

व्यावसायिक परीक्षण रिपोर्ट  
COMMERCIAL TEST REPORT (Initial)

संख्या / No. : T-1125/1651/2017  
माह / Month : December, 2017



**ESCORTS LIMITED, FARMTRAC 6065 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

ट्रैक्टर नगर, बुदनी (म.प्र.) ४६६ ४४५

**CENTRAL FARM MACHINERY TRAINING & TESTING INSTITUTE**

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1	2	3	4
2.	During the field operation with rotavator, the male-female joint of propeller shaft of the rotavator came out due to bending of safety bolt instead of shearing, resulting into bending of PTO shaft end of tractor while rotating along with the propeller shaft of rotavator. It seems the bending of PTO shaft end of tractor was resulted due to the failure of safety bolt to shear on overloading and hence considered as a consequential failure. To rectify this defect, front bearing (Part No. D10064630.9), PTO shaft with gear (Part No. D10061070.9) and rear bearing (Part No. D10063570.9) were replaced with new one.	--	88.7
3.	During the field operation with rotavator the leakage of lubrication oil from Hydrostatic Steering Unit was observed. While inspection, the metallic pipe end joining to Hydrostatic Steering Unit adopter found damaged. To rectify this defect, adopter (Part No. D10021080.9) and metallic pipe (tube assembly) (Part No. D10224980.9) were replaced with new one.	Mj21	90.7

### 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
<b>16.1.1 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	41.17 (D)	41.5	Yes
b)	Power at rated engine speed.(kW)	Non Evaluative	-do-	41.17 (D)	41.5	Yes
c)	Specific fuel consumption corresponding to maximum power, (g/kWh)	Non Evaluative	+ 5%	248 (D)	237	Yes
d)	Maximum equivalent crankshaft torque, (Nm)	Non Evaluative	± 8%	275 (D)	220.6	No
e)	Back-up torque, percent	Non Evaluative	10 percent, min.	10 percent, min (R)	22.6	Yes



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1	2	3	4	5	6	7	
f)	<b>Maximum operating temperature (<sup>o</sup>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)	118	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.	110 (D)	103	Yes
g)	Engine oil consumption, (g/kWh)		Evaluative	Not exceeding 1% of SFC at max. power under high ambient conditions	Max. 2.48 (D) 1% of SFC, max. (R)	0.70	Yes
h)	Smoke level		Evaluative	Maximum light absorption coefficient of 3.25 per metre or equivalent BOSCH No. 5.2 or 75 Hatridge value (As per CMVR)	3.25 per meter	0.07 per meter	Yes
<b>16.1.2</b>	<b>Drawbar performance:</b>						
a)	Maximum drawbar pull with ballast corresponding to 15 percent wheel slip, (kN).		Non Evaluative	Minimum 65% of static mass of tractor with ballast	24.60 (D)	30.21	Yes
					23.90 (R) Minimum		
b)	Maximum drawbar pull with standard ballast corresponding to 15 percent wheel slip, (kN).		Evaluative	Minimum 65% of static mass of tractor with standard ballast	18.35 (D)	23.03	Yes
					17.66 (R) Minimum		
c)	Maximum drawbar power with standard ballast (kW).		Evaluative	Minimum 80% of PTO power as referred in Sl. No. (i) a) of PTO performance in case of tractors having total static mass >1500 kg. Minimum 75% of PTO power as referred in Sl. No. (i) a) of PTO performance in case of light weight tractors. Minimum 75% of the engine power as referred in Sl. No. (i) a) of PTO performance in case of tractors which do not have a PTO shaft	32.93 (D)	34.4	Yes
					33.2 (R) Minimum		
d)	Maximum transmission oil temperature ( <sup>o</sup> C)		Non Evaluative	The declared value should not exceed the maximum value specified by oil company.	125 (D)	81	Yes
<b>16.1.3</b>	<b>Power lift and hydraulic pump performance:</b>						
a)	Maximum lifting capacity throughout the range of lift, (kN):						
	1)	At hitch points	Non Evaluative	[Tolerance of minus 10%]	20.0 (D)	21.93	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	17.0 (D) 9.77 (R) Minimum	18.83	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 minutes interval for a total duration of 30 minute. (mm)	Non Evaluative	The observed value should not exceed 50 mm	50 (D) 50 (R) Maximum	15	Yes
<b>16.1.4 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)	8.48	Yes
	2) Hot brake	Evaluative	10	10 (R)	9.23	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)	441 to 551	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.						
<b>16.1.5 Noise measurement:</b>						
a)	Maximum ambient noise emitted by the tractor, dB(A)	Evaluative	As per CMVR	88 (R)	85	Yes
b)	Maximum noise at operator's ear level, dB(A)	Evaluative	As per CMVR	96 (R)	94	Yes
<b>16.1.6 Amplitude of mechanical vibrations at:</b>						
	1) Left foot rest	Non Evaluative	100 microns (max)	100 (R)	60	Yes
	2) Right foot rest			100 (R)	80	Yes
	3) Seat (with driver seated)			100 (R)	60	Yes
	4) Steering wheel			100 (R)	130	No
<b>16.1.7 Air cleaner:</b>						
	Air cleaner oil pull over, (%)	Non Evaluative	0.25 % (maximum)	Dry type air cleaner	Not applicable	--
<b>16.1.8 Haulage requirements:</b>						
a)	Gross mass of the trailers, (tonne):					
	1) Two wheel	Non	--	5.0 (D)	5.0	Yes
	2) Four wheel	Evaluative	--	6.0 (D)	6.0	Yes
b)	Distance travelled / litre of fuel consumption, (km/l):					
	1) Two wheel	Non	--	3.5 to 6.0 (D)	4.14 to 4.24	Yes
	2) Four wheel	Evaluative	--	3.5 to 6.0 (D)	4.14 to 4.15	Yes
c)	Fuel consumption, (ml/km/tonne):					
	1) Two wheel	Non	--	35 to 45 (D)	47 to 48	No
	2) Four wheel	Evaluative	--	35 to 45 (D)	40	Yes



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1	2	3	4	5	6	7
<b>16.1.9</b>	<b>Wetland cultivation (Puddling Operation):</b>					
	Sealing for the following assemblies:	Evaluative	The identified assemblies should essentially meet the requirement of IS: 11092. 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	The manufacturer has recommended that the tractor is not suitable for wetland cultivation (puddling operation)	Not recommended	--
	1) Clutch assembly	-do-				
	2) Brake housings	-do-				
	3) Front axle hubs	-do-				
	4) Engine oil	-do-				
	5) Transmission oil	-do-				
<b>16.1.10</b>	<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 4931 (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 4488 (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)	--	Meets the requirements	Yes
	Specifications of swinging drawbar	Non Evaluative	Should meet the requirements of IS 12362 (Part 3) (as amended from time to time)	--	Not provided	NA
<b>16.1.11</b>	<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 6065 UM	Yes
	3) Year of manufacture	Evaluative		--	FD (September, 2015)	Yes
	4) Engine serial number	Evaluative		--	E2351618	Yes
	5) Chassis number	Evaluative		--	T052348025FD	Yes
	6) Declaration of PTO power, (kW)	Evaluative		--	41.17	Yes
<b>16.1.12</b>	<b>Discard limit for:</b>					
(a)	Cylinder bore diameter, (mm)	Evaluative	To be specified by the manufacturer and supported by printed literature.	91,300	90.986 to 91.005	Yes
(b)	Clearance between piston & cylinder liner at skirt, (mm)	Non Evaluative		0.45	0.056 to 0.094	Yes

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1	2	3	4	5	6	7
(c)	<b>Ring end gap (mm):</b>					
	- Top comp. ring.	Evaluative	-do-	2.00	0.37 to 0.50	Yes
	- 2 <sup>nd</sup> comp. ring.		-do-	2.00	0.45 to 0.60	Yes
- Oil ring.	-do-		2.00	0.40 to 0.55	Yes	
(d)	<b>Ring groove clearance (mm):</b>					
	- Top comp. ring.	Evaluative	-do-	0.20	0.123 to 0.140	Yes
	- 2 <sup>nd</sup> comp. ring.		-do-	0.20	0.059 to 0.075	Yes
- Oil ring.	-do-		0.15	0.039 to 0.054	Yes	
(e)	<b>Clearance of main bearings (mm):</b>					
	- Diametrical clearance	Evaluative	-do-	0.40	0.057 to 0.094	Yes
	- Crankshaft end float	Evaluative	-do-	0.67	0.18	Yes
(f)	<b>Clearance of big end bearings, (mm):</b>					
	- Diametrical	Evaluative	-do-	0.40	0.050 to 0.093	Yes
	- Axial	Evaluative	-do-	0.60	0.35 to 0.40	Yes
(g)	Clearance between bearing pins and bush, (mm)	Non Evaluative	-do-	0.40	0.076 to 0.095	Yes
(h)	Clearance between center pin (journals) and bushes, (mm)	Non Evaluative	- do -	0.40	0.021 to 0.087	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	2	3	4	5	6
1.	Critical	Evaluative	No critical breakdown.	None	Yes
2.	Major	Evaluative	Not more than two and neither of them should be repetitive in nature.	One (M)21	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.	One (M)21	Yes



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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	2	3	4	5
1.	Fitment of ROPS	With a provision for fitment of ROPS. If ROPS fitted it should meet the requirement of IS: 11821-1992.	Not provided  ROPS not fitted	No  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**
- 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)] : **Conforms**
- 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**



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- x) Agricultural Tractor & Machinery Lighting device for : Conforms travel on public roads (IS: 14683-1999) (Re-affirmed in March, 2009)

**16.4 Salient Observations:**

**16.4.1 Laboratory tests:**

**16.4.1.1 PTO Performance:**

- i) The maximum PTO power was observed as **41.5 kW** against the declaration of **41.17 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 **237 g/kWh** against the declaration of **248 g/kWh**, which meets the requirement of IS: 12207-2014 with regard to tolerance limit.
- iii) The maximum equivalent crankshaft torque was observed as **220.6 Nm** against the declaration of **275 Nm** which does not meet the requirement of IS: 12207-2014 with regard to tolerance limit. This should be looked into for necessary corrective action.
- iv) The backup torque is **22.6 %**.

**16.4.1.2 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. This calls for dampening down of vibrations to improve the operational comfort and service life of components.

**16.4.1.3 Haulage requirements:**

The specific fuel consumption with two wheel trailer was recorded as **47 to 48 ml/km/tonne** against the declaration of 35 to 45 ml/km/tonne. This should be looked into.

**16.4.1.4 Operator's Seat:**

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

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

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

**16.4.1.6 Three Point Linkage:**

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

**16.4.1.7 Nominal speed:**

The nominal speed of the tractor recorded as **24.62 kmph** in high reverse gear (RH4). The speed recorded in reverse gear RH4 is not safe as far as the reversing of the tractor is concerned. This should be looked into for necessary corrective action.



**16.4.2 Field performance test:**

**16.4.2.1 Dry land cultivation:**

During the dry land cultivation with ploughing operation and rotavation, the defects and breakdowns recorded in **Chapter 15** of this test report are occurred. This should be looked into for necessary corrective action.

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

The manufacturer has recommended that the tractor is not suitable for wetland cultivation (puddling operation). Hence the, wetland cultivation was not conducted. **Therefore, the declaration of the fact that the tractor is not suitable for wetland cultivation (Puddling operation) should be mentioned clearly and boldly in all the literature relevant to this tractor.**

**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 differential lock pedal, the longitudinal distance from seat index point to the centre of steering control wheel and vertical distance from seat index point to the centre of steering control wheel should be within the limit for easy handling of tractor.
- iii) The height of foot step from ground level should be within the limit for easy mounting and dismounting from the tractor.
- iv) Stop knob is provided but does not remain in stop position
- v) 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.

**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.



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## 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	11 Months (November, 2016 to November, 2017)	No	Due to waiting in drawbar performance test and seasonal constraints.

**TESTING AUTHORITY:**

C. K. TIJARE  
AGRICULTURAL ENGINEER



C. V. CHIMOTE  
TEST ENGINEER



Y. K. RAO  
SENIOR AGRICULTURAL  
ENGINEER



J.J.R. NARWARE  
DIRECTOR

## 18. APPLICANT'S COMMENTS

Para No.	Our Reference	Applicant's comments
18.1	16.4.1.1(iii), 16.4.1.4, 16.4.1.5, 16.4.1.6, & 16.4.2.1	These being studied & corrective action would be taken in near future.
18.2	16.4.1.7	For reverse speed, we will also take necessary action after discussion with Carraro as per Ministry's recommendations.
18.3	16.4.1.2, 16.4.1.3, 16.6, 16.7.1 & 16.7.2	Under our policy of continuous product improvement these aspects are further being looked into & will try to eliminate these deviations soon.