



**ESCORTS LIMITED, 26
(BRAND NAME - FARMTRAC) TRACTOR**



सत्यमेव जयते

भारत सरकार

कृषि एवं किसान कल्याण मंत्रालय
कृषि, सहकारिता एवं किसान कल्याण विभाग
मशीनीकरण एवं प्रौद्योगिकी प्रभाग

GOVERNMENT OF INDIA

MINISTRY OF AGRICULTURE AND FARMERS WELFARE

(DEPARTMENT OF AGRICULTURE, CO-OPERATION & FARMERS WELFARE, MECHANIZATION & TECHNOLOGY DIVISION)

केन्द्रीय कृषि मशीनरी प्रशिक्षण एवं परीक्षण संस्थान

ट्रैक्टर नगर, बुदनी (म.प्र.) ४६६ ४४५

CENTRAL FARM MACHINERY TRAINING & TESTING INSTITUTE

(An ISO : 9001 - 2015 Certified Institute)

Tractor Nagar, Budni (M.P.) 466 445

E-mail fmti-mp@nic.in Website : <http://www.fmttibudni.gov.in> Telephone : 07564 - 234729, 234743

T-1518/2045/2021	ESCORTS LIMITED, 26 (BRAND NAME- FARMTRAC) TRACTOR- Commercial (Technical Extension)
-------------------------	---

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

Test requested by (applicant) : M/s. Escorts Knowledge Management Centre,
15/5, Mathura Road,
Faridabad -121 003 (Haryana)

Selected for test by : The applicant
Place of running-in : At manufacturer's works
Duration of said running-in, (h):

- Engine : 20
- Transmission : 30

Method of Selection : The test sample was directly submitted by applicant for test as the Ministry has exempted the random selection of tractors.

2. FUEL AND LUBRICANTS

2.1 Fuel : The High-speed diesel oil supplied by M/s Indian Oil Corporation Limited having density of 0.836 g/cc at 15°C was used.

2.2 Lubricants:

S. No.	Particulars	As recommended by the manufacturer	As used during the test
1	Engine lubricating oil	CH-4 CLASS	Oil originally filled in the tractor systems were not changed
2	Gearbox, differential, rear axle, rear final drive, hydraulic, brake and steering system oil	UTTO (Tract ELFSF-3I)	--do--
3	Front axle and front final drive	Gear oil XP80W	--do--
4	Grease	Servo grease MP	MP Grease

3. ESSENTIAL TESTS

3.1. SPECIFICATIONS

	<u>Previous sample</u>	<u>Present sample</u>
3.1.1 Tractor:		
Make	Escorts Limited	
Model	26	
Brand name	FARMTRAC	
Type	Four wheeled, four wheel drive (4WD), unit constriction, standard agricultural tractor	
Month & Year of manufacture	MG (March 2018)	09/20
Chassis number	T052420629MG	T052511748FJ
Country of origin	India	
3.1.2 Engine:		
Make	Mitsubishi Heavy Industries-VST Diesel Engines Private Ltd. (apa)	
Model	MVS3L2-T3CC2	
Type	Four stroke, naturally aspirated, liquid cooled, indirect injection, diesel engine.	
Serial number	A30790	A19346
Country of origin	India	
3.1.2.1 Engine speed (rpm), (Manufacturer's recommended production settings):		
- Maximum speed at no load	2870 to 2930	
- Low idle speed	970 to 1030	
- Speed at maximum torque	1400 to 2000	
Rated speed, (rpm):		
- For PTO use	2700	
- For drawbar use	2700	

4. OTHER APPLICABLE TESTS

4.1 POWER LIFT AND HYDRAULIC PUMP PERFORMANCE TEST

Date(s) of test : 04.01.2021 & 05.01.2021
 Tractor run at the Institute prior to start : 6.06
 of hydraulic test, (h)
 Pump speed at rated engine speed : 2700
 (rpm)

4.1.1 Hydraulic power test:

Pump delivery rate at minimum : 21.0
 pressure and rated engine speed,
 (l/min)
 Maximum hydraulic power, (kW) : 5.7
 Pump delivery rate at maximum : 20.0
 hydraulic power, (l/min)
 Pressure at maximum hydraulic power, : 17.0
 (MPa)
 Sustained pressure of the open relief : 19.0
 valve, (MPa)

Tapping point:

a) Relief valve test : External circuit
 b) Pump performance test : At pump outlet
 Temperature of hydraulic fluid, (°C) : 60 to 65

4.1.2 Lifting capacity test :

Test	Height of lower hitch point above ground in down position, (mm)	Vertical movement with lifting forces, (mm)	Maximum force exerted through full range, (kN)	Corresponding pressure, (MPa)	Moment about rear axle, (kN-m)	Max. tilt angle of mast from vertical (degrees)
At hitch points	200	470	9.48	17.10	6.45	--
On the standard frame	200	455	5.75	17.10	7.42	26

4.1.3 Maintenance of lift load:

Force applied at the frame, (kN) : 5.18
 Temperature of hydraulic fluid at the : 60
 start of test, (°C)

Test data:

Elapsed time, (minute)	05	10	15	20	25	30
Cumulative drop in height of lift, (mm)	10	20	25	30	35	35

5. ADJUSTMENTS, DEFECTS, BREAKDOWNS AND REPAIRS

S. No.	Adjustment/Defect/Breakdown and Repairs	Category of Breakdown	Tractor run hours
--- None ---			

6. SUMMARY OF OBSERVATIONS, COMMENTS & RECOMMENDATIONS

6.1 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: 2019** for acceptance of tractor for the purpose of subsidies/NABARD financing for the applicable features for this tractor model.

Sl. No.	Characteristic	Category (Evaluative / Non Evaluative)	Requirements as per IS: 12207-2019	Values declared by the applicant/ requirement		As observed		Whether present model meets the requirement (Yes/No.)
				Previous sample	Present sample	Previous sample	Present sample	
1	2	3	4	5 a	5 b	6 a	6 b	7
6.1.1	PTO Performance :							
a)	Max. power under 2 h test, (kW) (Natural ambient condition)	Evaluative	Declared value to be achieved with a tolerance of: $\pm 5\%$ for PTO power or engine power >26 kW, $\pm 10\%$ for PTO power or Engine power ≤ 26 kW.	14.55 (D)	14.55 (D)	15.8	14.2	Yes
b)	Power at rated engine speed, (kW)	Non Evaluative	-do-	14.55 (D)	14.55 (D)	15.8	14.2	Yes
c)	Specific fuel consumption corresponding to maximum power, (g/kWh)	Evaluative	+ 10% Max.	325 (D)	325 (D)	339	341	Yes
d)	Maximum equivalent crankshaft torque, (Nm)	Non Evaluative	$\pm 8\%$	65.0 (D)	65.0 (D)	67.6	64.1	Yes
e)	Back-up torque, percent	Evaluative	12 percent, min.	12 (R)	12 (R)	21.4	27.7	Yes
6.1.2	Power lift and hydraulic pump performance :							
a)	Maximum lifting capacity throughout the range of lift, (kN):							
1)	At hitch points	Evaluative	± 10 percent	9.00 (D)	9.0 (D)	9.84	9.48	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	7.36 (D) 3.71 (R)	3.71 (D) 3.34 (R)	6.90	5.75	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	The observed value should not exceed 50 mm	50 (D)	0	0	35	Yes

T-1518/2045/2021		ESCORTS LIMITED, 26 (BRAND NAME- FARMTRAC) TRACTOR- Commercial (Technical Extension)						
1	2	3	4	5 a	5 b	6 a	6 b	7
6.1.3 Safety features :								
a)	Guards against moving and hot parts	Evaluative	Belt drives, pullies, silencer, hydraulics pipes(as per IS-12239 Part 2)			Meets the requirement		Yes
b)	Lighting arrangement	Evaluative	As per CMVR			Meets the requirement		Yes
c)	Seating requirements (Tractors having more than 1150 mm rear track width)	Non Evaluative	Should meet the requirements of IS: 12343 (As amended from time to time)			Not applicable		--
d)	Technical requirements for PTO shaft	Evaluative	Should meet the requirements of IS: 4931 (As amended from time to time)			Meets the requirement		Yes
e)	Dimensions of three point linkage	Non Evaluative	Should meet the requirements of IS: 4468 (Part-I) (As amended from time to time)			Does not meet the requirements		No
f)	Specifications of linkage drawbar	Evaluative	Should meet the requirements of IS 12953 (As amended from time to time)			Meets the requirement		Yes
g)	Specifications of Swinging drawbar (wherever fitted)	Evaluative	Should meet the requirements of IS 12362 (Part 3) (As amended from time to time)			Not provided		Not applicable
h)	1) Maximum travelling speed at rated engine speed in reverse gears, kmph	Evaluative	Should not exceed 20 kmph			11.16 kmph (Meets the requirement)		Yes
	2) Audible warning signal on tractor.	Evaluative	As soon as the travelling speed in reverse gear reaches to 20 kmph, an audible warning signal on tractor shall be activated.			Not fitted		Not applicable
6.1.4 Labeling of tractors (Provision of labeling plate):								
	1) Make	Evaluative	Should conform to the requirements of CMVR along-with declared value of PTO in kW and year of manufacture in numerical <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>MM</td><td>YY</td></tr></table> Digit 01-12 in box No.1 for MM will represent the month and next two digit in the box No.2 for YY will represent the year of manufacturing	MM	YY	ESCORTS LIMITED		Yes
	MM	YY						
	2) Model	Evaluative		26	Yes			
	3) Month & Year of manufacture	Evaluative		09/20	Yes			
	4) Engine number	Evaluative		A19346	Yes			
	5) Chassis number	Evaluative		T052511748FJ	Yes			
6) Declaration of PTO power, kW	Evaluative	14.55	Yes					
6.1.5 Literature (Submission to test agency)								
(a)	Operator manual	Evaluative	Provided/ Not Provided		Provided	Yes		
(b)	Parts Catalogue	Evaluative	Provided/Not Provided		Provided	Yes		
(c)	Workshop/ Service manual	Evaluative	Provided/Not Provided		Provided	Yes		

T-1518/2045/2021	ESCORTS LIMITED, 26 (BRAND NAME- FARMTRAC) TRACTOR-Commercial (Technical Extension)
-------------------------	--

1	2	3	4	5 a	5 b	6 a	6 b	7
6.1.6	Fitment of roll Over protective structures (ROPS): for tractor having more than 1150 mm rear track width	Evaluative	ROPS should meet the requirement of IS 11821 or OECD code or equivalent International standard			ROPS not provided		Not applicable
6.1.7	Standard Accessories	Evaluative	Trailer hitch, front tow hook, linkage drawbar should be provided with the tractor.			Provided		Yes
6.1.8	Accessories (optional)	Non Evaluative	Ballast weights, if fitted, should meet the requirement of CMVR			Provided		Yes

6.2 CATEGORY OF BREAKDOWNS / DEFECTS (As per Clause 5.0 of IS:12207-2019) :					
S. No.	Category of breakdowns	Category (Evaluative / Non Evaluative)	Requirements as per IS: 12207-2019	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

6.3 Conformity with following IS:	Previous sample	Present sample
i) Guide lines for declaration of power and specific fuel consumption and labelling of agricultural tractors (First revision) [IS10273: 1987 (Reaffirmed 2014)]	Conformed	Conforms
ii) Agricultural tractors - Rear mounted power take-off - Types 1, 2 and 3 (third revision) [IS:4931-1995 (Reaffirmed 2014)]	Conformed	Conforms
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 2014)]	Did not conform	Does not conform
iv) Drawbar for agricultural tractors – Link type [IS 12953:1990 (Reaffirmed October, 2017)]	Conformed	Conforms
v) Agricultural tractors - Operator's seat technical requirement [IS 12343 –1998 (First revision) (Reaffirmed 2014)]	Not applicable	Not applicable
vi) Guide for safety & comfort of operator of agricultural tractors: Part 1 General requirements (first revision): [IS 12239 (Pt-1) 1996/ISO 4254-1:1989 (Reaffirmed October, 2017)]	Did not conform	Does not conform

	<u>Previous sample</u>	<u>Present sample</u>
vii) Tractors and machinery for agriculture and forestry – Technical means for ensuring safety Part 2: Tractors (first revision) (IS 12239 (Pt-2) 1999) (Reaffirmed 2014)]	Did not conform	Does not conform
viii) Guide lines for location and operation of operator controls on agricultural tractors and machinery (first revision) IS: 8133-1983 (Reaffirmed 2014)]	Conformed	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 2014)]	Conformed	Does not conform
x) Agricultural Tractors and Machinery - Lighting device for travel on public roads (IS: 14683-1999) (Reaffirmed 2014)]	Conformed	Conforms

6.4 Salient Observations:

6.4.1 Laboratory tests:

6.4.1.1 PTO Performance Test:

- i) The maximum PTO power was recorded as **14.2 kW** against the declaration of **14.55 kW**, which meets the evaluative requirement of IS: 12207-2019 with regard to tolerance limit.
- ii) The specific fuel consumption corresponding to maximum power was recorded as **341 g/kWh** against the declaration of **325 g/kWh**, which meets the requirement of IS: 12207-2019 with regard to tolerance limit.
- iii) The maximum equivalent crankshaft torque was recorded as **64.1 N-m** against the declaration of **65.0 N-m**, which is within the permissible limit as specified in IS: 12207-2019.
- iv) The backup torque is **27.7 %** and meets the requirement of IS: 12207-2019.

6.4.1.2 Hydraulic performance:

- i) Maximum lifting capacity throughout the range of lift at hitch point and standard frame was recorded as **9.48 kN & 5.75 kN** respectively against the declaration of **9.00 kN & 3.71 kN** respectively & which meet the evaluative requirement of IS: 12207-2019.
- ii) The maximum lifting capacity on standard frame throughout the range of lift was observed as **5.75 kN** and the moment about rear axle was computed as **7.42 kN-m**, which is considered on higher side compared to the moment from front axle i.e. **6.65 kN-m**. It is therefore, recommended that the lifting capacity of the hydraulic system may be reduced suitably or standard ballast mass at front axle may be provided to avoid front lifting of the tractor.

6.4.1.3 Three point linkage:

The distance from end of PTO shaft to centre of lower hitch point does not meet the requirement of IS: 4468 (Part-1)-1997 (Reaffirmed in October 2017). This should be looked into for necessary corrective action.

6.4.2 Maintenance / Service Problems:

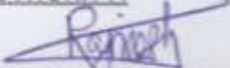
No noticeable maintenance / service problem was observed during the test.

- 6.4.3 Recommendation with regard to safety on tractor:**
The following requirements, inter alia, may be considered for incorporation on the tractor:
- Provision of drainage should be provided on both LHS and RHS foot rest as per IS: 12239 (Part-1)-1996 (Re-affirmed in October, 2017).
 - There should be provision for spark arresting device in exhaust system as per IS: 12239 (Part-1)-1996 (Re-affirmed in October, 2017).
 - In engine revolution gauge, colour zones should be provided as per IS: 6283 (Part-2) – 2007 (Re-affirmed in 2014).
 - PTO shaft master shield should be provided as per IS: 12239 (Part-1)-1996 (Re-affirmed in October, 2017).
 - The working clearance between the position control lever and mudguard was measured 30 mm against the minimum requirement of 70 mm. It should be as per IS: 12239 (Part-2) – 1999 (Reaffirmed in 2014).
- 6.4.4 Adequacy of Literature supplied with machine:**
- 6.4.4.1** The following literature was supplied with the tractor for reference during the testing.
- Operator's Manual for 26 (Brand Name -Farmtrac) & 30 (Brand Name -Farmtrac)
 - Repair Manual for 26 (Brand Name -Farmtrac) & 30 (Brand Name -Farmtrac)
 - Parts Catalogue for 26 (Brand Name -Farmtrac)
- 6.4.4.2** However, these literatures should also be brought out in other vernacular languages of India for guidance of users.

7. CITIZEN CHARTER

Time frame for Testing & Evaluation as per Citizen Charter	Duration of Test	Whether the Test Report is released within the time frame given in Citizen Charter	Remarks
10 Months	03 Months (November, 2020 to, January, 2021)	Yes	--None--

TESTING AUTHORITY:


RAJNEESH PATEL
 AGRICULTURAL ENGINEER


C.V. CHIMOTE
 TEST ENGINEER


J.J.R. NARWARE
 DIRECTOR

The report compiled by: **Smt. Poonam Khurasia**, Senior Technical Assistant.

8. APPLICANT COMMENTS

Para No.	Our Reference	Applicants comments
8.1	6.4.1.2, 6.4.1.3 & 6.4.3	These being studied & corrective action would be taken in near future in regular production.
8.2	6.3 (iii), (vi), (vii), (ix) & 6.4.4.2	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, whenever necessary.

T-1518/2045/2021	ESCORTS LIMITED, 26 (BRAND NAME- FARMTRAC) TRACTOR- Commercial (Technical Extension)
------------------	---

ANNEXURE- I

TRACTOR RUN HOURS DURING TEST

A.	LABORATORY AND TRACK TESTS	<u>HOURS</u>
1.	Running –in	50.00
2.	PTO Performance Test	4.00
3.	Power Lift and Hydraulic Pump Performance Test	1.50
4.	Theoretical speed test	1.66
B.	Miscellaneous test and other run hours, including idle run transportation, trial and preparation for test.	2.65
Total		59.81