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व्यावसायिक परीक्षण रिपोर्ट  
COMMERCIAL TEST REPORT (Initial)

संख्या / No. : T-1116/1642/2017  
माह / Month : November, 2017



**ESCORTS LIMITED, FARMTRAC 6060 UM TRACTOR  
(BRAND NAME : FARMTRAC)**



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

ट्रेक्टर नगर, बुदनी (म.प्र.) ४६६ ४४५

**CENTRAL FARM MACHINERY TRAINING & TESTING INSTITUTE**

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14.6 **Steering system:**  
Visual condition of the components of complete steering assembly : Normal

14.7 **Starter motor & Alternator:**  
Presence of soil/oil in housing : None  
Condition of bearings and other Components : Normal

**15. ADJUSTMENTS, DEFECTS, BREAKDOWNS AND REPAIRS**

S. No.	Adjustments/Defects/Breakdowns and repairs	Category of breakdown	Tractor run hours
--	-None-	--	--

**16. SUMMARY OF OBSERVATIONS, COMMENTS & RECOMMENDATIONS**

16.1 Evaluative (mandatory) / Non-evaluation (Non-mandatory) parameter 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:

S. 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
16.1.1	<b>PTO Performance :</b>					
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 >26kW. -7.5/+10% for PTO power ≤ 26kW	37.5 (D)	38.5	Yes
b)	Power at rated engine speed, (kW)	Non Evaluative	-do-	37.5 (D)	38.5	Yes
c)	Specific fuel consumption corresponding to maximum power, (g/kWh)	Non Evaluative	+ 5%	258 (D)	239	Yes
d)	Maximum equivalent crankshaft torque, (Nm)	Non Evaluative	± 8%	229.0 (D)	225.6	Yes
e)	Back-up torque, percent	Non Evaluative	10 percent, min.	10 percent, min (R)	22.5	Yes
f)	<b>Maximum operating temperature (°C):</b>					
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.	130 (D)	111	Yes



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1	2	3	4	5	6	7
16.1.4	<b>Brake performance at 25 kmph:</b>					
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)	6.64	Yes
	2) Hot brake	Evaluative	10	10 (R)	6.91	Yes
b)	Maximum force exerted on the brake pedal to achieve a deceleration of 2.5 m/s <sup>2</sup> , (N)	Evaluative	600	600 (R)	194 to 224	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
* The manufacturer has not recommended ballasting for road test, therefore the brake test was conducted under standard ballast condition only.						
16.1.5	<b>Noise measurement :</b>					
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	96 (R)	93	Yes
16.1.6	<b>Amplitude of mechanical vibrations at :</b>					
	1) Left foot rest	Non Evaluative	100 microns (max)	100 (R)	100	Yes
	2) Right foot rest			100 (R)	110	No
	3) Seat (with driver seated)			100 (R)	90	Yes
	4) Steering wheel			100 (R)	180	No
16.1.7	<b>Air cleaner:</b>					
	Air cleaner oil pull over, (%)	Non Evaluative	0.25 % (maximum)	Dry type air cleaner	Not applicable	--
16.1.8	<b>Haulage requirements:</b>					
a)	Gross mass of the trailers, (tones):					
	1) Two wheel	Non	--	5.0 (D)	5.0	Yes
	2) Four wheel	Evaluative	--	6.5 (D)	6.5	Yes
b)	Distance travelled / litre of fuel consumption, (km/l):					
	1) Two wheel	Non	--	4.50 to 5.50 (D)	4.07 to 4.35	No
	2) Four wheel	Evaluative	--	4.50 to 5.50 (D)	4.10 to 4.14	No
c)	Fuel consumption, (ml/km/tonne):					
	1) Two wheel	Non	--	35 to 40 (D)	46 to 49	No
	2) Four wheel	Evaluative	--	35 to 40 (D)	37 to 38	Yes
16.1.9	<b>Wetland cultivation (Puddling Operation):</b>					
	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-				

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1	2	3	4	5	6	7	
16.1.10	<b>Safety features :</b>						
a)	Guards against moving and hot parts	Evaluative	Belt drives, pulleys, silencer, hydraulic pipes (As per IS 12239 Part 2)	--	Meets the requirements	Yes	
b)	Lighting arrangement	Evaluative	As per CMVR	--	Meets the requirements	Yes	
c)	Seating requirements (Tractors having more than 1150 mm track width)	Non Evaluative	Should meet the requirements of IS 12343 (as amended from time to time)	--	Does not meet the requirements	No	
d)	Technical requirements for PTO shaft	Non Evaluative	Should meet the requirements of IS 4531 (as amended from time to time)	--	Does not meet the requirements	No	
e)	Dimensions 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 requirements	No	
f)	Specifications of linkage drawbar	Non Evaluative	Should meet the requirements of IS 12953 (as amended from time to time)	--	Does not meet the requirements	No	
	Specifications of swinging drawbar	Non Evaluative	Should meet the requirements of IS 12382 (Part 3) (as amended from time to time)	--	Not provided	NA	
16.1.11	<b>Labeling of tractors (Provision of labeling plate):</b>						
	1) Make	Evaluative	Should conform to the requirements of CMVR	--	ESCORTS LIMITED	Yes	
	2) Model	Evaluative		--	FARMTRAC 6060 UM	Yes	
	3) Year of manufacture	Evaluative		--	KD (January, 2015)	Yes	
	4) Engine serial number	Evaluative		--	E2335319	Yes	
	5) Chassis number	Evaluative		--	T052332879KD	Yes	
	6) Declaration of PTO power, (kW)	Evaluative		--	37.5	Yes	
16.1.12	<b>Discard limit for:</b>						
(a)	Cylinder bore diameter, (mm)	Evaluative	To be specified by the manufacturer and supported by printed literature.	91.020 +0.010	91.005 to 91.029	Yes	
(b)	Clearance between piston & cylinder liner at skirt, (mm)	Non Evaluative		0.45	0.132 to 0.154	Yes	
(c)	<b>Ring end gap (mm):</b>		Evaluative	-do-	2.00	0.45 to 0.60	Yes
	- Top comp. ring.	-do-		2.00	0.55 to 0.65	Yes	
	- 2 <sup>nd</sup> comp. ring.	-do-		2.00	0.50 to 0.65	Yes	
(d)	<b>Ring groove clearance (mm):</b>		Evaluative	-do-	0.20	0.137 to 0.142	Yes
	- Top comp. ring.	-do-		0.20	0.072 to 0.083	Yes	
	- 2 <sup>nd</sup> comp. ring.	-do-		0.15	0.044 to 0.049	Yes	
	- Oil ring.						



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(e)	<b>Clearance of main bearings (mm):</b>					
	- Diametrical clearance	Evaluative	-do-	0.40	0.026 to 0.051	Yes
(f)	- Crankshaft end float	Evaluative	-do-	0.67	0.32	Yes
	<b>Clearance of big end bearings, (mm):</b>					
(g)	- Diametrical	Evaluative	-do-	0.40	0.058 to 0.112	Yes
	- Axial	Evaluative	-do-	0.60	0.30	Yes
(h)	Clearance between king pin and bush, (mm)	Non Evaluative	-do-	0.40	0.08 to 0.09	Yes
(h)	Clearance between center pin and bush, (mm)	Non Evaluative	-- do--	0.40	0.03 to 0.29	Yes
16.1.13	<b>Literature (Submission to test agency):</b>					
(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

16.1.14 CATEGORY OF BREAKDOWNS / DEFECTS :					
S. No.	Characteristic	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.	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

16.2 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	No	
		If ROPS fitted it should meet the requirement of IS: 11821-1992.	ROPS not fitted	Not applicable	
2.	Accessories	Trailer hitch, front tow hook may be provided.	Trailer hitch provided Front tow hook provided	Yes	

**16.3 Conformity with following IS:**

- i) Guidelines for declaration of power and specific fuel consumption and labeling of agricultural tractors (First revision) [IS 10273:1987 (Reaffirmed in March, 2009)] : **Conforms**
- ii) Agricultural tractors – Rear mounted power take-off - Types 1, 2 and 3 (third revision) [IS: 4931-1995 (Reaffirmed in March, 2009)] : **Does not conform**



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- iii) Agricultural wheeled tractors - Three-point linkage: Part 1 Categories 1, 2, 3 & 4 (Fourth Revision) [IS 4468 (Part-1):1997/ ISO 730-1:1994 (Reaffirmed in March, 2009)] : **Does not conform**
- iv) Drawbar for agricultural tractors – Link type [IS 12953:1990 (Reaffirmed in March, 2007)] : **Does not conform**
- v) Agricultural tractors - Operator's seat technical requirement [IS 12343 -1998 (First revision) (Re-affirmed in March, 2009)] : **Does not conform**
- vi) Guide for safety & comfort of operator of agricultural tractors: Part 1 General requirements (first revision): [IS 12239 (PT-1) 1996 (Reaffirmed in February, 2012)/ISO 4254-1:1989] : **Does not conform**
- vii) Tractors and machinery for agriculture and forestry, powered lawn and garden equipment – Symbols for operator controls and other displays [IS: 6283 (Part-1) – 2006 (Reaffirmed in March, 2009) and IS: 6283 (Part-2)-2007 (Reaffirmed in March, 2009)]/ISO 3767-2:1991] : **Conforms**
- viii) Tractors and machinery for agriculture and forestry – Technical means for ensuring safety Part 2: Tractors (first revision) [(IS 12239 (PT-2) 1999) (Re-affirmed in March, 2009)] : **Does not conform**
- ix) Guidelines for location and operation of operator controls on agricultural tractors and machinery (first revision) (IS: 8133 – 1983) (Re-affirmed in March, 2009) : **Does not conform**
- x) Agricultural Tractor & Machinery Lighting device for travel on public roads (IS: 14683-1999) (Re-affirmed in March, 2009) : **Conforms**
- 16.4 Salient Observations:**
- 16.4.1 Laboratory tests:**
- 16.4.1.1 PTO Performance:**
- i) The maximum PTO power was observed as **38.5 kW** against the declaration of **37.5 kW** which meets the requirement of IS: 12207-2014 with regard to tolerance limit.
- ii) The specific fuel consumption corresponding to maximum power was recorded as **239 g/kWh** against the declaration of **258 g/kWh**, which meets the requirement of IS: 12207-2014 with regard to tolerance limit.
- ii) The backup torque is **22.5 %**.
- 16.4.1.2 Drawbar performance:**
- The creeping of rear tyres over rim was recorded as **35 mm** in RHS rear tyre during ten hours drawbar performance test. This should be looked into for necessary corrective action.
- 16.4.1.3 Hydraulic Performance:**
- During the hydraulic lift load maintenance test the drop in vertical height of the lower links was observed as **85 mm** against the maximum permissible limit of **50 mm**. It indicates an internal leakage in the hydraulic system. This may be looked into for necessary corrective action.





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**16.4.1.4 Mechanical Vibration:**

The amplitude of mechanical vibration on various assemblies marked as (\*) in Chapter-8 of this test report is on very higher side, especially at the steering control wheel & right hand side foot rest. This calls for dampening down of vibrations to improve the operational comfort and service life of components.

**16.4.1.5 Haulage requirements:**

The distance travelled per liter of fuel with two and four wheel trailer was recorded as **4.07 to 4.35 km/l and 4.10 to 4.14 km/l**, respectively against the declaration of 4.50 to 5.50 km/l & specific fuel consumption with two wheel trailer was recorded as **46 to 49 ml/km/tonne** against the declaration of 35 to 40 ml/km/tonne. This should be looked into.

**16.4.1.6 Operator's Seat:**

The width of seat, the longitudinal distance from seat index point to the centre of lock pedal, the vertical distance from seat index point to the centre of steering control wheel, vertical distance from seat index point to the foot rest and lateral distance from seat index point to the centre of foot accelerator does not meet the requirement of IS: 12343-1998. This should be looked into for necessary corrective action.

**16.4.1.7 Technical Requirements for Power Take Off Shaft:**

Dimension "d $\varnothing$ " and "b" [Refer Fig.2(a)] of power take off shaft and dimensions of "N" [Refer Fig.2(b)] of master shield does not meet the requirement of IS: 4931-1995. This should be looked into for necessary corrective action.

**16.4.1.8 Three Point Linkage:**

The width of ball and the lateral distance from lower hitch point to centre line of tractor does not meet the requirement of IS: 4468 (Part-1) -1997. This should be looked into for necessary corrective action.

**16.4.1.9 Dimensions of Linkage Drawbar:**

Dimension "F $\varnothing$ " [Refer Fig.1(b)] of linkage drawbar does not meet the requirement of IS: 12953-1990. This should be looked into for necessary corrective action.

**16.4.2 Field performance test:**

**16.4.2.1 Wet land cultivation (Puddling operation):**

No ingress of water and or mud in various assemblies/components was noticed during wetland cultivation of tractor. Hence, it meets the requirements of IS: 11082-1984 (Technical Requirements of Agricultural Tractors for Wetland Operation). The tractor is found suitable for wetland operation (Puddling).

**16.5 Maintenance / Service Problems:**

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

**16.6 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) The longitudinal distance from seat index point to the centre of lock pedal, the vertical distance from seat index point to the centre of steering control wheel, vertical distance from seat index point to the foot rest and lateral distance from seat index point to the centre of foot accelerator should be within the limit for easy handling of tractor.
- iii) Stop knob is provided but does not remain in stop position
- iv) The working clearance between draft control lever and mudguard should be as per the minimum requirements of relevant Indian Standard for easy operating the lever.






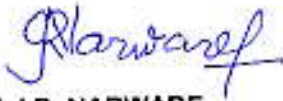
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- 16.7 Adequacy of Literature supplied with machine:
- 16.7.1 The following literature was supplied with the tractor for reference during the test:
- i) Tractor Operator's Manual
  - ii) Parts Catalogue
  - iii) Service Manual
- 16.7.2 The printed literature supplied with the test sample is in English. The literature may be brought out as per IS: 8132-1999 (Reaffirmed in March, 2009) for the guidance of user and service personnel in national as well as other regional languages.

**17. CITIZEN CHARTER**

Time frame for Testing & Evaluation as per Citizen Charter	Duration of test	Whether the report is released within the time frame given in the Citizen Charter	Remark
10 Months	12 Months (October, 2016 to October, 2017)	No	Due to waiting in drawbar performance test and seasonal constraints.

**TESTING AUTHORITY:**

 <b>C. K. TIJARE</b> AGRICULTURAL ENGINEER	 <b>C. V. CHIMOTE</b> TEST ENGINEER	 <b>Y. K. RAO</b> SENIOR AGRICULTURAL ENGINEER
 <b>J.J.R. NARWARE</b> DIRECTOR		

**18. APPLICANT'S COMMENTS**

Para No.	Our Reference	Applicant's comments
18.1	16.4.1.6,16.4.1.7,16.4.1.8,16.4.1.9, 16.6 & 16.7.2	These being studied & corrective action would be taken in near future.
18.2	16.4.1.2,16.4.1.3,16.4.1.4	Your valuable comments & suggestions for improvements are well taken. Under our policy of continuous product improvement these aspects are further being looked into & will try to eliminate these deviations soon wherever necessary.