5
Compression ratio	: 23 : 1
Type of cylinder head	: Monoblock
Type of cylinder liners	: Wet, Non replaceable
Type of combustion chamber	: Indirect injection
Arrangement of valves	: Overhead

Valve clearance (cold/hot):

- Inlet valve, (mm)	: 0.3 / 0.3
- Exhaust valve, (mm)	: 0.3 / 0.3

3.1.4 Fuel System:

Type of fuel feed system	: Gravity and force feed
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6.3.1.2 Drawbar Performance Test:

- Previous Sample**
- i) The maximum drawbar pull with standard ballast corresponding to 15 % wheel slip in case of base and variant models was observed as **7.75 kN** and **6.48 kN** against the declaration **6.00 kN**, which is within the tolerance limit as specified in IS:12207-2014.
- ii) The maximum drawbar power with standard ballast in case of base and variant models was observed as as **9.9 kW** and **8.8 kW** against the declaration of **9.40 kW & 8.85 kW** respectively, which is within the tolerance limit as specified in IS: 12207-2014.

- Present Sample**
- i) The maximum drawbar pull with standard ballast corresponding to 15 % wheel slip in case of previous and present sample was recorded as **6.48 kN** and **6.55 kN** against the declaration **6.00 kN**, which is within the tolerance limit as specified in IS:12207-2019.
- ii) The maximum drawbar power with standard ballast in case of previous and present sample was recorded as **8.8 kW** and **9.7 kW** against the declaration of **8.85 kW & 9.4 kW** respectively, which is within the tolerance limit as specified in IS: 12207-2019.

6.4 Adequacy of literature:

The following combined literature tractor models were supplied with the test sample for reference during the test.

- | | |
|----------------------|----------------------|
| a) Service Manual | a) Service Manual |
| b) Parts Catalogue | b) Parts Catalogue |
| c) Operator's manual | c) Operator's manual |

7. SUMMARY OF OBSERVATIONS, COMMENTS & RECOMMENDATIONS

7.1 On the basis of test conducted the performance results have been summarized as evaluative (mandatory) / Non-evaluation (Non-mandatory) parameter applicable for qualifying Minimum Performance criteria as per Clause-4 (Table-1) of **Indian standard: 12207-2019** for acceptance of the tractor for the purpose of subsidies/NABARD financing are summarized as under:

S. No.	Characteristic	Category (Evaluative / Non Evaluative)	Requirements as per IS: 12207-2019	Values declared by the applicant (D) / Requirement (R)	As observed	Whether meets the requirements (Yes / No)
1	2	3	4	5	6	7
7.1.1	PTO Performance:					
a)	Max. power under 2 h test, (kW) (Natural ambient condition)	Evaluative	Declared value to be achieved with a tolerance of: ± 5% for PTO power or engine power >26 kW, ± 10% for PTO power or Engine power ≤ 26 kW.	11.8 (D)	11.5	Yes
b)	Specific fuel consumption corresponding to maximum power, (g/kWh)	Evaluative	+ 10% Max.	360 (D)	317	Yes

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1	2	3	4	5	6	7
7.1.2	Drawbar performance:					
a)	Maximum drawbar pull with ballast corresponding to 15 percent wheel slip, (kN)	Non Evaluative	Minimum 70% of static mass with ballast	Ballast not recommended by the manufacturer	Not applicable	Not applicable
b)	Maximum drawbar pull without ballast corresponding to 15 percent wheel slip, (kN)	Evaluative	Minimum 70% of static mass of tractor without / standard ballast	6.00 (D) 5.32 Minimum (R)	6.55	Yes
c)	Maximum drawbar power without ballast, or with standard ballast as the case may be, (kW)	Evaluative	Minimum 80 % of PTO power as referred in SI No. i) a) of PTO performance in case of tractors having total static mass > 1500 kg Minimum 75 % of PTO power as referred in SI No. i) a) of PTO performance in case of light weight tractors having 1500 kg total static mass of tractor Minimum 75 % of the engine power as referred in SI No. i) a) of engine performance in case of tractors which do not have a PTO shaft.	9.4 (D) 8.6 Minimum (R)	9.7	Yes
d)	For tractor fitted with air conditioned / heated cabin: Maximum drawbar power without ballast, or with standard ballast as the case may be, kW	Evaluative	Minimum 70 percent of PTO power as referred in SI No. i) a) of PTO performance in case of tractors having total static mass > 1500 Kg.	Nil	Not fitted	Not applicable
e)	Maximum transmission oil temperature, (°C)	Evaluative	The declared value should not exceed the maximum value specified by oil company	121	78	Yes
7.1.3	Safety features:					
a)	Guards against moving and hot parts	Evaluative	Belt drives, pulleys, silencer, hydraulics pipes (as per IS-12239 Part 2)	Meet the requirements		Yes
b)	Lighting arrangement	Evaluative	As per CMVR	Meet the requirements		Yes
c)	Seating requirements (Tractors having more than 1150 mm rear track width)	Non Evaluative	Should meet the requirements of IS: 12343 (As amended from time to time)	Tractors rear track width is less than 1150 mm		Not applicable
d)	Technical requirements for PTO shaft	Evaluative	Should meet the requirements of IS: 4931 (As amended from time to time)	Meet the requirements		Yes
e)	Dimensions of three point linkage	Non Evaluative	Should meet the requirements of IS: 4468 (Part-I) (As amended from time to time)	Does not meet the requirements		No
f)	Specifications of linkage drawbar	Evaluative	Should meet the requirements of IS 12953 (As amended from time to time)	Meet the requirements		Yes
g)	Specifications of Swinging drawbar (wherever fitted)	Evaluative	Should meet the requirements of IS 12362 (Part 3) (As amended from time to time)	Not provided		Not applicable

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1	2	3	4	5	6	7
h)	1)	Maximum travelling speed at rated engine speed in reverse gears, kmph	Evaluative	Should not exceed 20 kmph	6.64 (meets the requirement)	Yes
	2)	Audible warning signal on tractor.	Evaluative	As soon as the travelling speed in reverse gear reaches to 20 kmph, an audible warning signal on tractor shall be activated.	Not applicable	Not applicable
7.1.4	Labelling of tractors (Provision of labelling plate):					
	1)	Make	Evaluative	Should conform to the requirements of CMVR along with maximum declared value of PTO power in kW and for month & year of manufacture in numerical MM YY Digit 01-12 in box No.1 for MM will represent the month and next two digit in the box No.2 for YY will represent the year of manufacturing	VST SHAKTI	Yes
	2)	Model	Evaluative		MT 180/JAI-2W	Yes
	3)	Month & Year of manufacture	Evaluative		10 / 20	Yes
	4)	Engine number	Evaluative		BCAEKC065963	Yes
	5)	Chassis number	Evaluative		BCBTKC005113	Yes
	6)	Declaration of PTO power, kW	Evaluative		11.8	Yes
	7)	Specific fuel consumption, (g/kWh)	Evaluative		360	Yes
7.1.5	Literature (Submission to test agency)					
(a)	Operator manual	Evaluative	Provided / Not Provided	Provided	Provided	Yes
(b)	Parts Catalogue	Evaluative	Provided / Not Provided	Provided	Provided	Yes
(c)	Workshop/ Service manual	Evaluative	Provided / Not Provided	Provided	Provided	Yes
7.1.6	Fitment of Roll Over Protective Structure (ROPS): for tractors having more than 1150 mm rear track width	Evaluative	ROPS should meet the requirement of IS:11821 or OECD code or equivalent International Standard	Not Provided	Not Fitted	Not applicable
7.1.7	Standard accessories	Evaluative	Trailer hitch, front tow hook, linkage drawbar should be provided with tractor	Provided	Provided	Yes
7.1.8	Accessories (Optional)	Non Evaluative	Ballast weights if fitted should meet the requirement of CMVR.	Provided	Provided	Yes

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7.2 CATEGORY OF BREAKDOWNS / DEFECTS (As per clause 5.0 of IS:12207-2019):					
S. No.	Category of Breakdown	Category (Evaluative / Non Evaluative)	Requirements as per IS: 12207-2019	As observed	Whether meets the requirement (Yes/No.)
1.	Critical breakdown	Evaluative	There is no 'critical breakdown' during the course of testing	None	Yes
2.	Major breakdowns	Evaluative	There are not more than 01 major breakdowns and neither of them is of repetitive nature	None	Yes
3.	Minor breakdowns	Evaluative	There are not more than 03 minor defects during the test and the frequency of each is not be more than two	None	Yes
4.	Total breakdowns	Evaluative	In no case, the total number of breakdowns should exceed four that is, (01 major + 03 minor) or 04 minor breakdowns	None	Yes

7.3 Salient Observations:

7.3.1 Laboratory tests:

7.3.1.1 PTO Performance:

- ii) The maximum PTO power was recorded as **11.5 kW** against the declaration of **11.8 kW**, which meets the evaluative requirement of IS: 12207-2019.
- iii) The specific fuel consumption corresponding to maximum power was recorded as **317 g/kWh** against the declaration of **360 g/kWh**, which meets the evaluative requirement of IS: 12207-2019.

7.3.1.2 Drawbar performance test:

- i) The maximum drawbar pull with standard ballast corresponding to 15 % wheel slip in case of previous and present sample was recorded as **6.48 kN and 6.55 kN** against the declaration **6.00 kN**, which is within the tolerance limit as specified in IS:12207-2019.
- ii) The maximum drawbar power with standard ballast in case of previous and present sample was recorded as **8.8 kW and 9.7 kW** against the declaration of **8.85 kW & 9.4 kW** respectively, which is within the tolerance limit as specified in IS: 12207-2019.

7.3.1.3 Three point linkage:

- i) The dia. of upper hitch pin hole does not meet the requirements of IS: 4468- (Part-2) -1997. This should be looked into for necessary corrective action.
- ii) Distance from end of power take-off to centre of lower hitch point (lower links in horizontal position) does not meet the requirements of IS: 4468- (Part-2) -1997. This should be looked into for necessary corrective action.

7.3.1.4 PTO master shield:

PTO master shield not provided on tractor as per the requirements of IS: 4931-1995 (Reaffirmed in January, 2019). This should be looked into for necessary corrective action.

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7.3.1.5 Location of operator's controls with regard to safety:

Location of operator's controls with regard to safety meets the requirements of IS: 8133-1983 (Reaffirmed in January, 2019), **except the following:**

- i) Fuel shut-off knob does not remain in stop position.
- ii) Direction of motion of hand operated accelerator lever for increasing the engine speed is not in accordance with the above referred standard.

7.3.1.6 Operator's work place:

Operator's work place meets the requirements of IS:12239 (Part-1) - 2018), **except the following:**

- i) Provision of vertical retainers at both sides of clutch pedal.
- ii) Provision of spark arresting device in the exhaust system.

7.4 Rear-mounted three-point linkage:

The dimensions of the rear three point linkage was not in symmetrical proportion. This is recommended to looked into for necessary corrective action.

7.5 Maintenance / Service Problems:

No noticeable maintenance or service problem was observed during the test.

7.6 Recommendation with regard to safety on tractor:

The following requirements, inter alia, may be considered for incorporation on the tractor:

- i) Provision of spark arrester in the exhaust system.
- ii) Master shield around the PTO shaft has not been provided. It should be provided as per IS: 4931-1995 (Reaffirmed in January, 2019).
- iii) Provision for mounting of canopy above driver's seat.
- iv) Vertical retainers at both sides of clutch pedal should be provided as per IS: 12239 (Part-1)-2018:
- v) The fuel shut off knob does not remain in 'STOP' position.
- vi) Direction of motion of hand operated accelerator lever for increasing the engine speed should be in accordance with IS: 8133-1983 (Reaffirmed in January, 2019).

7.7 Adequacy of Literature:

7.7.1 Following literature of following tractor models were supplied with the test sample for reference during the test.

- a) Service Manual for VST SHAKTI, VT 180 HS/JAI-4W, MT180/JAI-2W, MT180D, MT224-1D/AJAI-4W, MT 224-1D/JAI-2W PLUS tractor models.
- b) Parts Catalogue for VST SHAKTI, VT 180 HS/JAI-4W, MT180/JAI-2W, MT180D, MT224-1D/AJAI-4W, MT 224-1D/JAI-2W PLUS tractor models.
- c) Operator's manual for VST SHAKTI, VT 180 HS/JAI-4W, MT180/JAI-2W, MT180D, MT224-1D/AJAI-4W, MT 224-1D/JAI-2W PLUS tractor models.


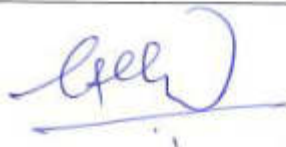
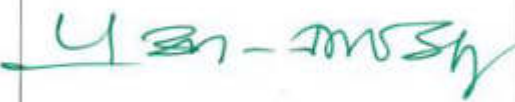
7.7.2 The supplied literature was found adequate; except:

- a) Scheduled servicing & routine maintenance chart provided in operator's manual & service manual does not correlate with each other. This is recommended to looked into for necessary corrective action.

7.7.3 The literature should be brought out in national as well as other regional languages of India for guidance of users.

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TESTING AUTHORITY:

C.V. CHIMOTE TEST ENGINEER	
Y.K.RAO SENIOR AGRICULTURAL ENGINEER	
P.K. PANDEY DIRECTOR	

Draft test report is compiled by: **Vithato Keyho**, Senior Technical Assistant

8. APPLICANT'S COMMENTS

Para No.	Our Reference	Applicant's comments
8.1	7.3.1.3 (i & ii), 7.3.1.4	This will be incorporated for the quality of product & necessary corrective action will be taken.
8.2	7.3.1.5 (i & ii), 7.3.1.6 (i & ii), 7.4, 7.6 (i, ii, iii, iv, v & vi) 7.7.2 (a) & 7.7.3	Suggestion and recommendation this will be implemented immediately and necessary corrective action will be taken.

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ANNEXURE – I

TRACTOR RUN HOURS DURING TEST

A.	LABORATORY AND TRACK TESTS	HOURS
1.	Running-in	18.0
2.	PTO performance test	3.9
3.	Nominal speed test	0.6
4.	Drawbar performance test	3.2
B.	Miscellaneous test and other run hours including idle run, transportation, trials and preparation for test	1.5
TOTAL:		27.2