



**ESCORTS LIMITED, EURO 60
(BRAND NAME - POWERTRAC) TRACTOR**



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@gov.in

Website : <http://www.fmttibudni.gov.in>

Telephone : 07564 - 234729

Fax : 07564 - 234743

T-1086/1611/2017	ESCORTS LIMITED , EURO 60 (BRAND NAME:POWERTRAC) TRACTOR- Commercial Variant)
------------------	--

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

Month: April	Test Report No.: T-1086/1611/2017	Year : 2017
--------------	-----------------------------------	-------------



GOVERNMENT OF INDIA
CENTRAL FARM MACHINERY TRAINING & TESTING INSTITUTE
TRACTOR NAGAR, BUDNI (MADHYA PRADESH) 466445, INDIA

E-mail: fmti-mp@gov.in

Web site: <http://www.fmttibudni.gov.in>

Telephone : 07564-234729

FAX : 07564-234743

T-1086/1611/2017	ESCORTS LIMITED , EURO 60 (BRAND NAME:POWERTRAC) TRACTOR- Commercial Variant)
-------------------------	--

Type of Test : **COMMERCIAL (Variant)**

Test code/Procedure : IS: 5994-1998 (Reaffirmed in March 2009),
and IS: 12207-2014

Period of Test : March to April , 2017

Test Report No. : **T-1086/1611/2017**

Month/Year : **April,2017**

-
- i) The results reported in this report are observed values and no corrections have been applied for atmospheric and site conditions.
 - ii) The data given in this report pertain to the particular machine submitted by the applicant for test.
 - iii) The results presented in this report do not in any way attribute to the durability of the machine.
 - iv) This report should not be reproduced in part or full without prior permission of the Director, Central Farm Machinery Training and Testing Institute, Budni (M.P.).
 - v) **This is a Variant test report should be read in conjunction with the Test Report of base model i.e. "Escorts limited, Powertrac 4455 BT Tractor" bearing No. T-967/1486, 2015 (March)**
-

Sl. No	Units	Conversion Factor
1.	Force:	
	1 kgf	9.80665 N 2.20462 lbf
2.	Power:	
	1 hp	1.01387metric hp (Ps) 745.7 W
	1 Ps	735.5 W
	1 kW	1.35962 Ps
3.	Pressure:	
	1 psi	6.895 kPa
	1 kgf/cm ²	98.067 kPa = 735.56 mm of Hg
	1 bar	100 kPa = 10 N/cm ²
	1 mm of Hg	1.3332 m-bar

A B B R E V I A T I O N S	
Apa	As per applicant
TDC	Top Dead Centre
IS	Indian Standard
LHS/RHS	Left Hand Side/ Right Hand Side
Hg	Mercury
Temp.	Temperature
N.R.	Not recorded
Rpm	Revolutions per minute
O.D/I.D	Outer diameter/ Inner diameter
N.A.	Not available/ Not applicable
PTO	Power take-off
R.H.	Relative Humidity

C O N T E N T S

	<u>PAGE</u>
1. Scope of test	05
2. Fuel & Lubricants	06
3. Essential Test	
3.1 Specifications	06
3.2 Nominal speed	17
3.3 PTO Performance Test	19
4. Adjustments, defects, breakdowns & repairs	27
5. Comparison Between Base Model and Variant Model	
6. Summary of observations, comments & recommendations	27
7. Citizen charter	30
8. Applicant comment's	30
Annexure -I	31

T-1086/1611/2017	ESCORTS LIMITED , EURO 60 (BRAND NAME:POWERTRAC) TRACTOR- Commercial Variant)
-------------------------	--

Manufacturer	: M/s. Escorts Limited, Plot No. 2 & 3, Sector – 13 FARIDABAD – 121 007 HARYANA
Test requested by (applicant)	: The manufacturer
Place of running-in & carried out	: At manufacturer work place
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. SCOPE OF TEST

The “Escorts Limited, Powertrac 4455 BT” tractor had undergone “Initial Commercial Test” at this Institute and a test report No.T-967/1486/2015, was released in March, 2015. Now the applicant has submitted an application vide letter No. ERC: Budni: EURO 60-B-82/16, dated 05.11.2016 for testing of “Escorts Limited, Euro 60 (Brand Name: Powertrac)” tractor as a Variant of “Escorts Limited, Powertrac 4455 BT” tractor.

The applicant having enclosed a list of following differences in the technical specifications between “Escorts Limited , Powertrac 4455 BT” and “ Escorts Limited , Euro 60 (Brand Name: Powertrac” and requested to test the “ Escorts Limited , Euro 60 (Brand Name : Powertrac” as a variant of “Escorts Limited , Powertrac 4455 BT” tractor :-

The major features of Base model and Variant model are listed below:

S. No.	Parameters	Base Model	Variant Model
1.	Make	Escorts limited	Escorts limited
2.	Model	Powertrac 4455 BT	Euro 60
3.	Brand name	Powertrac	Powertrac
4.	Engine Model	AE4.312A-3A	AE4.368C-3A
5.	Bore/stroke, (mm)	95/110	98/122
6.	Compression ratio, (apa)	18.0 ± 5% : 1	17.5 ± 5% : 1
7.	Capacity as specified by the applicant, (cc)	3120	3682
8.	Max speed at no load	2300 to 2400	2350 to 2450
9.	Speed at max torque	1200 to 1300	900 to 1100
10.	Numbers of fuel filter	Two	One
11.	Make & model of fuel feed pump	FP/KS22AD62, 9440 030 029	F 002 A50 040, FP/KSG22AD105
12.	Make & model of fuel Injection pump	F002 AOZ 954, PES4A90D410RS3500	F002 A3Z 008, PES4A90D410RS3500
13.	Make & model of fuel Injectors	Bosch, India & F 002 C70 023 459(Holder No), DSL A 146 P 5509	Bosch, India & F 002 C70 023 (Holder no.), DSLA 144P 5586 (Nozzle no.)
14.	Make & model of governor	RSV325...1100A4C 1738L	RSV375...1100A4C1799 L
15.	Injection timing	7±1 ° before TDC	8 ±1 ° before TDC
16.	Exhaust gas recirculation (EGR)	Not provided	Provided
17.	Bare radiator capacity ,(l)	6.05	4.50

T-1086/1611/2017	ESCORTS LIMITED , EURO 60 (BRAND NAME:POWERTRAC) TRACTOR- Commercial Variant)
-------------------------	--

1	2	3	4
18.	Total coolant capacity,(l)	12.00	9.80
19.	Equivalent crankshaft torque at max power, Nm	146.7	178
20.	Maximum Equivalent crankshaft torque, Nm	188.8	229
21.	Max PTO power ,(kW)	32.8	38.1
22.	Wheel base ,mm	2220	2245
23.	Overall dimension ,length, width & height,(mm)	3510/1890//2210	3770/1915/2275

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
- PTO performance test

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 Oil	SAE 15 W40 (API4)/SAE 20W40 (APICD/SF-IS:13656-EP-DL-2)	As recommended
2.	Transmission and hydraulic oil	UTTO (Tract ELFSF-31)	Oil originally filled in the tractor was not changed
3.	Steering housing oil	SAE 80W 90/EP 80(API GL-4,IS:1118-EP,Type GL-4)	--do--
4.	Grease	Servo Grease MP	Servo Grease MP

3. ESSENTIAL TESTS

3.1. SPECIFICATIONS

3.1.1 Tractor:		<u>Base model</u>	<u>Variant model</u>
Make	: Escorts Limited		Escorts limited
Model	: Powertrac -4455 BT		Euro 60
Brand name	: POWERTRAC		POWERTRAC
Type	: Four wheeled, rear-wheel driven, Standard Agricultural Tractor		
Year of manufacture	: 2014(February 2014)		EE (August ,2016)
Chassis Serial number	: B-3227482		T053310805EE
Country of Origin	: India		India

T-1086/1611/2017	ESCORTS LIMITED , EURO 60 (BRAND NAME:POWERTRAC) TRACTOR- Commercial Variant)
-------------------------	--

3.1.2 Engine:	<u>Base model</u>	<u>Variant model</u>
Make :	Escorts Limited	Escorts Limited
Model :	AE4.312A-3A	AE4.368C-3A
Type :	Four stroke, naturally aspirated, water, cooled, direct injection, diesel engine.	
Serial number :	E -3251191	E3346817
Engine speed (Manufacturer's recommended production setting)(rpm) :		
- Maximum speed at no load :	2300 to 2400	2350 to 2450
- Low idle speed :	600 to 700	600 to 700
- Speed at maximum torque :	1200 to 1300	900 to 1100
Rated speed, (rpm):		
- For PTO use :	2200	2200
- For drawbar use :	2200	2200
3.1.3 Cylinder & Cylinder Head:		
Number :	Four	Four
Disposition :	Vertical, Inline	Vertical, Inline
Bore/stroke, (mm) :	95/110	98/122
Capacity as specified by the applicant, (cc) :	3120	3682
Compression ratio, (apa) :	18.0 ± 5% : 1	17.5± 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) :	0.30	0.3 0
- Exhaust valve, (mm) :	0.40	0.40
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) :	59.2	59.5
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 :	Metallic	Steel sheet
3.1.4.2 Water separator		
Make :	Provided	Provided
Type :	Hilux	Hilux
Location :	Inverted funnel, gravity separation.	
Location :	Provided between fuel tank and the fuel feed pump.	
3.1.4.3 Fuel feed pump:		
Make :	Bosch, India	Bosch, India
Type :	Plunger with hand primer	Plunger with hand primer
Model/Group combination No. :	FP/KS22AD62, 9 440 030 029	F002 A50 040, FP/KSG22AD105
Provision of sediment bowl :	Provided (metallic)	Provided (metallic)
Method of drive :	Through cam shaft of fuel injection pump	

T-1086/1611/2017	ESCORTS LIMITED , EURO 60 (BRAND NAME:POWERTRAC) TRACTOR- Commercial Variant)
-------------------------	--

		<u>Base model</u>	<u>Variant model</u>
3.1.4.4	Fuel filters:		
	Make	Bosch, India	Bosch, India
	Model/Group combination No.	9 450 030 120	F002 H20 187
	Number	Two	One
	Type of elements		
	-Primary	Cloth	Paper
	-Secondary	Paper	----
	Capacity of final stage filter, (l)	0.50	0.50
3.1.4.5	Fuel Injection pump:		
	Make	Bosch, India	Bosch, India
	Model/Group combination No.	F 002 A0Z 954, PES3A90D410RS3500	F 002 A3Z 008 PES3A90D410RS3500
	Type	Inline Plunger	Inline Plunger
	Serial number	31058967	62024130
	Method of drive	Through timing gears	Through timing gears
.1.4.6	Fuel injectors:		
	Make	Bosch, India	Bosch, India
	Model/Group combination No.	F002 C70 023 (Holder No.),DSL A 146 P 5509 (Nozzle No.)	F 002 C70 023 Nozzle no., DSLA 146P 5602 (Holder no)
	Type	Multi hole (five holes)	Multi hole (5-holes)
	Manufacturer's production pressure setting, (MPa)	25.0 to 25.8	24.5 to 25.30
	Injection timing	7°±1 before TDC	8 °±1 before TDC
	Firing order	1-3-4-2	1-3-4-2
3.1.4.7	Governor:		
	Make	Bosch,India	Bosch, India
	Model/Group combination No.	RSV325...1100A4C1738L	RSV325...1100A4C1799L
	Serial number	Not provided	71801602
	Type	Mechanical, centrifugal, variable speed	
	Rated engine speed, (rpm)	2200	2200
	Governed range of engine speed (rpm)	600 to 2400	600 to 2450
3.1.5	Air Intake system:		
3.1.5.1	Pre-cleaner		
	Make	Escort (apa)	Escort (apa)
	Type	Centrifugal with transparent dust collector.	
	Location	Above main air cleaner inlet tube, Inside the bonnet.	
3.1.5.2	Air cleaner:		
	Make	Not available	Fleetguard
	Type	Dry, Paper element	Dry, Paper element
	Location	In the front of the radiator , under the bonnet	
	Range of suction pressure at maximum power, (kPa)	3.0 to 3.3	3.3 to 3.4
	Maintenance schedule	Clean element every day & replace after 500 hours of operation.	

	<u>Base model</u>	<u>Variant model</u>
3.1.6 Exhaust System:	Updraft (Cylindrical)	Updraft (Cylindrical)
Type of silencer :		
Position of silencer outlet with respect to SIP, (mm):		
- Vertical :	830	980
- Longitudinal :	1740	1545
- Lateral :	340 (on LHS)	395 (on LHS)
Range of exhaust gas pressure at maximum power, (kPa) :	9.3 to 9.9	3.9 to 4.0
Provision of spark arrestor :	None	
Provision against entry of rain water :	A bend is provided at the top of silencer.	
3.1.6.1 EGR Details:		
Make :	Not provided	Padmini
Type /Function :		Solenoid operated
Identification mark :		D10282690
Details of EGR system :	A M.S pipe of 15.82 mm external diameter is connected in between the exhaust & intake manifold for exhaust gas recirculation	
Location :	On RHS of engine at air intake manifold	
3.1.7 Lubricating system:		
Type :	Forced feed-cum-splash	
Oil sump capacity, (l) :	6.0	8.5
Total lub oil capacity, (l) :	7.5	9.2
Oil change period :	First change after 50 hours of operation and subsequently after every 250 hours of operation.	
Cooling device, (if any) :	None	
Lubrication Oil Filters:		
Make :	Powertrac	
Type :	Full flow, spin-on , paper element.	
Number :	One	One
Pump:		
Type :	Gear	
Method of drive :	Through timing gears	
Pressure release setting, (kPa) :	300±10	300±10
Minimum permissible pressure, (kPa) :	98.1	98.1
3.1.8 Cooling system:		
Type :	Forced circulation of water	
Coolant as recommended :	Not available	Veedol
Details of pump :	Centrifugal, semi open impeller of 74.7 mm diameter having eight vanes and driven through crankshaft pulley by a cogged "V-belt" common to alternator	
Details of fan :	Suction type, having seven polypropylene blades of 460 mm diameter and mounted on water pump shaft.	
Means of temperature control :	Thermostat	Thermostat
Bare radiator capacity, (l) :	6.05	4.50
Capacity of expansion flask,(l) :	0.80	0.76
Total coolant capacity, (l) :	12.00	9.80
Radiator cap pressure,(kPa) :	88	88

T-1086/1611/2017	ESCORTS LIMITED , EURO 60 (BRAND NAME:POWERTRAC) TRACTOR- Commercial Variant)
-------------------------	--

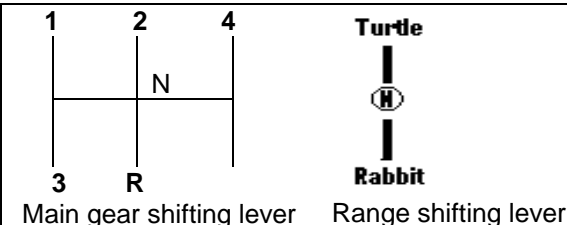
3.1.9	Starting System:	<u>Base model</u>	<u>Variant model</u>
	Type	: 12 V DC, Electrical	12 V DC, Electrical
	Aid for cold starting	: None	None
	Any other device provided for easy starting.	: None	None
3.1.10	Electrical System:		
3.1.10.1	Battery:		
	Make & Model	: Exide Express & MHD 880	AMARON & TRA550D31R
	Number	: One	One
	Type	: Lead Acid	Lead Acid
	Capacity and rating	: 12V,88 Ah at 20 hour discharge rating	
	Location	: On RHS of clutch housing in a separate metallic box.	
3.1.10.2	Starter:		
	Make	: Autolek	Panalfa
	Model	: STM-1153W	155-0704
	Type	: Pre-engaging solenoid operated	
	Capacity and rating	: 12V, 2.8 kW	12 V,2.8 kW
	Serial Number	: Not available	Not available
3.1.10.3	Generator:		
	Make	: Autolek	MINDA
	Model	: ALT4009H	EF076817
	Type	: Alternator	Alternator
	Serial number	: Not available	Not available
	Output rating	: 12V/ 35 A	12 V,35 ampere
	Method of drive	: Driven through crank shaft pulley by cogged V-belt common to water pump.	
3.1.10.4	Voltage regulator	: In built in alternator	

Description	No. & capacity of bulbs	Height of the centre of beam above ground level, (mm)		Size of beam, (mm)		Distance between centre of the beam and outside edge of tractor at standard rear track setting, (mm)	
		<u>Base model</u>	<u>Variant model</u>	<u>Base model</u>	<u>Variant model</u>	<u>Base model</u>	<u>Variant model</u>
1	2	3	4	5	6	7	8
Front Lights:							
- Head lights	2,12V, 35/35W	1035	1000	130 φ	135φ	580	510
- Parking lights	2, 12V, 5W	1410	1420	65 x 65	80 x 85	235	265
- Turn Indicators-cum-Hazard lights	2, 12V, 21W	1410	1420	70 x 65	80 x 85	170	150
- Reflectors (white)	2	1410	1420	30 x 55	45 x 80	280	200
Rear lights:							
-Tail light-cum-brake light	2, 12V, 21/5W	1370	1400	65 x 65	80 x 85	240	225
- Turn Indicators-cum-Hazard lights	2,12V, 21W	1370	1400	70 x 65	80 x 85	170	115
- Plough light (on RHS mudguard)	1, 12V, 55W	1500	1440	125 φ	120φ	400	410
- Reflectors (Red)	2	1370	1400	30 x 55	45 x 80	280	170
-Registration plate Light (RHS)	01,12V,5W	Part of rear combination assembly	1315	Part of rear combination assembly	30 φ	Part of rear combinatio assembly	230

		<u>Base model</u>	<u>Variant model</u>
3.1.11 Instrument panel details:-			
i)	Engine speed meter {analog type (0-25) x 100 rpm}	Provided	Provided
ii)	Digital cumulative run hour meter	Provided	Provided
iii)	Coolant temperature gauge (with colour zones)	Provided	Provided
iv)	Air cleaner air flow restriction indicator	Not provided	provided
v)	Fuel level gauge (with colour zones).	Provided	Provided
vi)	Lubricating oil pressure indicator	Provided	Provided
vii)	Main switch (key-turn type)	Provided	Provided
viii)	Light switch (Rotary type)	Provided	Provided
ix)	Two way switch for turn indicators	Provided	Provided
x)	Hazard light switch	Provided	Provided
xi)	Turn-cum-hazard indicator lights tell-tale	Provided	Provided
xii)	Battery charging warning indicator light	Provided	Provided
xiii)	Head lamp (Long beam) 'ON' indicator light	Provided	Provided
xiv)	Horn push button	Provided	Provided
xv)	Hand accelerator lever	Provided	Provided
xvi)	Steering control wheel	Provided	Provided
xvii)	Engine stop knob	Provided	Provided
xviii)	Rear view mirror.	Provided	Provided
xix)	Mobile charging socket	Not provided	provided

		<u>Base model</u>	<u>Variant model</u>
3.1.12 Transmission System:			
3.1.12.1 Clutch:			
Make	:	Luk, India	
Type	:	Dual, Dry, friction plate & pads diaphragm type	
No. of friction plate, (s)	:	Two	
Size (OD/ID), (mm):	:		
-Transmission	:	280.0 ϕ / 165.64 ϕ and having four pads. Each pads of 28.60 cm ² contact area.	
-PTO	:	280.3/168.7	

3.1.12.2 Method of operation:	
-Transmission	: By pressing the clutch pedal ,on LHS
-PTO	: By pressing the clutch pedal,fully

3.1.12.3 Gear box:	
Make	: Escorts (apa) Escorts (apa)
Type	: Mechanical, Constant mesh gears
Gear shifting pattern (In case of base & variant model)	
	

3.1.12.3 No. of speeds:	
- Forward	: 08 08
- Reverse	: 02 02
Location of gear shifting levers	: Gear shifting lever is located on RHS of the operator's seat & range shift lever is on LHS of the operator's seat.
Oil capacity, (l)	: 11.5 12.0
Oil changing period	: After every 1200 hours of operation.

		<u>Base model</u>	<u>Variant model</u>
3.1.12.4 Differential unit:			
Type	:	Crown wheel & pinion with differential unit accommodated inside the differential housing.	
Reduction through crown wheel and bevel pinion	:	2.818 : 1 (31/11 T)	
Oil capacity(l)	:	27.0 (common with rear final drive ,brakes & hydraulic system)	
Oil changing period	:	After every 1200 hours of operation.	
Differential lock:	:	Provided	
Type	:	Dog clutch	
Location	:	RHS of operator's seat	
Method of operation	:	By pressing a pedal provided on RHS of operator's seat.	
3.1.12.5 Rear axle & final drive:			
Make		Farmtrac(apa)	
Type	:	Planetary reduction unit, accommodated inside the rear axle housing on both sides after brake.	
Reduction through final drive	:	4.500 : 1 (Sun gear-16T,planet -20T & ring gear -56T)	
Oil capacity of final drive, (l)		27.0 (Common with differential ,brakes & hydraulic system)	
Oil changing period	:	After every 1200 hours of operation.	
3.1.13 Power lift:			
Make	:	Escort (apa)	
Type	:	Open centre, Live, ADDC	
No. and type of cylinder	:	One, single acting	
Type of linkage lock for transport	:	Hydraulic, shut off valve its fully in closed position acts as transport lock.	
3.1.13.1 Hydraulic pump:			
- Make	:	Eaton	
- Type	:	Gear	
- Location & drive	:	On LHS of engine	
No. & type of filters	:	Through timing gears	
Hydraulic oil capacity, (l)	:	27.0 (Common with differential, rear axle, final drive & brakes system).	
Oil change period	:	After every 1200 hours of operation.	
Provision for external tapping	:	Provided	Provided
Details of control levers	:	i) Position control lever (Black) ii) Draft control lever (Red) iii) Flow regulation and hydraulic lock knob (provided below operator's seat) iv) Auxiliary spool valve/external circuit (double action)	
Method of draft sensing	:	Through top link	

T-1086/1611/2017	ESCORTS LIMITED , EURO 60 (BRAND NAME:POWERTRAC) TRACTOR- Commercial Variant)
------------------	--

3.1.13.2 Three point linkage:

S. No.	Observations	As per IS: 4468- (Part-1) -1997, (Cat.I / Cat.II), (mm)	As measured (mm)		Remarks in case of Variant model	
			Base model	Variant model		
1	2	3	4	5	6	
I.	Upper hitch points:					
	a)	Dia of hitch pin hole	19.30 to 19.50 / 25.70 to 25.90	25.85	25.80	Conforms to Cat.II
	b)	Width of ball	44.0 (max.) / 51.0 (max)	50.92	51.0	Conforms to Cat.II
II.	Lower hitch points:					
	a)	Dia of hitch pin hole	22.40 to 22.65 / 28.70 to 29.00	28.92	28.89	Conforms to Cat.II
	b)	Width of ball	34.8 to 35.0 / 44.8 to 45.0	44.84	44.81	Conforms to Cat.II
III.	Lateral distance from lower hitch point to centre line of tractor.		359 / 435	364	364	Does not conform
IV.	Lateral movement of lower hitch points		100 (min) / 125 (min)	165	325	Conforms to Cat.I&II
V.	Distance from end of power take-off to centre of lower hitch point (lower links in horizontal position)		450 to 575 / 550 to 625	565	565	Conforms to Cat.I&II
VI.	Transport height		820 (min)/ 950 (min)	870	865	Conforms to Cat.I&II
VII.	Power range (without force)		560 (min)/ 650 (min)	605	615	Conforms to Cat.I
VIII.	Leveling adjustment		100 (min)/ 100 (min)	430	450	Conforms to Cat.I&II
IX.	Lower hitch point clearance		100 (min)/ 100 (min)	240	125	Conforms to Cat.I&II
X.	Lower hitch point height		200 (max) / 200 (max)	200	200	Conforms to Cat.I&II

3.1.13.3 Drawbar:				
3.1.13.3.1 Linkage Drawbar [Refer Fig.1 (b)] :				
Notation	As per IS: 12953-1990, (Cat.I) / (Cat.II), (mm)	As measured, (mm)		Remarks in case of variant model
		Base model	Variant model	
A	683 ± 1.5 / 825 ± 1.5	682.5	683	Conforms to cat-I
B	75 (min) / 75 (min)	76.3	75.6	-- do --
C	30 (min) / 30 (min)	32.5	32.1	-- do --
D∅	21.79 to 22.00 / 27.79 to 28.00	27.98	27.88	Conforms to cat-II
E	39.0 (min) / 49.0 (min)	57.9	58.1	-- do --
F∅	12.0 (min) / 12.0 (min)	12.0	12.0	-- do --
G	15.0 (min) / 15.0 (min)	15.76	15.81	-- do --
H∅	25 ± 1 / 25 ± 1	24.85	25.04	-- do --
J	80 ± 1.5 / 80 ± 1.5	79.94	80.15	-- do --
No. of holes	7 / 9	07	07	-- do --

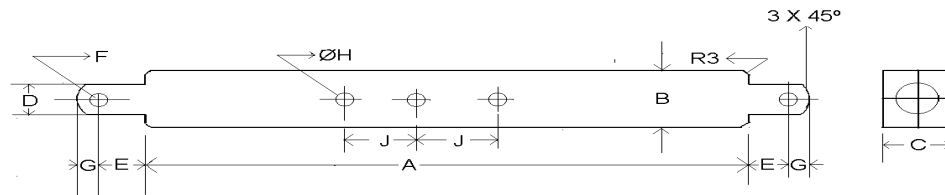


Fig. 1(b): DIMENSIONAL NOTATIONS FOR LINKAGE TYPE DRAWBAR

3.1.13.3.2	Swinging drawbar	:	Not provided	
3.1.14	Power take-off shaft:		Base model	Variant model
	Type	:	Type-I, semi Independent	Type-I, semi Independent
	Method of engaging	:	By a hand lever provided on LHS of operator's seat.	
	No. of shaft,(s)	:	One	One
	PTO speed corresponding to rated engine speed, (rpm):	:	656	656
	Distance behind rear axle, (mm)	:	340	325
	Engine to PTO speed ratio	:	3.35: 1	3.353 : 1
	Other speed	:	Yes ,as following	

Gear	Engine to PTO speed ratio		PTO speed at Rated engine speed, (rpm)	
	Base model	Variant model	Base model	Variant model
L-1/H-1	4.58:1	4.838:1	481	455
L-2/H-2	3.39:1	3.592:1	649	612
L-3/H-3	1.93:1	2.042:1	1139	1077
L-4/H4	1.42:1	1.500:1	1550	1467
LR/HR	3.99:1	4.221:1	551	521

3.1.14.1 Specifications of Power Take-Off Shaft:

Specification	As per IS: 4931-1995 (Type-I)	As observed		Remarks in case of variant model
		Base model	Variant model	
1	2	3	4	5
Nominal speed, (rpm)	540 ± 10	540 rpm of PTO shaft corresponds to 1809 rpm of engine	540 rpm of PTO shaft corresponds to 1811 rpm of engine	Conforms
No. of splines	6	6	6	-do-
Direction of rotation	Clockwise	Clockwise	Clockwise	-do-
Location	The position of the centre of the end of PTO shaft shall be within 50mm to right or left of the centre line of the tractor.	In the centre line of the tractor	In the centre line of the tractor	-do-
Dimensions, (mm) [Refer Fig.2]:				
DØ	34.79 ± 0.06	34.79	34.76	Conforms
dØ	28.91 ± 0.05	28.86	28.87	-do-
BØ	29.4 ± 0.1	29.50	29.47	-do-
AØ (optional)	8.3 ± 0.1	8.35	8.36	-do-

1	2	3	4	5
W	8.69 – 0.09 - 0.16	8.60	8.64	-do-
a	7	7	7	-do-
b (optional)	25 ± 0.5	25.5	25.5	-do-
c	38	38.0	38.0	-do-
X	30°	30°	30°	-do-
B	76 (min)	82.4	85.7	-do-
h	450 to 675	550	545	-do-

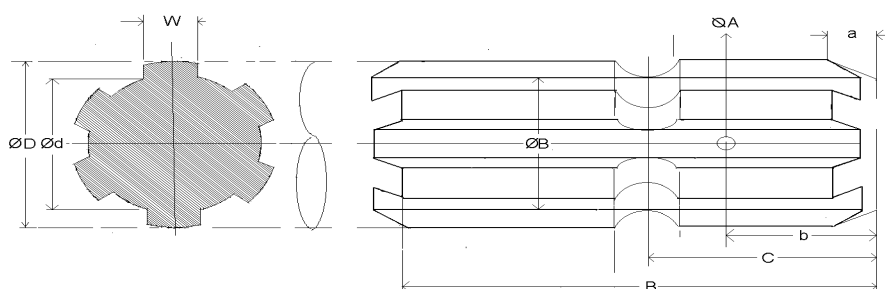


Fig.2 (a): DIMENSIONAL NOTATIONS FOR TYPE-I POWER TAKE-OFF SHAFT

		<u>Base model</u>	<u>Variant model</u>
1.14.2	Master Shield of Power Take-Off Shaft:	Not provided	Not provided
3.1.15	Towing hitch:		
3.1.15.1	Front		
	Type :	Clevis	Clevis
	Location :	At front of engine support.	
	Height above ground level, (mm) :	700	675
	Type of adjustment :	Fixed	Fixed
	Dia of pin hole, (mm) :	32.4	35.16
	Width of clevis, (mm) :	54.4	59.48
3.1.15.2	Rear		
	Type :	Clevis	Clevis
	Location :	At rear of transmission housing	
	Height above ground level, (mm):		
	- Maximum :	740	730
	- Minimum :	570	560
	- No. of positions :	Four	Four
	- Type of adjustment :	By changing the position of hitch on its mounting bracket.	
	Distance of hitch point, (mm):		
	-From rear wheel centre :	435	430
	-From power take-off shaft end :	95	95
	Dia of pin hole, (mm) :	42.5	43.
	Width of clevis, (mm) :	87.6	88

		<u>Base model</u>	<u>Variant model</u>
3.1.16 Steering:			
Make	:	Danfoss (apa)	
Type	:	Hydrostatic assisted	
Location	:	Above clutch housing	
Method of operation	:	Manual, by steering control wheel	
Diameter of steering control wheel, (mm)	:	460	380
Make of distributor	:	Danfoss (apa)	Danfoss (apa)
Make & Type of pump	:	EATON	EATON (apa)
Location	:	On LHS of the engine	
Method of drive	:	Through FIP camshaft	
Make ,Number, Type & Location of hydraulic cylinder	:	RANE, 01, double acting & near below side of front axle.	
Steering oil capacity, (l)	:	3.0	3.0
Lubricant change period	:	After every 1000 hours of operation.	
3.1.17 Brakes:			
3.1.17.1 Service Brake:			
Make	:	Brakes India limited (apa)	
Type	:	Mechanical, oil immersed multi disc brakes	
Location	:	On rear axle shaft	
No. of disc(s)	:	Three (on each wheel side)	
Area of liners, (cm ²)	:	890.54 (on each wheel side)	
Material of liners	:	Non Asbestos (apa)	
Method of operation	:	Independent or combined pedal operation by right foot.	
Capacity,(l)	:	27.0 (Common with differential ,rear axle ,final drive & hydraulic system)	
Oil change period	:	After every 1200 hours of operation.	
3.1.17.2 Parking Brake:			
Type	:	Pawl & ratchet arrangement for locking service brakes.	
Location & Method of operation	:	Services brake act as parking brake when locked in position by a hand lever provided on right hand side of operator seat.	
3.1.18 Wheel Equipment:-			
3.1.18.1 Steering Wheel(s):			
Make	:	Good Year	Good Year
Number(s)	:	Two	Two
Type of tyre	:	Pneumatic, ribbed	Pneumatic, ribbed
Size	:	7.50-16	7.50-16
Ply rating	:	8	8
Maximum permissible loading capacity of each tyre at 196 kPa pressure, (kgf)	:	660	660
Recommended inflation pressure, kPa :			
- for field work	:	230	230
- for transport	:	230	230
Track width, (mm)	:	1330 (Std) & 1430,1450 & 1550.	1360 (Std) & 1460, 1480 & 1580.
Method of changing track width	:	By extending the telescopic front axle & reversing the wheel discs.	
Make & size of rims	:	WIL & 5.50 F x 16	SSWL & 5.50 F x 16

3.1.18.2	Drive wheel (s) :	Base model	Variant model
	Make	Good Year	Good Year
	Number	Two	Two
	Type of tyre	Pneumatic, traction	Pneumatic, traction
	Size	16.9 - 28	16.9-28
	Ply rating	12	12
	Maximum permissible loading capacity of each tyre at 108 kPa pressure, (kgf)	1850	1850
	Recommended inflation pressure, (kPa):		
	- For field work	: 110	110
	- For transport	: 130	130
	Track width, (mm)	: 1440 (std), 1560, 1640, 1740, 1840, & 1960	1455 (std), 1575, 1655, 1755, 1855 & 1975.
	Make & size of wheel rim	: Wheels India ltd & W 15 x 28	SSWL & W 15 x 28
3.1.18.3	Wheel base, (mm)	: 2220	2245
	Method of changing wheel base, if any, and range	: None	None
3.1.19	Operator's seat:		
	Make	: SIETZ	SIETZ
	Type	: Cushioned with back rest	
	Type of Suspension	: Two helical coil springs	
	Type of Damping	: Hydraulic shock absorber	
	Range of adjustment, (mm):		
	Vertical	: ± 35	(Three fixed height at 30 mm spacing
	Lateral	: Nil	Nil
	Longitudinal	: ± 80	±55
3.1.20	Provision for safety and comfort of operator:		
3.1.20.1	Operator's Seat:		
	Meets the minimum requirements of IS: 12343-1998, (Re-affirmed in March, 2009) except the following:		
	<u>Base model</u>	<u>Variant model</u>	
	i) Length of seat	i) Width of seat	
	ii) Width of seat	ii) Distance from SIP to the centre of differential lock pedal	
	iii) Longitudinal distance of SIP from steering control wheel		
3.1.20.2	Conformity with IS: 6283 (Part 1 & 2)-1998 (Re-affirmed in March, 2009) :		
	Controls and displays are identifiable with symbols meets the requirements as per IS : 6283 (Part 1&2) – 1998		
	<u>Base model</u>	<u>Variant model</u>	
	i) Meets the minimum requirements	i) Meets the minimum requirements	
3.1.20.3	Conformity with IS : 8133-1983 (Re-affirmed in March, 2009) :		
	Location and movement of various controls meets the requirement of IS : 8133-1983, except the following:		
	<u>Base model</u>	<u>Variant model</u>	
	i) The fuel shut-off lever does not remain in stop position	i) The fuel shut-off lever does not remain in stop position	

3.1.20.4 Conformity with IS:12239 (Part-1)-1996 (Re-affirmed in March,2007) :
Meets the requirements of IS: 12239 (Part-1) – 1996, **except the following:**

<u>Base model</u>	<u>Variant model</u>
i) The spark arrester has not been provided in the exhaust system.	i) The spark arrester has not been provided in the exhaust system.

3.1.20.5 Conformity with IS:12239 (Part-2)-1999 (Re-affirmed in March,2009) :
Meets the requirements of IS:12239 (Part-2)-1999, **except the following:**

<u>Base model</u>	<u>Variant model</u>
i) The working clearance between the position control lever & mudguard has not been provided as per the requirement.	i) The working clearance between the position control lever & draft control lever is 30 mm & has not been provided as per the requirement.

3.1.20.6 Conformity with IS: 14683 – 1999 (Re-affirmed in March, 2009) :
Lightings provided on the tractor meets the requirements and conform to IS: 14683-1999.

3.1.21 Mass of tractor, (kg):		Unballasted	Unballasted
- Front	:	865	960
- Rear	:	1480	1480
- Total	:	2345	2440

3.1.22 Over all dimensions:			
- Length	:	3510	3770
- Width	:	1890	1915
- Height (with exhaust pipe)	:	2210	2275
Minimum ground clearance, (mm)	:	360 (below transmission housing)	423 (below engine sump)

3.1.23 Labelling of tractor:
The labelling plate riveted on LHS of the front axle support provides the following information:

Name of Manufacturer	:	M/s.ESCORTS LIMITED (AGRI MACHINERY GROUP)
Make	:	ESCORTS LIMITED
Model	:	EURO 60
Brand name	:	POWERTRAC
Year of manufacture	:	EE (i.e. August,2016)
Engine Serial Number	:	E3346817
Chassis Serial Number	:	T053310805EE
Maximum PTO Power, kW	:	38.1
Specific fuel consumption, gm/kWh	:	258

3.1.24 Number of external lubricating points:			
- Oiling	:	Nil	Nil
- Grease cups	:	02	02
- Grease nipples	:	12	12

3.1.25 Colour of tractor:			
Chassis & engine	:	Black	Black
Sheet metal:	:	Blue	Blue
Mudguard & Rim	:	Off white	Off white

T-1086/1611/2017	ESCORTS LIMITED , EURO 60 (BRAND NAME:POWERTRAC) TRACTOR- Commercial Variant)
------------------	--

3.2 NOMINAL SPEED TEST

Movement	Gear No.	No. of engine revolutions for one revolution of driving wheel		Nominal speed at rated engine speed (kmph) 16.9-28 tyre size with 670 mm radius index		Variation in nominal speed (%) in case of variant model
		Base model	Variant model	Base model	Variant model	
Forward	L1	179.83	191.70	3.08	2.90	-5.8
	L2	132.42	140.50	4.18	3.95	-5.5
	L3	75.82	79.70	7.30	6.97	-4.5
	L4	55.78	58.30	9.93	9.53	-4.0
	H1	50.86	52.50	10.95	10.57	-3.5
	H2	37.94	39.10	14.65	14.20	-3.1
	H3	21.84	22.20	25.34	25.03	-1.2
	H4	16.27	16.30	34.01	34.05	0.1
Reverse	RL	161.21	165.10	3.45	3.36	-2.6
	RH	44.22	45.90	12.43	12.11	-2.6

3.3 PTO PERFORMANCE TEST

S. No.	Particulars	Base model	Variant model
1	Date(s) of test	26.08.2014 & 27.08.2014	28.03.2017 & 29.03.2017
2	Tractor run at this Institute prior to start of PTO test, (h)	5.4	6.4
3	Dynamometer test bench used	Fuchino ESF-1000S Eddy current.	SAJ-AG 400 Eddy current.

Maximum power two hours test under natural ambient condition test was conducted. The results of Power take-off performance test under natural ambient & high ambient of Base & Variant Model are tabulated in **Table-1**.

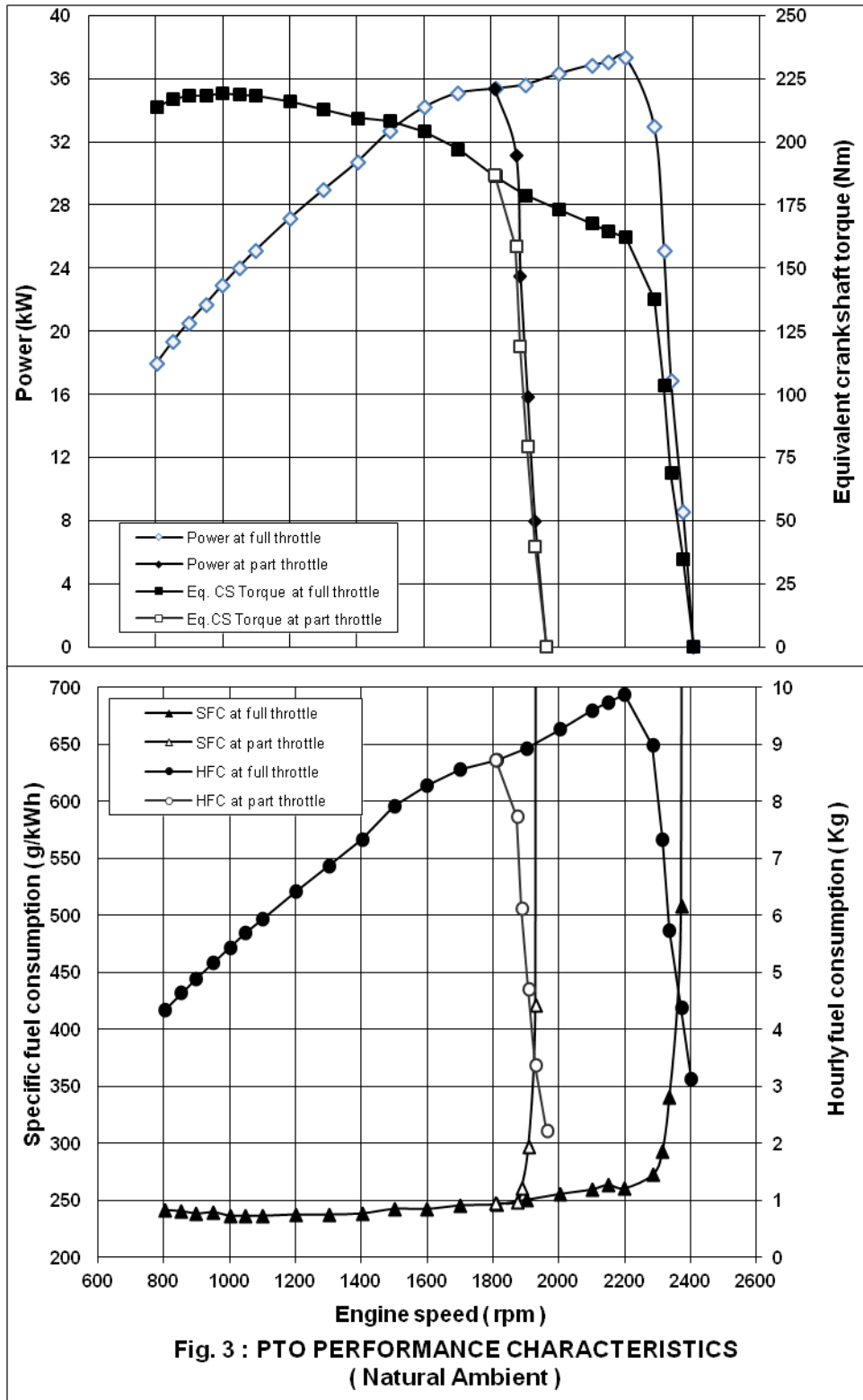
Table-1

Model	Power, (kW)	Speed, (rpm)		Fuel Consumption			Specific energy, (kWh/l)
		PTO	Engine	(l/h)	(kg/h)	(kg/kWh)	
1	2	3	4	5	6	7	8
a) Maximum power – 2 hours test (under natural ambient condition):							
Base model	33.8	656	2198	10.55	8.82	0.261	3.20
	32.3	656	2198	10.20	8.53	0.264	3.17*
Variant model	37.4	656	2199	11.81	9.87	0.264	3.17
	35.0	656	2199	11.30	9.44	0.270	3.10*
b) Power at rated engine speed (2200 rpm):							
Base model	33.8	656	2198	10.55	8.82	0.261	3.20
	32.3	656	2198	10.20	8.53	0.264	3.17*
Variant model	37.4	656	2199	11.81	9.87	0.260	3.16
	35.0	656	2199	11.30	9.44	0.270	3.10*
c) Power at standard power take-off speed (540 ± 10 rpm):							
Base model	31.7	540	1809	9.39	7.85	0.247	3.38
	30.0	539	1806	9.06	7.57	0.252	3.31*
Variant model	35.4	539	1809	10.44	8.73	0.247	3.39
	33.5	540	1811	10.02	8.37	0.250	3.35*

T-1086/1611/2017	ESCORTS LIMITED , EURO 60						
	(BRAND NAME:POWERTRAC) TRACTOR- Commercial Variant)						

1	2	3	4	5	6	7	8
d) Varying loads at rated engine speed:							
i) Torque corresponding to maximum power available at rated engine speed:							
Base model	33.8	656	2198	10.55	8.82	0.261	3.20
Variant model	37.5	656	2199	11.81	9.94	0.260	3.16
ii) 85% of the torque obtained in (i) :							
Base model	29.7	678	2271	9.40	7.86	0.265	3.16
Variant model	33.0	681	2285	10.74	8.98	0.272	3.07
iii) 75% of the torque obtained in (ii):							
Base model	22.4	682	2285	7.51	6.28	0.280	2.99
Variant model	25.1	690	2314	8.76	7.32	0.292	2.86
iv) 50% of the torque obtained in (ii) :							
Base model	15.1	688	2305	5.87	4.91	0.326	2.57
Variant model	16.8	696	2335	5.73	6.85	0.340	2.46
v) 25% of the torque obtained in (ii):							
Base model	7.6	695	2328	4.44	3.71	0.486	1.72
Variant model	8.6	707	2371	5.22	4.37	0.508	1.65
vi) Unloaded:							
Base model	1.6	701	2348	3.23	2.70	1.677	0.50
Variant model	0.0	716	2402	3.73	3.12	0	0
f) Varying loads at standard PTO speed (540 ± 10 rpm)							
i) Torque corresponding to maximum power available at standard PTO speed :							
Base model	31.7	540	1809	9.39	7.85	0.247	3.38
Variant model	35.4	539	1809	10.44	8.73	0.247	3.39
ii) 85% of the torque obtained in (i) :							
Base model	28.9	579	1940	8.50	7.11	0.246	3.40
Variant model	31.4	559	1873	9.24	7.73	0.248	3.37
iii) 75% of the torque obtained in (ii):							
Base model	21.9	583	1953	6.71	5.61	0.257	3.26
Variant model	23.5	562	1886	6.11	7.30	0.260	3.22
iv) 50% of the torque obtained in (ii) :							
Base model	14.7	589	1973	5.12	4.28	0.290	2.88
Variant model	15.9	569	1907	5.62	4.70	0.296	2.82
v) 25% of the torque obtained in (ii):							
Base model	7.4	597	2000	3.68	3.08	0.414	2.02
Variant model	8.0	575	1929	4.04	3.37	0.421	1.99
vi) Unloaded:							
Base model	1.3	603	2020	2.50	2.09	1.595	0.52
Variant model	0.0	585	1963	2.65	2.21	0	0

* Under high ambient conditions



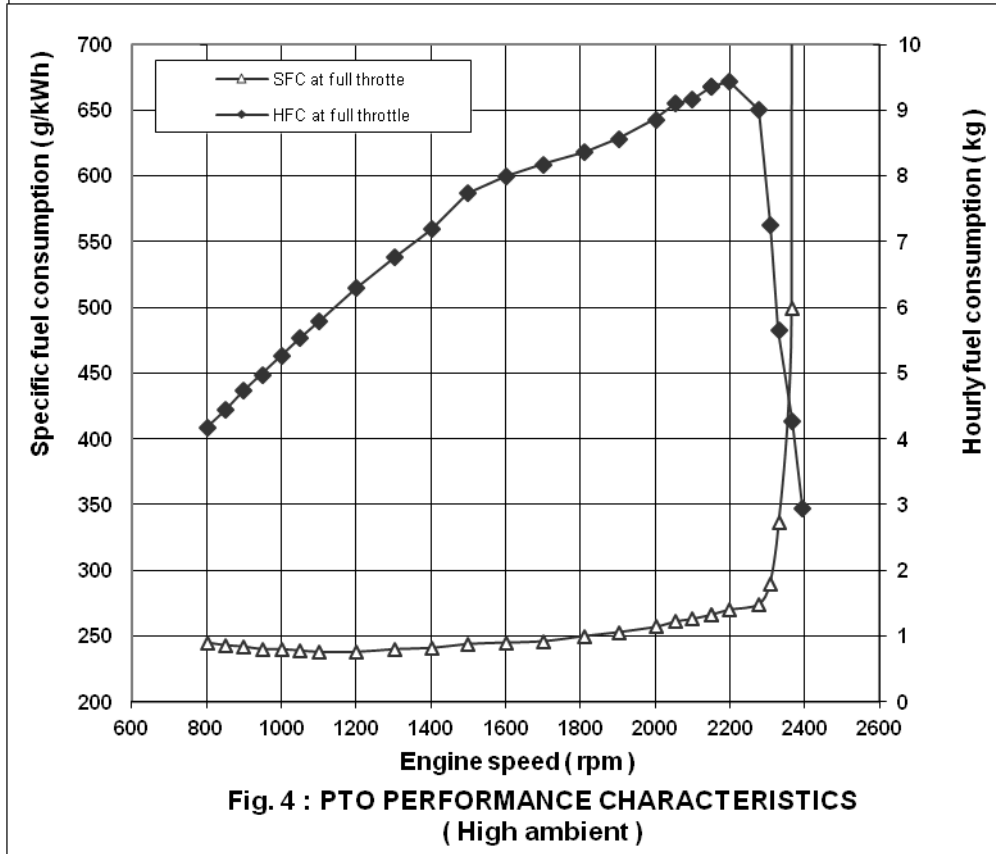
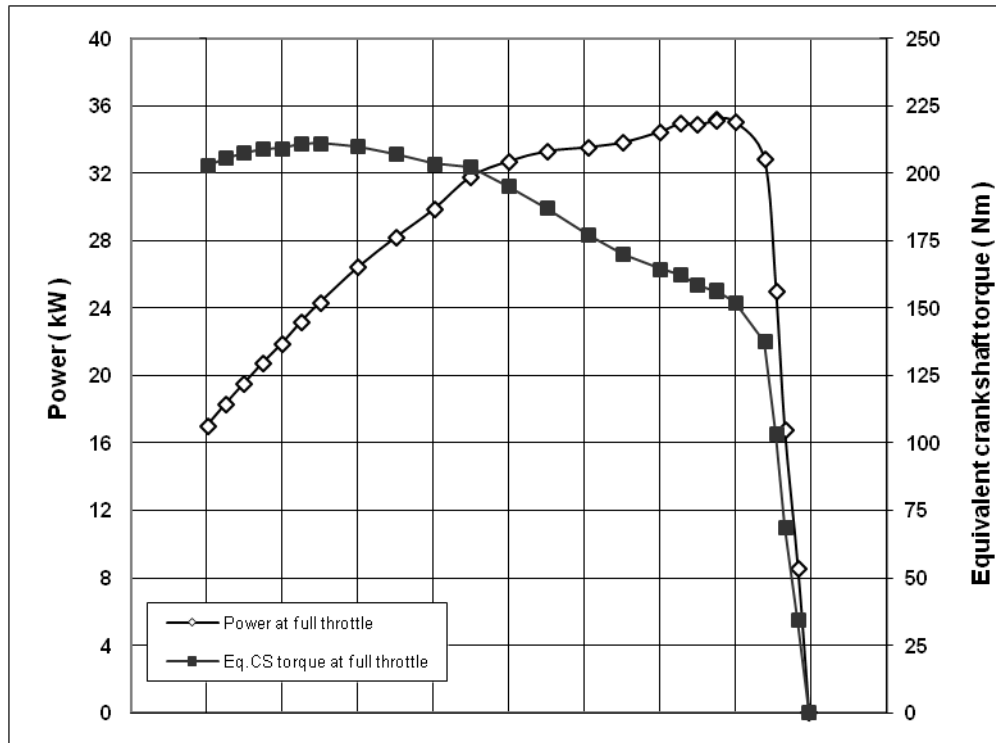
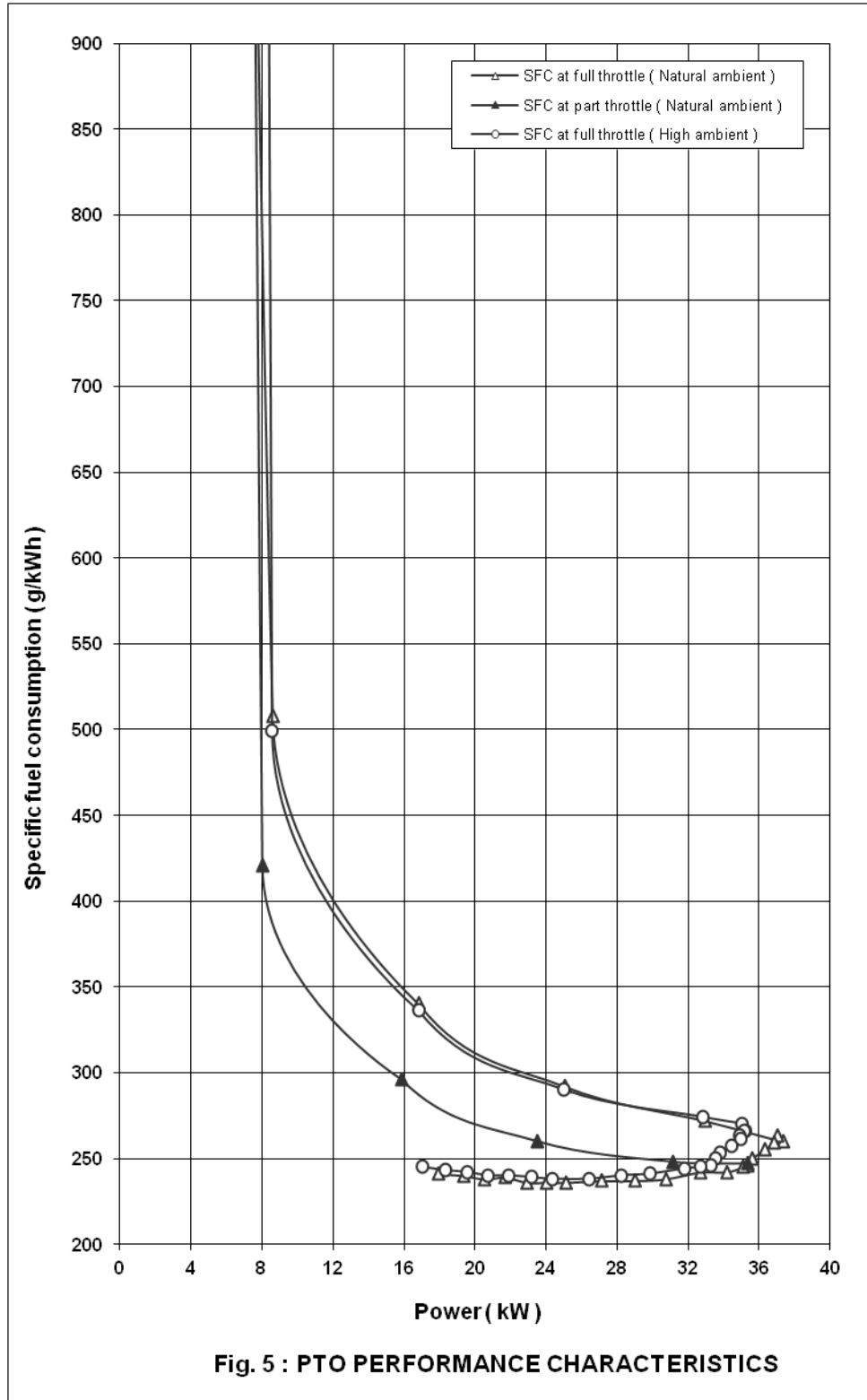


Fig. 4 : PTO PERFORMANCE CHARACTERISTICS
(High ambient)



T-1086/1611/2017	ESCORTS LIMITED , EURO 60 (BRAND NAME:POWERTRAC) TRACTOR- Commercial Variant)
------------------	--

Sl. No.	Parameters	Base model		Variant model	
		Natural Ambient	High Ambient	Natural Ambient	High Ambient
1	2	3	4	5	6
i)	No load maximum speed, (rpm)	2348	2342	2402	2394
ii)	Equivalent crankshaft torque at maximum power (Nm)	146.7	142.1	162.2	152.1
iii)	Maximum equivalent crank shaft torque (Nm)	188.8	176.6	219.2	211.2
iv)	Engine speed at maximum equivalent crankshaft torque, (rpm)	1296	1296	1000	1100
v)	Backup torque (%)	28.7	--	35.1	38.9
vi)	Smoke level , maximum light absorption coefficient (per meter)	0.47	--	0.37	--
v)	Range of atmospheric condition :				
	- Temperature, (°C)	28 to 32	42 to 45	26. to 29	42 to 45
	- Pressure, (kPa)	97.6 to 98.5	98.5 to 99.3	98.4 to 98.7	98.2 to 98.6
	- Relative humidity, (%)	31 to 71	22 to 69	58 to 61	15 to 22
vi)	Maximum Temperature, (°C):				
	- Engine oil	100	109	107	111
	- Coolant	98	98	84	97
	- Fuel	58	70	47	57
	- Air intake	40	53	34	48
	- Exhaust gas	537	526	564	569
vii)	Pressure at maximum power:				
	- Intake air, (kPa)	3.0 to 3.3	3.3 to 3.7	3.3 to 3.4	4.0 to 4.1
	- Exhaust gas, (kPa)	9.3 to 9.9	8.8 to 10.4	5.2 to 5.33	4.9 to 5.1
viii)	Consumptions:				
	Lub. Oil (g/kWh)	--	0.70	--	0.83
	-Coolant (% of total coolant capacity)	--	0.50	--	Nil

4. ADJUSTMENTS, DEFECTS, BREAKDOWNS AND REPAIRS

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

5. COMPARISON BETWEEN BASE MODEL AND VARIANT MODEL (Based on Table 3 & 4 of Indian Standard 12207: 2014)

Sl. No.	Clause No	Features	Observation on base model T-967/1486/March,2015	Observation on variant model	Remarks
1	2	3	4	5	6
1.	i)	Clutch	Dual , dry friction plate & pads diaphragm type	Dual , dry friction plate & pads diaphragm type	No change
2.	ii)	Air cleaner	Same configuration in base & variant models (refer para 3.1.5)		No change

T-1086/1611/2017	ESCORTS LIMITED , EURO 60 (BRAND NAME:POWERTRAC) TRACTOR- Commercial Variant)
------------------	--

1	2	3	4	5	6		
3.	iii)	Exhaust system	Updraft , (Cylindrical)	Updraft , (Cylindrical)	No Change		
		Provision of EGR (exhaust gas recirculation)system	Not provided	Provided	Changed		
4.	iv)	Gear Box:					
		- Type	Mechanical, Constant mesh gears	Mechanical, Constant mesh gears	No Change		
5.	v)	Reduction ratio of transmission:					
		Movement	Gear	Base model	Variant model	Variation (%)	Remark
		Forward	L1	179.83	191.70	6.6	Changed
			L2	132.42	140.50	6.1	-do-
			L3	75.82	79.70	5.1	-do-
			L4	55.78	58.30	4.5	-do-
			H1	50.86	52.50	3.2	-do-
			H2	37.94	39.10	3.1	-do-
			H3	21.84	22.20	1.6	-do-
			H4	16.27	16.30	0.2	-do-
Reverse	LR	161.21	165.10	2.4	-do-		
	HR	44.22	45.90	3.8	-do-		
6.	vi)	Range of speeds (kmph):					
		- Forward	3.08 to 34.01	2.90 to 34.05 (Variation of -5.8 to 0.1 %)	Changed		
		- Reverse	3.45 to 12.43	3.36 to 12.11 (Variation of -2.6 %)	Changed		
		Additional no. of speed	None	None	No change		
7.	vii)	Fitment of accessories:					
		- Expansion tank	Provided	Provided	No change		
		- Additional hydraulic pump	None	None	--do--		
		- Air compressor	None	None	--do--		
		- Radiator	Provided	Provided	--do--		
		- Bare radiator capacity, (l)	6.05	4.5	Changed		
		Total coolant capacity,(l)	12.0	9.8	Changed		
		- Oil cooler	None	None	No Change		
8.	viii)	Brake system:					
		Type	Oil immersed discs brake	Oil immersed discs brake	No Change		
9.	ix)	Type of three point linkage:					
		Type	Cat.I/Cat.II	Cat.I/Cat.II	No change		
		Rear/front mounted	Rear mounted	Rear mounted	No change		
10.	x)	PTO shafts:					
		Location	Centrally located	Centrally located	No change		
		Type	Type-I, semi independent	Type-I, semi independent	No change		
		No of splines	6	6	No change		
		Speed corresponding to rated engine speed (rpm)	656 - Clockwise rotation	656- Clockwise rotation	No change		
		- Anticlockwise rotation speed (rpm)	Not provided	Not provided	No change		
		Other speed	Multi speeds provided	Provided	No Change		

T-1086/1611/2017	ESCORTS LIMITED , EURO 60 (BRAND NAME:POWERTRAC) TRACTOR- Commercial Variant)
------------------	--

1	2	3	4	5	6
11.	xi)	Type of drive:			
		2WD or 4WD	2WD	2WD	No change
12.	xii)	Hydraulic System:			
		Location & type of Hydraulic pump drive	Same configuration in base & variant models (refer para 3.1.13).		No change
13.	xiii)	Positioning of Hydraulic Sensing Mechanism			
		Lower link, top link, etc.	Through top link	Through top link	No change
14.	xiv)	Final Reduction unit:	Same configuration in base & variant models (refer para 3.1.12.5)		No change
15.	xv)	Type of fuel Injection pump:			
		Inline/Rotary/Common rail	Inline plunger	Inline plunger	-do-
16.	Change related to statutory/ regulatory requirements (As per Table 4):				
	a)	Engine operating principle (spark/ compression ignition, two/four stroke)	Compression Ignition, 4 stroke	Compression Ignition, 4 stroke	No change
	b)	Number & arrangement of cylinders	Four, vertical inline	Four vertical inline	No change
	c)	Maximum declared PTO power, (kW)	32.8	38.1	Changed
	d)	Bore /stroke ,(mm)	95/110	98/122	Changed
	e)	Engine displacement (cc)	3120	3682	Changed
	f)	Rated engine speed (rpm)	2200	2200	No change
	g)	Naturally aspirated/turbo charged	Naturally aspirated	Naturally aspirated	-do-
17.	Change related to ergonomics, safety comfort, statutory / regulatory requirements:				
	a)	IS: 10273	Conformed	Conforms	No change
	b)	IS: 4931	Conformed	Conforms	-do-
	c)	IS: 4468	Did not conform	Does not conform	-do-
	d)	IS: 12953	Conformed	Conforms	-do-
	e)	IS:12343	Did not conform	Does not conform	-do-
	f)	IS:12239 (Pt-I)	Did not conform	Does not conform	-do-
	g)	IS:12239 (Pt-II)	Did not conform	Does not conform	-do-
	h)	IS:8133	Did not conform	Does not conform	-do-
	i)	IS: 6283	Conformed	Conforms	-do-
j)	IS:14683	Conformed	Conforms	-do-	

T-1086/1611/2017	ESCORTS LIMITED , EURO 60 (BRAND NAME:POWERTRAC) TRACTOR- Commercial Variant)
------------------	--

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 Variant model meets the require- ments (Yes/ No.)
				Base model	Variant model	Base model	Variant model	
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	32.8 (D)	38.1 (D)	33.8	37.4	Yes
b)	Power at rated engine speed, (kW)	Non Evaluative	-do-	32.8 (D)	38.1 (D)	33.8	37.4	Yes
c)	Specific fuel consumption corresponding to maximum power, (g/kWh)	Non Evaluative	± 5%	256 (D)	258 (D)	261	264	Yes
d)	Maximum equivalent crankshaft torque, (Nm)	Non Evaluative	± 8%	181.3 (D)	229 (D)	188.8	219.2	Yes
e)	Back-up torque, percent	Non Evaluative	10% , min.	10 %, min. (R)	10% min. (R)	28.7	35.1	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.	130 (D)	130 (D)	109	111	Yes

T-1086/1611/2017	ESCORTS LIMITED , EURO 60 (BRAND NAME:POWERTRAC) TRACTOR- Commercial Variant)
------------------	--

1	2	3	4	5 a	5 b	6 a	6 b	7
	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 (D)	98	97	Yes
	g) Engine oil consumption , (g/kWh)	Evaluative	Not exceeding 1% of SFC at max. power under High ambient conditions	2.56 (D) 2.36 (R)	2.56 (D) 2.70 (R)	0.70	0.58	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)	0.47	0.37	Yes
6.1.2	Safety features :							
a)	Guards against moving and hot parts	Evaluative	Belt drives, pulley, silencer, hydraulic pipes (As per IS 12239 (part 2)		At present no requirements		Provided	--
b)	Lighting arrangement (Tractor having more than 1150 mm rear track width)	Evaluative	As per CMVR		Provided		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)		Did not meets the requirement		Does not meets the requirement	No
d)	Technical requirements for PTO shaft	Non-Evaluative	Should meet the requirements of IS 4931 (as amended from time to time)		Meets the requirement		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)		Did not meets the requirement		Does not meets 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		Meets the requirement	Yes

T-1086/1611/2017	ESCORTS LIMITED , EURO 60 (BRAND NAME:POWERTRAC) TRACTOR- Commercial Variant)
------------------	--

1	2	3	4	5 a	5 b	6 a	6 b	7
6.1.3	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		--	EURO 60 (Brand name : Powertrac)		Yes
	3)	Year of manufacture	Evaluative		--	EE (i.e. August , 2016)		Yes
	4)	Engine number	Evaluative		--	E 3346817		Yes
	5)	Chassis number	Evaluative		--	T053310805EE		Yes
	6)	Declaration of PTO power, kW	Evaluative		--	38.1		Yes
6.1.4	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

6.2 Salient Observations:

6.2.1 Laboratory tests:

6.2.1.1 PTO Performance:

- i) The maximum power in case of base & variant model was observed as 33.8 & 37.4 kW against the declaration of 32.8 & 38.1 kW respectively. Which is within the tolerance limit specified in IS: 12207-2014.
- ii) The specific fuel consumption in case of base and variant models corresponding to maximum power was observed as **261 & 264 g/kWh** against the declaration of **256 & 258 g/kWh** respectively, which is within the tolerance limit.
- iii) The percentage of backup torque was recorded as **28.7 & 35.1%** in case of Base & variant model respectively.

6.2.1.2 Location and operation of operator's control:

- i) The spark arrester has not been provided in the exhaust system.
- ii) The working clearance between the position control lever & draft control lever is 30 mm & has not been provided as per the requirement.

6.2.1.3 Three point linkage:

Lateral distance from lower hitch point to centre line of tractor does not meet the requirement as per IS: 4468 (part –I) 1997(mm).

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:

- i) Provision for spark arresting device in exhaust system.
- ii) The fuel shut-off lever does not remain in stop position
- iii) Width of seat
- iv) Distance from SIP to the centre of differential lock pedal
- v) Provision for master shield for PTO shaft

- 6.5 Applicant has submitted the Literature during test with machine:
- Operator's Manual for Escorts Ltd. EURO 60 (Brand name: Powertrac) tractor models.
 - Spare Parts Catalogue for Escorts Ltd. EURO 60 (Brand name: Powertrac) tractor model.
 - Repair manual for Escorts Ltd. EURO 60 (Brand name: Powertrac) tractor model.

The following point should be incorporated in the operator's manual.

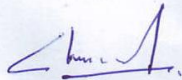
Information related to PTO & Drawbar performance of the tractor such as, maximum PTO power, rated power, power at standard PTO speed, maximum torque, backup torque, specific fuel consumption, maximum drawbar power & pull etc should be included in the technical specification of the tractor for the guidance of the user's.

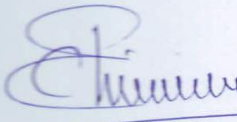
- 6.5.2 It is therefore, recommended that following literature may be brought out as per IS: 8132-1999 (Reaffirmed in March, 2009) for the guidance of users and service personnel in national as well as regional languages for this model of tractor.

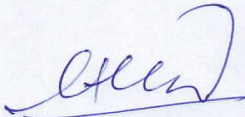
7. CITIZEN CHARTER

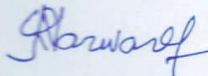
Duration of Test	Time frame for Testing & Evaluation as per Citizen Charter	Whether the Test Report is released within the time frame given in Citizen Charter	Remarks
March to April , 2017	10 Months	Yes	None

TESTING AUTHORITY:


C.S.RAGHUWANSHI
AGRICULTURAL
ENGINEER


C.V.CHIMOTE
TEST ENGINEER


Y.K. RAO
SENIOR AGRICULTURAL
ENGINEER


J.J.R.NARWARE
DIRECTOR

8. APPLICANT'S COMMENTS

Para No.	Our Reference	Applicant's comments
8.1	6.2.1.3	These being studied & corrective action would be taken in near future.
8.2	6.2.1.21(I 7 ii) ,6.4 & 6.5.2	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 wherever necessary.

T-1086/1611/2017	ESCORTS LIMITED , EURO 60 (BRAND NAME:POWERTRAC) TRACTOR- Commercial Variant)
------------------	--

ANNEXURE-I

TRACTOR RUN HOURS DURING TEST

A.	LABORATORY AND TRACK TESTS	HOURS
1.	Running –in	--
2.	PTO Performance Test	11.7
3.	Theoretical speed test	0.50
B.	Miscellaneous test and other run hours, including idle run transportation, trial and preparation for test.	0.50
	Total	12.7