

व्यावसायिक परीक्षण रिपोर्ट
COMMERCIAL TEST REPORT (Supplementary)

संख्या / No. : T-1009/1533/2016
माह / Month : March, 2016



ESCORTS LIMITED, POWERTRAC 439 TRACTOR
(To be read in conjunction with the test report bearing No. T-793/1301/2011)



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

(An ISO : 9001 - 2008 Certified Institute)

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

E-mail fmti-mp@nic.in

Website : <http://cfmtti.dacnet.nic.in>

Telephone : 07564 - 234729

Fax : 07564 - 234743



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1	2	3	4
7.	Make & Model	Exide & MF70Z	Amaron & TRA 500 R
	Type	Lead acid	Lead acid
	Capacity and rating	12V, 70 Ah at 20 hours discharge rate	12V, 75 Ah at 20 hours discharge rate
	Location	On LHS of clutch housing in separate metallic box.	On RHS of clutch housing in separate metallic box.

The Manufacturer also desires the following features as an optional features as per table 8.1.2 of IS: 12207:2014 which are not affecting the tractor performance with base model and some are inspected/verified on the submitted samples under supplementary.

Table -2: Declared as optional features in present sample.

S. No	Parameters	Previous Sample (Test report no.T-793/1301/2011, September, 2011)	Present Sample	Test carried out
1.	Tyre Size	12.4-28,12PR	12.4-28,12PR (Standard fitment) 13.6-28,12PR (optional)	Nominal speed test
	Rim size	W11-28	W11-28	
2.	Expansion tank	Not provided	Provided	Physical verification
3.	Colour of bonnet & mudguard	Blue & white	Yellow	As declared by manufacturer
4.	Rim & disc	White	Black	

Subsequent to the examination of the case in light of Indian Standard IS 12207-2014, the following tests were considered to be carried out:

- Specification checking
- Nominal speed test

-With 12.4-28 (standard tyre fitment with recommended rim as per IS13154/ITTAC manual)
-With 13.6-28 (optional tyre fitting with recommended rim as per IS13154/ITTAC manual))

- Two-hour maximum PTO power test under normal ambient condition with 3.50 lit capacity copper radiator
- Brake performance test with oil immersed brake
- Location of Centre of gravity
- Turning ability test
- Operator field of vision

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 and Air cleaner oil	20W40 (API CD -IS: 13656-E-DL-2)	Servo super 20W40
2.	Transmission and hydraulic oil	20W40 (API GL-4 IS: 1118-EP-Type)	Oil originally filled in the tractor was not changed
3.	Steering housing oil	SAE 90 (API GL-4 IS: 1118-EP-Type-GL-4)	
4.	Grease	Servo Grease MP	Servo Grease MP

3. ESSENTIAL TESTS

3.1. SPECIFICATIONS

3.1.1 Tractor:	<u>Previous sample</u>	<u>Present sample</u>
Make	: Escorts limited	Escorts limited
Model	: POWERTRAC 439	POWERTRAC 439
Brand name	: None	None
Type	: Four wheel, Rear-wheel drive, Agricultural Tractor	drive, General Purpose,
Year of manufacture	: 11-B-11(February ,2011)	15-B-1(1 st February,2015)
Chassis Serial number	: B-3139664	T05-3263648
Country of Origin	: India	India



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3.1.2 Engine:	Previous sample	Present sample
Make	: Escorts Limited	Escorts Limited
Model	: E3.215D-3A	E3.215D-3A
Type	: Four stroke, naturally aspirated, water, cooled, direct injection, diesel engine.	
Serial number	: E-3154587	E-3292514
Engine speed (Manufacturer's recommended production setting)(rpm) :		
- Maximum speed at no load	: 2475 to 2525	2475 to 2525
- Low idle speed	: 600 to 650	600 to 650
- Speed at maximum torque	: 1200 to 1300	1200 to 1300
Rated speed, (rpm):		
- For PTO use	: 2200	2200
- For drawbar use	: 2200	2200
3.1.3 Cylinder & Cylinder Head:		
Number	: Three	Three
Disposition	: Vertical, Inline	Vertical, Inline
Bore/stroke, (mm)	: 91.0/110.0	91.0/110.0
Capacity as specified by the applicant, (cc)	: 2146	2146
Compression ratio, (apa)	: 18.0 ± 5% : 1	18.0 ± 5% : 1
Type of cylinder head	: Monoblock	Monoblock
Type of cylinder liners	: Wet, replaceable	Wet, replaceable
Type of combustion chamber	: Direct injection, open chamber in piston crown.	
Arrangement of valves	: Overhead, inline	Overhead, inline
Valve clearance (cold/hot):		
- Inlet valve, (mm)	: 0.3 / 0.4	0.3 / 0.4
- Exhaust valve, (mm)	: 0.3 / 0.4	0.3 / 0.4
3.1.4 Fuel System:		
Type of fuel feed system	: Gravity and forced feed	Gravity and forced feed
3.1.4.1 Fuel tank:		
Capacity, (l)	: 45	45.6
Location	: Above clutch housing	Above clutch housing
Provision for draining of sediments/ water	: Not provided, however water separator is provided.	Not provided, however water separator is provided.
Material of fuel tank	: Steel sheet	Steel sheet
3.1.4.2 Water separator		
Make	: Provided	Provided
Type	: Hilux	
Type	: Inverted funnel, gravity separation.	
Capacity, (l)	: 0.50	
Location	: On RHS, in between fuel tank and fuel filter.	
3.1.4.3 Fuel feed pump:		
Make	: Bosch, India	Bosch, India
Type	: Plunger	Plunger
Model/Group combination No.	: FP/KS22AD62, 9 440 030 029	FP/KSG22AD108, F002 A60 040
Provision of sediment bowl	: Provided (metallic)	Provided (metallic)
Method of drive	: Through timing gears	



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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: 2014 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: 12207-2014	Values declared by the applicant/ requirement		As observed		Whether present sample meets the requirements (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: -5 / +10% for PTO power >26 kW. -7.5/+10% for PTO power ≤ 26 kW or -5 / +10% for engine power >26 kW. -7.5/+10% for engine power ≤ 26 kW	25.0 (D)	25.0 (D)	25.4	26.2	Yes
b)	Power at rated engine speed, (kW)	Non Evaluative	-do-	25.0 (D)	25.0 (D)	25.4	26.2	Yes
c)	Specific fuel consumption corresponding to maximum power, (g/kWh)	Non Evaluative	± 5%	252 (D)	238 (D)	235	232	Yes
f) Maximum operating temperature (°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)	125	105	92	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)	110	104	75	Yes
g)	Engine oil consumption, (g/kWh)	Evaluative	Not exceeding 1% of SFC at max. power under High ambient conditions	2.36 (R)	0.20	0.08	--	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 (R)	3.25 per meter (R)	0.07	--	Yes



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1	2	3	4	5 a	5 b	6 a	6 b	7
6.1.2	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 (R)	10	10	5.40	8.26	Yes
	2) Hot brake	Evaluative	10 (R)	10	10	6.80	8.47	Yes
b)	Maximum force exerted on the brake pedal to achieve a deceleration of 2.5 m/s ² (N)	Evaluative	600 (R)	600	600	245 to 290	434 to 468	Yes
6.1.3	Safety features :							
a)	Guards against moving and hot parts	Evaluative	Belt drives, pulley, silencer, hydraulic pipes (As per IS 12239 (part 2)	--		Provided	--	
b)	Lighting arrangement (Tractor having more than 1150 mm rear track width)	Evaluative	As per CMVR	--		Provided	Yes	
c)	Seating requirement (Tractors having more than 1150 mm rear track width)	Non-Evaluative	Should meet the requirements of IS 12343 (as amended from time to time)	--		Meets the requirement	Yes	
d)	Technical requirements for PTO shaft	Non-Evaluative	Should meet the requirements of IS 4931 (as amended from time to time)	--		Meets the requirement	Yes	
e)	Dimension 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 requirement	No	
f)	Specification of linkage and swinging drawbars	Non-Evaluative	Should meet the requirements of IS 12953 and IS 12362 (part 3) (as amended from time to time)	--		Meets the requirement	Yes	
6.1.4	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		--		Powertrac 439	Yes	
	3) Year of manufacture	Evaluative		--		15-B-01 (01 st February 2015)	Yes	
	4) Engine number	Evaluative		--		E3292514	Yes	
	5) Chassis number	Evaluative		--		T05-3263648	Yes	
	6) Declaration of PTO power, kW	Evaluative		--		25	Yes	
6.1.5	Literature (Submission to test agency)							
(a)	Operator manual	Evaluative	Provided/ Not Provided	As per relevant IS Code (IS 8132)		Provided	Yes	
(b)	Parts Catalogue	Evaluative	Provided/Not Provided	As per relevant IS Code (IS 8132)		Provided	Yes	
(c)	Workshop/ Service manual	Evaluative	Provided/Not Provided	As per relevant IS Code (IS 8132)		Provided	Yes	



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**ESCORTS LIMITED, POWERTRAC 439 TRACTOR
Commercial (Supplementary)****6.2 Salient Observations:****6.2.1 Laboratory tests:****6.2.1.1 PTO Performance:**

- i) The maximum power in case of previous & present sample was observed as 25.4 & 26.2 kW respectively against the declaration of 25.0 kW, which is within the tolerance limit specified in IS: 12207-2014.

6.2.1.3 Three point linkage:

Some of the parameters of three point linkage conforms to Cat.I and some of them conforms to Cat.II. Keeping in view the spirit of standardization, necessary improvement may be incorporated.

6.3 Maintenance / Service Problems:

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

6.4 Recommendation with regard to safety on tractor:

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

- Provision of safety against accidental start of engine.
- Provision for spark arresting device in exhaust system.
- Provision of differential lock.
- The fuel shut-off lever does not remain in stop position

6.5 Adequacy of Literature supplied with machine:**6.5.1** The following literature not supplied with the tractor

- Operator's manual
- Service Parts catalogue
- Service Manual

6.5.2 It is therefore, recommended that following literature may be brought out as per IS: 8132-1999 (Reaffirmed in March, 2009) for the guidance of users and service personnel in national as well as regional languages for this model of tractor.**7. CITIZEN CHARTER**

Duration: of Test	Time frame for Testing & Evaluation as per Citizen Charter	Whether the Test Report is released within the time frame given in Citizen Charter	Remarks
February to march , 2016	10 Months	Yes	None

TESTING AUTHORITY:**P.C MESHARAM
SENIOR AGRICULTURAL ENGINEER****C. R LOHI
DIRECTOR**

Test report compiled by Mr. Chanchlesh Singh Raghuwanshi, Senior Technical Assistant

8. APPLICANT'S COMMENTS

Para No.	Our Reference	Applicant's comments
8.1	6.2.1.3, 6.4	Your valuable comments & suggestions for improvements are well taken. Under our policy of continuous product improvement these aspects are further being looked into and will try to eliminate these deviations soon wherever necessary



ANNEXURE-I

TRACTOR RUN HOURS DURING TEST

A.	LABORATORY AND TRACK TESTS	HOURS
1.	Running –in	--
2.	PTO Performance Test (2 hour max.power test)	3.3
3.	Theoretical speed test	0.9
4.	Brake performance test	0.8
5.	Location of Centre of gravity	0.2
6.	Turning Ability	0.2
7.	Operator's field of vision	0.2
B.	Miscellaneous test and other run hours, including idle run transportation, trial and preparation for test.	0.5
	Total	6.10