



**ESCORTS LIMITED,
FARMTRAC CHAMPION F1 TRACTOR**



भारत सरकार

GOVERNMENT OF INDIA

कृषि मंत्रालय (कृषि एवं सहकारिता विभाग, मशीनीकरण एवं प्रौद्योगिकी 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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T-924/1441/2014

ESCORTS LIMITED, FARMTRAC CHAMPION F1 TRACTOR –
Commercial (Initial)

Manufacturer : M/s. Escorts Limited,
Plot No 2 & 3, Sector-13,
Faridabad – 121 007 (Haryana)

Test requested by : M/s. Escorts R & D Centre,
15/5, Mathura Road,
Faridabad – 121 003 (Haryana)

Place of running-in : At applicant's works.

Duration of said running-in, (h):

- Engine : 20
- Transmission : 30

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 : Escorts Limited

Model : Farmtrac Champion F1

Brand name : Farmtrac

Type : Four wheeled, rear-wheel driven, General Purpose Agricultural Tractor.

Year of manufacture : 2013

Chassis number : T-2275148

Country of origin : India

Variants, if any * : None

1.2 Engine:

Make : Escorts Limited

Model : E3.215D-3A

Type : Four stroke, naturally aspirated, water cooled, direct injection, diesel engine.

Serial number : E - 2278927

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

- Maximum speed at no load : 2475 to 2525

- Low idle speed : 600 to 700

- Speed at maximum torque : 1200 to 1300

Rated speed, (rpm):

- For PTO use : 2200

- For drawbar use : 2200

1.3 Cylinder & Cylinder Head:

Number : Three

Disposition : Vertical, Inline

Bore/stroke, (mm) : 91/110

Capacity as specified by the applicant, (cc) : 2146

Compression ratio : $17.5 \pm 5\% : 1$



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Condition of seals for stub axles and king pins : Normal

Clearance between centre pin and bushes, (mm) : 0.166 to 0.198 | Against the discard limit of 0.50 mm

15.6 Steering system:

Visual condition of the components of complete steering assembly : Normal

15.7 Starter motor & Alternator:

Presence of soil/oil in housing : None

Condition of bearings and other components : Normal

16. ADJUSTMENTS, DEFECTS, BREAKDOWNS AND REPAIRS

Sl. No.	Adjustments/Defects/Breakdowns and Repairs	Tractor run hours
1. Nil.....	

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: 12207-2008 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: 12207-2008	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 >35hp. - 7.5/+10% for PTO power ≤ 35 hp	25.0 (D)	25.4	Yes
b)	Power at rated engine speed (kW)	Non Evaluative	-do-	25.0 (D)	25.4	Yes
c)	Specific fuel consumption corresponding to maximum power, (g/kWh)	Non Evaluative	± 5%	258 (D)	262	Yes
d)	Maximum equivalent crankshaft torque, (Nm)	Non Evaluative	± 8%	140.0 (D)	135.0	Yes
e)	Back-up torque, percent	Non Evaluative	7 percent, min.	7% Min (D)	22.4	Yes

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1	2	3	4	5	6	7	
f)	Maximum operating temperature, ($^{\circ}$ 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.	125 (D)	108	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.	118 (D)	111	Yes
g)	Engine oil consumption, (g/kWh)		Evaluative	Not exceeding 1% of SFC at max. power under High ambient conditions	2.62 (R) 2.58 (D)	0.46	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)	0.18 per meter	Yes
17.1.2 Drawbar performance :							
a)	Maximum drawbar pull with ballast corresponding to 15 percent wheel slip, (kN)		Non Evaluative	Minimum 65% of static mass with ballast	16.32 Minimum (R)	21.48	Yes
					16.35 Minimum (D)		
b)	Max. drawbar pull without ballast corresponding to 15 percent wheel slip, (kN)		Evaluative	Minimum 65% of static mass of tractor without ballast	Minimum 11.98 (R)	16.19	Yes
					Minimum 12.0 (D)		
c)	Maximum drawbar power without ballast, (kW).		Evaluative	Min. 80% of PTO power as referred in 16.1.1 (a) of PTO performance	20.3 Minimum (R)	22.4	Yes
					20.0 Minimum (D)		
d)	Maximum transmission oil temperature ($^{\circ}$ C)		Non Evaluative	The declared value should not exceed the maximum value specified by oil company	125 (D)	81	Yes



1	2	3	4	5	6	7
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%]	13.7 (D)	12.87	Yes
	2) With the standard frame	Evaluative	The lift capacity should at least be 18 kg/PTO hp. and it should be 16 kg/engine hp where the tractor is not provided with a PTO shaft	6.0 (R) (Minimum) 9.8 (D)	12.08	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 Minutes, (mm)	Non Evaluative	[Tolerance of plus 5 mm]	50 (D)	47	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 Un ballast* (m):					
	1) Cold brake	Evaluative	10	10 (R)	6.68	Yes
	2) Hot brake	Evaluative	10	10 (R)	6.85	Yes
b)	Maximum force exerted on the brake pedal to achieve a deceleration of 2.5 m/s ² (N)	Evaluative	600	600 (R)	206 to 230	Yes
17.1.5	Noise measurement:					
a)	Maximum ambient noise emitted by the tractor dB(A)	Evaluative	As per CMVR	88 (R)	84	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)	120	No
	2) Right foot rest				250	No
	3) Seat (with driver seated)				70	Yes
	4) Steering Wheel				170	No

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1	2	3	4	5	6	7
17.1.7 Haulage requirements :						
a) Gross mass of the trailers, (tones):						
	1) Two wheel	Non Evaluative	--	5.0 (D)	5.0	Yes
Yes	2) Four wheel	Evaluative	--	6.0 (D)	6.0	Yes
b) Distance travelled / litre of fuel consumption, (km/l):						
Yes	1) Two wheel	Non Evaluative	--	6.5 to 7.5 (D)	5.25 to 5.51	No
	2) Four wheel	Evaluative	--	6.5 to 7.5 (D)	4.56 to 4.60	No
c) Fuel consumption (ml/km/tonne):						
	1) Two wheel	Non Evaluative	--	27 to 33 (D)	36.26 to 38.08	No
Yes	2) Four wheel	Evaluative	--	27 to 33 (D)	36.26 to 36.52	No

*As no road ballast is recommended by the applicant

17.1.8 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.			
	1) Clutch assembly	-do-		There should be no ingress of water and/or mud	No ingress of water and/or mud was observed	Yes
	2) Brake housings	-do-				
Yes	3) Front axle hubs	-do-				

17.1.9 Safety features :						
Yes	a) Guards against moving and hot parts	Evaluative	As per CMVR	At present no requirements	provided	Yes
	b) Lighting arrangement	Evaluative	As per CMVR	--	Provided	Yes

17.1.10 Labelling of tractors (Provision of labelling plate):						
	1) Make	Evaluative	Should conform to the requirements of CMVR along-with declared value of PTO HP	--	Escorts limited	Yes
	2) Model	Evaluative		--	Farmtrac Champion F1	Yes
	3) Year of manufacture	Evaluative		--	2013	Yes
No	4) Engine number	Evaluative		--	E 2278927	Yes
No	5) Chassis number	Evaluative		--	T 2275148	Yes
Yes	6) Declaration of PTO power, (kW)	Evaluative		--	25 (33.5)	Yes



1	2	3	4	5	6	7
17.1.11	Discard limit for:					
(a)	Cylinder bore diameter, (mm)	Evaluative	To be specified by the manufacturer	91.3 (D)	91.02 to 91.03	Yes
(b)	Clearance between piston & cylinder liner at skirt, (mm)	Non Evaluative		0.45 (D)	0.138 to 0.139	Yes
(c)	Ring end gap (mm):					
	- Top comp. ring	Evaluative	-do-	3.00	0.40 to 0.45	Yes
	- 2 nd comp. ring		-do-	3.00	1.15 to 1.20	Yes
	- Oil ring		-do-	3.00	0.40 to 0.50	Yes
(d)	Ring groove clearance (mm):					
	- Top comp. ring	Evaluative	-do-	0.40	0.144 to 0.145	Yes
	- 2 nd comp. ring		-do-	0.40	0.078	Yes
	- Oil ring		-do-	0.20	0.058 to 0.059	Yes
(e)	Clearance of main bearings (mm):					
	- Diametrical clearance	Evaluative	To be specified by the manufacturer	0.55	0.072 to 0.084	Yes
	- Crankshaft end float	Evaluative		0.80	0.35	Yes
(f)	Clearance of big end bearings, (mm):					
	- Diametrical	Evaluative	-do-	0.50	0.065 to 0.076	Yes
	- Axial	Evaluative	-do-	0.75	0.40	Yes
(g)	Clearance between king pin and bush, (mm)	Non Evaluative	-do-	0.50	0.125 to 0.166	Yes
(h)	Clearance between centre pin and bush, (mm)	Non Evaluative	-do-	0.50	0.166 to 0.198	Yes

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17.1.12 CATEGORY OF BREAKDOWNS / DEFECTS :

S. No.	Category of breakdowns	Category (Evaluative / Non Evaluative)	Requirements as per IS: 12207-2008	As observed	Whether meets the requirements (Yes/No.)
1.	Critical	Evaluative	There should be no 'critical breakdown' during its validation after all tests including Repeat / Supplementary tests.	None	Yes
2.	Major	Evaluative	There should not be more than two 'major breakdowns' and neither of them is of repetitive nature.	None	Yes
3.	Minor	Evaluative	There should not be more than five 'minor defects' during the test 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

17.2 Optional requirements as per Clause-4 (Table-2) of IS:12207-2008:

S. No.	Characteristic	Requirements as per IS: 12207-2008	AS observed	Whether meets the requirements (Yes/No.)
1	Maximum oil pull over, (%)	0.25% (max.)	0.16%	Yes
2.	Seating requirements	Should meet the requirements of IS: 12343-1998	Meets the requirements	Yes
3.	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
4.	Technical requirements for PTO shaft	Should meet the requirements of IS: 4931 -1995	Does not meet the requirements	No
5.	Dimensions of three point linkage	Should meet the requirements of IS: 4468 (Part-I)-1997	Does not meets the requirements	No
6.	Specifications of linkage drawbar	Should meet the requirements of IS: 12953-1990.	Meets the requirements	Yes
	Specification of swinging drawbar	Should meet the requirements of IS: 12362 Part 3-1994.	Not provided	Not applicable
7.	Accessories	Trailer hitch, front tow hook, linkage drawbar may be provided.	Provided	Yes

17.3 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 - Rear mounted three-point linkage: Part 1 Categories 1, 2, 3 & 4 (fourth revision) [IS 4468 (Part-1):1997 (Reaffirmed in March, 2007)/ISO 730-1:1994]	: Does not conform	17.4.1.3
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) (Reaffirmed in March, 2009)]	: Conforms	17.4.1.4
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	17.4.1.5
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 March, 2009)]	: Does not conform	
viii)	Tractors and machinery for agriculture and forestry, powered lawn and garden equipment – Symbols for operator controls and other displays [IS: 6283 (Part-1 & Part-2) –2006 & 2007(Reaffirmed in March, 2009)/ ISO 3767-2:1991]]	: Conforms	17.4.1.6
ix)	Guide lines for location and operation of operator controls on agricultural tractors and machinery (first revision) (IS: 8133 – 1983) (Reaffirmed in March, 2009)]	: Does not conform	
x)	Agricultural Tractor & Machinery Lighting device for travel on public roads (IS: 14683-1999) (Reaffirmed in March, 2009)]	: Conforms	17.5

17.4 Salient Observations: 17.6

17.4.1 Laboratory tests:

17.4.1.1 PTO Performance:

- i) The backup torque is 22.4%.
- ii) The specific fuel consumption corresponding to maximum power was measured as 262 g/kWh against the declaration of 258 g/kWh, which is within the tolerance limit of IS: 12207-2008.
- iii) During the test at full load & varying speed the maximum coolant temperature was observed as 111 °C which is closed to the declaration of 118 °C . This should be looked into for necessary corrective action. 17.7
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- iv) During test at full load and varying speed 160 ml water has come out from the coolant overflow bottle. This should be looked into for necessary corrective action.

17.4.1.2 Hydraulic Performance:
 The maximum Cumulative drop in height of lift during load maintenance test was observed was 47 mm which near to required limit of 50mm, this should be looked into for necessary corrective action. 17.7.3

**17.4.1.3 Mechanical Vibration:**

The amplitude of mechanical vibration on various assemblies marked as (*) in Chapter-8 of this test report is on higher side, especially at the foot rest, 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 Specifications of Power Take-off Shaft:

The dimensions of PTO master shield do not meet the requirements. This should be looked into for necessary corrective action.

17.4.1.6 Haulage performance:

- (i) The distance travelled per litre of fuel consumption with two wheel & four wheel trailer were observed as 5.25 to 5.51 km/l & 4.56 to 4.60 against the declaration 6.5 to 7.5 km/l respectively. This does not meet the requirement of IS: 12207-2008 and therefore, should be looked into for necessary corrective action.
- (ii) The Specific Fuel consumption (ml/km/tonne) with two & four wheel trailers were observed as 36.26 to 38.08 & 36.26 to 36.52 respectively against the declaration 27 to 33 ml/km/tonne. This does not meet the requirement of IS: 12207-2008 and therefore, should be looked into for necessary corrective action.

17.5 Maintenance / Service Problems:

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

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) The working clearance around the hydraulic draft and position control levers may be provided as per IS: 12239 (Part-2) – 1999.
- iii) Fuel shut-off knob does not remain in "STOP" position.

17.7 Adequacy of Literature supplied with machine:

17.7.1 Operator's manual, Service manual & part's catalogue of Farmtrac Champion F1 tractor was supplied with the tractor for reference during the testing. Following points should be reviewed w.r.t. the literature supplied :

- i) The printing quality in case of operator's manual is very poor and one can't easily read the figures mentioned in the catalogue, besides only one side of the catalogue is printed, as per environmental concerns both side of papers can be used in quality manner.
- ii) Literature can be supplied in regional languages to understand end customer use.

17.7.3 The literatures should also be brought out in national as well as other regional languages for the guidance of users and service personnel.



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18. Citizen charter

Duration of Test	Test duration under citizen charter	Whether the report released within time frame given citizen charter	Remark, if any
10 Months	7 Months (September, 2013 to March, 2014)	Yes	None

Para No.

19.1

19.2

19.3

TESTING AUTHORITY:

P.K VERMA
SENIOR AGRICULTURAL ENGINEER

C.R. LOHI
DIRECTOR

Test Report compiled by **Shri Nitesh Kumar Verma** Assistant Agricultural engineer