



**ESCORTS LIMITED 60 F2
(Brand Name - FARMTRAC) 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)

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T- 1083/1608/2017	ESCORTS LIMITED, 60 F2 TRACTOR (Brand Name: FARMTRAC) - Commercial (Variant)
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Manufacturer : M/s. Escorts Limited,
Plot No 2 & 3, Sector-13,
Faridabad – 121 007 (Haryana)

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

Month: April	Test Report No. T- 1083/1608/2017	Year : 2017
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Type of Test

: **COMMERCIAL (Variant)**

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

Period of Test : March, 2017 to April, 2017

Test Report No. : **T- 1083/1608/2017**

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 and, should be read in conjunction with the Test Report of base model i.e. "**Farmtrac 6050 Tractor**" bearing **No.T- 988/1512/2015 November, 2015**.
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SELECTED CONVERSIONS & ABBREVIATIONS

SELECTED CONVERSIONS			ABBREVIATIONS	
Sl. No	Units	Conversion Factor		
1	Force:		apa	As per applicant
	1 kgf	9.80665 N	TDC	Top Dead Centre
		2.20462 lbf	IS	Indian Standard
2	Power:		LHS/RHS	Left Hand Side/ Right Hand Side
	1 hp	1.01387metric hp (Ps)	Hg.	Mercury
		745.7 W	Temp.	Temperature
	1 Ps	735.5 W	N.R.	Not recorded
	1 kW	1.35962 Ps	rpm	Revolutions per minute
3	Pressure:		O.D/I.D	Outer diameter/ Inner diameter
	1 psi	6.895 kPa	N.A.	Not available/ Not applicable
	1 kgf/cm ²	98.067 kPa = 735.56 mm of Hg	PTO	Power take-off
	1 bar	100 kPa = 10 N/cm ²	R.H	Relative Humidity
	1 mm of Hg	1.3332 m-bar		

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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)

Selected for test by : Applicant
Place of running-in & test carried out : At applicant's works

Duration of said running-in (h):
- Engine : 20
- Transmission : 30

Method of Selection : The tractor was directly submitted by manufacturer.

1. SCOPE OF TEST

The “Farmtrac 6050 ” tractor had undergone “Initial Commercial Test” at this Institute and a test report **No. T- 988/1512/2015**, was released in November, 2015. Now the applicant has submitted an application vide letter No. ERC: Budni: 60 F2 B-80/16 dated 02.08.2016 for testing of “Escorts Ltd.60 F2 (Brand name: FARMTRAC)” tractor as a Variant of “Farmtrac 6050” tractor.

The applicant having enclosed a list of following differences in the technical specifications between “Farmtrac 6050” and “Escorts Ltd.60 F2 (Brand name: FARMTRAC)” and requested to test the “Escorts Ltd.60 F2 (Brand name: FARMTRAC)” as a variant of “Farmtrac 6050” tractor.

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

S. No.	Parameters	Base Model (Test Report No. T-988/1512/2015)	Variant Model
1	2	3	4
1.	Model of tractor	FARMTRAC 6050	Escorts Ltd. 60 F2
2.	Brand name	FARMTRAC	FARMTRAC
3.	Type of tractor	Four wheeled, rear wheel driven, Standard Agricultural Tractor.	Four wheeled, rear wheel driven, Standard Agricultural Tractor.
4.	Model Group combination of fuel feed pump	FP/KSG22AD10 / F002 AF0 040	FP/KSG22AD105 / F002 A50 040
5.	Nozzle number of fuel injector	DSL A 150 P 5589	DSL A 150 P 5584
6.	Exhaust System (Position of silencer outlet w.r.t SIP, mm)		
	-Vertical	870	920
	-Longitudinal	1625	1540
	-Lateral	400 (on LHS side)	155 (on LHS side)
	PTO shaft:		
	Speed corresponding to rated engine speed, (rpm)	552 - Clockwise rotation	552 - Clockwise rotation
	Other speed corresponding to rated engine speed, (rpm)	Ground PTO speed provided, 427, 576, 1044, 1377 & 487	195, 263, 463, 630 & 1295
1	2	3	4

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7.	Range of nominal speed, (kmph):		
	- Forward	2.64 to 30.6	2.69 to 30.89 (with variation of -0.21 to 1.89 %)
	- Reverse	3.04 to 10.86	4.04 to 14.52 (with variation of 32.89 to 33.70 %)
	Additional no. of speed	None	None
8.	Location of gear shifting lever:	Side shift	Centre shift
9.	Rear final drive unit:		
	Reduction through crown wheel and bevel pinion	2.818 : 1 (31/11T)	5.714 : 1 (40/7T)
10	Rear final reduction:		
	Type	Planetary reduction unit	No separate reduction unit is provided. Crown wheel and pinion serve as final drive.
	Reduction through final drive	4.500:1 (Sun gear -16T, planet -20T & ring gear -56T)	Not applicable
11	Wheel equipments :		
	Front wheels		
	Track width, mm	1315 (Std.), 1445, 1505, 1525, 1625, 1645, 1735, 1765, 1835 & 1935	1250, 1270, 1350, 1370 (std), 1470, 1570, 1670, 1770 & 1870
	Rear wheels		
	Track width, mm	1360, 1440 (std.), 1560, 1640, 1750, 1840 & 1950	1470 (std.), 1580, 1670, 1780, 1900, & 1990.
	Wheel base, mm	2140	2120
12	Type of steering system:	Hydrostatic (power steering)	Mechanical re-circulating ball and nut type gear box with single drop arm
13	Brake system:		
	No. of disc (s)	Three (on each wheel side)	Five (on each wheel side)
	Area of liners (cm ²)	902.2 (on each wheel side)	2035.9 (on each side)
14	Front towing hitch	Provided	Provided
15	Minimum & maximum height of rear towing hitch, mm	530 & 760	425 & 665
16	Overall dimensions (Length, Width & Height), mm	3455, 1830 & 2225	3380, 1865 & 2225

Subsequent to the examination of the case in light of Sl. No. iii) of clause of 8.1.2, clause 8.4, Sl. No. v), vii) & xiii) of Table-3 of Indian Standard **IS: 12207-2014**, the following tests were considered to be carried out:

- Specification checking
- Nominal speed test
- Two hour maximum PTO power performance test, under natural ambient condition
- Brake test
- Turning ability test

2. FUEL AND LUBRICANTS

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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.	Air cleaner	SAE 15W40 / SAE 20W40	As recommended
2.	Engine oil	SAE 15W40	As recommended
3.	Gearbox	SAE 80W90 / EP 80	Oil originally filled in the systems were not changed
4.	Differential, rear axle housing, brake and hydraulic system oil	UTTO (Tract ELFSF-3I)	--do--
5.	Steering system	CASTROL - TQ	--do--
6.	Grease	Servo grease MP	MP Grease

3. ESSENTIAL TESTS

3.1. SPECIFICATIONS

	<u>Base Model</u>	<u>Variant Model</u>
3.1.1 Tractor:		
Make	: Escorts Limited	Escorts Limited
Model	: Farmtrac 6050	60 F2
Brand name, if any	: Farmtrac	Farmtrac
Type	: Four wheeled, rear-wheel driven, Agricultural Tractor.	Standard
Year of manufacture	: 14-K-04 (October, 2014)	DE (i.e. July, 2016)
Chassis number	: T05-2326284	T052370769DE
Country of Origin	: India	India
3.1.2 Engine:		
Make	: Escorts Limited	Escorts Limited
Model	: AF3.344F-3A	AF3.344F-3A
Type	: Four stroke, naturally aspirated, liquid cooled, direct injection, diesel engine.	
Serial number	: E-2330906	E 2376062
Engine speed (Manufacturer's recommended production setting), (rpm) :		
- Maximum speed at no load	: 2150 to 2250	2150 to 2250
- Low idle speed	: 600 to 700	600 to 700
- Speed at maximum torque	: 1000 to 1200	1000 to 1200
Rated speed, (rpm):		
- For PTO use	: 1850	1850
- For drawbar use	: 1850	1850
3.1.3 Cylinder & Cylinder Head:		
Number	: Three	
Disposition	: Vertical, Inline	
Bore/stroke, (mm)	: 111.76/117 (apa)	
Capacity as specified by the applicant, (cc)	: 3440 (apa)	

Base Model

Variant Model

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	Compression ratio, (apa)	:	18.0 (± 5%) : 1
	Type of cylinder head	:	Monoblock
	Type of cylinder liners	:	Wet, non-replaceable
	Type of combustion chamber	:	Direct injection, re-entrant
	Arrangement of valves	:	Overhead, inline
	Valve clearance (cold):		
	- Inlet valve, (mm)	:	0.40
	- Exhaust valve, (mm)	:	0.60
3.1.4	Fuel System:		
	Type of fuel feed system	:	Gravity and force feed
3.1.4.1	Fuel tank:		
	Capacity, (l)	:	60.0 57.0
	Location	:	Above clutch housing
	Provision for draining of sediments/ water	:	Not provided , however a water separator is provided
	Material of fuel tank	:	Metallic
3.1.4.2	Water separator	:	
	Make	:	Hilux
	Type	:	Inverted funnel, gravity separation.
	Location	:	In between fuel tank & fuel feed pump
	Capacity (l)	:	0.50
3.1.4.3	Fuel feed pump:		
	Make	:	Bosch, India
	Type	:	Plunger with hand primer
	Model/Group combination No.	:	FP/KSG22AD10, F 002 AF0 040 FP/KSG 22AD105, F002 A50 040
	Provision of sediment bowl	:	Provided (Metallic)
	Method of drive	:	Through cam shaft of fuel injection pump
3.1.4.4	Fuel filters:		
	Make	:	Bosch, made in India
	Model/Group combination No.	:	9 450 030 120 F 002 H20 187
	Number	:	Two One
	Type of elements	:	
	-Primary	:	Cloth Paper
	-Secondary	:	Paper
	Capacity of final stage filter, (l)	:	0.50 0.41
3.1.4.5	Fuel Injection pump:		
	Make	:	Bosch, Made in India
	Model/Group combination No.	:	F 002 A0Z 920, PES3A95D410RS 2000 F002 A0Z 920, PES3A95D410RS2000
	Type	:	Inline, plunger
	Serial number	:	45664573 65535089
	Method of drive	:	Through timing gears
3.1.4.6	Fuel injectors:		
	Make	:	Bosch, made in India
	Model/Group combination No. :	:	
	Holder number	:	F 002 C80 015 F 002 C80 015
	Nozzle number	:	DSL A 150 P 5589 DSL A 150 P 5584

Base Model

Variant Model

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	Make	:	Farmtrac (apa)
	Type	:	Full flow, spin-on paper element.
	Number	:	One
	Lubrication oil Pump:		
	Make	:	Farmtrac (apa)
	Type	:	Gear
	Method of drive	:	Through gear mounted on camshaft
	Pressure release setting, (kPa)	:	412 to 480.5
	Minimum permissible pressure, (kPa)	:	147.1
3.1.8	Cooling system:		
	Type	:	Forced circulation of liquid
	Coolant as recommended	:	Not available Veedol
	Coolant water ratio	:	1:3 1:3
	Details of pump	:	Centrifugal, semi open impeller having 8 vanes of 104 mm diameter and driven through crankshaft pulley by a "V" belt common to alternator.
	Details of fan	:	Suction type having Six metallic blades of 407 mm diameter and mounted on water pump shaft.
	Means of temperature control	:	Thermostat
	Bare radiator capacity, (l)	:	5.85 5.70
	Capacity of expansion flask, (l)	:	0.80 0.76
	Total coolant capacity, (l)	:	13.15 12.75
	Radiator cap pressure, (kPa)	:	88 88
3.1.9	Starting System:		
	Type	:	12V, DC, Electrical
	Aid for cold starting	:	None
	Any other device provided for easy starting.	:	None
3.1.10	Electrical System:		
3.1.10.1	Battery:		
	Make & Model	:	Exide Express & MHD 880 Exide & MHD880
	Number	:	One
	Type	:	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	:	Bosch Bosch (apa)
	Model	:	F002G70054/DE 114-L F002G70054/DE114-L
	Type	:	Pre-engaging, solenoid operated
	Capacity and rating	:	12V, 2.0 kW 12V, 2.0 kW (apa)
	Serial Number	:	N.A. Not available
3.1.10.3	Generator:		
	Make	:	Autolek Minda
	Model	:	ALT 4009F 03 235 01002
	Type	:	Alternator
	Serial number	:	NA Not available

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	Base model	Variant model
Output rating	:	12V /35 Amp
Method of drive	:	Through crankshaft pulley by a cogged “V” belt common to water pump.

3.1.10.4 Voltage regulator : Inbuilt with alternator

3.1.10.5 Details of lights:

Description	No. & capacity of bulb	Height of the centre of beam above ground level, (mm)	Size, (mm)	Distance between centre of the beam and outside edge of tractor at standard rear track setting, (mm)
1	2	3	4	5
Base Model:				
Front Lights:				
- Head lights	2, 12V, 35/35W	960	155 Φ	522
- Parking lights	2, 12V, 5W	1320	85 x 85	210
- Turn-cum-hazard Indicator light	2, 12V, 21W	1320	85 x 85	95
Reflectors (White)	2	1320	70 x 45	155
Rear lights:				
- Tail-cum-brake light	2, 12V, 21/5W	1350	85 x 85	220
- Turn-cum-hazard Indicator light	2, 12V, 21W	1350	85 x 85	105
- Plough light (on RHS mudguard)	1, 12V, 55W	1430	130 Φ	355
- Reflectors (Red)	2	1350	70 x 45	165
- Registration plate light (RHS)	1, 12V, 5W	1250	30 Φ	165
Variant Model:				
Front Lights:				
- Head lights	2, 12V, 35/35W	965	155 Φ	520
- Parking lights -LED	05, 13.5 V, 0.16W	1300 & 1335	85 x 85	245
- Turn-cum-hazard Indicator light - LED	06, 13.5V, 3.5W	Min. 1335 Max. 1370	85 x 85	245
Reflectors (White)	02	Min. 1335 Max. 1370	70 x 45	245
Rear lights:				
- Parking lights - LED	06, 13.5 V, 0.10W	1300/1335	85 x 85	225
- Brake lights	06, 13.0 V, 2.1W	1350 (apa)	85 x 85	220 (apa)
- Turn-cum-hazard Indicator light - LED	06, 13.5V, 2.1W	1335/1370	85 x 85	225
- Plough light (on RHS mudguard)	1, 12V, 55W	1415	130 Φ	385
- Reflectors (Red)	02	1335, 1370	70 x 45	225
- Registration plate light (RHS)	1, 12V, 5W	1290	30 Φ	205

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		<u>Base model</u>	<u>Variant model</u>
3.1.11 Instrument panel details:-			
i)	Engine speed cum digital cumulative run hour meter (0 to 30 x 100 rpm)	Provided	--
ii)	Engine speed cum cumulative run hour meter (0 to 25 x 100 rpm)	--	Provided
iii)	Engine digital run hour meter	Not provided	Provided
iv)	Lubricating temperature gauge (with colour zones)	Provided	Provided
v)	Water temperature gauge (with colour zones)	Provided	Provided
vi)	Fuel level gauge (with colour zones)	Provided	Provided
vii)	Battery charging warning indicator light	Provided	Provided
viii)	Main switch (key-turn type)	Provided	Provided
ix)	Light switch (Rotary type on LHS & RHS)	Provided	Provided
x)	Turn indicator light switch (two way)	Provided	Provided
xi)	Hazard warning light switch	Provided	Provided
xii)	Turn-cum-hazard indicator lights (Tell-tale)	Provided	Provided
xiii)	Head lamp (Long beam) 'ON' indicator light	Provided	Provided
xiv)	Horn push button	Provided	Provided
xv)	Fuel shut-off knob	Provided	Provided
xvi)	Hand accelerator lever	Provided	Provided
xvii)	Steering control wheel	Provided	Provided
xviii)	Rear view mirror.	Provided	Provided
xix)	Mobile charging socket	Provided	Provided
xx)	LED light switch	Not provided	Provided

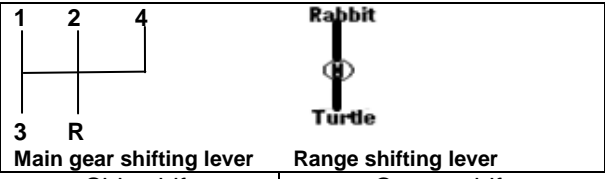
3.1.12 Transmission System:	<u>Base model</u>	<u>Variant model</u>
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3.1.12.1 Clutch:

Make	: Luk, India	Luk, India (apa)
Type	: Dual, dry friction plates & pads diaphragm type.	Dual, dry friction plates & pads diaphragm type.
No. of friction plate, (s)	: Two	Two
Size, (OD/ID, mm):		
Transmission	: 280 ϕ / 167.7 ϕ and having four pads, each pads of 28.39 cm ² contact area.	280 ϕ / 167.7 ϕ and having four pads, each pads of 28.39 cm ² contact area (apa).
PTO	: 280 / 165.9 ϕ	280 / 165.9 ϕ (apa)
Method of operation:		
Transmission	: By pressing the clutch pedal, on LHS	
PTO	: By a hand lever provided on LHS of operator's seat	

3.1.12.2 Gear box:

Make	:	Farmtrac (apa)
Type	: Mechanical, constant mesh gears.	Mechanical, constant mesh gears (apa)

No. of speeds:	<u>Base model</u>	<u>Variant model</u>
- Forward	:	08
- Reverse	:	02
Gear shifting pattern:		
Gear shifting pattern	: 	
Location of gear shifting levers	: Side shift	: Centre shift
Main gear shift	: On RHS of operator's seat	: At front of operator's seat
Range selection (high-low & medium)	: On LHS of operator's seat	: At front of operator's seat
Oil capacity, (l)	: 12.0	: 12.0
Oil changing period	: After every 1200 hours of operation.	

3.1.12.3 Rear differential unit:

Type	: Crown wheel & pinion with differential unit accommodated inside the differential housing.	
Reduction through crown wheel & bevel pinion	: 2.818:1 (31/11 T)	: 5.714 : 1 (40/7T)
Oil capacity (l)	: 26.5 (common with rear final drive, brakes & hydraulic system)	: 22.0 (Common with rear axle housing, brakes & hydraulic system)
Oil changing period	: After every 1200 hours of operation.	
Differential lock:		
Type	: Dog clutch	: Dog clutch (apa)
Location	: RHS of operator's seat	: RHS of operator's seat
Method of operation	: By pressing a pedal provided on RHS of operator's seat	

3.1.12.4 Rear axle & Rear final drive:

Make	: Farmtrac (apa)	
Type	: Planetary reduction unit, accommodated inside the rear axle housing on both sides after brake.	: No separate reduction unit is provided. Crown wheel and pinion serve as final drive.
Reduction through final drive	: 4.500:1 (Sun gear - 16T, planet -20T & ring gear -56T)	Not applicable
Oil capacity of rear axle & final drive, (l)	: 26.5 (Common with differential, brakes & hydraulic system)	: 22.0 (Common with differential, brakes & hydraulic system)
Oil changing period	: After every 1200 hours of operation.	

3.1.13 Power lift (Hydraulic system):

Make	: Farmtrac	
Model	: Not specified	
Type	: Open center, 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.	

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3.1.13.1 Hydraulic pump:	Base model	Variant model
- Make :	Rexroth	
- Type :	Gear	
- Location & drive :	On LHS of engine &	Through timing gears
No. & type of filters :	Two, one fine wire mesh strainer and one spin-on paper element.	One, spin on paper element
Cooling device for hydraulic oil, if any :	None	
Hydraulic oil capacity, (l) :	26.5 (Common with differential, rear axle, final drive & brakes system)	22.0 (Common with differential, rear axle housing, brakes & hydraulic system)
Oil change period :	After every 1200 hours of operation.	
Provision for external tapping :		Provided
Details of control levers :	<ul style="list-style-type: none"> i) Position control lever ii) Draft control lever iii) Flow regulation and hydraulic lock knob (provided below operator's seat) iv) Auxiliary spool valve/external circuit (double action) 	<ul style="list-style-type: none"> i) Position control lever ii) Draft control lever iii) Provided iv) Provided
Method of draft sensing :		Through top link

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	25.77	25.80	Conforms to Cat.II
	b) Width of ball	44.0 (max.) / 51.0 (max.)	51.00	51.00	Conforms to Cat.II
II.	Lower hitch points:				
	a) Dia of hitch pin hole	22.40 to 22.65 / 28.70 to 29.00	28.96	22.40 /28.79	Conforms to Cat. I & II
	b) Width of ball	34.8 to 35.0 / 44.8 to 45.0	45.0	44.89 /44.89	Conforms to Cat. II
III.	Lateral distance from lower hitch point to centre line of tractor.	359 / 435	364	363.9	Does not conform
IV.	Lateral movement of lower hitch points	100 (min) / 125 (min)	170	395	Conforms to Cat.I & II

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1	2	3	4	5	6
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	575	490	Conforms to Cat.I
VI.	Transport height	820 (min)/ 950 (min)	965	930	Conforms to Cat.I
VII.	Power range (without force)	560(min)/ 650 (min)	615	620	Conforms to Cat.I
VIII.	Leveling adjustment	100 (min)/ 100 (min)	465	135	Conforms to Cat.I & II
IX.	Lower hitch point clearance	100 (min)/ 100 (min)	310	105	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] :

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	683	683	Conforms to Cat-I
B	75 (min) / 75 (min)	76.0	76.0	Conforms to Cat I & II
C	30 (min) / 30 (min)	33.4	32.9	Conforms to Cat I & II
D \emptyset	21.79 to 22.0 / 27.79 to 28.00	27.86	27.91	Conforms to Cat-II
E	39.0 (min) / 49.0 (min)	56.8	56.81	Conforms to Cat I & II
F \emptyset	12.0 (min) / 12.0 (min)	12.0	12.0	Conforms to Cat I & II
G	15.0 (min) / 15.0 (min)	15.2	15.0	Conforms to Cat I & II
H \emptyset	25 ± 1 / 25 ± 1	25.0	25.0	Conforms to Cat I & II
J	80 ± 1.5 / 80 ± 1.5	80	80	Conforms to Cat I & II
No. of holes	7 / 9	07	07	Conforms to Cat-I

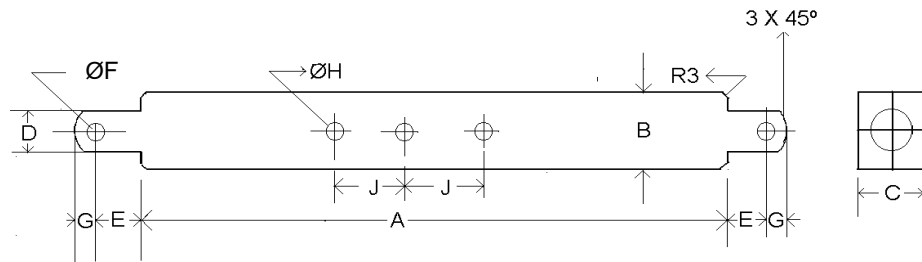


Fig. 1: DIMENSIONAL NOTATIONS FOR LINKAGE TYPE DRAWBAR

	<u>Base model</u>	<u>Variant model</u>
3.1.13.3.2 Swinging drawbar :		Not provided
3.1.13.3.3 Provision for coupling of trailer brakes :		Not provided

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3.1.14	Power take-off shaft:	Base model	Variant model
	Type	Type-I, Independent	Type-I, 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):	552	552
	Distance behind rear axle, (mm)	330	325
	Engine to PTO speed ratio	3.353 : 1	3.353 : 1
	Whether the PTO shaft is capable of transmitting the full power of engine	Yes	Yes
	Other speed (rpm)	: 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	4.337	9.514	427	195
L-2/H-2	3.210	7.059	576	263
L-3/H-3	1.829	4.011	1044	463
L-4/H4	1.344	2.947	1377	630
LR/HR	3.800	6.270	487	296

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 1811 rpm of engine.	540 rpm of PTO shaft corresponds to 1811 rpm of engine	Conforms
No. of splines	6	6	6	Conforms
Direction of rotation	Clockwise	Clockwise	Clockwise	Conforms
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.	Centrally located	In the centre line of tractor	Conforms
Dimensions, (mm) [Refer Fig.2]:				
DØ	34.79 ± 0.06	34.76	34.77	Conforms
dØ	28.91 ± 0.05	28.74	28.59	Does not conform
BØ	29.4 ± 0.1	29.38	29.33	Conforms
AØ (optional)	8.3 ± 0.1	8.33	8.24	Conforms
W	8.69 – 0.09 - 0.16	8.60	8.65	Conforms
a	7	7	7	Conforms
b (optional)	25 ± 0.5	25.5	25.5	Conforms
c	38	38	38	Conforms
X	30°	30°	30°	Conforms
B	76 (min)	84.6	84.12	Conforms
h	450 to 675	520	520	Conforms

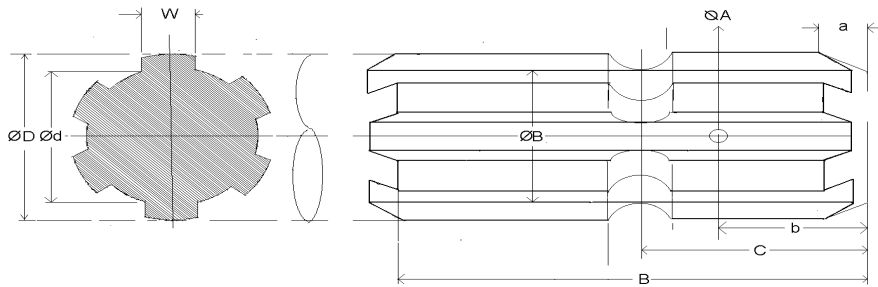


Fig.2 (a): DIMENSIONAL NOTATIONS FOR TYPE-I POWER TAKE-OFF SHAFT

3.1.14.2 **Power Take-off Master Shield (Type I):**
Dimensions of Power take-Off Master Shield, [Refer Fig. 2(b)]:

Specification	As per IS 4931-1995 (mm)	As Observed		Remark
		Base model	Variant model	
K	70(Min.)	30	Not provided	Not applicable
M	125 ± 5	80		
N	85 ± 5	105		
P	285 ± 5	280		
r	76 (Max.)	20		

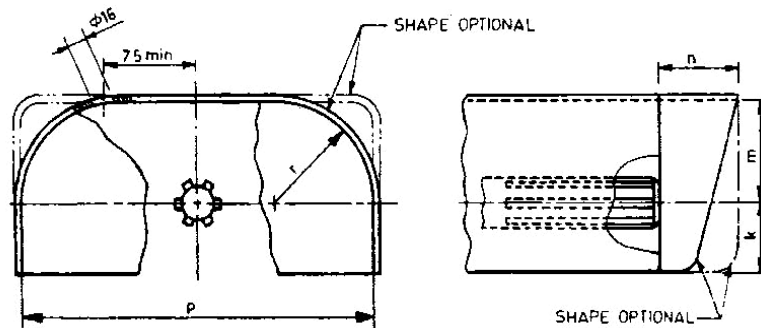


Fig. 2(b): DIMENSIONAL NOTATIONS FOR PTO SHAFT MASTER SHIELD

3.1.15 Towing hitch:		Base model	Variant model
3.1.15.1 Front	:	Provided	Provided
Type	:	Clevis	Clevis
Location	:	At front of engine support	At front of engine support
Height above ground level, (mm)	:	630	615 (Fix)
Type of adjustment	:	Fixed	Fixed
Width of clevis, (mm)	:	46.9	46.9
Dia. of pin hole, (mm)	:	32.5	32.5
3.1.15.2 Rear:			
Type	:		Clevis
Location	:		At rear of differential housing
Height above ground level, (mm):			
- Maximum	:	760	665
- Minimum	:	530	425
- No. of positions	:	Five	Eight
- Type of adjustment	:	By changing the position of hitch on its mounting bracket.	By changing & reversing the position of hitch on its mounting bracket.

	<u>Base model</u>	<u>Variant model</u>
Distance of hitch point, (mm):		
-From rear wheel centre :	450	445
-From power take-off shaft end :	120	120
Dia of pin hole, (mm) :	43.3	30.1
Width of clevis, (mm) :	76	69.1
3.1.16 Steering:		
Make :	Danfoss (apa)	Rane
Type :	Hydrostatic (power steering)	Mechanical with re-circulating ball & nut type gearbox and single drop arm (apa)
Location :	Above clutch housing	Above clutch housing
Method of operation :	Manual, by steering control wheel	
Diameter of steering control wheel, (mm) :		430
Make of distributor :	Danfoss	Not applicable
Make & Type of pump :	Rexroth & gear (tandem)	-do-
Location :	LHS of engine	-do-
Method of drive :	Through timing gears	-do-
Make, Number & Type :	Rane madras limited (apa), one & double acting	-do-
Location of hydraulic ram cylinder :	Centrally located below front axle	-do-
Steering oil capacity, (l) :	2.9	0.9
Lubricant change period :	First change after every 200 hours and subsequently After every 1200 hours of operation.	First change after every 150 hours and subsequently After every 850 hours of operation
3.1.17 Brakes:		
3.1.17.1 Service Brake:		
Make :	JMI	Brakes India Ltd (apa)
Type :	Mechanical, oil immersed multi disc brakes	Mechanical, oil immersed multi disc brakes
Location :	On rear axle shaft	On rear axle shaft
No. of disc (s) :	Three (on each wheel side)	Five (on each wheel side)
Area of liners, (cm ²) :	902.2 (on each wheel side)	2035.9 (on each wheel side)
Material of liners :	Non asbestos (apa)	Non asbestos (apa)
Method of operation :	Individual or combined foot.	pedal operation by right foot.
Oil capacity, (l) :	26.5 (Common with differential, rear axle, final drive & hydraulic system)	22.0 (Common with differential, rear axle, final drive & hydraulic system)
Oil change period :	After every 1200 hours of operation.	After every 1200 hours of operation with cleaning of strainer.

3.1.17.2	Parking Brake:		
	Type	:	Base model Variant model
	Location & Method of operation	:	Pawl and ratchet arrangement By locking the service brakes in position by a hand lever provided on RHS of operator's seat.
3.1.18	Wheel Equipment:		
3.1.18.1	Steered Wheel(s):		
	Make	:	Good Year
	Number	:	Two
	Type of tyre	:	Pneumatic, ribbed
	Size	:	6.00 -16
	Ply rating	:	8
	Maximum permissible load on each tyre at inflation pressure recommended for road work, (kgf)	:	410 @ 210 kPa
	Recommended inflation pressure, kPa :		
	- for field work	:	196
	- for transport	:	196
	Track width, (mm)	:	1315 (Std.), 1250, 1270, 1350, 1370 (std), 1470, 1570, 1670, 1770, 1870
	Method of changing track width	:	By extending the telescopic front axle and reversing the wheels
	Make & size of rim	:	SSWL & 4.50 x 16 SSWL & 4.5 E x 16
3.1.18.2	Drive wheel (s):		
	Make	:	Good Year
	Number	:	Two
	Type of tyre	:	Pneumatic, traction
	Size	:	14.9-28
	Ply rating	:	12
	Maximum permissible load on each tyre at inflation pressure recommended for road work, (kgf)	:	1410 @ 110 kPa
	Recommended inflation pressure, (kPa):		
	- For field work	:	100
	- For transport	:	108
	Track width, (mm)	:	1360, 1440 (std.), 1470 (std.), 1580, 1670, 1560, 1640, 1750, 1780, 1900, & 1990. 1840 & 1950
	Method of changing track width	:	By changing & reversing the wheel disc on off-set rim lugs.
	Make & size of wheel rim	:	SSWL & W12 x 28
3.1.18.3	Wheel base, (mm)	:	2140 2120
	Method of changing wheel base, if any, and range	:	None None
3.1.19	Operator's seat:		
	Make	:	Autofit Sietz (apa)
	Type	:	Cushioned seat with backrest
	Type of Suspension	:	Two helical coil springs
	Type of Damping	:	Hydraulic shock absorber

Range of adjustment, (mm):	<u>Base model</u>	<u>Variant model</u>
Vertical	: Nil	Nil
Lateral	: Nil	Nil
Longitudinal	: ± 70	±45

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) Width of seat	i) Width of seat ii) Vertical distance from seat index point to centre of accelerator pedal iii) Vertical distance of seat index point to foot rest.

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.

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:**

i) Fuel shut-off knob does not remain in “STOP” position.	i) Stop knob does not remain in the “STOP” position.
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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:**

i) Provision of spark arresting device in the exhaust system.	i) Vertical retainer is not provided on both side of clutch and brake pedal. ii) Width of foot step is less than the minimum requirement. iii) Provision of spark arresting device in the exhaust system. iv) Master shield over PTO shaft is not provided.
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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:**

i) The working clearance between the position & draft control levers has been not provided as per the requirement.	i) The working clearance between position control lever and RHS fender is less than the minimum requirement.
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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.

3.1.20.7 Rear view mirror:
Rear view mirror has been provided

1.20.8 Slow moving emblem:
Slow moving emblem has been provided.

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3.1.21	Mass of tractor, (kg): Without ballast	Base model			Variant model		
		Front	Rear	Total	Front	Rear	Total
	:	855	1485	2330	710	1260	1970

3.1.22	Over all dimensions:		
	- Length	:	3455 3380
	- Width	:	1830 1865
	- Height (with exhaust pipe)	:	2225 2225
	Minimum ground clearance, (mm)	:	397(Below gear box drain plug) 407 (below battery box mounting bracket)

3.1.23 Labelling plate of tractor:
Location of labelling plate: Labeling plate is riveted on LHS of gear box housing and provides the following information:-

Name of Manufacturer	:	Escorts Limited (Agri. Machinery Group)
Make	:	ESCORTS LIMITED
Model	:	60 F2
Brand name	:	FARMTRAC
Year of manufacture	:	DE (i.e. July, 2016)
Engine Serial Number	:	E 2376062
Chassis Serial Number	:	T 052370769DE
Maximum PTO Power, kW (hp)	:	32.3
Specific fuel consumption, gm/kWh(g/hph)	:	260

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

3.1.25	Colour of tractor:		
	Chassis, engine & bonnet	:	Blue Blue
	Mudguards, wheel discs & rims	:	Off white Off white

3.2 NOMINAL SPEED TEST

Movement	Gear No.	No. of engine revolutions for one revolution of driving wheel		Nominal speed at rated engine speed fitted with 14.9-28 tyre size of 640 mm radius index, (kmph) respectively.		Variation in nominal speed (%)
		Base model	Variant model	Base model	Variant model	Variant model
1	2	3	4	5	6	7
Forward	L1	168.88	165.6	2.64	2.69	+1.89
	L2	124.66	123.4	3.58	3.61	+0.84
	L3	71.21	70.00	6.28	6.37	+1.43
	L4	52.19	51.60	8.55	8.64	+1.05
	H1	46.78	46.90	9.54	9.52	-0.21
	H2	34.94	34.60	12.77	12.89	+0.94
	H3	19.64	19.60	22.73	22.73	0.00
	H4	14.59	14.40	30.60	30.89	+0.95
Reverse	LR	146.99	110.60	3.04	4.04	+32.89
	HR	41.11	30.70	10.86	14.52	+33.70

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3.3 PTO PERFORMANCE TEST

S. No.	Particulars	Base Model	Variant Model
1	Date(s) of test	16.04.2015 & 17.04.2015	26.03.2017
2	Tractor run at this Institute prior to start of PTO test, (h)	1.4	0.50
3	Dynamometer test bench used	Fuchino ESF1000S - Eddy Current	Anadig-700 ECA3-5

Maximum power two hours test under natural ambient condition was conducted. The results of Power take-off performance test under natural ambient of base & variant models are tabulated in **Table-1**.

Table-1

	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	32.9	582	1951	10.21	8.54	0.259	3.23
Variant model	32.6	552	1851	9.91	8.28	0.254	3.29

Sl. No.	Parameters	Base Model		Variant Model
		Natural Ambient	High Ambient	Natural Ambient (Under max. power two hours test)
i)	No load maximum speed, (rpm)	2183	2183	2194
ii)	Equivalent crankshaft torque at maximum power (Nm)	161.2	153.6	168.0
iii)	Maximum equivalent crank shaft torque (Nm)	201.0	189.1	--
iv)	Engine speed at maximum equivalent crankshaft torque, (rpm)	999	999	--
v)	Backup torque (%)	24.7	--	--
vi)	Smoke level , maximum light absorption coefficient, (per meter)	0.23	--	--
v)	Range of atmospheric condition :			
	- Temperature, (°C)	23 to 29	42 to 45	30
	- Pressure, (kPa)	98.5 to 99.3	99.5 to 100.4	98.8 to 99.0
	- Relative humidity, (%)	32 to 47	9 to 27	32 to 34
vi)	Maximum Temperature, (°C):			
	- Engine oil	110	119	100
	- Coolant	79	92	74
	- Fuel	48	62	38
	- Air intake	34	47	31
	- Exhaust gas	596	581	544
vii)	Pressure at maximum power:			
	- Intake air, (kPa)	2.3 to 2.4	2.2	2.7 to 2.9
	- Exhaust gas, (kPa)	11.2 to 11.5	10.5 to 10.8	2.0 to 2.1
viii)	Consumptions:			
	Lub. Oil (g/kWh)	--	0.36	--
	-Coolant (% of total coolant capacity)	--	1.90	--

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4. OTHER APPLICABLE TESTS

4.1 BRAKE TEST

4.1.1 Service brake:

4.1.2 Cold brake test:

Date of test(s) : 30.03.2017
 Type of Track : Concrete
 Maximum attainable speed (kmph):
 -Without Ballast : 35
 -With Road Ballasted : 35

		At maximum attainable speed			
Unballasted tractor	Braking device control, force (N)	425	390	350	310
	Mean deceleration, (m/sec ²)	4.68	3.35	2.88	2.50
	Stopping distance, (m)	12.81	14.13	16.39	18.90
		At 25 kmph travel speed			
Unballasted tractor	Braking device control, force(N)	360	330	310	290
	Mean deceleration, (m/ sec ²)	2.85	2.79	2.66	2.50
	Stopping distance, (m)	7.89	8.65	9.05	9.65

4.1.2.1 Brake fade test:

		At maximum attainable speed			
Braking device control force (N)		440	400	370	334
Mean deceleration, (m/ sec ²)		3.87	3.57	3.23	2.50
Stopping distance, (m)		12.81	13.78	16.62	18.90
		At 25 kmph travel speed			
Braking device control force,(N)		350	340	330	316
Mean deceleration, (m/ sec ²)		2.87	2.71	2.56	2.50
Stopping distance, (m)		8.37	8.90	9.43	9.65

Maximum deviation of tractor from its original course, (m) : None
 Abnormal vibration : None
 The brakes were heated by : Self braking

Remark:- The applicant had not recommended any ballast for road application. Hence the applicable brake test on road ballast was not conducted.

4.1.3 Parking brake test:

Particulars	18 percent slope		12 percent slope with trailer of 2.1 tonnes.	
	Up	Down	Up	Down
Braking device control force, (N)	--	--	187	254
Efficacy of parking brake	-----Effective-----			

4.2. TURNING ABILITY

Characteristics	Minimum turning diameter, (m)		Minimum clearance diameter, (m)	
	LHS	RHS	LHS	RHS
Base model				
Brake applied	6.49	6.22	6.68	6.42
Brakes released	7.30	7.14	7.54	7.38
Variant model				
Brake applied	6.03	6.08	6.43	6.48
Brakes released	6.76	6.89	7.16	7.21

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5. ADJUSTMENTS, DEFECTS, BREAKDOWNS AND REPAIRS

S. No.	Adjustment/ Defects/ breakdowns and Repairs	Category of breakdown	Tractor run hours
--None--			

6. 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-988/1512/2015, November, 2015)	Observation on variant model	Remarks	
1	2	3	4	5	6	
1.	i)	Clutch	Same configuration in base & variant models (refer para 3.1.12.1)		No change	
2.	ii)	Air cleaner	Same configuration in base & variant models except (refer para 3.1.5)		No change	
		Range of suction pressure at maximum power (kPa)	2.3 to 2.4	2.7 to 2.9	Changed	
3.	iii)	Exhaust system				
		a)	Position of silencer outlet w.r.t SIP, mm			
			-Vertical	870	920	Changed
			-Longitudinal	1625	1540	Changed
			-Lateral	400 (on LHS side)	155 (on LHS side)	Changed
	b)	Range of exhaust gas pressure at maximum power (kPa)	11.2 to 11.5	2.0 to 2.1	Changed	
4.	iv)	Gear Box:				
		Type	Mechanical, constant mesh gears.	Mechanical, constant mesh gears	No change	
		Location of gear shifting lever:	Side shift	Centre shift	Changed	
		Main gear shift lever	On RHS of operator's seat	At front of operator's seat	Changed	
	Range selection lever	On LHS of operator's seat	At front of operator's seat	Changed		
Reduction ratio of transmission:						
	Movement	Gear	Base model	Variant model	Variation (%)	Remark
	Forward	L1	168.88	165.6	-1.94	Changed
		L2	124.66	123.4	-1.01	-do-
		L3	71.21	70	-1.70	-do-
		L4	52.19	51.6	-1.13	-do-
		H1	46.78	46.9	+0.26	-do-
		H2	34.94	34.6	-0.97	-do-
		H3	19.64	19.6	-0.20	-do-
		H4	14.59	14.4	-1.30	-do-
	Reverse	LR	146.99	110.6	-24.76	Changed
		HR	41.11	30.7	-25.32	--do--

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1	2	3	4	5	6	
5.	v)	Range of speeds, (kmph):				
		- Forward	2.64 to 30.60	2.69 to 30.89	Changed	
		- Reverse	3.04 to 10.86	4.04 to 14.52	Changed	
		Additional no. of speed	None	None	No change	
6.	vi)	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)	5.85	5.70	--do--	
		Total coolant capacity,(l)	13.15	12.95	--do--	
		- Oil cooler	Not provided	Not provided	No change	
7.	vii)	Brake system:				
		Type	Mechanical, multiple oil immersed discs		No Change	
		No. of disc (s)	Three (on each wheel side)	Five (on each wheel side)	Changed	
		Area of liners (cm ²)	902.2 (on each wheel side)	2035.9 (on each side)	Changed	
8.	viii)	Type of three point linkage				No change
		Type	Cat.I / Cat.II	Cat.I / Cat.II	No change	
		Rear/front mounted	Rear mounted	Rear mounted	No change	
9.	ix)	PTO shaft (s)				
		Location	In the centre line of tractor		No change	
		Type	Type-I, Independent		No change	
		Speed corresponding to rated engine speed (rpm)	552 - Clockwise rotation		No change	
		Other speed corresponding to rated engine speed (rpm)	427, 576, 1044, 1377 & 487	195, 263, 463, 630 & 1295	Changed	
		- Anticlockwise rotation speed (rpm)	Not provided	Not provided	No change	
10.	x)	Type of drive:	2WD	2WD	No change	
11.	xi)	Hydraulic system:				
		Location & type of Hydraulic pump drive	Same configuration in base & variant models (refer para 3.1.13.1).		No change	
12.	xii)	Positioning of Hydraulic Sensing Mechanism:				
		Lower link, top link, etc.	Through top link	Through top link	No change	
13.	xiii)	Rear Final Reduction:				
		Reduction through crown wheel and bevel pinion	2.818:1 (31/11T)	5.714:1 (40/7T)	Changed	
		Type	Planetary reduction unit	No separate reduction unit is provided. Crown wheel and pinion serve as final drive.	Changed	
		Reduction through final drive	4.500:1 (Sun gear - 16T, planet -20T & ring gear -56T)	Not applicable	Changed	

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1	2	3	4	5	6
14.	xiv)	Type of fuel Injection pump:			
		Inline/Rotary/Common rail	Inline plunger	Inline plunger	No change
15.	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	Three vertical inline	Three vertical inline	No change
	c)	Maximum declared PTO power, (kW)	32.3	32.3	No change
	d)	Bore /stroke ,(mm)	111.76/117	111.76/117	No change
	e)	Declared max. PTO power (kW)	32.3 @ 1850 rpm engine speed	32.3 @ 1850 rpm engine speed	No change
	d)	Engine displacement (cc)	3440	3440	No change
	e)	Rated engine speed (rpm)	1850	1850	No change
	f)	Naturally aspirated/turbo charged	Naturally aspirated	Naturally aspirated	No change
16	Change related to ergonomics, safety comfort, statutory / regulatory requirements:				
	a)	IS: 10273	Conformed	Conforms	No change
	b)	IS: 4931	Did not conform	Does not conform	-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-
17.	Other changes				
	a)	Model Group combination of fuel feed pump	FP/KSG22AD10 / F002 AF0 040	FP/KSG22AD105 / F002 A50 040	Changed
	b)	Nozzle number of fuel injector	DSL A 150 P 5589	DSL A 150 P 5584	Changed
	c)	Generator:			
		Make	Autolek	Minda	Changed
		Model	ALT 4009 F	0323501002	Changed
d)	Front towing hitch	Various configuration in base model (refer para 3.1.15.1)			No Change
e)	Rear towing hitch	Various configuration in base model (refer para 3.1.15.2)			Changed

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1	2	3	4	5	6
	f)	Wheel equipments:			
		Track width of steered wheel, mm	1315 (Std.), 1445, 1505, 1525, 1625, 1645, 1735, 1765, 1835 & 1935	1250, 1270, 1350, 1370 (std), 1470, 1570, 1670, 1770 & 1870	Changed
		Track width of drive wheel, mm	1360, 1440 (std.), 1560, 1640, 1750, 1840 & 1950	1470 (std.), 1580, 1670, 1780, 1900, & 1990.	Changed
	g)	Wheel base (mm)	2140	2120	Changed
	h)	Type of steering system:	Hydrostatic (power steering)	Mechanical, re-circulating ball & nut type gear box with single drop arm	Changed
		Oil capacity, (l)	2.90	0.90	Changed
	i)	Over all dimensions, mm:			
		- Length	3455	3380	Changed
		- Width	1830	1865	Changed
		- Height (with exhaust pipe)	2225	2225	No change
		Minimum ground clearance, (mm)	397 (Below gear box drain plug)	407 (below battery box mounting bracket)	Changed
	j)	Sheet metal:			
		Style of bonnet & Fender			
		- Colour	Blue	Blue	No change
		-Decals (Sticker)	Farmtrac 6050	Farmtrac 60 F2	Changed
	k)	Unballasted mass of tractor, (kg)	2330	1970	Changed
	l)	Oil capacity of differential, rear axle housing, brakes & hydraulic system, (l)	26.5	22.0	Changed

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7. SUMMARY OF OBSERVATIONS, COMMENTS & RECOMMENDATIONS

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.

7.1 Evaluative & Non Evaluative Parameters:

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 requirements (Yes/No)
				Base model	Variant Model	Base model	Variant model	
1	2	3	4	5 a	5 b	6 a	6 b	7
7.1.1	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	32.3	32.3	32.9	32.6	Yes
b)	Specific fuel consumption corresponding to maximum power, (g/kWh)	Non Evaluative	± 5%	260	260	259	254	Yes
7.1.2	Brake performance at 25 kmph:							
a)	Maximum stopping distance at a force, equal to or less than 600 N on brake pedal with unballasted, (m):							
	1) Cold brake	Evaluative	10	10 (R)	10 (R)	6.17	7.89	Yes
	2) Hot brake	Evaluative	10	10 (R)	10 (R)	6.80	8.37	Yes
b)	Maximum force exerted on the brake pedal to achieve a deceleration of 2.5 m/s ² (N).	Evaluative	600	600 (R)	600 (R)	206 to 236	290 to 316	Yes
c)	Whether parking brake is effective at a force of 600 N at foot pedal(s) or 400 N at hand lever. (at 12% slope), N	Evaluative	Yes / No	Yes	Yes	385	254	Yes

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1	2	3	4	5 a	5 b	6 a	6 b	7
7.1.3	Labelling of tractors (Provision of labeling plate):							
	1)	Make	Evaluative	Should conform to the requirements of CMVR along-with declared value of PTO HP	--	ESCORTS LIMITED		Yes
	2)	Model	Evaluative		--	60 F2 (Brand name : FARMTRAC)		Yes
	3)	Year of manufacture	Evaluative		--	DE (i.e. July, 2016)		Yes
	4)	Engine number	Evaluative		--	E 2376062		Yes
	5)	Chassis number	Evaluative		--	T 052370769DE		Yes
	6)	Declaration of PTO power, kW	Evaluative		--	32.3		Yes
7.1.4	Literature (Submission to test agency)							
(a)	Operator manual		Evaluative	Provided/Not Provided	Provided	Provided	Provided	Yes
(b)	Parts Catalogue		Evaluative	Provided/Not Provided	Provided	Provided	Provided	Yes
(c)	Workshop/Service manual		Evaluative	Provided/Not Provided	Provided	Provided	Provided	Yes

7.2 Salient Observations:

7.2.1 Laboratory tests:

7.2.1.1 PTO Performance:

- i) The maximum PTO power was observed as **32.6 kW** against the declaration of **32.3 kW**, which meets the requirement of IS: 12207-2014 with regard to tolerance limit.
- ii) The specific fuel consumption corresponding to maximum power was recorded as **254 g/kWh** against the declaration of **260 g/kWh**, which is within the tolerance limit of IS: 12207-2014.

7.2.1.2 Three point linkage:

Dimension of lateral distance from lower hitch point to centre of tractor does not meet the requirement of IS 4468 (Part-I): 1997. Some of the parameters of three point linkages meet to the Cat.I and some of Cat. II of IS 4468 (Part-I): 1997. Keeping in view the spirit of standardization, necessary improvements may be incorporated.

7.2.1.3 Linkage Drawbar:

Some of the parameters of linkage drawbar meet to the Cat.I and some of Cat. II of IS 12953 : 1990 (Reaffirmed in 2000). Keeping in view the spirit of standardization, necessary improvements may be incorporated.

7.2.1.4 Operator's Seat:

Dimensions of width of seat and vertical distance of seat index point from foot rest does not meet the requirements of IS: 12343:1998 (Re-affirmed in March, 2009) and calls for necessary corrective action.

7.3 Maintenance / Service Problems:

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

7.4 Recommendation with regard to safety on tractor:

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

- i) Width of seat should be within the limit for human comfort while operating the tractor.
- ii) Vertical distance of seat index point from foot rest should be within the limit for easy handling of tractor.
- iii) The spark arrester has not been provided in the exhaust system.
- iv) The stop control knob should remain in stop position after pulling it to prevent the accident against start of the tractor.
- v) The working clearance around the position control lever and fender should be sufficient for safely operating.
- vi) Coupling to attach trailer brakes should be provided.

7.5 Adequacy of Literature supplied with machine:

7.5.1 The following literature has been supplied with the tractor

- a) Service Manual of **Escorts Ltd., 60 F2 (Brand Name-FARMTRAC)** tractor.
- b) Parts Catalogue of **Escorts Ltd., 60 F2 (Brand Name-FARMTRAC)** tractor.
- c) Operator's manual of **Escorts Ltd., 60 F2 (Brand Name-FARMTRAC)** tractor.

7.5.2 i) The supplied literature was found adequate.

- ii) 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.

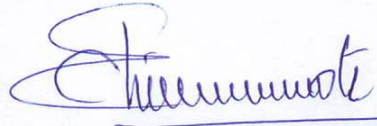
The results of the tests carried out on variant model "**Escorts Ltd, 60 F2 (Brand Name-FARMTRAC)Tractor**" Tractor have been compared with those on base model "**Escorts Ltd, Farmtrac 6050**" Tractor and found within the limit, as specified in **Indian Standard: 12207-2014**.

8. CITIZEN CHARTER

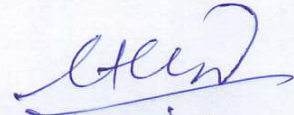
Duration of Test	Time frame for Testing & Evaluation as per Citizen Charter	Whether the Test Report is released within the time frame given in Citizen Charter	Remarks
02 Month (March, 2017 to April, 2017)	10 Months	Yes	None

TESTING AUTHORITY:

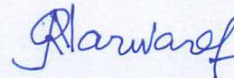

RAJNEESH PATEL
AGRICULTURAL ENGINEER



C.V CHIMOTE
TEST ENGINEER



Y.K RAO
SENIOR AGRICULTURAL ENGINEER



J.J.R. NARWARE
DIRECTOR

9. APPLICANT'S COMMENTS

Para No.	Our Reference	Applicant's comments
9.1	7.2.1.2, 7.2.1.3 & 7.2.1.4	These being studied & corrective action would be taken in near future.
9.2	7.5.2	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.

TRACTOR RUN HOURS DURING TEST

A.	LABORATORY AND TRACK TESTS	<u>HOURS</u>
1.	Running –in	--
2.	PTO Performance Test	3.13
3.	Brake Test	2.00
4.	Turning ability	0.40
5.	Theoretical speed test	0.50
B.	Miscellaneous test and other run hours, including idle run transportation, trial and preparation for test.	Nil
	Total	6.03