

संख्या / No. : T-1655/2186/2022
माह / Month : June, 2022

गोपनीय परीक्षण रिपोर्ट
CONFIDENTIAL TEST REPORT

व्यावसायिक परीक्षण रिपोर्ट में परिवर्तित
CONVERTED TO COMMERCIAL TEST REPORT

[ONLINE TESTING]

(यह परीक्षण रिपोर्ट 30/06/2025 तक वैध है / THIS TEST REPORT IS VALID UPTO 30/06/2025)



VST SHAKTI MT 932 TRACTOR



भारत सरकार

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

GOVERNMENT OF INDIA
MINISTRY OF AGRICULTURE AND FARMERS WELFARE
(DEPARTMENT OF AGRICULTURE & FARMERS WELFARE)

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Initially the applicant had submitted the application of “VST SHAKTI MT 932” tractor for confidential test online application no.28/2021-22/20 dated 23.05.2021. After releasing the draft test report, applicant had submitted a letter vide no. Nil dated 20.06.2022 for conversion of nature of test from confidential test to commercial test as per clause no. 9 of IS:12207-2019. The request of the applicant has been examined and accepted for conversion of nature of test as per relevant commercial test procedures. Hence, this confidential test report is released under commercial test.

Manufacturer : M/s. VST Tillers Tractors Limited
Plot No.39, Phase-1, Sipcot Industrial Complex, Mookandapalli, Krishnagiri, Hosur [Tamil Nadu]-635 126.

: **Head Office- VST Tillers Tractors Limited, Plot No.1, Dyavasnadra Indl Layout, Whietfield Road,Post Box No.4801, Mahadevapura post, Bengaluru [Karnataka]-560 048.**

Test requested by (applicant) : The Manufacturer
Selected for test by : The Testing Authority
Place of running-in : At Institute premises
Duration of said running-in, (h):

- Engine : 12
- Transmission : 09

Method of Selection : The test sample was selected randomly out of five tractors from the production line by the representative of testing authority through online.

Details of tractors made available for random selection:		
S. No.	Chassis Number	Engine Number
(i)	BHATHD000381	A28917
(ii)	BHATHD000387	A29085
(iii)	BHATHD000388	A29082
(iv)	BHATHD000389	A28921
(v)	BHATHD000392	A29087

1. SPECIFICATIONS

1.1 Tractor:

Make : VST SHAKTI
Model : VST SHAKTI MT 932
Brand name : None
Variants, if any : None
Type : Four Wheel Driven (4WD), Standard Agricultural Tractor.

Month & Year of manufacture : 09 & 21
Chassis number : BHATHD000381
Country of origin : India

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1.2 Engine:	
Manufacturer's address	: M/s. Mitsubishi Heavy Industries, VST Diesel Engines Pvt Ltd., Plot No. 305, Hebbal Industrial Area, Metagalli, Mysore [Karnataka]-570 016.
Make	: M/s. Mitsubishi Heavy Industries
Model	: MVS 4L2-T3CC6
Type	: Four stroke, natural aspirated, water cooled, indirect injection, diesel engine
Serial number	: A28917
Year of manufacture	: 2021
1.2.1 Engine speed (Manufacturer's recommended production setting), (rpm):	
- Maximum speed at no load	: 2570 to 2630
- Low idle speed	: 970 to 1030
- Speed at maximum torque	: 1400 to 2200
Rated speed, (rpm):	
- For PTO use	: 2400
- For drawbar use	: 2400
1.3 Cylinder & Cylinder Head:	
Number	: Four
Disposition	: Vertical, inline
Bore/stroke, (mm)	: 78/92
Capacity as specified by the applicant, (cc)	: 1758 (apa)
Compression ratio	: 22 (±0.5): 1
Type of cylinder head	: Mono-block
Type of cylinder liners	: Dry, Non- replaceable
Type of combustion chamber	: Direct combustion, Re-entrant cavity on piston crown
Arrangement of valves	: Overhead, inline
Valve clearance (Cold/Hot):	
- Inlet valve, (mm)	: 0.25 ± 0.05
- Exhaust valve, (mm)	: 0.25 ± 0.05
1.4 Fuel System:	
Type of fuel feed system	: Gravity and force feed
1.4.1 Fuel tank:	
Capacity, (l)	: 27.0
Location	: Above the clutch housing
Provision for draining of sediments/ water	: Provided
Material of fuel tank	: Plastic
1.4.2 Water separator	: Not provided
1.4.3 Fuel feed pump:	
Make	: Pricol
Type	: Electrical
Model, Group combination number	: 30N60-20301/M514 00 00 00 00
Location	: On RHS of engine
Method of drive	: Through engine camshaft
1.4.4 Fuel filters:	
Make	: Mitsubishi Diesel Engine
Type of element	: Spin on paper element, thrown away
Number	: One
Capacity of final stage filter, (l)	: 0.35

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17. SUMMARY OF OBSERVATIONS, COMMENTS & RECOMMENDATIONS

17.1 On the basis of tests 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 IS: 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
17.1.1	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	17.89 (D)	17.2	Yes
b)	Power at rated engine speed, (kW)	Non-Evaluative	-do-	17.89 (D)	17.2	Yes
c)	Specific fuel consumption corresponding to maximum power, (g/kWh)	Evaluative	+10 percent Max.	360 (D)	325	Yes
d)	Maximum equivalent crankshaft torque, (Nm)	Non-Evaluative	± 8 percent	89 (D)	87.7	Yes
e)	Back-up torque, percent	Evaluative	12 percent	12 (D)	28.2	Yes
f)	Maximum operating temperature, ($^{\circ}$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)	110	Yes
	2) Coolant (water)	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.	118 (D)	103	Yes
g)	Engine oil consumption, (g/kWh)	Evaluative	Not exceeding 1% of SFC at max. power under High ambient conditions	3.31 (Maximum) (R)	0.44	Yes
h)	Smoke level	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 per meter (Maximum) (R)	0.19	Yes

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1	2	3	4	5	6	7
17.1.2	Drawbar performance:					
a)	Maximum drawbar pull with ballast corresponding to 15 percent wheel slip, (kN)	Non-Evaluative	Minimum 70 percent of static mass with ballast	Ballasting not recommended by the manufacturer	Not applicable	Not applicable
b)	Max. drawbar pull with standard ballast, as the case may be corresponding to 15 percent wheel slip or 7 percent track slip, (kN)	Evaluative	Minimum 70 percent of static mass of tractor without ballast or as the case may be	9.50 (D) 8.86 (R) (Minimum)	11.10	Yes
c)	Maximum drawbar power 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.	14.5 (D) 12.9 (R) (Minimum)	14.4	Yes
d)	For tractors fitted with air conditioned /heated cabin: Maximum drawbar power with standard ballast as the case may be, kW	Evaluative	Minimum 70 % 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 applicable	Not applicable
e)	Max. transmission oil temperature (°C)	Evaluative	The declared value should not exceed the maximum value specified by oil company	121 (D)	89	Yes
17.1.3	Power lift and hydraulic pump performance:					
a)	Maximum lifting capacity throughout the range of lift, (kN):					
	1) At hitch points	Evaluative	[Tolerance of ± 10%]	12.25 (D)	11.65	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.	6.50 (D) 4.05 (R) (Minimum)	10.02	Yes
b)	Maximum drop in the height of the point of application of the force after each 5 min. interval for a total duration of 30 min/ mm	Non-Evaluative	The observed value should not exceed 50 mm.	50 (D) 50 (R) (Maximum)	20	Yes

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1	2	3	4	5	6	7	
17.1.4	Brake performance at 23.4 kmph:						
a)	Maximum stopping distance at a force, equal to or less than 600 N on brake pedal with standard ballasted, (m):						
	1)	Cold brake	Evaluative	10	10 (R)	6.90	Yes
	2)	Hot brake	Evaluative	10	10 (R)	7.13	Yes
b)	Maximum force exerted on the brake pedal to achieve a deceleration of 2.5 m/s ² . (N)	Evaluative	600	600 (R)	285 to 343	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 (R)	Yes	Yes	
17.1.5	Noise measurement:						
a)	Maximum ambient noise emitted by the tractor at bystanders' position, dB(A)	Evaluative	88 dB(A) for >1.5 tonne GVW and 85 dB(A) for <1.5 tonne GVW (as per CMVR)	85 (R)	82	Yes	
b)	Maximum noise at operator's ear level dB(A)	Evaluative	As per CMVR	96 (R)	90	Yes	
17.1.6	Amplitude of mechanical vibrations at:						
	1) Left foot rest	Non-Evaluative	100 microns (max)	100 (D)	149	No	
	2) Right foot rest				197	No	
	3) Seat (with driver seated)				164	No	
	4) Steering Wheel				140	No	
17.1.7	Air cleaner oil pull over:						
	Maximum air cleaner oil pull over (%)	Evaluative	0.25 % (max.)	Dry type air cleaner fitted	Not applicable		
17.1.8	Haulage requirements:						
a)	Gross mass of the trailers, (tones):						
	-Two wheel	Non-Evaluative	--	5.0 (D)	5.0	Yes	
	-Four wheel		--	Not recommended	Not applicable	Not applicable	
b)	Distance travelled / litre of fuel consumption, (km/l):						
	-Two wheel	Non-Evaluative	--	9 to 10 (D)	4.50 to 4.75	No	
	-Four wheel		--	Not recommended	Not applicable	Not applicable	
c)	Fuel consumption (ml/km/tonne):						
	-Two wheel	Non-Evaluative	--	34 to 36 (D)	42.07 to 44.49	No	
	-Four wheel		--	Not recommended	Not applicable	Not applicable	

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1	2	3	4	5	6	7	
17.1.9	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	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-					

17.1.10 Safety features:						
a)	Guards against moving and hot parts		Evaluative	Belt drives, pulleys, silencer, hydraulic pipes (As per IS 12239 (Part-2))	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: 12343-2021	Not applicable as the rear track width of the tractor is less than 1150 mm	Not applicable
d)	Technical requirements for PTO shaft		Evaluative	Should meet the requirements of IS: 4931-1995 (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-2)-1993 (As amended from time to time)	Meets the requirement	Yes
f)	Specifications of linkage drawbar		Evaluative	Should meet the requirements of IS:12953-1990	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 fitted	Not applicable
h)	1)	Maximum travelling speed at rated engine speed in reverse gears, kmph	Evaluative	Should not exceed 20 kmph	(11.57 kmph) 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 provided	Not applicable

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1	2	3	4	5	6	7
17.1.11	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 MM YY Digit 01-12 in box No.1 for MM will represent the months & next two digits in box No.2 for YY will represent the year of manufacturing.		VST SHAKTI	Yes
	2) Model	Evaluative			VST SHAKTI MT 932	Yes
	3) Month & Year of manufacture	Evaluative			09 & 21	Yes
	4) Engine number	Evaluative			A28917	Yes
	5) Chassis number	Evaluative			BHATHD000381	Yes
	6) Declaration of PTO power, kW	Evaluative			17.89	Yes
	7) Specific fuel consumption, g/kWh	Evaluative			360	Yes
17.1.12	Discard limit for:					
(a)	Cylinder bore diameter, (mm)	Evaluative	To be specified by Manufacturer	78.90	78.023 to 78.056	Yes
(b)	Clearance between piston & cylinder liner at skirt, (mm)	Non-Evaluative		0.50	0.093 to 0.098	Yes
(c)	Piston diameter at skirt, mm	Non-Evaluative		77.55	77.956 to 77.959	Yes
(d)	Ring end gap (mm):					
	- Top comp. ring.	Evaluative	-do-	2.0	0.30 to 0.35	Yes
	- 2 nd comp. ring.		-do-	2.0	0.40 to 0.45	Yes
	- Oil ring.		-do-	2.0	0.25 to 0.45	Yes
(e)	Ring groove clearance (mm):					
	- Top comp. ring.	Evaluative	-do-	0.50	Tappered	--
	- 2 nd comp. ring.	-do-	-do-	0.50	0.076 to 0.078	Yes
	- Oil ring.	-do-	-do-	0.50	0.038 to 0.039	Yes
(f)	Clearance of main bearings, (mm):					
	- Diametrical	Evaluative	-do-	0.80	0.049 to 0.081	Yes
	- Crank shaft end float	Evaluative	-do-	1.50	0.13	Yes
(g)	Clearance of big end bearings, (mm):					
	- Diametrical	Evaluative	-do-	0.50	0.068 to 0.071	Yes
	- Axial	Evaluative	-do-	0.80	0.10 to 0.15	Yes
(h)	Clearance between king pin and bush, (mm)	Non-Evaluative	-do-	Tapper roller bearings are provided		Not applicable
(i)	Clearance between center pin and bush, (mm)	Non-Evaluative	-do-	1.0	0.102 to 0.118	Yes

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1	2	3	4	5	6	7
17.1.13	Literature (Submission to test agency):					
(a)	Operator manual	Evaluative	The printed literature in booklet form should be provided as per IS 8132 & should submit along with the test sample	Provided / Not Provided	Provided	Yes
(b)	Parts Catalogue	Evaluative		Provided / Not Provided	Provided	Yes
(c)	Workshop/ Service manual	Evaluative		Provided / Not Provided	Provided	Yes
17.1.14	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
17.1.15	Standard accessories	Evaluative	Trailer hitch, front tow hook, linkage drawbar should be provided with tractor	Provided	Provided	Yes
17.1.16	Accessories (Optional)	Non Evaluative	Ballast weights if fitted should meet the requirement of CMVR.	Provided	Not Provided	Not applicable

17.2 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 02 major breakdowns and neither of them is of repetitive nature.	None	Yes
3.	Minor breakdowns	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 5 minor breakdowns.	None	Yes

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17.3	Conformity with following IS:	
i)	Guide lines for declaration of power and specific fuel consumption and labelling of agricultural tractors (First revision) [IS10273: 1987 (Reaffirmed in January, 2019)]	: Conforms
ii)	Agricultural tractors - Rear mounted power take-off - Types 1, 2 and 3 (third revision) [IS:4931-1995 (Reaffirmed in January, 2019)]	: Conforms
iii)	Agricultural wheeled tractors - Rear mounted three-point linkage: Part 2 Categories 1N (fourth revision) [IS 4468(Part-II):1993/ISO 730-2:1979 (Reaffirmed in 2019)]	: Conforms
iv)	Drawbar for agricultural tractors – Link type [IS 12953:1990 (Reaffirmed October, 2017)]	: Conforms
v)	Agricultural tractors – Operator’s seat technical requirement [IS 12343 –2021]	: Not applicable as the rear track width of the tractor is less than 1150 mm
vi)	Guide for safety & comfort of operator of agricultural tractors: Part 1 General requirements (first revision): [IS 12239 (PT-1)-2018 /ISO 4254-1:2013]	: Does not conform
vii)	Tractors and machinery for agriculture and forestry – Technical means for ensuring safety Part 2: Tractors (first revision) (IS 12239 (PT-2) 1999) (Reaffirmed in January, 2019)]	: Does not conform
viii)	Guide lines for location and operation of operator controls on agricultural tractors and machinery (first revision) IS: 8133- 1983 (Reaffirmed in January, 2019)]	: Conforms
ix)	Tractors and machinery for agriculture and forestry, powered lawn and garden equipment - Symbols for operator controls and other displays Part 2 Symbols for agricultural tractors and machinery [IS:6283 (Part-1)- 2006 and IS: 6283 (Part-2)- 2007 (Reaffirmed in January, 2019)]	: Conforms
x)	Agricultural Tractors and Machinery - Lighting device for travel on public roads (IS: 14683-1999) (Reaffirmed in January, 2019)]	: Conforms

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17.4 Salient Observations:

17.4.1 Laboratory tests:

17.4.1.1 PTO performance test:

The specific fuel consumption corresponding to maximum power was recorded as **325 g/kWh** against the declaration of **360 g/kWh** which is within the tolerance limit specified in IS: 12207-2019. This should be looked into for necessary corrective action.

17.4.1.2 Mechanical Vibration:

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

17.4.1.3 Three-point linkage:

- (i) The lateral distance from lower hitch point to centre line of the tractor of three-point linkage does not meet the requirement of IS: 4468 (Part-2) Category 1N -Narrow Hitch: 1993 (Re-affirmed in 2019). This should be looked into for necessary corrective action.
- (ii) Some of the parameters of three-point linkages conform to Cat. 1N and some of them conform to Cat. I. Keeping in view the spirit of standardization, necessary improvements may be incorporated.

17.4.1.4 Operator's work place:

Operator's work place meets the requirements of IS: 12239 (Part-I) 2018 (Reaffirmed Oct., 2017), except the following:

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

Above parameters does not meet the requirement of 12239 (PT-1) 2018 /ISO 4254-1:2013 This should be looked into for necessary corrective action at production level.

17.4.1.5 Constructional requirement with regard to safety:

Meets the requirements of IS: 12239 (Part-II)-1996 (Re-affirmed in January, 2019), except the following:

- (i) PTO master shield has not been provided.

17.4.1.6 Field performance test:

17.4.1.6.1 Dry land operation:

During the field test (dry land operation -rotavation test) the average working depth was recorded as 6 to 7 cm with the matching rotavator as recommended by the applicant. Upon, this applicant vide letter No. Nil dated 11.04.2022 has requested to continue the rotavation operation with the recommended matching rotavator. This should to be looked into for necessary corrective action.

17.4.1.7 Haulage performance:

- (i) The specific fuel consumption with two-wheel trailer was recorded as **42.07 to 44.49 ml/km/tonne**, respectively against the declaration of **34 to 36 ml/km/tonne** respectively which does not meet the non-evaluative requirement of IS: 12207-2019. This should to be looked into for necessary corrective action.

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- (ii) The distance traveled per liter of fuel consumption with two-wheel trailer was recorded as **4.50 to 4.75 km/l**, respectively against the declaration of **9 to 10 km/l** respectively which does not meet the non-evaluative requirement of IS: 12207-2019. This should be looked into for necessary corrective action.

17.4.1.8 Power take -off shaft:

In addition to clockwise rotation of PTO shaft, anticlockwise rotation has also been provided in contrast of “clockwise rotation” recommended in Clause No.4 of IS: 4931-1995. The provision of anticlockwise rotation has the potential of rendering the tractor not conforming to IS: 4931- 1995. In this case, it may lead to non-inclusion of tractor in the subsidy list. This should be looked into for necessary corrective action.

In response thereto, the applicant vide letter No. Nil dated 20.06.2022 has submitted that “to meet the IS:4931 -1995 requirement, we have decided to eliminate the anticlockwise PTO speed option by removing the following parts & thereby there would be only one direction of rotation i.e., clockwise, and which conforms to IS: 4931-1995 was allowed. Thus, tractor now became IS: 4931-1995 conformant. Details of following parts removed of reverse speed PTO as under: -

S. No.	Parts Name	Parts Number	Quantity
1.	Spacer PTO reverse Idler	BHA10C00260A0	01
2.	Gear idler PTO-Reverse assembly	BHA11C00320A2	01
3.	Gear Reverse Idler PTO	BHA11C00300A2	01
4.	Bushing ,20x24x18	BHA10C00110A0	01
5.	Washer PTO reverse Idler (ID 20 mm & thickness 1.6 mm)	MWA2001600GA1	01
6.	Shaft idler PTO reverse	BHA11C0010A1	01

17.5 Wet land cultivation (puddling operation):

No ingress of mud and / or water was noticed during puddling operation of the tractor and meet the requirements of IS: 11082-1984 (Re-affirmed in Oct. 2017) (Technical requirements of agricultural tractors for wetland operation). Therefore, the tractor is found suitable for wetland operation (Puddling).

17.6 Component assembly inspection:

During the component assembly inspection, the front differential- crown wheel & bevel pinion teeth was measured as **22/10T**. Whereas, the same has been specified as **23/10T** vide specification sheet. It must be looked into for necessary corrective action.

17.7 Maintenance / Service Problems:

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

17.8 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 of tractor’s engine as per IS: 12239 (Part-I) 2018.
- (ii) Vertical retainers at inner sides of clutch pedals should be provided as per relevant standard.

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- (iii) Provision of PTO master shield around the PTO shaft as per IS: 4931-1995(Reaffirmed in January, 2019).

17.9 Adequacy of Literature supplied with machine:



17.9.1 The following literature was supplied with the tractor for reference during the testing.

- (i) Operator manual of "VST SHAKTI, VST SHAKTI MT932" Tractor model.
- (ii) Service manual of "VST SHAKTI, VST SHAKTI MT932" Tractor model.
- (iii) Parts catalogue of "VST SHAKTI, VST SHAKTI MT932" Tractor model.

17.9.2 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) Safe hitch height while using trailer.
- (ii) Recommendation of haulage capacity during haulage operation.
- (iii) Maintenance schedule of air cleaner filter elements.

TESTING AUTHORITY:

C.V. CHIMOTE TEST ENGINEER	
P. K. PANDEY DIRECTOR	

Draft test report is compiled by: C.S. Raghuwanshi, Agricultural Engineer.

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18. APPLICANT'S COMMENTS

Para no.	Our reference	Comments																												
18.1	17.4.1.2, 17.4.1.3 (i & ii), 17.4.1.4 (i&ii), 17.4.1.6.1, 17.4.1.7 (i & ii) & 17.6	Necessary improvement & corrective action will be incorporated for quality of products.																												
18.2	17.4.1.8	<p>The applicant vide letter No. Nil dated 20.06.2022 has submitted that “to meet the IS:4931 requirement, we want to eliminate the anti-clockwise PTO rotation by remove the following parts: -</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>S. No.</th> <th>Parts Name</th> <th>Parts Number</th> <th>Quantity</th> </tr> </thead> <tbody> <tr> <td>1.</td> <td>Spacer PTO reverse Idler</td> <td>BHA10C00260A0</td> <td>01</td> </tr> <tr> <td>2.</td> <td>Gear idler PTO-Reverse assembly</td> <td>BHA11C00320A2</td> <td>01</td> </tr> <tr> <td>3.</td> <td>Gear Reverse Idler PTO</td> <td>BHA11C00300A2</td> <td>01</td> </tr> <tr> <td>4.</td> <td>Bushing ,20x24x18</td> <td>BHA10C00110A0</td> <td>01</td> </tr> <tr> <td>5.</td> <td>Washer PTO reverse Idler (ID 20 mm & thickness 1.6 mm)</td> <td>MWA2001600GA1</td> <td>01</td> </tr> <tr> <td>6.</td> <td>Shaft idler PTO reverse</td> <td>BHA11C0010A1</td> <td>01</td> </tr> </tbody> </table>	S. No.	Parts Name	Parts Number	Quantity	1.	Spacer PTO reverse Idler	BHA10C00260A0	01	2.	Gear idler PTO-Reverse assembly	BHA11C00320A2	01	3.	Gear Reverse Idler PTO	BHA11C00300A2	01	4.	Bushing ,20x24x18	BHA10C00110A0	01	5.	Washer PTO reverse Idler (ID 20 mm & thickness 1.6 mm)	MWA2001600GA1	01	6.	Shaft idler PTO reverse	BHA11C0010A1	01
S. No.	Parts Name	Parts Number	Quantity																											
1.	Spacer PTO reverse Idler	BHA10C00260A0	01																											
2.	Gear idler PTO-Reverse assembly	BHA11C00320A2	01																											
3.	Gear Reverse Idler PTO	BHA11C00300A2	01																											
4.	Bushing ,20x24x18	BHA10C00110A0	01																											
5.	Washer PTO reverse Idler (ID 20 mm & thickness 1.6 mm)	MWA2001600GA1	01																											
6.	Shaft idler PTO reverse	BHA11C0010A1	01																											
18.3	17.8 (i, ii & iii) & 17.9.2 (i, ii & iii).	Suggestion & recommendation will be incorporated for the quality of product & necessary corrective action will be taken. This will be implemented immediately.																												

ANNEXURE- I

BRIEF SPECIFICATION OF MATCHING IMPLEMENTS AS DECLARED BY APPLICANT

S.No.	Parameters	Reversible M.B. plough	Rotavator used during dry land operation	Rotavator used during wet land cultivation
1.	Make	VST Shakti	Sonalika	CAPTAIN
2.	Type	Mounted	Mounted	Mounted
3.	No. of bottom/blades	02	30 blades in 6 flanges	20 blades in 5 flanges
4.	Type of bottom/blades	General purpose	L-type	L-type
5.	Size of bottom/blades, (mm)	170	150x110x08	245 x 65 x 7
6.	Spacing of bottom/flanges, (mm)	200	225	40
7.	Lower hitch point span, (mm)	490	560	510
8.	Mast height, (mm)	400	360	470
9.	Overall dimensions, (mm):			
	- Length	1260	970	700
	- Width	670	1435	1200
	- Height	915	780	860
10.	Gross mass, (kg)	140	340	180

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ANNEXURE-II

BRIEF SPECIFICATION OF HALF CAGE WHEEL AS DECLARED BY APPLICANT

S.No.	Parameters	Specification
1	Type	Half cage wheel made of M.S rod of 19.2 mm & 15.6 mm diameter & M.S sheet lugs
2	Outer dia. (mm)	725
3	Width (mm)	250
4	No. & Type of Lugs	08, trapezoidal shape made of M.S sheet.
5	Size of angle section, (mm)	135x 255 x 5.6
6	Length of lug, (mm)	250
7	Spacing of lug, (mm)	195
8	Weight of each cage wheel, (kg)	25

ANNEXURE-III

BRIEF SPECIFICATION OF MATCHING TRAILER AS DECLARED BY APPLICANT

S.No.	Parameters	Trailer
1.	Type of trailer	Semi-Trailer
2.	Number of axles	Single
3.	Un laden weight of Trailer, kg	630
4.	Overall dimension of trailer, (mm)	
	Overall width	1340
	Overall length	3240
	Overall height	1560
	Wheel base	Not applicable
5.	Dimension of fitted Platform, (mm):	
	Length	2430
	Width	1830
	Height from ground	1260
6.	Brakes of trailers	Not provided

ANNEXURE- IV

TRACTOR RUN HOURS DURING TEST

A.	LABORATORY AND TRACK TESTS:	HOURS
1.	Running-in	21.0
2.	PTO performance test	11.9
3.	Drawbar performance test	10.3
4.	Power lift and hydraulic pump performance test	3.4
5.	Brake test	1.0
6.	Noise measurement	1.5
7.	Mechanical vibration test	1.2
8.	Turning ability	0.2
9.	Location of centre of gravity	0.2
10.	Operator's field of vision	0.2
11.	Theoretical speed test	0.5
B.	FIELD TEST:	
1.	MB Plough	10.5
2.	Rotavation	12.4
3.	Puddling test (including water proof test)	15.8
C.	HAULAGE TEST:	7.9
D.	Miscellaneous test and other run hours including idle run, transportation, trials and preparation for test	7.9
	TOTAL:	105.9