



TAFE, MF 9000 TRACTOR



भारत सरकार

GOVERNMENT OF INDIA

कृषि मंत्रालय (कृषि एवं सहकारिता विभाग, मशीनीकरण एवं प्रोद्योगिकी प्रभाग)
Ministry of Agriculture (Deptt. of Agri. & Co-op, Mechanization & Technology Division)

केन्द्रीय कृषि मशीनरी प्रशिक्षण एवं परीक्षण संस्थान

CENTRAL FARM MACHINERY TRAINING & TESTING INSTITUTE

(An ISO : 9001-2008 Certified Institute)

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3. ESSENTIAL TESTS

3.1. SPECIFICATIONS

	<u>Base Model</u>	<u>Variant Model</u>
3.1.1 Tractor:		
Make	: TAFE LTD.	TAFE
Model	: MF 5245 DI Planetary Drive Power Steering	MF 9000
Type	: Four wheeled, Rear-wheel driven, standard agricultural tractor	
Year of manufacture	: AAAZ (January 2010)	KEAB (August 2012)
Chassis number	: 533167	633366
Country of Origin	: India	India
3.1.2 Engine:		
Make	: SIMPSON & Co. Limited	
Model	: T III S 325-F4	T III A SJ 327-F3
Type	: Four stroke, naturally aspirated, water cooled, direct injection, diesel engine.	
Serial number	: S 325 030 424	SJ327 26406
Engine speed (Manufacturer's recommended production setting), (rpm) :		
- Maximum speed at no load	: 2300 to 2475	2325 to 2475
- Low idle speed	: 700 to 750	700 to 750
- Speed at maximum torque	: 1200 to 1400	1200 to 1400
Rated speed, (rpm):		
- For PTO use	: 2250	2250
- For drawbar use	: 2250	2250
3.1.3 Cylinder & Cylinder Head:		
Number	: Three	Three
Disposition	: Vertical, inline	Vertical, inline
Bore/stroke, (mm)	: 91.4 / 127	95.0 / 127
Capacity as specified by the applicant, (cc)	: 2500	2700
Compression ratio, (apa)	: 18.5 : 1	18.3 : 1
Type of cylinder head	: Mono block	Mono block
Type of cylinder liners	: Dry, replaceable	Dry, replaceable
Type of combustion chamber	: Re-entrant bowl	Open cavity on piston crown
Arrangement of valves	: Overhead, inline	Overhead, inline
Valve clearance (cold/hot):		
- Inlet valve, (mm)	: 0.30 / 0.25	0.30 / 0.30
- Exhaust valve, (mm)	: 0.30 / 0.25	0.30 / 0.30
3.1.4 Fuel System:		
Type of fuel feed system	:	Gravity and force feed



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	<u>Base Model</u>	<u>Variant Model</u>
3.1.4.1 Fuel tank:		
Capacity, (l)	: 45.0	59.5
Location	: Above the engine under the bonnet.	
Provision for draining of sediments/ water	: Not provided	Not provided
Material of fuel tank	: Sheet Metal	Sheet metal
3.1.4.2 Water separator :	: Not provided	Not provided
3.1.4.3 Fuel feed pump:		
Type	: Plunger	Plunger
Make	: Delphi- TVS	Bosch India
Model/Group combination No.	: 2FSG 862480 50A	FP/KEG22AD312, 9 440 030 033
Provision of sediment bowl	: Not provided	Not provided
Method of drive	: Hand priming pump is provided on fuel filter assembly	Hand priming pump is provided on fuel filter assembly
3.1.4.4 Fuel filters:		
Make	: Delphi- TVS	Mico Lic Bosch
Model/Group combination No.	: 7111-296	F 002 H20 138
Number	: Two	Two
Type of elements:		
- Primary	: Paper	Paper
- Secondary	: Paper	Paper
Capacity of final stage filter, (l)	: 0.55	0.55
3.1.4.5 Fuel Injection pump:		
Make	: Delphi- TVS	Bosch India
Model/Group combination No.	: S07B3A/G8972A390A	F 002 AOZ 787, PES3A95D320LS3500
Type	: Rotary	Plunger, Inline
Serial number	: 00010KCT	20341075
Method of drive	:	Through timing gears
3.1.4.6 Fuel injectors:		
Make	: Delphi- TVS INDIA	Mico Lic Bosch
Model/Group combination No.	: LJBG 00912 A	F002C80018, DSLA 145 P 1150
Type	: Multihole (five holes)	Multihole (six holes)
Manufacturer's production pressure setting, (MPa)	: 25.0 to 25.8	25.0 to 25.8
Injection timing	: 10 +0/-2 degree before TDC	12 +0/-2 degree before TDC
Firing order	: 1 - 2 - 3	1 - 2 - 3
3.1.4.7 Governor:		
Make	: Delphi-TV S	Bosch India
Model/Group combination No.	: NA (Inbuilt With FIP)	RSV375...1125A4C1626R
Type	: Mechanical, centrifugal, variable speed	
Rated engine speed, (rpm)	: 2250	2250
Governed range of engine speed (rpm)	: 700 to 2475	700-2475



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1	2	3	4	5	6
	h)	IS:8133	Conforms	Conforms	No change
	i)	IS: 6283	conforms	conforms	No change
	j)	IS:14683	Conformed	Conforms	No change
21.	xxi)	Final Reduction:			
		Reduction through crown wheel and bevel pinion	3.45 : 1	3.45 : 1	No change
		Type of final reduction	Planetary reduction unit at the end of rear axle shafts.		No change
		Reduction through final drive	3.143 : 1	3.143 : 1	No change
22.	xxii)	Type of fuel Injection pump:	Rotary	Inline plunger	change
		Make	DELPHI-TVS	BOSCH	Changed
		Model/Group combination No.	S 07B3A/G8972A390A	F 002 AOZ 787/ PES 3A 95 D320LS3500	
23.	Change related to statutory/ regulatory requirements (As per Table 4):				
	a)	Engine operating principle (spark/ compression ignition, two/four stroke)	Compression Ignition, 4 stroke	Compression Ignition, 4 stroke	No change
	b)	Number & arrangement of cylinders	Three vertical inline	Three vertical inline	No change
	c)	PTO power (kW)			Changed
	d)	Engine displacement (cc)	30.5	33.7	Changed
	e)	Rated engine speed (rpm)	2500	2700	No change
			2250	2250	
24.	Other changes:				
	a)	Fuel feed pump:			
		Make			
		Model/Group combination No.	Delphi- TVS	Bosch India	Changed
			2 FSG 862480 50A	FP/KEG 22AD312,9440 030 033	Changed
	b)	Fuel filters:			
		Make			
		Model/Group combination No.	Delphi- TVS	Bosch India	Changed
			7111-296	F 002 H20 138	Changed
	c)	Fuel injectors:			
		Make			
		Model/Group combination No.	DELPHI-TVS India	Bosch India	Changed
			LJBG 00912 A	F 002 C 80018	Changed
	d)	Governor:			
		Make			
		Model/Group combination No.	DELPHI-TVS	Bosch India	Changed
			NA(In built with FIP)	RSV 375...1125 A4C 1626R	Changed
	e)	Front axle			Changed
	f)	Wheel base (mm)	Adjustable type	Fixed type	Changed
			1935	1965	Changed
	g)	Overall length (mm)			Changed
			3380	3600	

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7. SUMMARY OF OBSERVATIONS, COMMENTS & RECOMMENDATIONS

7.1 On the basis of test conducted the performance results have been summarized as evaluative (mandatory) and non - evaluative (not mandatory) parameters applicable for qualifying Minimum Performance Criteria as per clause-4 table-1 of Indian Standard 12207: 2008 for acceptance of tractor for the purpose of subsidies/NABARD financing for the applicable features for this tractor model.

S. No.	Characteristic	Category (Evaluative / Non Evaluative)	Requirements as per IS: 12207-2008	Values declared by the applicant (D)/ Requirement (R)		As observed		Whether Variant model meets the requirements (Yes/No.)
				Base	Variant	Base	Variant	
1	2	3	4	5 a	5 b	6 a	6 b	7
7.1.1	PTO Performance :							
a)	- Max. power under 2 h test, (kW) (Natural ambient condition)	Evaluative	Declared value to be achieved with a tolerance of: -5 / +10% for PTO power >35hp. -7.5/+10% for PTO power ≤ 35 hp	30.5 (D)	33.7 (D)	29.2	33.3	Yes
b)	Power at rated engine speed, (kW)	Non Evaluative	-do-	30.5 (D)	33.7 (D)	29.2	33.3	Yes
c)	Specific fuel consumption corresponding to maximum power, (g/kWh)	Non Evaluative	± 5%	265 (D)	265 (D)	275	237	No
d)	Engine oil consumption, (g/kWh)	Evaluative	Not exceeding 1% of SFC at max. power under High ambient conditions	2.85 Maxim um (R)	2.38 (R)	0.88	0.61	Yes
f)	Maximum operating temperature (°C)			132 (D)	132 (D)	130	108	Yes
	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.					
	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)	112 (D)	103	104	Yes



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1	2	3	4	5 a	5 b	6 a	6 b	7
7.1.2	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)	10 (R)	7.10	6.76	Yes
	2) Hot brake	Evaluative	10	10 (R)	10 (R)	7.40	6.88	Yes
b)	Maximum force exerted on the brake pedal to achieve a deceleration of 2.5 m/s ² (N)	Evaluative	600	600 (R)	600 (R)	330 to 390	218 to 270	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	Yes	Yes

1	2	3	4	5 a	5 b	6 a	6 b	7
7.1.3	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	TAFE			
	2) Model	Evaluative		MF 5245 DI Planetary Drive Power Steering	MF 9000			Yes
	3) Year of manufacture	Evaluative		AAAZ (Jan, 2010)	KEAB			Yes
	4) Engine serial number	Evaluative		S 325 030 424	SJ 327 26406			Yes
	5) Chassis serial number	Evaluative		533167	633366			Yes
	6) Declaration of PTO power, kW	Evaluative		30.5	33.7			Yes
	7) Specific Fuel Consumption (gm/kWh)	Evaluative		265	265			Yes

7.2

Salient Observations:

7.2.1

Laboratory tests:

7.2.1.1

PTO Performance:

- i) The specific fuel consumption in case of variant model corresponding to maximum power was observed as 237 g/kWh against the declaration of 265 g/kWh and which does not meet the requirements of IS: 12207-2008 with regard to tolerance. This should be looked into for necessary corrective action.

7.2.1.2

Three point linkage:

- i) The diameter of hitch pin hole of upper hitch points, width of ball of lower hitch point and lateral distance from lower hitch point to the centre line of the tractor does not meet the requirement of IS: 4468 (Part-1)-1997. This should be looked into for necessary corrective action
- ii) Some of the parameters of three point linkage conform to Cat. - I and some of them conforms to Cat.-II. In view of the spirit of standardization, necessary improvements may be incorporated.



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7.2.1.3 Power take-off shaft:

The dimension "AØ" of the Power Take-off shaft does not meet the requirements of IS: 4931-1995. This should be looked into for necessary corrective action.

7.2.1.4 Operator's seat (Conformity with IS: 12343-1998):

The vertical distance from seat index point to the centre of clutch & brake pedals and length of operator's seat provided on the tractor does not meet the requirements of relevant Indian Standard and calls necessary improvement. This should be looked into for necessary corrective action.

7.3**Recommendation with regard to safety on tractor:**

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

- Provision of vertical retainer at clutch pedal.
- Provision of spark arresting device in exhaust system.
- Provision of power take-off master shield
- Provision of differential lock.
- Provision of working clearance around the Parking Brake lever as per the requirements of Indian Standards.

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

7.4.1 The following revised literature was supplied with test sample for reference.

7.4.2 The supplied literature of this model of tractor was not found adequate. It is therefore recommended that, the literature may be updated for modified specifications and the following technical data should be incorporated.

- Information related to specific fuel consumption corresponding to the maximum power should be included in the technical specification of the tractor for the guidance of the user's.
- Fuel saving tips should be included in the operator's manual.
- All variants along with their features may be provided at a glance.

The results of the tests carried out on variant model "TAFE, MF 9000" have been compared with those on base model "TAFE, MF 5245 DI Planetary Drive Power Steering" and found within the limit, as specified in Indian Standard: 12207-2008.



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8.0 Citizen charter

Duration of Test	Test duration under citizen charter	Whether the report released within time frame given in the citizen charter	Remark
6 Months (December 2012 to May 2013)	10 Months	Yes	--

TESTING AUTHORITY:

C. V. Chimote
C. V. CHIMOTE
 TEST ENGINEER

P. K. Verma
P. K. VERMA
 SENIOR AGRICULTURAL ENGINEER

C. R. Lohi
C. R. LOHI
 DIRECTOR

Test report compiled by Sh. P. RISHI PRAKASH, Senior Technical Assistant.

9. Applicant's Comments

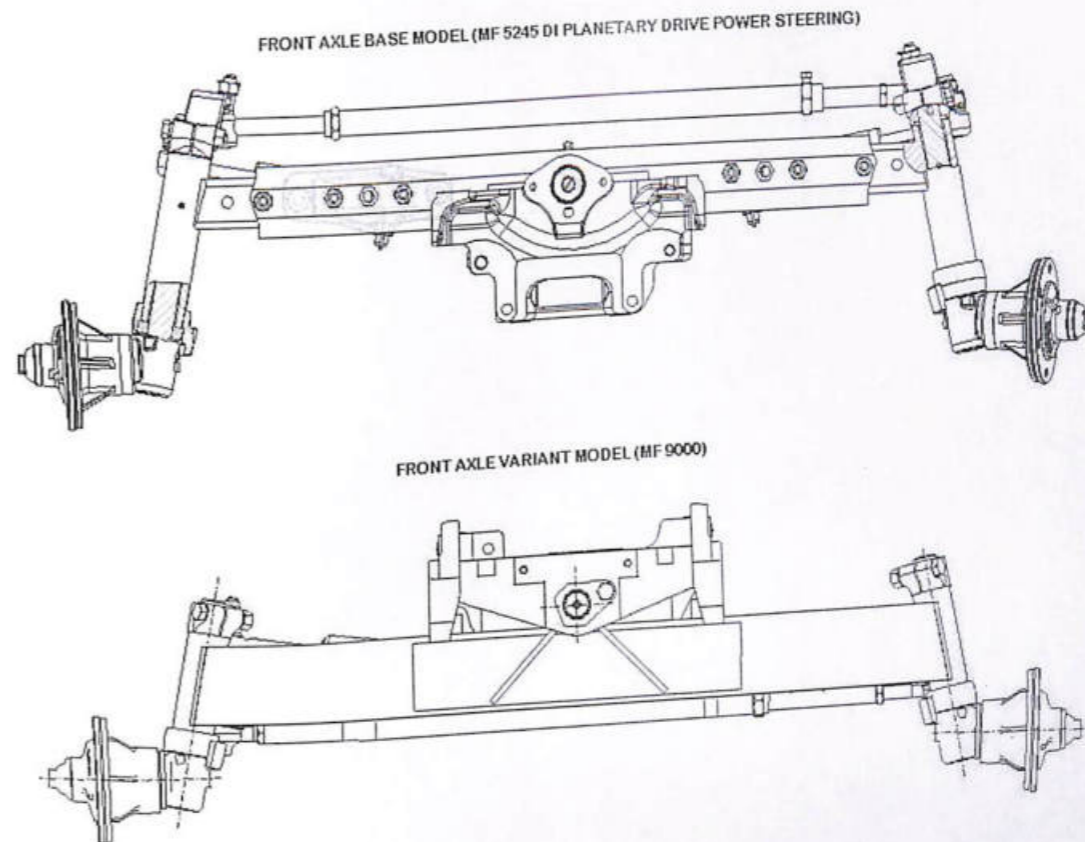
Para No.	Our Reference	Applicant's comments
9.1	7.2.1.2, 7.2.1.3, 7.2.1.4	Regarding the non-conformity we will study and initiate the appropriate corrective actions.



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Annexure-I



Annexure-II

TRACTOR RUN HOURS DURING TEST

		HOURS
A.	LABORATORY AND TRACK TESTS	Nil
1.	Running-in	7.7
2.	PTO Performance Test	2.2
3.	Brake test	0.2
4.	Turning ability	0.6
5.	Theoretical speed test	3.5
B.	Miscellaneous test and other run hours, including idle run transportation, trial and preparation for test.	
TOTAL		14.2