व्यावसायिक परीक्षण रिपोर्ट संख्या/No. : T- 1087/1612/2017 COMMERCIAL TEST REPORT (Initial) माह/Month : May, 2017



# ESCORTS LIMITED, EURO 41E3 TRACTOR (BRAND NAME-POWERTRAC)



### 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.) 466 445

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

Telephone: 07564-234729 FAX: 07564-234743 Page 1 of 49

## ESCORTS LIMITED, EURO 41 E3 TRACTOR (BRAND NAME – POWERTRAC) - Commercial (Initial)

Manufacturer : M/s. Escorts Limited,

Plot No. 2 & 3, Sector – 13 FARIDABAD – 121 007

**HARYANA** 

Month: May Test Report No. T-1087/1612/2017 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

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## ESCORTS LIMITED, EURO 41 E3 TRACTOR (BRAND NAME – POWERTRAC) - Commercial (Initial)

Type of Test : COMMERCIAL (Initial)

Test code/Procedure : IS: 5994-1998 (Reaffirmed in 2009), IS:

9253-2001(Reaffirmed in 2012) and

IS: 12207-2014

Period of Test : July, 2016 to March, 2017

Test Report No : T-1087/1612/2017

Month/Year : May, 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 tests.
- **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.).

SELECTED CONVERSIONS					
SI. 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 <sup>2</sup>	98.067 kPa = 735.56 mm of Hg			
	1 bar	100 kPa = 10 N/cm <sup>2</sup>			
	1 mm of Hg	1.3332 m-bar			

ABE	BREVIATIONS
ара	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

## ESCORTS LIMITED, EURO 41 E3 TRACTOR (BRAND NAME – POWERTRAC) - Commercial (Initial)

#### 17. SUMMARY OF OBSERVATIONS, COMMENTS & RECOMMENDATIONS

**17.1** Evaluative (mandatory) / Non-evaluation (Non-mandatory) parameter applicable for qualifying Minimum Performance criteria as per Clause-4 (Table-1) of IS: 12207-2014 for acceptance of the tractor for the purpose of subsidies/NABARD financing are summarized as under:

S. No.	CI	haracteristic	Category (Evaluative / Non Evaluative)	Requirements as per IS: 12207-2014	Values declared by the applicant(D)/ Requirement (R)	As observed	Whether meets the requirem ents (Yes/No.)
1		2	3	4	5	6	7
17.1.1	PTO	Performance	:				
a)	unde (kW (Nat cond	) ural ambient dition)	Evaluative	Declared value to be achieved with a tolerance of: -5 / +10% for PTO power >26kW7.5/+10% for PTO power ≤ 26kW	30.65 (D)	31.1	Yes
b)	engi (kW		Non Evaluative	-do-	30.65 (D)	31.1	Yes
с)	cons corre max (g/k)		Non Evaluative	+ 5%	240 (D)	246	Yes
d)	equi cran	imum valent kshaft ue, (Nm)	Non Evaluative	± 8%	170.5 (D)	163.9	Yes
1		2	3	4	5	6	7
e)	perc		Non Evaluative	10 percent, min.	10 percent, min (R)	21.3	Yes
f)	Max	imum operatir					
	1)	Engine oil	Non Evaluative	The declared value should not exceed the max. value specified by the oil company and the observed value under high ambient condition should not exceed the declaration.	125 (D)	102	Yes
	2)	Coolant (water)	Evaluative	The declared value should not exceed the boiling temperature of coolant under the pressurized or otherwise and the observed value under high ambient condition should not exceed the declaration.	110 (D)	93	Yes
g)		ine oil sumption, Wh)	Evaluative	Not exceeding 1% of SFC at max. power under high ambient conditions	Max. 2.40 (D) 1% of SFC, max. (R)	0.11	Yes
h)	Smc	ke level	Evaluative	Maximum light absorption coefficient of	3.25 per meter	0.25 per	Yes

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17.1.2	Drawbar performa	nce :	3.25 per metre or equivalent BOSCH No. 5.2 or 75 Hatridge value (As per CMVR)		meter	
a)	Maximum drawbar pull with ballast corresponding to 15 percent wheel slip, (kN).	Non Evaluative	Minimum 65% of static mass of tractor with ballast	16.60 (D) 16.76 (R) Minimum	22.62	Yes
b)	Maximum drawbar pull without ballast corresponding to 15 percent wheel slip, (kN).	Evaluative	Minimum 65% of static mass of tractor with standard ballast	13.10 (D) 13.19 (R) Minimum	16.78	Yes
c)	Maximum drawbar power without ballast (kW).	Evaluative	Minimum 80% of PTO power as referred in SI. No. i) a) of PTO performance in case of tractors having total static mass >1500 kg. Minimum 75% of PTO power as referred in SI. No. i) a) of PTO performance in case of light weight tractors. Minimum 75% of the engine power as referred in SI. No. i) a) of PTO performance in case of tractors which do not have a PTO shaft.	24.5 (D) 24.9 (R) Minimum	27.3	Yes
d)	Maximum transmission oil temperature (°C)	Non Evaluative	The declared value should not exceed the maximum value specified by oil company.	125 (D)	81	Yes
17.1.3	Power lift and hyd					
a)	Maximum lifting capace  1) At hitch points	city throughout t Non Evaluative	he range of lift, (kN):  [Tolerance of minus 10%]	13.70 (D)	15.03	Yes

1	2	3	4	5	6	7
	2) With the standard frame	Evaluative	The lift capacity should at least be 24 kg/PTO kW and it should be 21.5 kg/engine kW where the tractor is not provided with a PTO shaft	8.80 (D) 7.32 (R) Minimum	7.66	Yes
b)	Maximum drop in the height of the point of application of the force after each 5 minutes interval for a total duration of 30 minute, (mm)	Evaluative	The observed value should not exceed 50 mm	50 (D) 50 (R) Maximum	10	Yes
17.1.4	Brake performan	ce at 25 kmph	:			
a)			force, equal to or less tha			
	1) Cold brake	Evaluative	10	10 (R)	8.71	Yes
	2) Hot brake	Evaluative	10	10 (R)	8.83	Yes
b)	Maximum force exerted on the brake pedal to achieve a deceleration of	Evaluative	600	600 (R)	281 to 327	Yes

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	2.5	m/s <sup>2</sup> , (N)					
c)		ether parking					
		ke is effective					
	at a	force of 600	Evaluative	Yes/No	Yes (R)	Yes	Yes
		t foot pedal(s)	Lvaluative	163/140	165 (11)	163	163
		00 N at hand					
	leve						
				ommended ballasting f		refore the b	rake
17.1.5		se measureme		llasted condition only.			
a)		se measureme	ii .				
a)		pient noise					
		tted by the	Evaluative	As per CMVR	88 (R)	83	Yes
		tor, dB(A)					
b)		rimum noise					
	at c	operator's ear	Evaluative	As per CMVR	96 (R)	95	Yes
	leve	l, dB(A)		7.0 po. 0	()		
17.1.6	Am	plitude of mech	nanical vibrati	ons at :			
	1)	Left foot rest			100 (R)	150	NO
	2)	Right foot		100 microns (max)	100 (R)	170	NO
		rest			(5)		
	3)	Seat (with	Non Evaluative		100 (R)	120	No
		driver	Evaluative				
	4)	seated) Steering	-		100 (R)	170	NO
	4)	wheel			100 (K)	170	NO
17.1.7	Air	cleaner:	I.			Į.	
		cleaner oil pull	Non	0.25 %	0.25%	0.16	Yes
		r, (%)	Evaluative	(maximum)	(Maximum)		
17.1.8		ılage requireme					
a)	Gro	ss mass of the t		:	T		
	1)	Two wheel	Non		5.0 (D)	5.0	Yes
	2)	Four wheel	Evaluative		6.0 (D)	6.0	Yes
1 b)	Dict	2	litro of fuel con	4 nsumption, (km/l):	5	6	7
5,	1)	Two wheel			6.0 to 8.0 (D)	5.87 to	NO
	٠,	I WO WITOOT	Non		0.0 10 0.0 (D)	5.91	110
	2)	Four wheel	Evaluative		7.0 to 9.0 (D)	5.47 to	NO
					,	5.87	
c)		l consumption, (	ml/km/tonne):				
	1)	Two wheel			29.0 to 33.0	34	NO
	2)	Four wheel	Non		(D)	20 to 20	Voc
	2)	rour wheel	Evaluative		29.0 to 33.0 (D)	28 to 30	Yes
17.1.9	Wet	land cultivation	n (Puddling O	peration):	(-)	<u>I</u>	
	Sea		Evaluative	The identified	There should	No	Yes
	follo	wing		assemblies should	be no ingress	ingress of	
		emblies:		essentially meet the requirement of IS:	of water	water	
	1)	Clutch	d-	11082. No water ingress	and/or mud	and/or	
	0,	assembly	-do-	in the identified		mud was	
	2)	Brake	-do-	assembly given in column-2.		observed.	
	0,	housings		If tractor does not meet			
	3)	Front axle	-do-	the requirements of			
	4)	hubs Engine oil	-do-	wetland cultivation, it may be recommended			
	5)	Transmission	-do-	for dry land operation			
	3)	oil	-u0-	only			
	1		l	1	l .	l .	

17.1.10 Safety features :

(d)	-	Oil ring.  g groove cleara		-do-	0.7	75	0.55	165
				-00	(1)			
	-	2 <sup>nd</sup> comp. ring.	Evaluative	-do-	0.7		0.65 to 0.75 0.50 to	Yes
	-	Top comp.		-do-	2.0		0.40	Yes
(c)	Rin	g end gap (mm	):	ا ا		20	0.40	V
	cylir skirt	ween piston & nder liner at t, (mm)	Evaluative	printed literature.			0.146	
(b)	Clea	neter, (mm) arance	Non	the manufacturer and supported by	0.4	45	98.05 0.123 to	Yes
(a)	Cyli	nder bore	Evaluative	To be specified by	98.	.30	98.01 to	Yes
17.1.12	Disc	card limit for:				•		
	6)	Declaration of PTO power, (kW)	Evaluative			30.65		Yes
	5)	Chassis number	Evaluative			T0532	81160FD	Yes
	4)	Engine serial number	Evaluative			E3312		Yes
1		2	3	4	5		6	7
			ı					
	3,	manufacture	Lvaldative		-	2015)	,,	163
	3)	Year of	Evaluative	CMVR			PTEMBER,	Yes
	1) 2)	Model	Evaluative	Should conform to the requirements of			41 E3	Yes
17.1.11		eling of tractor Make	s (Provision of Evaluative	of labeling plate):		Lecor	RTS LIMITED	Yes
47.4.5	swir	nging drawbar	Evaluative	requirements of IS 12362 (Part 3) (as amended from time to time)	-	INOL	, provided	INA
f)	linka	ecifications of age drawbar ecifications of	Non Evaluative Non	Should meet the requirements of IS 12953 (as amended from time to time)  Should meet the		req	eets the uirements	Yes
		e point linkage	Evaluative	requirements of IS 4468 (Part 1) (as amended from time to time) Should meet the			quirements	Vas
e)	Dim	Shaft of	Non	4931 (as amended from time to time)  Should meet the		Does	s not meet	No
d)	Tec requ	hnical uirements for	Non Evaluative	Should meet the requirements of IS			eets the uirements	Yes
c)	requ (Tra mor	uting uirements actors having e than 1150 track width)	Non Evaluative	Should meet the requirements of IS 12343 (as amended from time to time)			s not meet quirements	No
	arra	ingement				req	uirements	
b)	part	ving and hot s nting	Evaluative	silencer, hydraulic pipes (As per IS 12239 Part 2) As per CMVR			uirements eets the	Yes
a)	Gua	ards against	Evaluative	Belt drives, pulleys,			eets the	Yes

					_		
	-	Top comp.		-do-		Taper	
		ring.				rings	
	-	2 <sup>nd</sup> comp.		-do-	0.20	0.031 to	Yes
		ring.	Evaluative	40	0.20	0.045	. 00
	<u> </u>	Oil ring.		-do-	0.15	0.034 to	Yes
	_	Oil fillig.		-40-	0.13	0.050	163
(2)	-					0.050	
(e)	Cle	earance of mair	n bearings (mm	1):	1	1	
	-	Diametrical	Evaluative	-do-	0.40	0.065 to	Yes
		clearance	Lvaluative	-40-		0.127	
	-	Crankshaft	English the	-l -	0.67	0.30	Yes
		end float	Evaluative	-do-			
(f)	Clearance of big end bearings, (mm):						
	-	Diametrical			0.40	0.022 to	Yes
			Evaluative	-do-		0.074	
	-	Axial	Evaluative	-do-	0.60	0.35	Yes
(g)	Cle	earance				0.00.1	
(3)		tween king pin	Non	-do-	0.50	0.23 to	Yes
		d bush, (mm)	Evaluative		0.00	0.27	
(h)		earance			0.50	0.05 to	Yes
(11)		tween center	Non		0.50	0.10	163
			Evaluative	do		0.10	
		and bush,	Evaluative				
47.4.42	(m		! 1- 11				
17.1.13		erature (Submi					
(a)	Ор	erator manual	Evaluative	Provided/	Provided	Provided	Yes
				Not provided			
(b)	Pa	rts Catalogue	Evaluative	Provided/	Provided	Provided	Yes
` ′		•		Not provided			
(c)	Wo	orkshop/	Evaluative	Provided/	Provided	Provided	Yes
(-)		rvice manual		Not provided			
	-		l	110t provided	l .	1	

17.1.14	CATEGORY O	F BREAKDOWI	NS / DEFECTS :		
S. No.	Characteristic	Category (Evaluative / Non Evaluative)	Requirements as per IS: 12207-2014	As observed	Whether meets the requirements (Yes/No.)
1	2	3	4	5	6
1.	Critical	Evaluative	No critical breakdown.	None	Yes
2.	Major	Evaluative	Not more than two and neither of them should be repetitive in nature.	None	Yes
3.	Minor	Evaluative	Not more than five and frequency of each should not be more than two.	None	Yes
4.	Total breakdowns	Evaluative	In no case, the total number of breakdowns should exceed five, that is, (2 major + 3 minor) or 5 minor breakdowns.	None	Yes

17.2	Optional requiren	nents as per Clause-4 (Table-2)	of IS:12207-2014:	
S. No.	Characteristic	Requirements as per IS: 12207-2014	As observed	Whether meets the requireme nts (Yes/No.)
1	2	3	4	5
1.	Fitment of ROPS	With a provision for fitment of ROPS.	Not provided	No
		If ROPS fitted it should meet	ROPS not fitted	Not

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		the requirement of IS: 11821-1992.		applicable
2.	Accessories	Trailer hitch, front tow hook	Trailer hitch provided	Yes
		may be provided.	Front tow hook provided	

#### 17.3 Conformity with following IS:

- Guidelines for declaration of power and specific fuel: Conforms consumption and labeling of agricultural tractors (First revision) [IS 10273:1987 (Reaffirmed in March, 2009)]
- ii) Agricultural tractors Rear mounted power take-off : Conforms Types 1, 2 and 3 (third revision) [IS: 4931-1995 (Reaffirmed in March, 2009)]
- iii) Agricultural wheeled tractors Three-point linkage: : Does not conform Part 1 Categories 1, 2, 3 & 4 (Fourth Revision) [IS 4468 (Part-1):1997/ ISO 730-1:1994 (Reaffirmed in March, 2009)]
- iv) Drawbar for agricultural tractors Link type : Conforms [IS 12953:1990 (Reaffirmed in March, 2007)]
- v) Agricultural tractors Operator's seat technical : **Does not conform** requirement [IS 12343 –1998 (First revision) (Reaffirmed in March, 2009)]
- vi) Guide for safety & comfort of operator of agricultural: Does not conform tractors: Part 1 General requirements (first revision): [IS 12239 (PT-1) 1996 (Reaffirmed in February, 2012)/ISO 4254-1:1989]
- vii) Tractors and machinery for agriculture and forestry, : Conforms powered lawn and garden equipment Symbols for operator controls and other displays [IS: 6283 (Part-1) 2006 (Reaffirmed in March, 2009) and IS: 6283 (Part-2)-2007 (Reaffirmed in March, 2009)]/ISO 3767-2:1991]
- viii) Tractors and machinery for agriculture and forestry : Conforms Technical means for ensuring safety Part 2: Tractors (first revision) [(IS 12239 (PT-2) 1999) (Re-affirmed in March, 2009)]
- ix) Guidelines for location and operation of operator : Does not conform controls on agricultural tractors and machinery (first revision) (IS: 8133 1983) (Re-affirmed in March, 2009)
- x) Agricultural Tractor & Machinery Lighting device for : Conforms travel on public roads (IS: 14683-1999) (Re-affirmed in March, 2009)

#### 17.4 Salient Observations:

#### 17.4.1 Laboratory tests:

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#### 17.4.1.1 PTO Performance:

- The maximum PTO power was observed as 31.1 kW against the declaration of 30.7 kW which meets the requirement of IS: 12207-2014 with regard to tolerance limit.
- ii) The percentage drop in maximum power during natural ambient and high ambient condition was observed as 6.1%, which is considered on higher side. This should be looked into for necessary corrective action.
- iii) The backup torque is 21.3 %.

#### 17.4.1.2 Drawbar performance:

The creeping of LHS & RHS rear tyres over rim was recorded as 45 & 40 mm, respectively during ten hours drawbar performance test. This should be looked into for necessary corrective action.

#### 17.4.1.3 Mechanical Vibration:

The amplitude of mechanical vibration on various assemblies marked as (\*) in Chapter-9 of this test report is on very higher side, especially at the operator's seat, steering control wheel & foot rests. This calls for dampening down of vibrations to improve the operational comfort and service life of components.

#### 17.4.1.4 Haulage requirements:

The distance travelled per liter of fuel with two and four wheel trailer & specific fuel consumption with two wheel trailer does not meet the values declared by the applicant. This should be looked into.

#### 17.4.1.5 Operator's Seat:

The vertical distance from seat index point to the centre of brake pedal does not meet the requirement of IS: 12343-1998. This should be looked into for necessary corrective action.

#### 17.4.2 Field performance test:

#### 17.4.2.1 Wet land cultivation (Puddling operation):

No ingress of water and or mud in various assemblies/components was noticed during wetland cultivation of tractor. Hence, it meets the requirements of IS: 11082-1984 (Technical Requirements of Agricultural Tractors for Wetland Operation). The tractor is found suitable for wetland operation (Puddling).

#### 17.5 Maintenance / Service Problems:

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

#### 17.6 Recommendation with regard to safety on tractor:

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

- i) Provision for spark arresting device in exhaust system.
- **ii)** Longitudinal distance from seat index point to centre of steering control wheel should be within the limit for easy handling of tractor.
- **iii)** The provision for starting the engine unless the traction transmission is in neutral position or park position or the traction clutch is disengaged or the operator is in operator's seat (station) is not available.
- iv) Stop compression ignition is provided but does not remain in stop position
- v) The mudguard front of the rear wheels is shorter than the circumference of tyre.

## ESCORTS LIMITED, EURO 41 E3 TRACTOR (BRAND NAME – POWERTRAC) - Commercial (Initial)

vi) The working clearance between draft control lever and seat should be as per the minimum requirements of relevant Indian Standard for easy operating the lever.

- 17.7 Adequacy of Literature supplied with machine:
- 17.7.1 The following literature was supplied with the tractor for reference during the test:
  - i) Tractor Operator's manual
  - ii) Parts Catalogue
  - iii) Service Manual
- 17.7.2 The printed literature supplied with the test sample is in English. The literature may be brought out as per IS: 8132-1999 (Reaffirmed in March, 2009) for the guidance of user and service personnel in national as well as other regional languages.

#### 18. CITIZEN CHARTER

Time frame for Testing & Evaluation as per Citizen Charter	Duration of test	Whether the report is released within the time frame given in the Citizen Charter	Remark
10 Months	8 Months (July,2016 to March, 2017)	Yes	None

#### **TESTING AUTHORITY:**

C. K. TIJARE AGRICULTURAL ENGINEER C. V. CHIMOTE TEST ENGINEER

Y. K. RAO SENIOR AGRICULTURAL ENGINEER

J.J.R. NARWARE DIRECTOR

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#### 19. APPLICANT'S COMMENTS

Para No.	Our Reference	Applicant's comments	
19.1	17.3 (iii), (v), (vi) &	These being studied & corrective action would be	
	(ix), 17.4.1.4	taken in near future.	
19.2	17.4.1.2, 17.4.1.3, 17.4.1.4, 17.6 & 17.7.2	Your valuable comments & suggestions for improvements are well taken. Under our policy of continues product improvement these aspects are further being considered & will try to eliminate these deviations soon wherever necessary.	

### ANNEXURE - I

### BRIEF SPECIFICATION OF IMPLEMENTS USED DURING FIELD TEST

S. No.	l t e m	Disc Plough	Rotavator	
1.	Make	Field King	Escorts	
2.	Туре	Mounted	Mounted	
3.	No. of bottom / blades/discs 03 42 in 8 flar		42 in 8 flanges	
4.	Type of bottom / blades/discs	Concave	Hatchet type	
5.	Size of bottom / blade/disc, (mm)	335	245x75x6.0	
6.	Spacing of bottom/flanges/disc, (mm)	280	245	
7.	Lower hitch point span, (mm)	785	735	
8.	Mast height, (mm)	510	470	
9.	Overall dimensions, (mm):			
	- Length	1920	1985	
	- Width	1040	1020	
	- Height	1180	1045	
10.	Gross mass, (kg)	345	500	

### ANNEXURE -II

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# ESCORTS LIMITED, EURO 41 E3 TRACTOR (BRAND NAME – POWERTRAC) - Commercial (Initial)

### **BRIEF SPECIFICATION OF FULL CAGE WHEELS**

SI No.	Items	Specification
1.	Туре	Full cage wheel
2.	Outer dia, (mm)	1250
3.	Width, (mm)	1010
4.	No. and types of lugs	32, straight lugs made up of M.S. angle section welded to angle iron frame.
5.	Size of angle section, (mm)	40 x 40 x 6
6.	Length of lug, (mm)	500
7.	Spacing of lug, (mm)	180
8.	Weight of each cage wheels, (kg)	150

### **ANNEXURE-III**

#### TRACTOR RUN HOURS DURING TEST

A.	LABORATORY AND TRACK TESTS:	HOURS
1.	Running-in	
2.	2. PTO performance test	
3.	Power lift and hydraulic pump performance test	
4.	Drawbar performance test	18.17
5.	Turning ability	0.20
6.	Location of centre of gravity	0.20
7.	Operator's field of vision	0.10
8.	Brake test	1.25
9.	Air cleaner oil pull over test	4.50
10.	Noise measurement	2.08
11.	Mechanical vibration test	1.00
12.	Theoretical speed test	0.66
B.	FIELD TEST:	
1.	Disc ploughing	11.25
2.	Rotavation	11.59
3.	Wetland cultivation (including water proof)	15.08
C.	HAULAGE TEST:	7.55
D.	<b>D.</b> Miscellaneous test and other run hours including idle run, transportation, trials and preparation for test	

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TOTAL:	96.71
IOIAL.	30.7