

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

संख्या / No. : T-1667/2198/2022
माह / Month : July, 2022

[ONLINE TESTING]

(यह परीक्षण रिपोर्ट 31/07/2025 तक वैध है।/THIS TEST REPORT IS VALID UPTO : 31/07/2025)



TAFE, MF 6028 MAX PRO 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)

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

e-mail: fmti-mp@nic.in

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

Telephone: 07564-299003

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- Manufacturer** : **M/s. Tractor and Farm Equipment Limited**, Post Box No. 3302, Old 35 (New 77), Mahatma Gandhi Road, Nungambakkam, Chennai - 600 034 (Tamil Nadu)
- Location of other manufacturing plants (apa) : (i) **M/s. Tractor and Farm Equipment Limited**, Kalladipatti Plant, 10/205, Kalladipatti (P.O.), Pin code- 624201, Dindigul District, (Tamil Nadu)
(ii) **M/s. Tractor and Farm Equipment Limited**, Doddaballapur plant, Plot No. 1, Kiadb Industrial Area, Doddaballapur, Bangalore – 561203
- 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 : 16
- 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
(i)	MEA1355DMM1344495
(ii)	MEA1355DMM1344466
(iii)	MEA1355DMM1344507
(iv)	MEA1355DMM1344472
(v)	MEA1355DMM1344480

1. SPECIFICATIONS

- 1.1 Tractor:**
- Make : TAFE
Model : MF 6028 MAX PRO
Brand name : None
Variants, if any : None
Type : Four Wheel Driven (4WD), Standard Agricultural Tractor.
Month & Year of manufacture : 12 & 21
Chassis number : MEA1355DMM1344480
Country of origin : India
- 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 : MVS3L2-JCT
Type : Four stroke, natural aspirated, liquid cooled, indirect injection, diesel engine
Serial number : A60825L1
Year of manufacture : 2021

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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	16.0 (D)	15.9	Yes
b)	Power at rated engine speed, (kW)	Non-Evaluative	-do-	16.0 (D)	15.9	Yes
c)	Specific fuel consumption corresponding to maximum power, (g/kWh)	Evaluative	+10 percent Max.	310 (D)	316	Yes
d)	Maximum equivalent crankshaft torque, (Nm)	Non-Evaluative	± 8 percent	65 (D)	72.5	Yes
e)	Back-up torque, percent	Evaluative	12 percent	12 (D)	23.9	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.	132 (D)	104	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.	112 (D)	97	Yes
g)	Engine oil consumption, (g/kWh)	Evaluative	Not exceeding 1% of SFC at max. power under High ambient conditions	3.20 (Max) (R)	1.17	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 (Max) (R)	0.26	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 unballasted, 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	7.0 (D) 6.69 (R) (Minimum)	8.94	Yes
c)	Maximum drawbar power with unballasted 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.	12.0 (D) 11.9 (R) (Minimum)	13.0	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	132 (D)	88	Yes
17.1.3	Power lift and hydraulic pump performance:					
1)	At hitch points	Evaluative	[Tolerance of ± 10%]	5.75 (D)	6.01	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.	4.00 (D) 3.74 (R) (Minimum)	4.01	Yes

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1	2	3	4	5	6	7
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)	0	Yes
17.1.4 Brake performance at 25 kmph:						
a)	Maximum stopping distance at a force, equal to or less than 600 N on brake pedal with unballasted, (m):					
	1) Cold brake	Evaluative	10	10 (R)	6.28	Yes
	2) Hot brake	Evaluative	10	10 (R)	6.36	Yes
b)	Maximum force exerted on the brake pedal to achieve a deceleration of 2.5 m/s ² . (N)	Evaluative	600	600 (R)	108 to 142	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)	79	Yes
b)	Maximum noise at operator's ear level dB(A)	Evaluative	As per CMVR	96 (R)	89	Yes
17.1.6 Amplitude of mechanical vibrations at:						
	1) Left foot rest	Non-Evaluative	100 microns (max)	100 (D)	98	Yes
	2) Right foot rest				96	Yes
	3) Seat (with driver seated)				92	Yes
	4) Steering Wheel				150	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, (tonnes):					
	-Two wheel	Non-Evaluative	-	1.5 (D)	1.5	Yes
	-Four wheel		-	Not recommended	Not applicable	Not applicable
b)	Distance travelled / litre of fuel consumption, (km/l):					
	-Two wheel	Non-Evaluative	-	5 to 7 (D)	7.13 to 7.52	No
	-Four wheel		-	Not recommended	Not applicable	Not applicable
c)	Fuel consumption (ml/km/tonnes):					
	-Two wheel	Non-Evaluative	-	100 to 140 (D)	88.65 to 91.88	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, pullies, 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	(10.95 kmph) Meets the requirement		Yes	

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	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
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.		TAFE	Yes
	2) Model	Evaluative			MF 6028 MAX PRO	Yes
	3) Month & Year of manufacture	Evaluative			12 & 21	Yes
	4) Engine number	Evaluative			A60825L1	Yes
	5) Chassis number	Evaluative			MEA1355DMM1 344480	Yes
	6) Declaration of PTO power, kW	Evaluative			16.0	Yes
	7) Specific fuel consumption, g/kWh	Evaluative			310	Yes
17.1.12	Discard limit for:					
(a)	Cylinder bore diameter, (mm)	Evaluative	To be specified by Manufacturer	78.20	78.015 to 78.041	Yes
(b)	Clearance between piston & cylinder liner at skirt, (mm)	Non-Evaluative		0.30	0.083 to 0.090	Yes
(c)	Piston diameter at skirt, mm	Non-Evaluative		77.80	77.749 to 77.955	Yes
(d)	Ring end gap (mm):					
	- Top comp. ring.	Evaluative	-do-	1.50	0.40	Yes
	- 2 nd comp. ring.		-do-	1.50	0.50 to 0.55	Yes
	- Oil ring.		-do-	2.00	0.45 to 0.50	Yes
(e)	Ring groove clearance (mm):					
	- Top comp. ring.	Evaluative	-do-	0.30	Tapped	--
	- 2 nd comp. ring.	-do-	-do-	0.30	0.080 to 0.084	Yes
	- Oil ring.	-do-	-do-	0.20	0.037 to 0.041	Yes
(f)	Clearance of main bearings, (mm):					
	- Diametrical	Evaluative	-do-	0.20	0.039 to 0.122	Yes
	- Crank shaft end float	Evaluative	-do-	0.50	0.10	Yes

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1	2	3	4	5	6	7	
(g)	Clearance of big end bearings, (mm):						
	-	Diametrical	Evaluative	-do-	0.20	0.023 to 0.041	Yes
	-	Axial	Evaluative	-do-	0.50	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-	0.50	0.090 to 0.188	Yes	
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(Reaffirmed in 2019)/ISO 730-2:1979].	: Does not conform
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- 2021.	: 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)]	: Does not conform
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 Mechanical Vibration:

The amplitude of mechanical vibration on various assemblies marked as (*) in Chapter-9 of this test report is on higher side. This calls for dampening down of vibrations to improve the operational comfort and service life of components.

17.4.1.2 Three-point linkage:

- (i) The power/ movement range 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) The distance from end of power take-off to centre of lower hitch point (lower links in horizontal position) 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.

17.4.1.3 Operator's work place:

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

- (i) Provision of vertical retainers at inner sides of clutch pedal.
- (ii) Provision of spark arresting device in the exhaust system.
- (iii) Provision for mounting a canopy above driver's seat.

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

17.4.1.4 Field performance test:

17.4.1.4.1 Dry land operation:

- (i) During dry land rotavation test with recommended matching rotavator, the maximum depth of operation was observed as 7.0 cm. Upon this, the applicant vide letter No. Nil dated 22.04.2022 has informed that the depth of rotavation is not possible to increase further & requested to continue the rotavation operation with the same matching rotavator.

17.4.1.5 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).

17.4.1.6 Haulage performance:

The distance traveled per liter of fuel consumption with two-wheel trailer was recorded as **7.13 to 7.52 km/l**, respectively against the declaration of **5 to 7 km/l** respectively which does not meet the non-evaluative requirement of IS: 12207-2019. This should to be looked into for necessary corrective action.

17.5 Maintenance / Service Problems:

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

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17.7 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) Provision of vertical retainers at inner sides of clutch pedal.
- (iii) Provision for mounting a canopy above driver's seat.

17.8 Adequacy of Literature supplied with machine:



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

- (i) Operator manual of "TAFE, MF 6028 MAX PRO" Tractor model.
- (ii) Workshop service manual of "TAFE, MF 6028 MAX PRO" Tractor model.
- (iii) Parts book of "TAFE, MF 6028 MAX PRO" Tractor model.

17.8.2 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) Recommended tyre inflation pressure for road & field work.
- (iii) Recommendation of haulage capacity during haulage operation.
- (iv) Brand name of coolant.

TESTING AUTHORITY:

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

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