

व्यावसायिक परीक्षण रिपोर्ट
COMMERCIAL TEST REPORT (Initial)

संख्या/No. : T-1023/1547/2016
माह/Month : April-2016

S.A.E (YKR)

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TAFE, MF 1134 TRACTOR



सत्यमेव जयते

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

ट्रैक्टर नगर, बुदनी (म.प्र.) ४६६ ४४५

CENTRAL FARM MACHINERY TRAINING & TESTING INSTITUTE

(An ISO : 9001 - 2008 Certified Institute)

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Manufacturer	: M/s. Tractors and Farm Equipment Limited, P.O. Box No.3302 35, Mahatma Gandhi Road, Nungambakkam, Chennai- 600 034
Test requested by	: The manufacturer
Place of running-in	: At applicant's works.
Duration of said running-in, (h):	
- Engine	: 12
- Transmission	: 24
Method of Selection	: The tractor was submitted directly by the applicant for test. Hence, method of selection is not known.

1. SPECIFICATIONS

1.1 Tractor:

Make	: TAFE
Model	: MF 1134
Type	: Four wheeled, rear-wheel driven, Standard Agricultural Tractor.
Year of manufacture	: 2014
Chassis number	: MEA03901DE3000025
Country of origin	: India
Variants, if any *	: None

1.2 Engine:

Make	: SIMPSON & Co. Limited
Model	: T III A S334 –F5.2
Type	: Four stroke, naturally aspirated, water cooled, direct injection, diesel engine.
Serial number	: S318.117068

1.2.1 Engine speed(Manufacturer's recommended production setting), (rpm):

- Maximum speed at no load	: 2100 to 2200
- Low idle speed	: 600 to 800
- Speed at maximum torque	: 1000 to 1400

Rated speed, (rpm):

- For PTO use	: 2000
- For drawbar use	: 2000

1.3 Cylinder & Cylinder Head:

Number	: Three
Disposition	: Vertical, Inline
Bore/stroke, (mm)	: 88.9/122 (apa)
Capacity as specified by the applicant, (cc)	: 2270 (apa)
Compression ratio	: 18.3 : 1
Type of cylinder head	: Monoblock
Type of cylinder liners	: Dry, replaceable
Type of combustion chamber	: Re-entrant cavity on piston crown
Arrangement of valves	: Overhead, inline

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16. ADJUSTMENTS, DEFECTS, BREAKDOWNS AND REPAIRS

Sl. No.	Adjustments/Defects/Breakdowns and Repairs	Tractor run hours
1.	During lifting capacity at hitch test abnormal sound coming from tractor, so as per approval of testing authority hydraulic oil was cleaned and refilled up to mark level.	40.17
2.	During hydraulic test following parts found damage and replace with new one. <ul style="list-style-type: none"> • PRV O-Ring • Ram cylinder O-Ring 	40.67

17. SUMMARY OF OBSERVATIONS, COMMENTS & RECOMMENDATIONS

17.1 Evaluative (mandatory) / Non-evaluative (Non-mandatory) parameters applicable for qualifying Minimum Performance criteria as per Clause-4 (Table-1) of IS: 12207-2014 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: 12207-2014	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: -5 / +10% for PTO power >26 kW. -7.5/+10% for PTO power ≤ 26 kW or -5 / +10% for Engine power >26 kW. -7.5/+10% for Engine power ≤ 26 kW	22.0 (D)	22.1	Yes
b)	Power at rated engine speed, (kW)	Non Evaluative	-do-	22.0 (D)	22.1	Yes
c)	Specific fuel consumption corresponding to maximum power, (g/kWh)	Non Evaluative	+ 5%	265 (D)	259.03	Yes
d)	Maximum equivalent crankshaft torque, (Nm)	Non Evaluative	± 8%	137.3(D)	123.9	Yes
e)	Back-up torque, percent	Non Evaluative	10 percent, min.	10 percent, min (R)	17.7	Yes
f)	Maximum operating temperature, (°C)					
	1)					
	Engine oil	Non 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)	117	Yes

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	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)	100	Yes
g)	Engine oil consumption, (g/kWh)		Evaluative	Not exceeding 1% of SFC at max. power under High ambient conditions	2.59 (R) 1% of SFC (D)	0.627	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 (R)	0.23	Yes
17.1.2	Drawbar performance :						
a)	Max. drawbar pull with ballast corresponding to 15 percent wheel slip, (kN)		Non Evaluative	Minimum 65% of static mass with ballast	14.5 (D) 14.92 (R) Minimum	20.51	Yes
b)	Maximum drawbar pull without ballast corresponding to 15 percent wheel slip, (kN)		Evaluative	Minimum 65% of static mass of tractor without ballast	13.5 (D) 11.16 (R) Minimum	15.30	Yes
c)	Maximum drawbar power without 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.	18.9 (D) 17.7 (R) Minimum	21.2	Yes
d)	Max. transmission oil temperature (°C)		Non Evaluative	The declared value should not exceed the maximum value specified by oil company	132(D)	83	Yes
17.1.3.	Power lift and hydraulic pump performance :						
a)	Maximum lifting capacity throughout the range of lift, (kN):						
	1)	At hitch points	Non Evaluative	[Tolerance of minus 10%]	11.0 (D)	7.93	No

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	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	10.0 (D) 5.2 (R) (Minimum)	7.79	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 minute, (mm)	Non Evaluative	Observed value should not exceed 50 mm.	50 (D) 50 (R)	50	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 road ballast, (m):						
	1)	Cold brake	Evaluative	10	10 (R)	6.59	Yes
	2)	Hot brake	Evaluative	10	10 (R)	6.61	Yes
b)		Maximum force exerted on the brake pedal to achieve a deceleration of 2.5 m/s ² (N)	Evaluative	600	600 (R)	298 to 388	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 dB(A)	Evaluative	As per CMVR	88 (R)	82	Yes
b)		Maximum noise at operator's ear level dB(A)	Evaluative	As per CMVR	98 (R)	94	Yes

17.1.6	Amplitude of mechanical vibrations at :						
	1)	Left foot rest	Non Evaluative	100 microns (max)	100 (R)	230	No
	2)	Right foot rest				280	No
	3)	Seat (with driver seated)				110	No
	4)	Steering Wheel				120	No
17.1.7		Air cleaner pull over:	Non Evaluative	0.25% (Max)	0.25%	0 to 0.09	Yes

17.1.8	Haulage requirements :						
a)	Gross mass of the trailers, (tones):						
	1)	Two wheel	Non	--	5.0 (D)	5.0	Yes

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	2)	Four wheel	Evaluative	--	5.0 (D)	5.0	Yes
b)	Distance travelled / litre of fuel consumption, (km/l):						
	1)	Two wheel	Non Evaluative	--	4.8 to 7.5 (D)	6.41 to 6.70	No

	2)	Four wheel		--	4.8 to 7.5(D)	7.07 to 7.13	No
c)	Fuel consumption (ml/km/tonne):						
	1)	Two wheel	Non	--	25 to 30 (D)	29.49 to 31.19	No
	2)	Four wheel	Evaluative	--	25 to 30 (D)	28.04 to 28.28	No

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)	Transmissi on oil	-do-				

17.1.10	Safety features :						
a)	Guards against moving and hot parts	Evaluative	Belt drives, pulley, silencer, hydraulic pipes (As per IS 12239 part 2)	--	Provided	Yes	
b)	Lighting arrangement	Evaluative	As per CMVR	--	Provided	Yes	
c)	Seating requirement (Tractors having more than 1150 mm rear track width)	Non-Evaluative	Should meet the requirements of IS 12343 (as amended from time to time)	--	Conforms	Yes	
d)	Technical requirements for PTO shaft	Non-Evaluative	Should meet the requirements of IS 4931 (as amended from time to time)	--	Does not meet the requirement	No	
e)	Dimension of three point linkage	Non-Evaluative	Should meet the requirements of IS 4468 (part 1) (as amended from time to time)	--	Does not meet the requirement	No	
f)	Specification of linkage and swinging drawbars	Non-Evaluative	Should meet the requirements of IS 12953 and IS 12362 (part 3) (as amended from time to time)	--	Conforms	Yes	

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17.1.11	Labelling of tractors (Provision of labelling plate):						
	1)	Make	Evaluative	Should conform to the requirements of CMVR along-with declared value of PTO HP	--	TAFE	Yes
	2)	Model	Evaluative		--	MF 1134	Yes
	3)	Year of manufacture	Evaluative		--	DE (2014)	Yes
	4)	Engine number	Evaluative		--	S318.117068	Yes
	5)	Chassis number	Evaluative		--	MEA03901DE3000025	Yes
	6)	Declaration of PTO power, (kW)	Evaluative		--	22	Yes

17.1.12	Discard limit for:						
(a)	Cylinder bore diameter, (mm)	Evaluative	To be specified by the manufacturer	89.21 (D)	88.95 to 88.96	Yes	
(b)	Clearance between piston & cylinder liner at skirt, (mm)	Non Evaluative		NA	0.144 to 0.158	Yes	
(c)	Ring end gap (mm):						
	- Top comp. ring	Evaluative	-do-	1.50	0.30 to 0.35	Yes	
	- 2 nd comp. ring		-do-	1.50	0.30 to 0.40	Yes	
	- Oil ring		-do-	1.50	0.30 to 0.35	Yes	
(d)	Ring groove clearance (mm):						
	- Top comp. ring	Evaluative	-do-	0.25	0.073 to 0.078	Yes	
	- 2 nd comp. ring		-do-	0.25	0.062 to 0.065	Yes	
	- Oil ring		-do-	0.25	0.046 to 0.050	Yes	
(e)	Clearance of main bearings (mm):						
	- Diametrical clearance	Evaluative	-do-	0.25	0.090 to 0.171	Yes	
	- Crankshaft end float	Evaluative		0.50	0.25	Yes	
(f)	Clearance of big end bearings, (mm):						
	- Diametrical	Evaluative	-do-	0.25	0.080 to 0.124	Yes	
	- Axial	Evaluative	-do-	0.75	0.25 to 0.30	Yes	
(g)	Clearance between king pin and bush, (mm)	Non Evaluative	-do-	0.50	0.096 to 0.125	Yes	
(h)	Clearance between centre pin and bush, (mm)	Non Evaluative	-do-	1.25	0.084 to 0.122	Yes	
17.1.13	Literature (Submission to test agency)						
(a)	Operator manual	Evaluative	Provided/Not Provided	As per relevant IS Code (IS 8132)	Provided	Yes	
(b)	Parts Catalogue	Evaluative	Provided/Not Provided	As per relevant IS Code (IS 8132)	Provided	Yes	

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(c)	Workshop/ Service manual	Evaluative	Provided/Not Provided	As per relevant IS Code (IS 8132)	Provided	Yes
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17.1.14 CATEGORY OF BREAKDOWNS / DEFECTS :					
S. No.	Category of breakdowns	Category (Evaluative / Non Evaluative)	Requirements as per IS: 12207-2014	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.	02	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.	02	Yes

17.2 Optional requirements as per Clause-4 (Table-2) of IS:12207-2014:				
S. No.	Characteristic	Requirements as per IS: 12207-2014	As observed	Whether meets the requirements (Yes/No.)
1.	Fitment of ROPS	With a provision for fitment of ROPS.	Not provided	Not applicable
		If ROPS fitted it should meet the requirement of IS: 11821-1992	Not provided	Not applicable
2.	Accessories	Trailer hitch, front tow hook, linkage drawbar may be provided.	Provided	Yes

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 2009)] : **Conforms**
- ii) Agricultural tractors - Rear mounted power take-off - Types 1, 2 and 3 (third revision) [IS:4931-1995 (Reaffirmed 2009)] : **Does not conform**

- iii) Agricultural wheeled tractors - Three-point linkage: Part 2 Category 1N (Narrow Hitch) (Third Revision) [IS 4468 (Part-2):1993/ ISO 730-2:1979 (Reaffirmed 2009)] : **Does not conform**
- iv) Drawbar for agricultural tractors – Link type [IS 12953:1990 (Reaffirmed 2007)] : Conforms
- v) Agricultural tractors - Operator's seat technical requirement [IS 12343 –1998 (First revision) (Reaffirmed 2009)] : Conforms
- vi) Guide for safety & comport of operator of agricultural tractors: Part 1 General requirements (first revision): [IS 12239 (PT-1) 1996/ISO 4254-1:1989 (Reaffirmed 2009)] : **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 2009)] : **Does not conform**
- viii) Guide lines for location and operation of operator controls on agricultural tractors and machinery (first revision) IS: 8133-1983 (Reaffirmed 2009)] : 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 2009)] : Conforms
- x) Agricultural Tractors and Machinery - Lighting device for travel on public roads (IS: 14683-1999) (Reaffirmed 2009)] : **Does not conform**

17.4 Salient Observations:

17.4.1 Laboratory tests:

17.4.1.1 PTO Performance:

- i) The backup torque is **17.7 %**.
- ii) The specific fuel consumption corresponding to maximum power was measured as **259 g/kWh** against the declaration of **265 g/kWh**, which is within the tolerance limit of IS: 12207-2014.

17.4.1.2 Drawbar performance:

During 10 hour drawbar test, creeping of LHS and RHS rear tyre over the rims was observed as 50 and 55 mm respectively, which was considered on higher side. This should be looked into for necessary corrective action.

17.4.1.3 Mechanical Vibration:

The amplitude of mechanical vibration on various assemblies marked as (*) in Chapter-9 of this test report is on higher side, especially at the foot rest, seat & steering control wheel. This calls for dampening down of vibrations to improve the operational comfort and service life of components.

17.4.1.4 Three point linkage:

The lateral distance from lower hitch point to center line of tractor does not meet the requirements of IS-4468-(Part I)-1997. This should be looked into for necessary corrective action.

17.4.1.5 P.T.O shaft

1) | The dimension “dø”, “Aø”, “a” and “c” of the PTO shaft does not meet the requirements of IS-4931-1995. This should be looked into for necessary corrective action.

17.4.1.6 Operator’s work place:

Operator’s work place meets the requirements of IS-12239(part-I)--1996.**except the following.**

1) | Spark arrester was not provided.

17.4.1.7 Safety Guards :

Safety Guards does not meet the requirements of IS-12239(part-II)-1996.**except the following.**

1) | Master shield for PTO was not provided.

17.4.2 Field performance test:**17.4.2.1 Wetland 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 (Technical requirements of agricultural tractors for wetland operation). Therefore, the tractor is recommended as suitable for wetland operation (Puddling).

17.4.2.2 Haulage performance:

The fuel consumption with two wheel trailer & four wheel trailer and average distance traveled per litre of fuel consumption does not meet the requirement of IS: 12207-2014 and therefore, should be looked into for necessary corrective action.

17.5 Maintenance / Service Problems:

Following maintenance or service problem was observed during the test.

During hydraulic test following parts found damage and replace with new one.

- PRV O-Ring
- Ram cylinder O-Ring

17.6 Recommendation with regard to safety on tractor:

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

- i) Provision for spark arresting device in exhaust system.
- ii) Provision of PTO shaft master shield.
- iii) Differential lock may be provided.
- iv) Provide oil changing period of transmission oil in operator’s manual for the guidance of users and service personnel.

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**17.7 Adequacy of Literature supplied with machine:**

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

- i) Operator's Manual in respect of MF 1134 tractor.
- ii) Tractor Parts Catalogue in respect of MF 1134 tractor.
- iii) Service Manual in respect of MF 1134 tractors.

17.7.2 The literatures supplied by applicant should also in national as well as other regional languages for the guidance of users and service personnel.

18. Citizen charter

Duration of Test	Test duration under citizen charter	Whether the report released within time frame given citizen charter	Remark, if any
13, Months (March, 2015 to April ,2016)	10 Months	No	Due non availability of land for field test

TESTING AUTHORITY:

H.L.YADAV
SENIOR AGRICULTURAL
ENGINEER

C.R.LOHI
DIRECTOR

Test Report compiled by Shri. Shwetabh Singh Senior Tech. Assistant

19. APPLICANT'S COMMENTS

Para No.	Our Reference	Applicant's comments
1.	17.1.3 (a) 1, 17.1.6 (1), (2), (3) & (4), 17.1.8 (b) 1, 2, (c)1,2, 17.1.10 (d,e), 17.4.1.2, 17.4.1.4, 17.4.1.5, 17.4.1.6, 17.4.1.7, 17.4.2.2, 17.5 & 17.6	We will look in to for corrective action and implementation of these safety features.
2.	17.3 (ii, iii, vi, vii, x)	We will look in to for corrective action.

ANNEXURE- I**BRIEF SPECIFICATION OF IMPLEMENTS USED DURING FIELD TEST**

S.No	Item	Disc Plough	Rotavator
1.	Make	M & M	Same
2.	Type	Mounted	Mounted
3.	No. of Disc/blades	02	30
4.	Type of Disc/blades	Plain concave	"L"
5.	Size of bottoms/blades, (mm)	620	160 x 70 x 7
6.	Spacing of bottoms/flanges, (mm)	520	220
7.	Lower hitch point span, (mm)	635	730
8.	Mast height, (mm)	470	570
9.	Overall dimensions, (mm):		
	- Length	1520	1420
	- Width	1190	750
	- Height	1010	1150
10.	Gross mass, (kg)	305	295

ANNEXURE – II**BRIEF SPECIFICATION OF FULL CAGE WHEEL**

S. No.	Items	Specifications
1.	Type	Full cage wheel
2.	Dia, (mm)	1280
3.	Width, (mm)	850
4.	No. and types of lugs	24, straight lugs made up of MS-angle section welded to angle iron frame.
5.	Size of angle section, (mm)	50 x 50 x 6
6.	Length of lugs, (mm)	425
7.	Spacing of lugs, (mm)	160
8.	Weight of each cage wheels (kg)	145

ANNEXURE- IIITRACTOR RUN HOURS DURING TEST

A.	LABORATORY AND TRACK TESTS:	HOURS
1.	Running-in	--
2.	PTO performance test	11.47
3.	Power lift and hydraulic pump performance test	4.26
4.	Drawbar performance test	16.94
5.	Turning ability	0.20
6.	Location of centre of gravity	0.15
7.	Operator's field of vision	-
8.	Brake test	1.73
9.	Noise measurement	1.83
10.	Air cleaner oil-pull over test	3.5
11.	Mechanical vibration test	1.0
12.	Nominal speed test	0.50
B.	FIELD TEST:	
1.	Disc ploughing	10.25
2.	Rotavation	11.83
3.	Puddling (including 5 hrs water proof test)	15.0
C.	HAULAGE TEST:	5.82
D.	Miscellaneous test and other run hours including idle run, transportation, trials and preparation for test	10.94
	TOTAL:	95.42