

व्यावसायिक परीक्षण रिपोर्ट (प्रारंभिक)
INITIAL COMMERCIAL TEST REPORT
(CONVERTED FROM 1st Batch of Variant report)

संख्या/No. : T- 1697/2228/2022
माह/Month : December, 2022

Application Reference No. 28/2021-22/118

(यह परीक्षण रिपोर्ट 31/12/2027 तक वैध है। / THIS TEST REPORT IS VALID UPTO 31/12/2027)



VST SHAKTI, MT 180 D 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, Cooperation & Farmers Welfare)

केन्द्रीय कृषि मशीनरी प्रशिक्षण एवं परीक्षण संस्थान
ट्रैक्टर नगर, बुदनी (म.प्र.) 466 445
CENTRAL FARM MACHINERY TRAINING & TESTING INSTITUTE
(An ISO 9001: 2015 Certified Institute)
TRACTOR NAGAR, BUDNI (M.P.) 466 445

E-mail: fmti-mp@nic.in

Web site: <http://www.fmttibudni.gov.in>

Telephone: 07564-299003

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5. And whereas the applicant had submitted an online application vide letter No. Nil dated 03.05.2022 for 1st Batch testing of variant model “**VST Shakti, MT 180 D**”. However, in view of the declaration of the applicant that this model is to be treated as Base Model henceforth, all the tests as applicable for ICT had to be conducted on “**VST Shakti, MT 180 D**” tractor, for ICT report of the Base Tractor Model is to be referred to as the reference report for all the variants. This report is therefore issued as ICT on “**VST Shakti, MT 180 D**” tractor. The Variant Test Report on this tractor, Test Report No. **T-1246/1773/2019 (June, 2019), ipso facto, comes to be infructuous.**

2. FUEL AND LUBRICANTS

- 2.1 Fuel** : The High-speed diesel oil supplied by M/s Indian Oil Corporation Limited having density of 0.826 g/cc at 15°C was used.

2.2 Lubricants:

	Particulars	As recommended by the manufacturer	As used during the test
1.	Engine oil	SAE 20W40	As recommended
2.	Transmission, rear axle, front axle, final drive rear differential, hydraulic & steering system	SAE 90	Oil originally filled in the tractor was not changed
3.	Grease	Multi-purpose	Servo grease MP

3. SPECIFICATIONS

- 3.1 Tractor:**
- Make : VST SHAKTI
 Model : MT 180 D
 Brand name : None
 Type : Four wheeled, Four wheel driven, Standard Agricultural Tractor.
 Month & Year of manufacture : 03 / 22
 Chassis number : BCATCE002501
 Country of origin : India
- 3.2 Engine:**
- Make : VST Tillers Tractors Limited
 Model : V3D1
 Type : Four stroke, Water cooled, Indirect injection, naturally aspirated ,diesel engine
 Serial number : BDBECE000699
- 3.2.1 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
- 3.3 Cylinder & Cylinder Head:**
- Number : Three
 Disposition : Vertical, Inline
 Bore/stroke, (mm) : 73/78 (apa)
 Capacity as specified by the applicant, (cc) : 979.5
 Compression ratio : 23 : 1

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17. ADJUSTMENTS, DEFECTS, BREAKDOWNS AND REPAIRS

Sl. No.	Adjustments/Defects/Breakdowns and Repairs	Tractor run hours
1.	<p>During the hydraulic performance test, the maximum lifting capacity at hitch point throughout the range of lift was observed as 5.75 kN against the declaration of 6.5 kN, which does not meet the evaluative requirement of IS: 12207-2019 with regard to tolerance limit. Upon this, the applicant, vide letter No. Nil dated 11.07.2022 has requested for repeat test after 1st servicing of tractor (50 hours), overhauling of control valve and calibration of safety and over pressure (relief) valves, which was allowed. The following works were carried out on the tractor.</p> <ul style="list-style-type: none"> i) Replacement of engine oil (SAE 20 W 40). ii) Replacement of engine oil filter. iii) Replacement of transmission oil (SAE 90). iv) Replacement of fuel filter. v) Cleaning of air cleaner element. vi) Cleaning of hydraulic oil strainer. vii) Cleaning and overhauling of control valve. viii) The procedure for calibration of safety and over pressure (relief) valves is neither mentioned in submitted manuals, nor has the applicant provided any related instruments for calibration of safety and over pressure (relief) valves. Hence, calibration of valves could not be carried out. 	38.69

18. SUMMARY OF OBSERVATIONS, COMMENTS & RECOMMENDATIONS

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

Sl. 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
18.1.1	PTO Performance :					
a)	Maximum power under 2 h test, (kW) (Natural ambient condition)	Evaluative	Declared value to be achieved with a tolerance of: $\pm 5\%$ for PTO power and or engine power >26 kW. $\pm 10\%$ for PTO power and or engine ≤ 26 kW.	10.3	10.9	Yes
b)	Power at rated engine speed, (kW)	Non Evaluative	-do-	10.3	10.9	Yes
c)	Specific fuel consumption corresponding to maximum power, (g/kWh)	Evaluative	+ 10% max.	360	316	Yes
d)	Maximum equivalent crankshaft torque, (Nm)	Non Evaluative	$\pm 8\%$	46.0	46.9	Yes

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1	2	3	4	5	6	7
e)	Back-up torque, percent	Evaluative	12 percent	12 (D) 12 (R)	21.8	Yes
f)	Maximum operating temperature, (°C)					
	1) Engine oil	Evaluative	The declared value should not exceed the max. value specified by the oil company and the observed value under high ambient condition should not exceed the declaration.	135 (D)	106	Yes
	2) Coolant	Evaluative	The declared value should not exceed the boiling temperature of coolant under the pressurized or otherwise and the observed value under high ambient condition should not exceed the declaration.	120 (D)	100	Yes
g)	Engine oil consumption, (g/kWh)	Evaluative	Not exceeding 1% of SFC at max. Power under High ambient conditions.	3.35 Maximum	0.918	Yes
h)	Smoke level, m ⁻¹	Evaluative	Maximum light absorption coefficient of 3.25 per meter or equivalent BOSCH No. 5.2 or 75 Hatridge value (As per CMVR).	3.25 Maximum	1.00	Yes
18.1.2	Drawbar performance :					
a)	Max. drawbar pull with ballasted corresponding to 15 percent wheel slip, (kN)	Non Evaluative	Minimum 70% of static mass of tractor with ballast.	Ballasting not recommended by the applicant	NA	Not applicable
b)	Max. drawbar pull with standard ballast corresponding to 15 percent wheel slip, (kN)	Evaluative	Minimum 70% of static mass of tractor without ballast or with standard ballast, as the case may be.	6.00 (D) 5.75 (R) Minimum	7.90	Yes
c)	Maximum drawbar power with standard ballast, (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.	10.4 (D) 8.2 (R) Minimum	9.1	Yes
d)	Maximum transmission oil temperature, (°C)	Evaluative	The declared value should not exceed the maximum value specified by oil company	121 (D)	77	Yes

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1	2	3	4	5	6	7	
18.1.3	Power lift and hydraulic pump performance :						
a)	Maximum lifting capacity throughout the range of lift, (kN):						
	1)	At hitch points	Evaluative	Tolerance of $\pm 10\%$	6.50 (D)	5.94	Yes
	2)	With the standard frame	Evaluative	The lift capacity should at least be 24 kg/PTO kW. And it should be 21.5 kg/engine kW where the tractor is not provided with a PTO shaft.	4.0 (D) 2.57 (R) Minimum	3.81	Yes
b)	Maximum drop in the height of the point of application of the force after each 5 minutes interval for a total duration of 30 Minutes, (mm)		Non Evaluative	The observed value should not exceed 50 mm	50 (D) Maximum	00	Yes
18.1.4	Brake performance at 14.4 kmph:						
a)	*Maximum stopping distance at a force, equal to or less than 600 N on brake pedal with standard ballast, (m):						
	1)	Cold brake	Evaluative	10	10 (R)	2.18	Yes
	2)	Hot brake	Evaluative	10	10 (R)	2.44	Yes
b)	Maximum force exerted on the brake pedal to achieve a deceleration of 2.5 m/s ² , (N)		Evaluative	600	600 (R) Maximum	209 to 275	Yes
c)	Whether parking brake is effective at a force of 600 N at foot pedal (s) or 400 N at hand lever		Evaluative	Yes / No	Yes	Yes	Yes
*Applicant has not recommended ballast during the brake test. Hence, the brake test was conducted in standard ballasted condition.							
18.1.5	Noise measurement :						
a)	Maximum ambient noise emitted by the tractor, dB(A)		Evaluative	As per CMVR	85 (R)	80	Yes
b)	Maximum noise at operator's ear level, dB(A)		Evaluative	As per CMVR	96 (R)	95	Yes
18.1.6	Amplitude of mechanical vibrations at:						
	1)	Left foot rest	Non Evaluative	100 microns (max.)	100 (R)	102	No
	2)	Right foot rest				133	No
	3)	Seat (with driver seated)				132	No
	4)	Steering wheel				181	No
18.1.7	Air cleaner:						
	Maximum air cleaner oil pull over, (%)		Evaluative	0.25 (Max.)	Dry type air cleaner is provided		Not applicable

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1	2	3	4	5	6	7
18.1.8	Haulage requirements :					
a)	Gross mass of the trailers, (tones):					
	Two wheel	Non Evaluative	As specified by the manufacturer	3.0	3.0	Yes
	Four wheel	Non Evaluative		Not recommended	Not applicable	
b)	Distance travelled / liter of fuel consumption, (km/l):					
	Two wheel	Non Evaluative	As specified by the manufacturer	6.0	4.98 to 5.04	No
	Four wheel	Non Evaluative		Not recommended	Not applicable	
c)	Fuel consumption, (ml/km/tonne):					
	Two wheel	Non Evaluative	As specified by the manufacturer	58.0	66.09 to 66.89	No
	Four wheel	Non Evaluative		Not recommended	Not applicable	
18.1.9	Wetland cultivation :					
	Sealing for the following assemblies:	Evaluative	The identified assemblies should essentially meet the requirement of IS: 11082. No water ingress in the identified assembly given in column-2. If tractor does not meet the requirements of wetland cultivation, it may be recommended for dry land operation only.	There should be no ingress of water and/or mud (R)	No ingress of water and/or mud was observed	Yes
	1) Clutch assembly	-do-				
	2) Brake housings	-do-				
	3) Front axle hubs	-do-				
	4) Engine Oil	-do-				
	5) Transmission Oil	-do-				
18.1.10	Safety features :					
a)	Guards against moving and hot parts	Evaluative	Belt drives, pulleys, silencer, hydraulic pipes (As per IS 12239 (Part2)	Meets the requirement	Yes	
b)	Lighting arrangement	Evaluative	As per CMVR	Meets the requirement	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)	Not applicable as rear track width of tractor 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)	Meets the requirement	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 requirement	No	

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1	2	3	4	5	6	7		
f)	Specifications of linkage drawbar	Evaluative	Should meet the requirements of IS: 12953 (As amended from time to time)		Meets the requirement	Yes		
g)	Swinging drawbar (wherever fitted)	Evaluative	Should meet the requirement of IS: 12362 (Part 3) (As amended from time to time)		Not provided	Not applicable		
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. The safety aspects about the operation of shuttle technology shall be brought in operation and manufacturer /dealer shall ensure the training on this aspect to operator before the delivery of tractor.		Not fitted	Not applicable		
18.1.11	Labelling of tractors (Provision of labelling plate):							
	1) Make	Evaluative	Should conform to the requirements of CMVR along with maximum PTO Power in kW and year of manufacture in numerical form. <table border="1" style="margin: 5px auto;"><tr><td>MM</td><td>YY</td></tr></table> Digit 01 – 12 in box No.1 for MM will represent the months and next two digits in box No.2 for YY will represent the year of Manufacturing.	MM	YY	VST SHAKTI		Yes
MM	YY							
	2) Model	Evaluative		MT 180 D		Yes		
	3) Month & Year of manufacture	Evaluative		03 / 22		Yes		
	4) Engine number	Evaluative		BDBECE000699		Yes		
	5) Chassis number	Evaluative		BCATCE002501		Yes		
	6) Maximum PTO power, (kW)	Evaluative		10.3		Yes		
	7) Specific fuel consumption, g/kWh	Evaluative	360		Yes			
18.1.12	Discard limit for:							
(a)	Cylinder bore diameter, (mm)	Evaluative	To be specified by the manufacturer and supported by the printed literature	73.950	72.971 to 73.001	Yes		
(b)	Clearance between piston & cylinder liner at skirt, (mm)	Non Evaluative		0.50	0.107 to 0.126	Yes		
(c)	Piston diameter at skirt, (mm)	Non Evaluative		72.50	72.892 to 72.901	Yes		
d)	Ring end gap, (mm):							
	- Top compression ring	Evaluative	To be specified by the manufacturer and supported by the printed literature	2.00	0.20 to 0.25	Yes		
	- 2 nd compression ring			2.00	0.35 to 0.50	Yes		
	- 3 rd compression ring			2.00	0.35 to 0.50	Yes		
	- Oil ring			2.00	0.20 to 0.25	Yes		

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1	2	3	4	5	6	7
(e)	Ring groove clearance, (mm):					
	- Top compression ring	Evaluative	To be specified by the manufacturer and supported by the printed literature	0.50	Tapered	Not applicable
	- 2 nd compression ring			0.50	0.076 to 0.082	Yes
	- 3 rd compression ring			0.50	0.069 to 0.086	Yes
- Oil ring.	0.50			0.045 to 0.059	Yes	
(f)	Clearance of main bearings, (mm):					
	- Diametrical clearance	Evaluative	To be specified by the manufacturer and supported by the printed literature	0.40	0.085 to 0.131	Yes
- Crankshaft end float	Evaluative	1.50		0.10	Yes	
(g)	Clearance of big end bearings, (mm):					
	- Diametrical	Evaluative	-do-	0.40	0.065 to 0.086	Yes
	- Axial	Evaluative	-do-	0.80	0.20	Yes
(h)	Clearance between king pin and bush, (mm)	Non Evaluative	-do-	1.50	0.033 to 0.053	Yes
(i)	Clearance between centre pin and bush, (mm)	Non Evaluative	-do-	1.50	0.123 to 0.148	Yes
18.1.13	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
18.1.14	Fitment of Roll Over Protective Structures (ROPS):					
	For tractor having more than 1150 mm rear track width	Evaluative	ROPS should meet the requirement of IS:1182 or OECD code or equivalent International Standard		Not fitted	Not applicable
18.1.15	Standard Accessories	Evaluative	Trailer hitch, front tow hook, linkage drawbar should be provided with tractor		Provided	Yes
18.1.16	Accessories (optional)	Non Evaluative	Ballast weight, if fitted, should meet the requirement of CMVR		Provided	Yes

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18.2 CATEGORY OF BREAKDOWNS / DEFECTS (As per clause 5.0 of IS:12207-2019):					
Sl. No.	Category of break-downs	Category (Evaluative / Non Evaluative)	Requirements as per IS: 12207-2019	As observed	Whether meets the Requirements (Yes/No)
1.	Critical	Evaluative	No critical breakdown	None	Yes
2.	Major	Evaluative	Not more than two and neither of them should be repetitive in nature	None	Yes
3.	Minor	Evaluative	Not more than five and frequency of each should not be more than two.	None	Yes
4.	Total breakdowns	Evaluative	In no case, the total number of breakdowns should exceed five, that is, (2 major + 3 minor) or (1 major + 4 minor) or 5 minor breakdowns.	None	Yes

18.3 Salient Observations:

18.3.1 Laboratory tests:

18.3.1.1 PTO performance test:

During varying speed test at full load under natural ambient condition, the governing fluctuation was observed from 1604 rpm to 1794 rpm (at engine speed setting of 1700 rpm). This should be looked into for necessary corrective action.

18.3.1.2 Hydraulic performance test:

During the hydraulic performance test, the maximum lifting capacity at hitch point throughout the range of lift was observed as 5.75 kN against the declaration of 6.5 kN, which does not meet the evaluative requirement of IS: 12207-2019 with regard to tolerance limit. Upon this, the applicant, vide letter No. Nil dated 11.07.2022 has requested for **repeat test** after 1st servicing of tractor (50 hours), overhauling of control valve and calibration of safety and over pressure (relief) valves, which was allowed. The following works were carried out on the tractor.

- i) Replacement of engine oil (SAE 20 W 40).
- ii) Replacement of engine oil filter.
- iii) Replacement of transmission oil (SAE 90).
- iv) Replacement of fuel filter.
- v) Cleaning of air cleaner element.
- vi) Cleaning of hydraulic oil strainer.
- vii) Cleaning and overhauling of control valve.
- viii) The procedure for calibration of safety and over pressure (relief) valves is neither mentioned in submitted manuals, nor has the applicant provided any related instruments for calibration of safety and over pressure (relief) valves. Hence, calibration of valves could not be carried out.

This should be looked into for necessary correction.

18.3.1.3 Mechanical Vibration:

The amplitude of mechanical vibration on various assemblies / components marked as (*) in Chapter – 10 of this test report is on higher side. This calls for dampening down of vibrations especially on left & right foot rest, steering wheel and operator's seat to improve the operational comfort and service life of components.

18.3.1.4 Operator's work place:

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

Above parameters does not meet the requirement of IS: 12239 (Part-I) 2018. This should be looked into for necessary corrective action at production level.

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18.3.1.5 PTO master shield:

PTO master shield has not been provided on tractor. This should be looked into for necessary corrective action.

18.3.1.6 Three point linkage:

- i) The dimension of diameter of ball of upper hitch point.
- ii) The distance from end of power take-off to centre of lower hitch point (lower links in horizontal position).
- iii) The leveling adjustment.
- iv) The transport height and power range (without force) of lower hitch point LHS & RHS from ground level was observed as 695 mm & 700 and 545 mm & 570mm respectively. It was not possible to maintain same height of LHS & RHS lower links even after the possible adjustments.

Above parameters does not meet the requirement of IS: 4468- (Part-2) -1993 (Cat. 1N Narrow Hitch). This should be looked into for necessary corrective action at production level.

18.3.1.7 Steered wheel rims :

The sizes of Steered Wheel Rims were found to be “4.00B X 12”. As per Rule 95 A (2) of CMVR, 1989 read in conjunction with IS: 13154- 2015 provides for “The Agricultural Tractor manufacturer shall select ONLY THAT RIM SIZE AS RECOMMENDED BY THE TYRE MANUFACTURER.” In this case, the rim size RECOMMENDED by IS: 13154-2015, by ITTAC manual, is “4JA”. An immediate corrective action is required to be taken even in stand point of view with compliance to CMVR, 1989.

18.3.1.8 Drive wheel rims :

The sizes of Drive Wheel Rims were found to be “W 6 X 18”. As per Rule 95 A (2) of CMVR, 1989 read in conjunction with IS: 13154- 2015 provides for “The Agricultural Tractor manufacturer shall select ONLY THAT RIM SIZE AS RECOMMENDED BY THE TYRE MANUFACTURER.” In this case, the rim size RECOMMENDED by IS: 13154-2015, by ITTAC manual, is “W7”. An immediate corrective action is required to be taken even in stand point of view with compliance to CMVR, 1989.

18.3.2 Field Performance:

18.3.2.1 Dryland operation:

- i) During the field test with rotavation operation, the engine stalling was observed and the engine speed got dropped to 2300 rpm from the no load engine speed of 2900 rpm in L-3 gear with 4WD engaged condition. Thus, the test in L3 gear was not possible to conduct. Upon this, applicant vide letter No. Nil dated 28.10.2022 has requested to conduct field test in L-2 gear with 4WD engaged condition, which was allowed.
- ii) During the field test with rotavation operation, forward speed of the tractor was observed as 1.90 to 1.97 km/h L-2 gear with 4WD engaged condition and which is not within the recommended speed range of 2.0 to 4.0 km/h as per IS: 9253-2013. This should be looked into for necessary corrective action.
- iii) During the field test with M.B. plough, the front & rear wheel slippage was observed as 29.1% & 33.6 % respectively L-3 gear with 4WD engaged condition and which was not within the permissible wheel slippage of 20% as per IS: 9253-2013. Upon this, applicant vide letter No. Nil dated 16.11.2022 has requested to conduct ploughing test in L-2 gear with 4WD engaged condition, which was allowed.

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18.3.2.2 Wetland cultivation (Puddling operation):

- i) During the puddling test, applicant has submitted letter No. Nil dated 24.11.2022 and requested to conduct the puddling test in L2 gear with 4WD engaged condition as the engine is getting overloaded and running below the rated speed in L3 gear with 4WD engaged condition, which was allowed. Accordingly, the puddling test was conducted in L2 gear with 4WD engaged condition.
- ii) No ingress of mud and / or water was noticed during puddling operation of the tractor and meet the requirements of IS: 11082-1984 (Technical requirements of agricultural tractors for wetland operation). Therefore, the tractor was found as suitable for wetland operation (Puddling).

18.3.3 Haulage Test:

- i) During the haulage test with two wheel (single axle) trailer, distance travelled/litre of fuel consumption was recorded as 4.98 to 5.04 km/l against the declaration of 6.00 km/l by the manufacturer and which does not meet the non-evaluative requirement of IS: 12207-2019 with regard to tolerance limit. This should be looked into for necessary corrective action.
- ii) During the haulage test with two wheel (single axle) trailer, specific fuel consumption (ml/km/ton) was recorded as 66.09 to 66.89 ml/km/ton against the declaration of 58.0 ml/km/ton by the manufacturer and which does not meet the non-evaluative requirement of IS: 12207-2019 with regard to tolerance limit. This should be looked into for necessary corrective action.
- iii) The manufacturer has not recommended to conduct the haulage test with four wheel trailer. Hence, the haulage test with four wheel trailer was not conducted.

18.4 Maintenance / Service problems:

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

18.5 Recommendation with regard to safety on tractor:

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

- i) Spark arrester should be provided in the exhaust system as per the requirement of IS: 12239 (Part-2)-1999 (Re-affirmed in January, 2019).
- ii) Vertical retainers at both sides of clutch pedal should be provided.
- iii) The fuel shut-off knob does not remain in stop position without the application of sustain manual effort.
- iv) PTO master shield may be provided.

18.6 Adequacy of Literature:

18.6.1 The following literature of tractor models was supplied with the test sample for reference during the test.

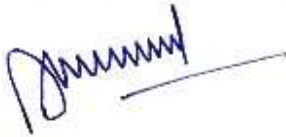

- a) Operator manual of VST SHAKTI, MT 180 D tractor model.
- b) Service manual VST SHAKTI, MT 180 D tractor model.
- c) Parts catalogue VST SHAKTI, MT 180 D tractor model.

18.6.2 The operator manual may be brought out for the guidance of users and service personnel as per IS:8132-1999 incorporating, inter alia, the following:

- i) Fuel saving tips
- ii) Safe hitch height of the trailer.
- ii) Coolant water ratio.

T- 1697/2228/2022	VST SHAKTI , MT 180 D TRACTOR – INITIAL COMMERCIAL TEST REPORT (CONVERTED FROM 1 st Batch of Variant report)
	(THIS TEST REPORT IS VALID UPTO 31/12/2027)

TESTING AUTHORITY:

PRAMOD YADAV AGRICULTURAL ENGINEER	
P. K. PANDEY DIRECTOR	

Draft test report is compiled by: **Pramod Yadav**, Agricultural Engineer

19. APPLICANT'S COMMENTS

Para No.	Our reference	Applicant's comments
19.1	18.3.1.1, 18.3.1.2, 18.3.1.3, 18.3.1.4 (i) & (ii), 18.3.1.5, 18.3.1.6 [(i), (ii), (iii) & (iv)], 18.3.2.1 (ii), 18.3.3 (i) & (ii), 18.5 [(i), (ii), (iii) & (iv)] and 18.6.2 [(i), (ii) & (iii)]	Observation/Parameters will be studied and necessary action will be initiated.
19.2	18.3.7 & 18.3.8	Observation/Parameters will be studied with our QA & design team for necessary corrective action & checking process will be introduced to avoid error in specification for future. Also corrective action is initiated with supplier as per ITTAC manual recommendation.

ANNEXURE – I

BRIEF SPECIFICATION OF MATCHING IMPLEMENTS AS DECLARED BY APPLICANT

S.No.	Item	MB Plough	Rotavator
1.	Make	VST	VST
2.	Type	Mounted	Mounted
3.	No. of bottom/blades	Two	28, at a spacing of 45 mm fitted on a shaft through fasteners
4.	Type of bottom/blades	General Purpose	Hatchet shape
5.	Size of bottom/blades, (mm)	170	210 x 40 x 5
6.	Spacing of bottom/flanges, (mm)	200	80
7.	Lower hitch point span, (mm)	490	260
8.	Mast height, (mm)	400	220
9.	Overall dimensions, (mm):		
	- Length	1260	1480
	- Width	670	1250
	- Height	915	800
10.	Gross mass, (kg)	140	140

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ANNEXURE- II

BRIEF SPECIFICATION OF MATCHING CAGE WHEEL AS DECLARED BY APPLICANT

S. No.	Items	Specifications
1.	Type	Half cage wheel made of M.S rod of 19.2 & 15.6mm diameter and M.S sheet lugs
2.	Diameter, (mm)	725
3.	Width, (mm)	250
4.	No. and types of lugs	08, Trapezoidal shape made of M.S sheet
5.	Size of angle section, (mm)	135 x 255 x 5.6
6.	Length of lugs, (mm)	250
7.	Spacing of lugs, (mm)	195
8.	Weight of each cage wheels (kg)	25

ANNEXURE- III

BRIEF SPECIFICATION OF TRAILER DECLARED AS MATCHING TRAILER BY APPLICANT

S.No.	Item	Trailer
1	Type of trailer	Semi - Trailer
2	Number of axles	Single
3	Un laden Weight of Trailer, kg	450
4	Overall dimensions of Trailer, (mm):	
	Overall Width	3165
	Overall Length	1690
	Overall Height	1140
	Wheel Base	Not applicable
5	Dimension of fitted Platform, (mm):	
	Length	2305
	Width	1630
	Height from ground	540
6	Brakes of Trailer	Not Provided

ANNEXURE-IV

TRACTOR RUN HOURS DURING TEST

A.	LABORATORY AND TRACK TESTS:	HOURS
1	Running-in	18.0
2	PTO performance test	12.0
3	Power lift and hydraulic pump performance test	2.5
4	Drawbar performance test	12.5
5	Turning ability	0.7
6	Location of centre of gravity	0.3
7	Operator's field of vision	--
8	Brake test	1.0
9	Noise measurement	1.5
10	Mechanical vibration test	0.8
11	Nominal speed test	1.2
B.	FIELD TEST:	
1	Disc ploughing	10.8
2	Rotavation	10.4
3	Puddling (including 5.0 hours water proof test)	15.2
C.	HAULAGE TEST:	11.3
D.	Miscellaneous test and other run hours including idle run, transportation, trials and preparation for test	12.4
TOTAL:		110.6