



EICHER, EICHER 371 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- 1092/1617/2017	EICHER, EICHER 371 TRACTOR - Commercial (Initial)
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Manufacturer : M/s. Eicher Tractors
(A unit of TAFE Motors & Tractors Limited, a wholly owned subsidiary of TAFE), Plot No.1, Sector - D, Industrial Area, Mandideep – 462 046, Distt. Raisen (M.P.)

Month: May	Test Report No. T- 1092/1617/2017	Year: 2017
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GOVERNMENT OF INDIA
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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 : May, 2016 to April, 2017

Test Report No. : T- 1092/1617/2017

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 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.)

SELECTED CONVERSIONS

SELECTED CONVERSIONS			ABBREVIATIONS	
Sl. No	Units	Conversion Factor		
1	Force: 1 kgf	9.80665 N	apa	As per applicant
		2.20462 lbf	TDC	Top Dead Centre
2	Power:		IS	Indian Standard
		1 hp	LHS	Left Hand Side/
			/RHS	Right Hand Side
		1.01387 metric 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	N.A.	Not available/Not applicable
		1 kgf/cm ²	PTO	Power take-off
		98.067 kPa = 735.56 mm of Hg	R.H	Relative Humidity
	1 bar	100 kPa = 10 N/cm ²	SIP	Seat Index Point
	1 mm of Hg	1.3332 m-bar		

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Manufacturer : M/s. Eicher Tractors
 (A unit of TAFE Motors & Tractors Limited, a wholly owned subsidiary of TAFE), Plot No.1, Sector - D, Industrial Area, Mandideep – 462 046, Distt. Raisen (M.P.)

Test requested by (applicant) : The manufacturer
 Place of running-in : At Applicant's works

Duration of said running-in, (h):
 - Engine : 21
 - Transmission : 32

Method of Selection : The tractor was submitted directly by the applicant for test. Hence, method of selection is not known.

1. SPECIFICATIONS

- 1.1 Tractor:**
- Make : EICHER
 - Model : EICHER 371
 - Variants, if any : Not specified
 - Type : Four wheeled, rear-wheel driven, unit construction, General Purpose Agricultural Tractor
 - Year of manufacture : 2015
 - Chassis number : 923714250116
 - Country of origin : India
- 1.2 Engine:**
- Make : Simpson
 - Model : T III A S324 F1.1
 - Type : Four stroke, liquid cooled, naturally aspirated, direct injection, diesel engine
 - Serial number : S324F 18133
- 1.2.1 Engine speed(Manufacturer's recommended production setting), (rpm):**
- Maximum speed at no load : 2100 to 2200
 - Low idle speed : 600 to 800
 - Speed at maximum torque : 1200 to 1600
- Rated speed, (rpm):**
- For PTO use : 2000
 - For drawbar use : 2000
- 1.3 Cylinder & Cylinder Head:**
- Number : Three
 - Disposition : Vertical, Inline
 - Bore/stroke, (mm) : 88.9/127 (apa)
 - Capacity as specified by the applicant, (cc) : 2365
 - Compression ratio : 18.5 ± 0.3 : 1



Type of cylinder head	: Integral, Monoblock
Type of cylinder liners	: Dry, replaceable
Type of combustion chamber	: Open chamber
Arrangement of valves	: Overhead, inline
Valve clearance (cold / hot):	
- Inlet valve, (mm)	: 0.25
- Exhaust valve, (mm)	: 0.25
1.4 Fuel System:	
Type of fuel feed system	: Gravity and force feed
1.4.1 Fuel tank:	
Capacity, (l)	: 45.6
Location	: Above Flywheel housing
Provision for draining of sediments/ water	: Not provided
Material of fuel tank	: Plastic
1.4.2 Water Separator:	
Make	: Alert
Type	: Inverted funnel, gravity separation
Location	: Mounted on LHS of engine in between fuel tank and fuel feed pump.
Capacity (l)	: 0.50
1.4.3 Fuel feed pump:	
Make	: Bosch
Type	: Plunger
Model/Group combination No.	: FP/KSG 22AD45/2, 9 440 030 030
Provision of sediment bowl	: Provided (metallic)
Method of drive	: Through cam shaft of fuel injection pump
Location	: Mounted on FIP
1.4.4 Fuel filters:	
Make	: Bosch India
Nozzle holder Number	: F 002 H20 129
Number	: Two
Type of elements:	
- Primary	: Paper
- Secondary	: Paper
Capacity of final stage filter, (l)	: 0.32
1.4.5 Fuel Injection pump:	
Make	: Bosch India
Model/Group combination No.	: F 002 AOZ 771 / PES3A80D320RS2000
Type	: Inline, plunger
Serial number	: 55603832
Method of drive	: Through timing gears

**1.4.6 Fuel injectors:**

Make	: Bosch India
Nozzle holder Number	: F 002 C70 018 555
Nozzle Number	: DSLA 146 P 5514
Type	: Multi holes (five holes)
Manufacturer's production pressure setting, (kgf/cm ²)	: 250+8
Injection timing	: 13 +0/-2 degree before TDC
Firing order	: 1- 2 -3

1.4.7 Governor:

Make	: Bosch India
Model/Group combination No.	: RSV 375... 1000 A4C1410R
Type	: Mechanical, centrifugal, variable speed
Governed range of engine speed, (rpm)	: 600 to 2200
Rated engine speed, (rpm)	: 2000

1.5 Air intake system:**1.5.1 Pre-cleaner:**

Make	: EICHER (apa)
Type	: Centrifugal with transparent dust collector
Location	: Above air cleaner inlet pipe

1.5.2 Air cleaner:

Make	: Eicher (apa)
Type	: Oil bath
Location	: In the front of Radiator, under the bonnet
Oil capacity (l)	: 1.0
Range of suction pressure at maximum power, (kPa)	: 2.1 to 2.2
Oil change period	: After every 8 to 10 hours in dusty condition and after every 50 hours of operation in normal working condition.

1.6 Exhaust System:

Type of silencer	: Updraft, cylindrical
Position of silencer outlet with respect to SIP, (mm):	
- Vertical	: 900
- Longitudinal	: 1445
- Lateral	: 430 (on LHS)
Range of exhaust gas pressure at maximum power, (kPa)	: 3.5 to 3.9
Provision of spark arresting device	: None
Provision against entry of rain water	: A bend is provided at the top of silencer

1.7 Lubricating system:

Type	: Forced feed-cum-splash
Oil sump capacity, (l)	: 7.5
Total lub oil capacity, (l)	: 8.20
Oil change period	: First change after 50 hours and subsequently after every 250 hours of operation.
Cooling device, (if any)	: None



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Filters:	
Make	: Eicher
Type	: Full flow, Through away, spin on
Number	: One
Pump:	
Make	: NA
Type	: Gear
Method of drive	: Through timing gears
Pressure release setting, (kPa)	: 343 to 517 (apa)
Minimum permissible pressure, (kPa)	: 157 (apa)
1.8 Cooling system:	
Type	: Forced circulation of water & coolant
Recommended Coolant Brand	: Golden Cruiser (apa)
Water/Coolant ratio	: 30.70
1.8.1 Details of Pump	: Centrifugal, semi open impeller having Six vanes of 69.70 mm diameter and driven through crankshaft pulley by a cogged "V" belt common to alternator.
1.8.2 Details of fan	: Suction type having Six polypropylene blades of 385 mm diameter and mounted on water pump shaft.
Method of drive	: By crankshaft pulley by a V-belt common to alternator.
Means of temperature control	: Thermostat
Bare radiator capacity, (l)	: 1.83
Capacity of expansion tank (l)	: 0.55
Total coolant capacity, (l)	: 7.0
Radiator cap pressure, (kPa)	: 88.3
1.9 Starting System :	
Type	: 12V, DC, Electrical
Aid for cold starting	: None
Any other device provided for easy starting	: None
1.10 Electrical System :	
1.10.1 Battery:	
Make and model	: Amaron & TRA500R
Number	: One
Type	: Lead Acid
Capacity and rating	: 12V, 75 Ah at 20 hours discharge rate
Location	: In a separate box at RHS of clutch housing
1.10.2 Starter :	
Make	: PANALFA
Model	: 3035
Type	: Pre-engaging, solenoid operated
Power rating	: 12V, 2.5 kW
Serial number	: Not available

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1.10.3 Generator:
 Make : PMP
 Model : F 002 G10416
 Type : Alternator
 Output rating : 12V, 23A (apa)
 Serial number : NA
 Method of drive : Through crankshaft pulley by a cogged "V" belt.

1.10.4 Voltage regulator : In-built in alternator

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)
Front Lights:				
- Head lights	2, 12V, 60/55W	1115	160 x 100	755
- Parking lights	2, 12V, 5W	1255	60 x 45	145
- Turn-cum-Hazard indicators	2, 12V, 21W	1255	60 x 45	90
Rear lights:				
Tail light - cum - Brake light	2, 12V, 21/5W	1255	65x65	140
Turn-cum-Hazard indicator	2, 12V, 21W	1255	65x70	70
- Plough light (on RHS mudguard)	1, 12V, 55 W	1390	135 x 105	290
- Reflectors (Red)	2	1255	55x30	180
- Registration plate light	Part of the rear tail light assembly			

1.10.6 Main switch : Key turn type, having three position viz:
 : OFF, Circuit ON & START

1.10.7 Light switch : Rotary type having four positions viz.
 i) OFF
 ii) Parking lights + Dash board light
 iii) Head lights (long beam) + (ii)
 iv) Head lights (short beam) + (ii)

1.10.8 Horn:
 Make : Addon
 Type : 12V, 2B, Electromagnetically vibrated diaphragm
 Location : In front of radiator, under the bonnet.

1.10.9 Fuse box : Contains 6 number of fuses having following capacities

Capacity	10A	15A	30A
Number	3	2	1

1.10.10 Details of other electrical accessories:

1.10.10.1 Flasher Unit:

Make	:	Interface
Capacity:	:	
- Turn signal	:	12V, 21W x 2 + 2W x 1
- Hazard signal	:	12V, 21W x 4 + 2W x 2
Flashes/min.	:	85

1.10.10.2 Seven pin trailer socket : Provided

1.11 Instrument panel details:

- i) Engine speed- cum- cumulative run hour meter (0 - 30 x 100 rpm)
- ii) Lubricating oil temperature gauge (with colour zones)
- iii) Lubricating oil pressure gauge (with colour zones)
- iv) Fuel level gauge (with colour zones).
- v) Main switch (key turn type)
- vi) Light switch (Rotary type)
- vii) Battery charging warning indicator lamp
- viii) Turn indicator –cum-hazard indicator lamp
- ix) Hazard light switch
- x) Turn indicator light switch
- xi) Horn push button
- xii) Head lamp (long beam) 'ON' indicator lamp
- xiii) Steering control wheel
- xiv) Hand accelerator lever
- xv) Fuel shut off - knob
- xvi) Rear view mirror

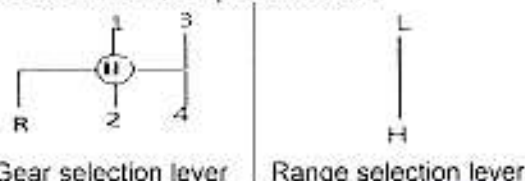
1.12 Transmission System:

1.12.1 Clutch:

	Standard Fitment	Optional Fitment
Make	: AMREP	Luk India
Type	: Single, dry friction plate.	Dual friction plate and pads
No. of friction plate(s)	: One	Two
Size, OD/ID (mm):		
- Transmission	: 280.0 ϕ / 165.5 ϕ	279.7/165.4 (having 4 pads of 26.2 cm ² size each)
- PTO	NA	279.6/ 167.5 ϕ
Method of operation:		
- Transmission	: By pressing the clutch pedal, on LHS	By pressing the clutch pedal half way, on LHS
-PTO	NA	By pressing the clutch pedal full , on LHS

1.12.2 Gear box:

- Make : Eicher
- Model : Not provided
- Type : Mechanical, combination of constant & sliding mesh gears
- Location of gear shifting levers : Both Gear & Range selection levers are located In-front of operator's seat
- Gear shifting pattern :



No. of speeds:

- Forward : 8
- Reverse : 2
- Oil capacity (l) : 42.5 (common with differential, final drive, brake housing & hydraulic system)
- Oil changing period : After every 1000 hours of operation.

1.12.3 Nominal Speed:

Movement	Gear No.	No. of engine revolutions for one revolution of driving wheel	Nominal speed at rated engine speed when fitted with 13.6-28 size tyres of 610mm radius index, (kmph)
Forward	L1	161.27	2.85
	L2	106.73	4.31
	L3	65.67	7.00
	L4	47.73	9.64
	H1	54.17	8.49
	H2	35.90	12.81
	H3	22.10	20.81
	H4	16.07	28.63
Reverse	LR	123.72	3.72
	HR	41.88	10.98

1.12.4 Differential:

- Type : Crown wheel & bevel pinion with differential unit accommodated inside the differential housing.
- Reduction through crown wheel & bevel pinion : 3.600 : 1 (36/10 T)
- Oil capacity (l) : 42.5 (common with gear box, brake housing, final drive & hydraulic system)
- Oil changing period : After every 1000 hours of operation.
- Differential lock : **Not provided**

1.12.5 Rear axle & final drive:

- Type : Bull and pinion gear reduction unit accommodated inside differential housing.
- Reduction through final drive : 4.461 : 1 (58/13T)
- Oil capacity of final drive, (l) : 42.5 (common with gear box, differential, brake housing, & hydraulic system)
- Oil changing period : After every 1000 hours of operation.

- 1.13 Power lift (Hydraulic System):**
- Make : Eicher (apa)
 - Type : Open center, live, ADDC
 - No. and type of cylinder : One, single acting
 - Type of linkage lock for transport : Hydraulic, response control valve in fully closed position act as a transport lock.
- 1.13.1 Hydraulic pump:**
- Make : DTL
 - Type : Gear
 - Location : On RHS of engine
 - Drive : Through timing gears
 - No. & Type of filter : One, spin on, full flow, throw away type filter provided in returning line on LHS of ADDC housing and one strainer provided in the suction line.
- Hydraulic oil capacity, (l) : 42.5 (common with gear box, differential, final drive, brake housing)
- Oil change period : After every 1000 hours of operation
- Provision for external tapping : Provided
- Details of control levers : i) Position control lever (yellow)
ii) Draft control lever (black)
iii) Response control knob (at distributor)
iv) Mode selector lever for tipping trailer
v) Finger Tip lever (Red)
- Method of draft sensing : Through top link

1.13.2 Three point linkage:

S. No.	Observations	As per IS: 4468 (Part-I) – 1997 (Cat I / Cat II), (mm)	As measured, (mm)	Remarks
1	2	3	4	5
I. Upper hitch points:				
a)	Dia of hitch pin hole	19.30 to 19.50 / 25.70 to 25.90	25.89	conforms to cat II
b)	Width of ball	44.0 (max.) / 51.0 (max)	50.92	Conforms to Cat. II
II. Lower hitch points:				
a)	Dia of hitch pin hole	22.40 to 22.65 / 28.70 to 29.00	28.95	Conforms to Cat. II
b)	Width of ball	34.80 to 35.00 / 44.80 to 45.00	44.79	--do--
III.	Lateral distance from lower hitch point to centre line of tractor	359 / 435	364	Does not conform
IV.	Lateral movement of lower hitch points	100 (min) / 125 (min)	135	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	455	Conforms to Cat. I



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1	2	3	4	5
VI.	Transport height	820 (min)/ 950 (min)	890	Conforms to Cat. I
VII.	Movement (power) range (Without force)	560 (min)/ 650 (min)	670	Conforms to Cat. I & II
VIII.	Leveling adjustment	100 (min)/ 100 (min)	300	--do--
IX.	Lower hitch point tyre clearance	100 (min)/ 100 (min)	165	--do--
X.	Lower hitch point height	200 (max) / 200 (max)	200	--do--

1.13.3 Linkage geometry dimensions [Refer Fig.-1(a)]:

The following are dimensions observed, corresponding to 610 mm as tyre dynamic radius index:

S. No.	Parameter	Notation	Dimension or range, (mm)	Setting used during test, (mm)
1.	Length of lower link	A	665	665
2.	Length of lift arm	B	270	270
3.	Length of lift rods	C	525 to 605	540
4.	Length of top link	D	530 to 830	610
5.	Distance of lift rod connection point from pivot point of lower link.	E	350	350
6.	Distance of lower link pivot point from rear wheel axis:			
	-Horizontally	F	165, behind	165, behind
	-Vertically	G	130, below	130, below
7.	Distance of upper link pivot point from rear wheel axis:			
	-Horizontally	H	230,230,230 behind	230 behind
	-Vertically	J	300,335,370 above	335 above
8.	Distance of lift arm pivot point from rear wheel axis:			
	-Horizontally	K	25 behind	25 behind
	-Vertically	L	325 above	325 above
9.	Height of lower hitch points relative to the rear wheel axis:			
	- In high position	M	140 to 280	260, above
	- In low position	N	- 555 to - 370	410, below
10.	Height of lower link hitch points when locked in transport position	--	260 mm above	

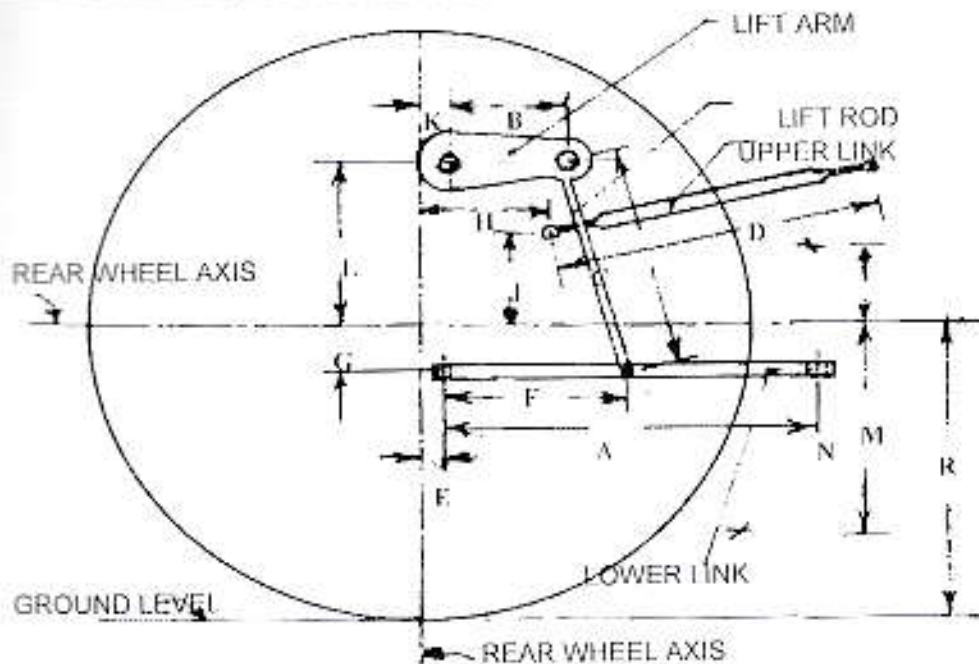
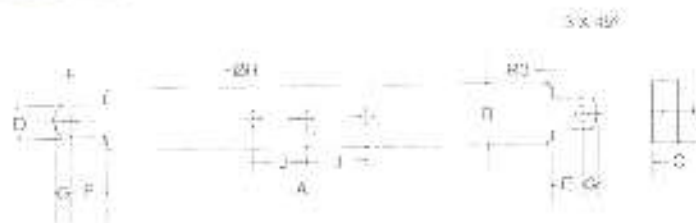


Fig.1 (a): DIMENSIONAL NOTATIONS FOR TABLE OF LINKAGE GEOMETRY

1.13.4 Drawbar:			
1.13.4.1 Linkage Drawbar [Refer Fig. 1 (b)]:			
Notation	As per IS: 12953-1995 (Cat. I) / (Cat. II), (mm)	As measured, (mm)	Remarks
A	683 ± 1.5 / 825 ± 1.5	683	Conforms to Cat-I
B	75 (min) / 75 (min)	75.0	- do -
C	30 (min) / 30 (min)	30.33	- do -
D \varnothing	21.79 to 22.00 / 27.79 to 28.00	27.88	Conforms to Cat-II
E	39.0 (min) / 49.0 (min)	64.3	Conforms to cat-I & II
F \varnothing	12.0 (min) / 12.0 (min)	12.0	- do -
G	15.0 (min) / 15.0 (min)	23.8	- do -
H \varnothing	25 ± 1 / 25 ± 1	25.3	- do -
J	80 ± 1.5 / 80 ± 1.5	81.0	- do -
No. of holes	7 / 9	7	Conforms to Cat-I



1(b): DIMENSIONAL NOTATIONS FOR LINKAGE DRAWBAR

1.13.4.2 Swinging drawbar : Not provided

- 1.14 Power take-off shaft:**
- Type : Type-I, Not Independent
 - Method of engaging : By a hand lever provided on LHS of operator's seat.
 - No. of shaft(s) : One
 - PTO speed corresponding to rated engine speed (rpm) : 556 @ engine speed of 2002 rpm
 - Distance behind rear axle. (mm) : 375
 - Engine to PTO speed ratio : 3.600 : 1
 - Whether the PTO shaft is capable of transmitting full power of the engine. : Yes
 - Other speeds, if any : Not provided

1.14.1 Specifications of Power Take-Off Shaft: [Refer Fig. 2 (a)]

Specification	As per IS:4931-1995 (Type-I)	As observed	Remarks
Nominal speed (rpm)	540 ± 10	540 rpm of PTO shaft corresponds to 1944 rpm of engine	Conforms
No. of splines	06	06	-do-
Direction of rotation	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.	Centrally located	-do-
Dimensions (mm) [See Fig. 2(a)]:			
D \varnothing	34.79 ± 0.06	34.85	-do-
d \varnothing	28.91 ± 0.05	28.85	-do-
B \varnothing	29.4 ± 0.1	29.5	-do-
A \varnothing (optional)	8.3 ± 0.1	8.35	-do-
W	8.69 - 0.09 - 0.16	8.56	-do-
a	7	7	-do-
b	25 ± 0.5	25.0	-do-
c	38	38	-do-
X	30°	30°	-do-
B	76 (min)	88	-do-
h	450 to 675	580	-do-

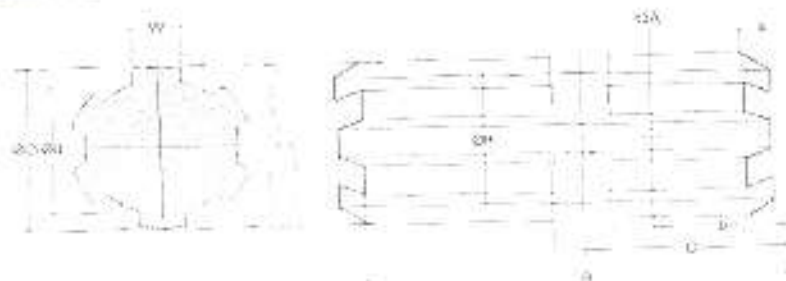


Fig. 2: DIMENSIONAL NOTATIONS FOR TYPE-I POWER TAKE-OFF SHAFT



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1.14.2	Power Take-off Master Shield	Not provided
1.15	Towing hitch:	
1.15.1	Front:	
	Type	: Clevis
	Location	: At front of the tractor below bumper
	Height above ground level.(mm)	: 415
	Type of adjustment	: fixed
	Width of clevis, (mm)	: 56.4
	Dia of pin hole, (mm)	: 21.6
1.15.2	Rear:	
	Type	: Clevis
	Location	: At rear of transmission housing
	Height above ground level, (mm):	
	- Maximum	: 740
	- Minimum	: 530
	-No. of position	: 4
	- Type of adjustment	: By changing hitch position on bracket
	Distance of hitch point,(mm):	
	- From rear axle centre	: 485
	- From power take-off shaft end	: 110
	Dia of pin hole, (mm)	: 32.0
	Width of clevis, (mm)	: 75.1
1.16	Steering:	
	Make of distributor	: ZF,India (apa)
	Type	: Mechanical, worm and roller with single drop arm
	Location	: Above clutch housing
	Method of operation	: Manual, by steering control wheel
	Diameter of steering control wheel, (mm)	: 430
	Lubricant capacity of system (l)	: 0.55
	Lubricant change period	: After every 1000 hours of operation.
1.17	Brakes:	
1.17.1	Service Brake:	
	Make	: JMI
	Type	: Oil immersed disc brake
	Location	: On differential half axle shaft
	No. of disc (s)	: 04 (on each wheel side)
	Area of liners. (cm ²)	: 918.14 (on each wheel side)
	Material of liners	: Non-asbestos (apa)
	Method of operation	: Individual or combined pedal operation by right foot.
1.17.2	Parking Brake:	
	Type	: Pawl and ratchet arrangement
	Method of operation	: Service brake acts as parking brake when locked in position by a hand lever provided.
	Location	: On RHS of operator's seat.



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- 1.18 Wheel Equipment:**
- 1.18.1 Steering Wheel(s):**
- Make : Good Year
 - Number(s) : Two
 - Type of tyre : Pneumatic, ribbed
 - Size : 6.00 -16
 - Ply rating : 8
 - Maximum permissible loading capacity of each tyre at 206 kPa pressure, (kgf) : 425
 - Recommended inflation pressure, kPa :**
 - for field work : 177 to 206
 - for transport : 177 to 206
 - Track width, (mm) : 1310 (std.), 1530
 - Method of changing track width : By reversing the wheels & changing position of disc on rim lugs.
 - Make & size of rims : SSWL, 4.5E x 16
- 1.18.2 Driving wheel:**
- Make : Good Year
 - Number : Two
 - Type of tyre : Pneumatic, traction
 - Size : 13.6 - 28
 - Ply rating : 12
 - Maximum permissible loading capacity of each tyre at 110 kPa pressure, (kgf) : 1005
 - Recommended inflation pressure, (kPa) :**
 - for field work : 78 to 96
 - for transport : 97 to 110
 - Track width, (mm) : 1340 (std.), 1420, 1500, 1540, 1620, 1700 & 1810
 - Method of changing track width : By reversing the wheels & changing position disc on rim lugs.
 - Make & size of rim : AMW, W12 x 28
- 1.18.3 Wheel base (mm) : 1900**
- Method of changing wheel base, if any : None
- 1.19 Operator's seat:**
- Make : Harita (apa)
 - Type : Cushioned with back rest
 - Type of suspension : Two Helical coil springs
 - Type of dampening : Hydraulic shock absorber
 - Range of adjustment, (mm):**
 - Vertical : Nil
 - Lateral : Nil
 - Longitudinal : ± 55
- 1.20 Optional Features : Dual Clutch (refer clause no 1.12.1)**
- 1.20 Provision for safety and comfort of operator:**
- 1.20.1 Conformity with IS:12343-1998 (Reaffirmed in March, 2009):**
Operator's seat meets the requirements of IS: 12343-1998, except Longitudinal distance of steering control wheel from SIP.



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- 1.20.2 Conformity with IS: 6283 (Part-2)-2007(Reaffirmed in March, 2009):**
 Symbols for operator controls and displays specific to agricultural tractor are provided as per IS: 6283 (Part - 2) – 2007.
- 1.20.3 Conformity with IS:8133-1983 (Reaffirmed in March, 2009):**
 Location and movement of various controls meets the requirement of IS:8133-1983 (Re-affirmed in March, 2009).
- 1.20.4 Conformity with IS: 12239 (Part-1)-1996 (Reaffirmed in February, 2012):**
 Meets the requirements of IS:12239(Part-1)-1996, **except the following:**
 i) Vertical retainers have been provided on only one side of clutch and brake pedals.
 ii) Provision of spark arresting device in the exhaust system.
- 1.20.5 Conformity with IS:12239 (Part-2)-1999 (Reaffirmed in March, 2009):**
 Meets the requirements of IS:12239 (Part-2)-1999, **except the following:**
 i) Differential lock is not provided.
 iii) PTO shaft master shield is not provided.
- 1.20.6 Conformity with IS: 14683 – 1999 (Re-affirmed in March, 2009) :**
 Lightings meet the requirements of IS: 14683-1999.
- 1.20.7 Rear view mirror:**
 Rear view mirror is provided.
- 1.21 Labelling of tractor as per IS: 10273-1987 (Reaffirmed in March, 2009):**
 The Labelling plate riveted on LHS mudguard, provides the following information:

Name of Manufacturer	Eicher Tractors (A Unit of Tafe Motors And Tractors Limited), Mandideep, Dist - Raisen (M.P.) – India
Make	EICHER
Model	EICHER 371
Year of manufacture	2015
Engine serial number	S324E18133
Chassis serial number	923714250116
Maximum P.T.O Power, kW	23.9
Specific fuel consumption, g/kWh	251.5

1.22 Ballast Mass, (kg):

Particulars		As used during drawbar test	As used during field test	As used during Haulage test
			Dry land	
Front	C.I. weight	50	50	50
	Water	Nil	Nil	Nil
Rear	C.I. weight	280	140	140
	Water	200	200	Nil
	Additional weight, if any	Nil	Nil	Nil

1.23 Masses:

Particulars	Mass of the tractor without operator but with all the liquid reservoirs full, (kg)		
	Front	Rear	Total
(i) Without ballast	760	1155	1915
(ii) With ballast as used during drawbar performance test.	810	1635	2445
(iii) With ballast as used during field test (Dry land) during wet land cultivation (puddling)	815	1500	2315
	770	1260	2030
(iv) With ballast as used during haulage test with trailer hitch, canopy and drawbar.	810	1340	2150

1.24 Overall dimensions:

Condition	Length, (mm)	Width, (mm)	Height, (mm)		Ground Clearance, (mm)
			With exhaust pipe	Without exhaust pipe	
Without ballast	3420	1740	2200	1705	355 (Below bumper mounting bracket)

1.25 Number of external lubricating points:

- Oiling : None
- Grease nipples : 16
- Grease cups : 02

1.26 Colour of tractor:

- Chassis & engine : Black
- Bonnet : Silver
- Mudguard, wheel discs & rims : Silver

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 15W40	SAE 15W40
2.	Air cleaner oil	SAE 15W40	SAE 15W40
3.	Transmission, differential, final drive and hydraulic system oil	ELF SF-3I	Oil originally filled in the tractor was not changed
4.	Steering housing oil	EP-80	
5.	Grease	Multi purpose	Servo Grease MP



3. PTO PERFORMANCE TEST

Date(s) of test : 15.07.2016 and 16.07.2016

Tractor run at the Institute prior to start of : 7.7

PTO test (h)

Type of dynamometer bench used : Eddy Current, SAJ AG-250

2.1 The results of power take-off performance are tabulated in Table-1 and graphically represented in Fig. 3, 4 and 5.

Table - 1

Power, (kW)	Speed (rpm)		Fuel consumption			Specific energy (kWh/l)
	PTO	Engine	(l/h)	(kg/h)	Specific, (kg/kWh)	
1	2	3	4	5	6	7
a) Maximum power – 2 hours test:						
25.1	556	2002	7.73	6.47	0.257	3.25
24.0	556	2002	7.50	6.27	0.261	3.20*
b) Power at rated engine speed (2000 rpm):						
25.1	556	2002	7.73	6.47	0.257	3.25
24.0	556	2002	7.50	6.27	0.261	3.20*
c) Power at standard power take-off speed (540 ± 10 rpm):						
24.9	540	1944	7.62	6.37	0.255	3.28
23.6	540	1944	7.39	6.18	0.262	3.19*
d) Varying loads at rated engine speed:						
i) Torque corresponding to maximum power available at rated engine speed (2000 rpm):						
25.1	556	2002	7.73	6.47	0.257	3.25
ii) 85% of the torque obtained in (i):						
22.1	575	2070	6.85	5.73	0.259	3.22
iii) 75% of the torque obtained in (ii):						
16.7	581	2092	5.45	4.56	0.272	3.07
iv) 50% of the torque obtained in (ii):						
11.1	588	2117	4.17	3.48	0.307	2.72
v) 25% of the torque obtained in (ii):						
5.7	597	2149	3.05	2.55	0.443	1.89
vii) Unloaded:						
0.1	601	2164	2.01	1.68	13.330	0.06
e) Varying loads at standard PTO speed:						
i) Torque corresponding to maximum power available at standard PTO speed (540 ± 10 rpm):						
24.9	540	1944	7.62	6.37	0.255	3.28
ii) 85% of the torque obtained in (i):						
21.9	559	2012	6.74	5.64	0.257	3.25
iii) 75% of the torque defined in (ii):						
16.6	564	2030	5.33	4.46	0.268	3.11
iv) 50% of the torque defined in (ii):						
11.2	572	2059	4.05	3.38	0.302	2.77
v) 25% of the torque defined in (ii):						
5.7	580	2088	2.95	2.47	0.432	1.93
vii) Unloaded:						
0.1	584	2102	1.91	1.60	13.112	0.06

* Under high ambient conditions



	<u>Natural ambient</u>	<u>High ambient</u>
-No load maximum engine speed, (rpm) :	2164	2164
-Equivalent crankshaft torque at maximum power, (Nm) :	119.9	114.5
-Maximum equivalent crankshaft torque, (Nm) :	135.7	128.0
-Engine speed at maximum equivalent crankshaft torque, (rpm) :	1199	1199
- Backup torque, (%) :	13.2	11.7
Smoke level , maximum light absorption coefficient, per meter :	0.17	--
- Range of atmospheric conditions:		
Temperature (°C) :	27 to 30	41 to 45
Pressure, (kPa) :	98.5 to 98.7	99.1 to 99.4
Relative humidity (%) :	65.6 to 71.4	34 to 56.4
-Maximum temperatures, (°C):		
Engine oil :	112	123
Coolant :	90	105
Fuel :	47	60
Air intake :	36	52
Exhaust gas :	587	603
-Pressure at maximum power:		
Intake air, (kPa) :	2.1 to 2.2	2.1 to 2.2
Exhaust gas, (kPa) :	3.5 to 3.9	3.7 to 4.5
-Consumptions :		
Lub oil, (g/kWh) :	--	1.22
coolant ,(% of total coolant capacity) :	--	0.71

4. DRAWBAR PERFORMANCE TEST

Date(s) of test :	14.03.2017 to 17.03.2017
Tractor run at the Institute prior to start of drawbar test, (h) :	24.8
Type of track :	Concrete
Height of drawbar, (mm):	
- Without ballast :	580
- With ballast :	550

- 4.1 The results of drawbar performance test consisting of maximum power and pull without ballast / with ballast and ten hours test are tabulated in **Table – 2** The results of the tests with ballast, are also represented graphically in **Fig. 6 & 7.**

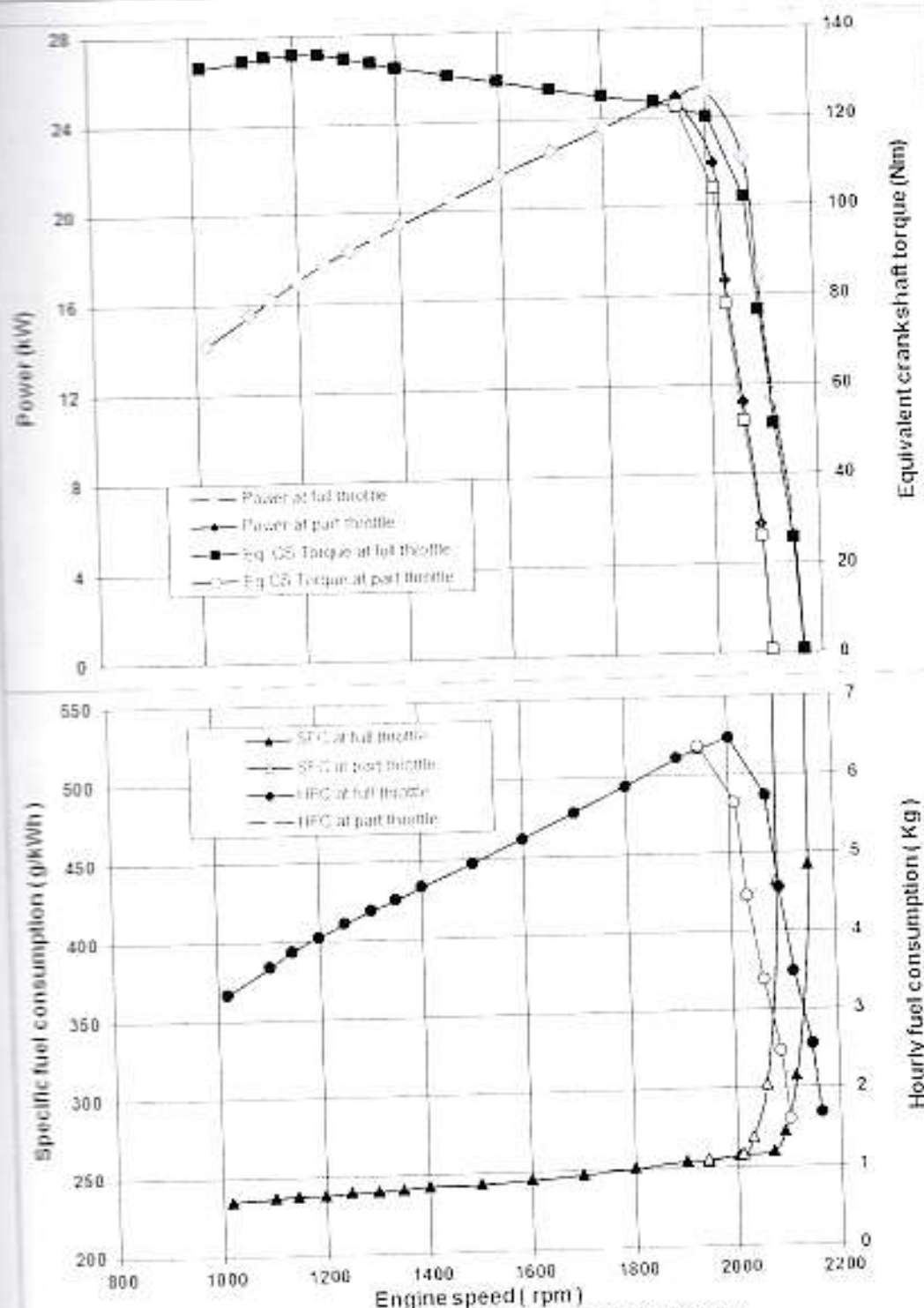


Fig. 3 : PTO PERFORMANCE CHARACTERISTICS
{ Natural Ambient }

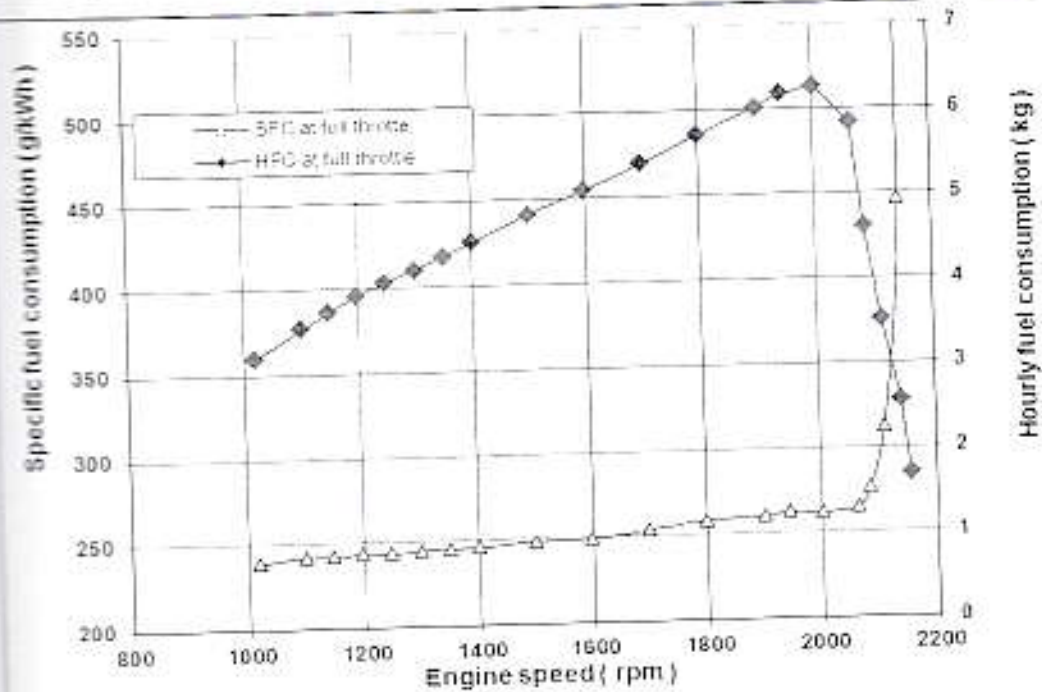
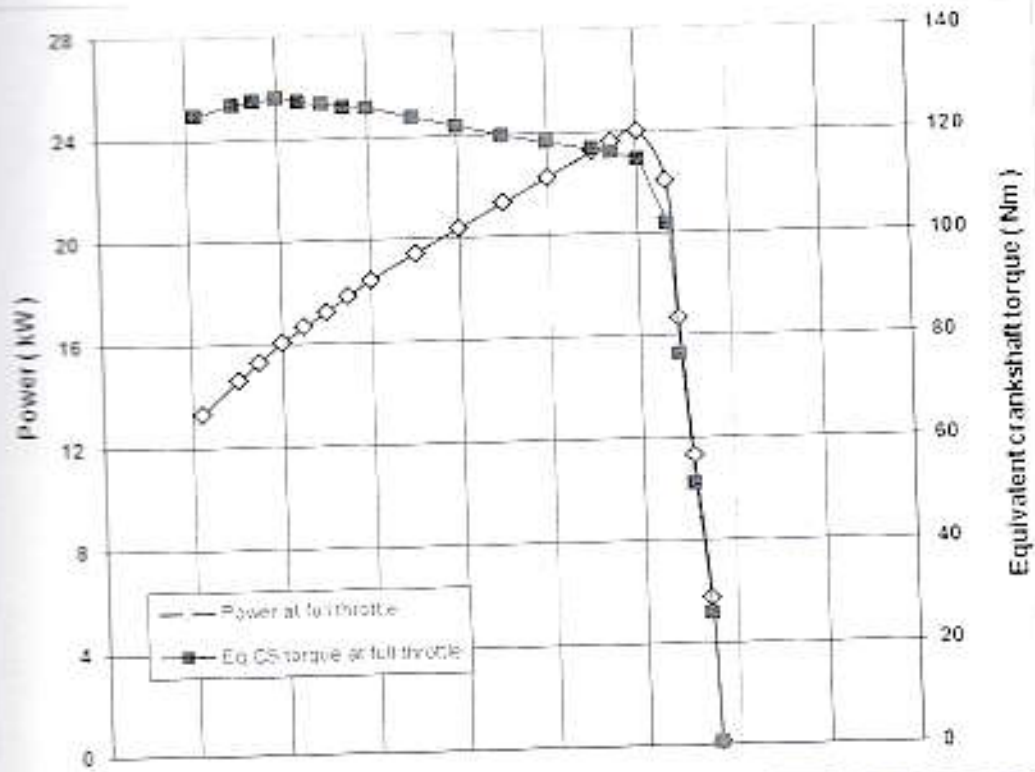


Fig. 4 : PTO PERFORMANCE CHARACTERISTICS (High ambient)

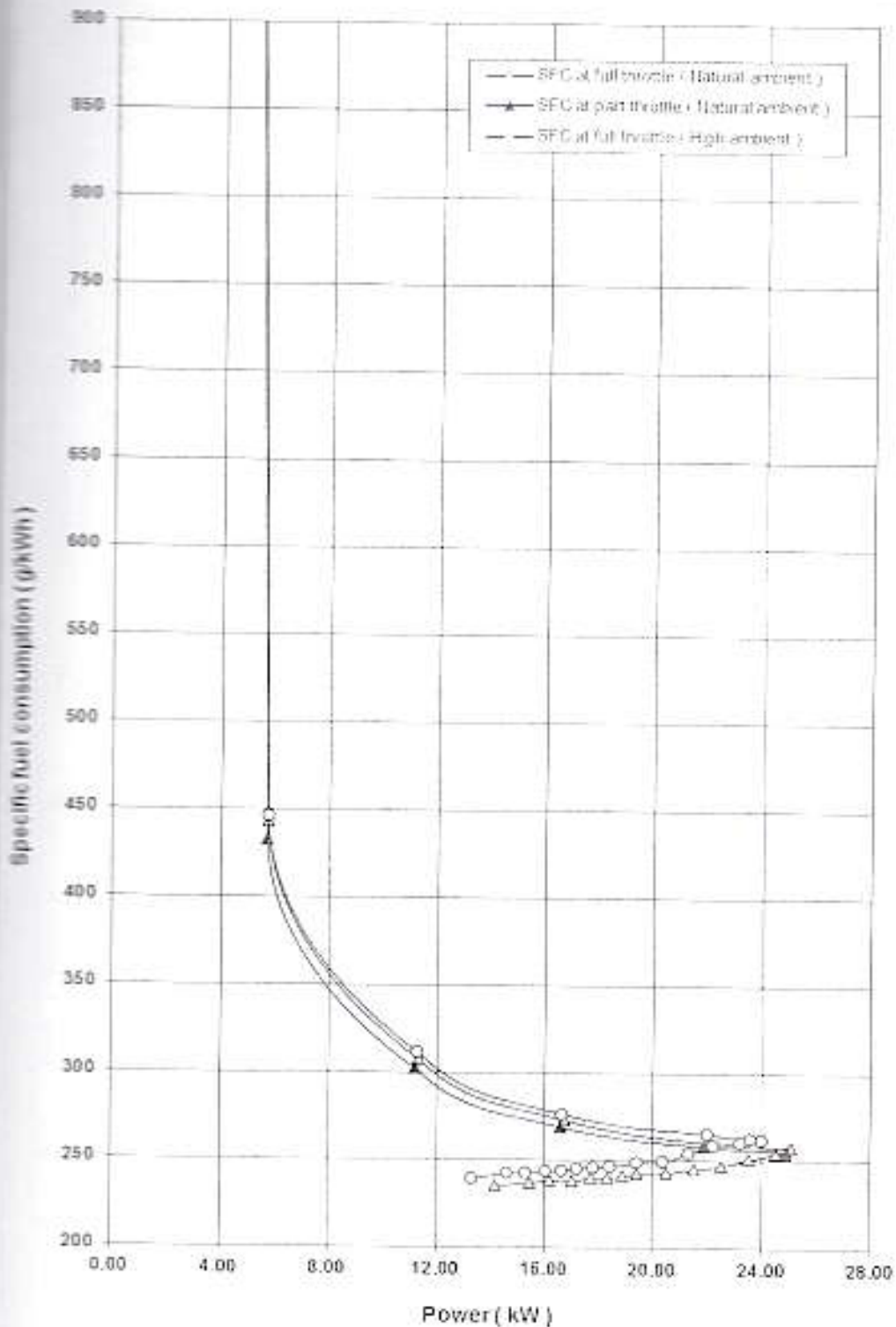


Fig. 5 : PTO PERFORMANCE CHARACTERISTICS



Table 2

DRAWBAR PERFORMANCE TEST

Sl. No.	Travel Speed, (km/h)	Draw-bar power (kW)	Draw-bar pull, (kN)	Engi- ne speed (rpm)	Wheel Slip, (%)	Fuel consumption		Specific energy (kWh/t)	Atmospheric conditions			Temperature, (°C)			Max. sustained pull, (kN)	
						kg/ kWh	(lit)		Temp (°C)	Pre-ssure (kPa)	R.H (%)	Fuel	Trans- oil	Cool- ant		Eng- ine oil
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
i) Maximum power test (Tractor unballasted):																
L1	2.63	10.6	14.48	2093	15.4	0.370	4.69	2.26	28	99.4	19	38	52	78	97	15.47
L2	3.37	15.9	14.40	2071	14.8	0.332	6.31	2.52	27	99.5	22	38	38	79	97	15.20
L3	6.75	21.8	11.61	2005	7.8	0.293	7.64	2.85	27	99.1	18	59	59	82	104	13.19
L4	9.55	23.6	8.91	2001	5.1	0.269	7.59	3.11	27	99.0	20	59	59	83	102	10.62
H1	8.44	23.2	9.89	2001	4.8	0.276	7.66	3.03	28	99.1	20	39	39	83	99	11.40
ii) Maximum power test (Tractor ballasted):																
L1	2.61	13.6	18.76	2104	14.9	0.346	5.63	2.42	31	98.9	16	39	61	78	102	20.11
L2	3.82	19.3	18.18	2029	14.6	0.325	7.50	2.57	30	98.9	15	36	61	82	103	18.60
L3	6.69	20.0	10.73	2001	6.6	0.317	7.58	2.64	30	99.0	16	39	61	84	107	11.98
L4	9.39	20.8	7.06	1998	4.6	0.307	7.64	2.72	29	99.1	16	37	56	84	105	9.42
H1	8.29	20.3	8.83	2004	4.7	0.302	7.33	2.77	29	99.2	14	37	53	84	103	10.44



Contd...Table - 2

G o a r	Travel Speed, (km/h)	Draw- bar power (kW)	Draw- bar pull, (kN)	Engi- ne speed (rpm)	Wheel Slip, (%)	Fuel consumption (kg/ kWh)	Speed fig energy (kWh/l)	Atmospheric conditions			Temperature, (°C)			Max. sust- ained pull, (kN)		
								Temp (°C)	Pre- ssure (kPa)	R.H (%)	Fuel	Trans. oil	Cool- ant		Eng- ine oil	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
iii) Five hours test at 75 percent of pull obtained at max. power (Ballasted wheeled tractor):																
L2	4.24	16.1	13.68	2119	7.2	0.319	6.19	2.60	16	98.9	18	22	34	77	91	--
iv) Five hours test at pull corresponding to 15 percent wheel slip (Ballasted wheeled tractor):																
L1	2.63	13.7	18.76	2105	--	0.351	5.84	2.34	31	98.5	12	37	59	76	100	--

i) The coolant (liquid) and lub oil consumption during 10 hours test were observed as 5.0 ml/h & 5.0 ml/h respectively.

ii) Creeping of tyres, (mm):

- LHS: 40

- RHS: 40

iii) Maximum temperatures during entire drawbar test, (°C):

Engine oil : 107

Coolant : 87

Transmission oil : 63

Fuel : 40

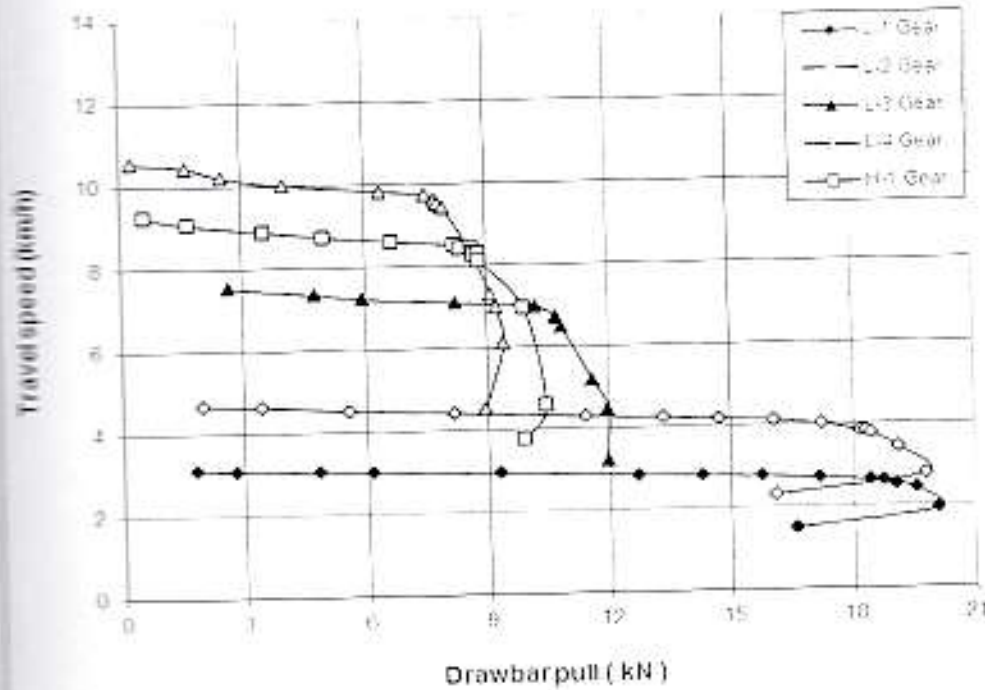
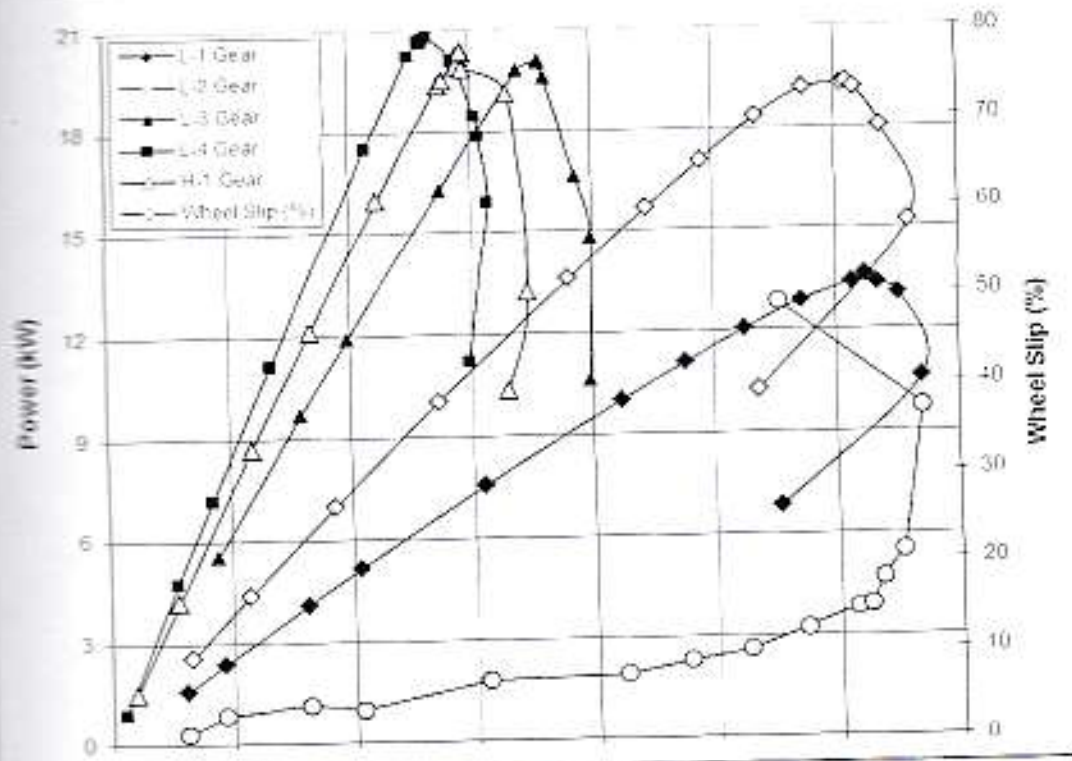


Fig.6: DRAWBAR PERFORMANCE CHARACTERISTICS (Ballasted Condition)

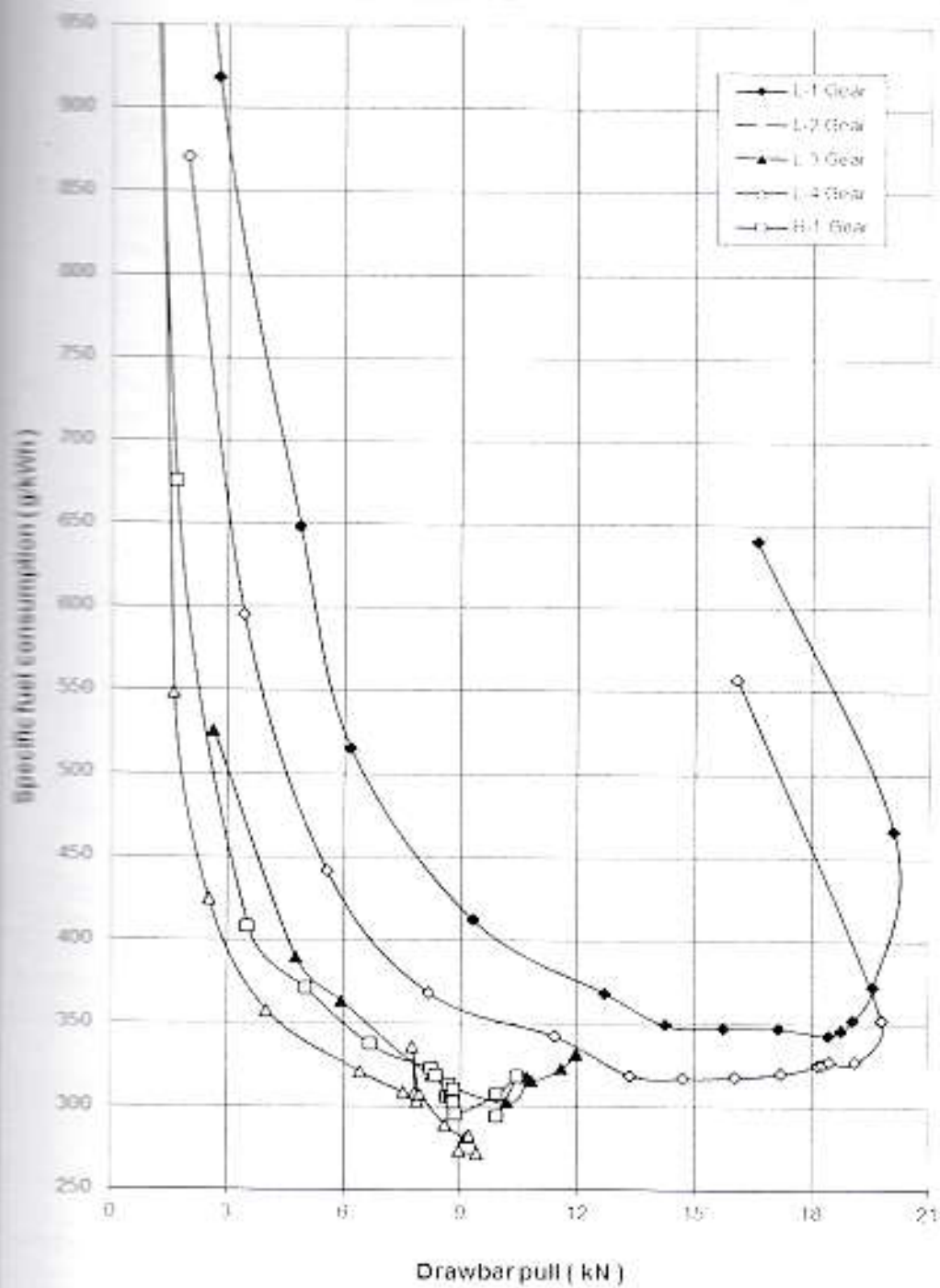


Fig.7 : DRAWBAR PERFORMANCE CHARACTERISTICS (Ballasted condition)



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5. POWER LIFT AND HYDRAULIC PUMP PERFORMANCE TEST

Date(s) of test : 25.07.2016 and 26.07.2016
 Tractor run at the Institute prior to start of hydraulic test, (h) : 19.3
 Pump speed at rated engine speed (rpm) : 1860

5.1 Hydraulic power test:

Pump delivery rate at minimum pressure and rated engine speed, (l/min) : 21.05
 Maximum hydraulic power, (kW) : 5.6
 Pump delivery rate at maximum hydraulic power, (l/min) : 21.09
 Pressure at maximum hydraulic power, (MPa) : 16.0
 Sustained pressure of the open relief valve, (MPa) : 18.0

Tapping point:

a) Relief valve test : External circuit
 b) Pump performance test : At pump outlet
 Temperature of hydraulic fluid, (°C) : 60 to 63

5.2 Lifting capacity test :

Test	Height of lower hitch point above ground in down position, (mm)	Vertical movement with lifting forces, (mm)	Maximum force exerted through full range, (kN)	Corresponding pressure, (MPa)	Moment about rear axle, (kN-m)	Max. tilt angle of mast from vertical (degrees)
At hitch points	200	665	11.78	16.2	9.78	--
On the standard frame	200	665	10.61	16.2	15.28	12.5

5.3 Maintenance of lift load:

Force applied at the frame, (kN) : 9.55
 Temperature of hydraulic fluid at the start of test, (°C) : 60

Test data:

Elapsed time (minute)	5	10	15	20	25	30
Cumulative drop in height of lift, (mm)	15	19	23	28	32	33



6. BRAKE TEST

6.1 Service brake:

6.1.1 Cold brake test:

Date of test(s) : 26.08.2016

Type of Track : Concrete

Maximum attainable speed (kmph):

Unballasted : 31

Road Ballasted : 31

		At maximum attainable speed			
Un-ballasted tractor	Braking device control, force (N)	562	460	357	254
	Mean deceleration, (m/sec ²)	3.20	3.13	2.97	2.50
	Stopping distance, (m)	11.59	11.86	12.50	14.83
Road ballasted tractor	Braking device control, force (N)	556	472	388	304
	Mean deceleration, (m/sec ²)	2.99	2.91	2.84	2.50
	Stopping distance, (m)	12.53	12.76	13.07	14.83

		At 25 kmph travel speed			
Un-ballasted tractor	Braking device control, force(N)	481	400	319	238
	Mean deceleration, (m/sec ²)	3.24	2.94	2.91	2.50
	Stopping distance, (m)	7.56	8.20	8.29	9.65
Road ballasted tractor	Braking device control, force(N)	498	429	361	292
	Mean deceleration, (m/sec ²)	3.00	2.93	2.73	2.50
	Stopping distance, (m)	8.19	8.24	8.82	9.65

6.1.2 Brake fade test:

		At maximum attainable speed			
Road ballasted tractor	Braking device control force(N)	522	459	396	334
	Mean deceleration, (m/sec ²)	2.92	2.82	2.68	2.50
	Stopping distance, (m)	12.79	13.16	13.85	14.83
		At 25 kmph travel speed			
Road ballasted tractor	Braking device control force, (N)	500	443	387	330
	Mean deceleration, (m/sec ²)	2.91	2.73	2.70	2.50
	Stopping distance, (m)	8.52	8.84	8.92	9.65

Maximum deviation of tractor from its original course, (m) : None

Abnormal vibration : None

The brakes were heated by : Self braking

6.2 Parking brake test:

Particulars	18 percent slope		12 percent slope with trailer mass of 1.95 tonnes.	
	Up	Down	Up	Down
Braking device control force, (N)	290	310	285	331
Efficacy of parking brake	-----Satisfactory-----			



7. NOISE MEASUREMENT

7.1 Noise at bystander's position:

Date of test	: 07.06.2016
Type of track	: Concrete
Background noise level, dB (A)	: 57.1
Atmospheric conditions:	
Temperature, (°C)	: 43
Pressure, (kPa)	: 99.6
Relative humidity, (%)	: 37
Wind velocity, (m/s)	: 0.9

TEST DATA:

S. No.	G e a r	Travelling speed before acceleration, (kmph)	Noise level, dB (A)
1.	L1	2.37	81
2.	L2	3.58	82
3.	L3	5.83	81
4.	L4	8.02	81
5.	H1	7.07	81
6.	H2	10.68	81
7.	H3	17.28	81
8.	H4	23.53	80

7.2 Noise at operator's ear level:

Date of test	: 15.03.2017
Type of track	: Concrete
Background noise level, dB(A)	: 56.2
Atmospheric conditions:	
Temperature, (°C)	: 28
Pressure, (kPa)	: 99.3
Relative humidity, (%)	: 16
Wind velocity, (m/s)	: 1.2

TEST DATA:

Gear	Drawbar pull at which the tractor develops the max. noise level, (kN)	Corresponding travelling speed, (kmph)	Noise level dB (A)
L1	13.83 to 14.17	2.69 to 2.64	93
L2	14.14 to 14.40	4.02 to 3.97	95
L3*	8.78 to 11.61	7.12 to 6.72	96
L4	8.48 to 8.61	9.89 to 9.75	96
H1	7.95 to 9.89	8.83 to 8.44	96

* Gear corresponds to the nominal travelling speed nearest to 7.5 kmph.

8. AIR CLEANER OIL PULL-OVER TEST

Date of test	: 13.06.2016
Atmospheric conditions:	
Temperature, (°C)	: 36 to 39
Pressure, (kPa)	: 96.8 to 97.6
Relative humidity, (%)	: 21 to 34
Mass of oil before test, (g)	: 865.9



Sl. No.	Position of tractor	Loss of Oil, (g)	Oil pull-Over, (%)	Engine oil pressure
i)	Tractor parked on level ground	0.4	0.05	Normal
ii)	Tractor tilted 15° laterally with RHS up	Nil	Nil	Normal
iii)	Tractor tilted 15° laterally with LHS up	Nil	Nil	Normal
iv)	Tractor tilted 15° longitudinally with front end up	Nil	Nil	Normal
v)	Tractor tilted 15° longitudinally with rear end up	0.6	0.07	Normal

9. MECHANICAL VIBRATION MEASUREMENT

Date of test : 20.07.2016

Type of test surface : Concrete

Sl. No.	Measuring points		Vibration, microns			
			At no load		At load corresponding to 85% of maximum PTO power	
			VD	HD	VD	HD
i)	Foot rest	Left	120*	130*	110*	130*
		Right	90	30	100*	110*
ii)	Steering control wheel		100*	70	120*	120*
iii)	Seat	Back	30	20	60	60
		Bottom	30	50	40	60
iv)	Mudguard	Left	60	30	30	60
		Right	40	70	70	50
v)	Head light	Left	100*	130*	100*	170*
		Right	130*	150*	90	120*
vi)	Battery base, centre		100*	120*	150*	140*
vii)	Tail light	Left	100*	60	100*	60
		Right	160*	70	120*	100*
viii)	Plough light		90	40	60*	40
ix)	Gear shifting lever		90	70	70	40
x)	Accelerator lever	Hand	90	100*	130*	70
		Foot	160*	120*	140*	120*
xi)	Brake pedal	Left	250*	160*	100*	120*
		Right	160*	60	100*	140*
xii)	Clutch pedal		130*	70	100*	90
xiii)	Main hydraulic control lever		50	30	60	30
xiv)	PTO engaging lever		30	20	70	30

*The amplitude of mechanical vibration is on higher side.

10. LOCATION OF CENTRE OF GRAVITY

Condition	Particulars	Coordinates
Tractor under un-ballasted condition but with all the liquid reservoirs full & the operator replaced by a 75 kg mass on the seat	Height above ground, (mm)	844
	Distance forward from the vertical plane containing the axis of rear wheels, (mm)	741
	Distance from the median plane parallel to the longitudinal axis of tractor bisecting the track, (mm)	6.5 (in RHS)

11. TURNING ABILITY

Characteristics	Minimum turning diameter, (m)		Minimum clearance diameter, (m)	
	LHS	RHS	LHS	RHS
Brake applied	6.23	6.12	6.69	6.58
Brakes released	6.94	6.83	7.40	7.29

12. OPERATOR'S FIELD OF VISION

The operator's field of vision to the front and rear from the operator's seat is represented in as per the following details.

1. The non-visible space in front is 7340 mm which is 3.86 times of its wheel base (i.e. 1900 mm).
2. The non-visible space in LHS & RHS is 2740 mm which is 2.04 times of its rear std. track width (i.e. 1340 mm).
3. The major parts creating masking effect are silencer and pre cleaner.

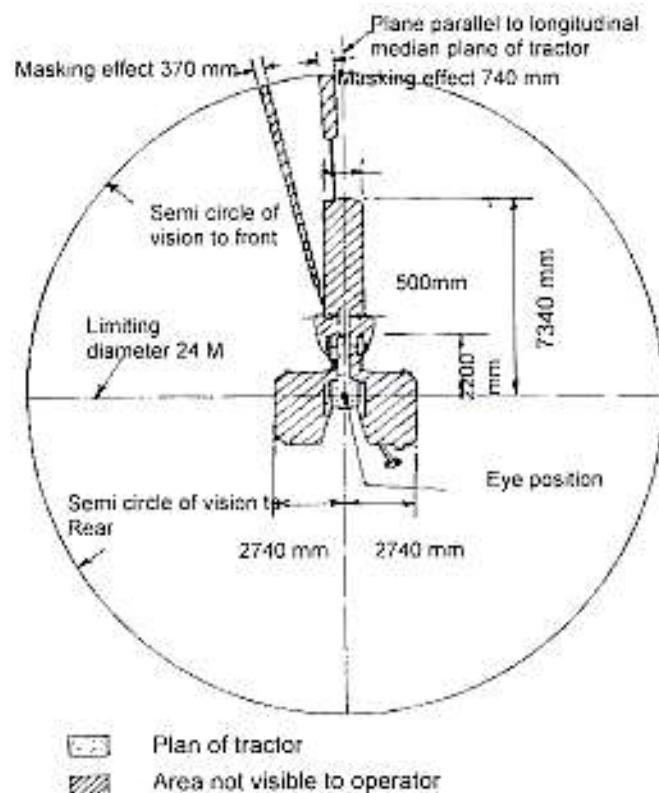


Fig. 8: OPERATOR'S FIELD OF VISION

13. FIELD TEST

- 13.1 The field tests comprising of Disc ploughing, rotavation and puddling with full cage wheels (including water proof test) were conducted for 10.2, 10.6 and 15.3 hours respectively. All the field tests were conducted at the full accelerator settings, when the no load speed of the engine is 2160.
- 13.2 The brief specifications of the implements used during field tests are given in Annexure-I.
- 13.3 The summary of field test observation with Disc plough and Rotavator is given in Table- 3.



SUMMARY OF FIELD PERFORMANCE TEST

Table - 3

S/No	Parameter/operation	Disc Ploughing	Rotavation	Puddling
i)	Type of soil (refer IS: 7926-1975)	Heavy	Heavy	Heavy
ii)	Av. soil moisture, (%) / Av. Depth of standing water, (mm)	7 to 11	12 to 15	12
iii)	Bulk density of soil, (g/cc)	1.6	1.5 to 1.6	-
iv)	Cone index, (kg/sq.cm) / puddling index, (%)	8.17 to 9.36	6.81 to 8.51	78
v)	Gear used	L 1	L 1	L 2
vi)	Av. speed of operation, (kmph)	2.45 to 2.67	3.07 to 3.15	4.04 to 4.05
vii)	Av. wheel slip, (%) / Av. Travel reduction, (%)	12.52 to 13.60	-2.2 to -2.5	16 to 17
viii)	Av. depth of cut, (cm) / Av. depth of puddle, (cm)	17.5 to 17.9	7.5 to 8	21
ix)	Av. working width, (cm)	49 to 50	110 to 134	--
x)	Area covered, (ha/h)	0.095 to 0.102	0.276 to 0.319	--
xi)	Fuel consumption:			
	- (l/h)	3.11 to 3.15	4.25 to 4.95	3.40 to 3.81
	- (l/ha)	30.8 to 32.7	15.40 to 15.52	--
xii)	Av. draft of implement, (kN)	5.5	NA	--

Remarks: The average lub oil and coolant consumptions during the entire field tests were observed as 3.19 ml/h & Nil respectively.

13.4 Wet land cultivation (puddling):

13.4.1 The tractor was fitted with Full cage wheel for conducting the puddling operation. The brief specification of Full cage wheel used is given in Annexure -II.

13.4.2 After completion of puddling test and water proof test, the tractor was partially dismantled to check effectiveness of sealing provided against ingress of water and / or mud in various assemblies / components as per requirements of IS : 11082 - 1984 (Technical requirement of Agriculture tractors for wet land cultivation). The observations recorded were as under.

S.No.	Location	Whether ingress of mud and/or water	Remarks
1	King pin assemblies	No	None
2	Stub axles	No	
3	Centre pin assembly	No	
4	Clutch housing	No	
5	Brake housing	No	
6	Engine sump, transmission, hydraulic, & Air cleaner oils	No	
7	Starter motor	No	
8	Alternator	No	



14. HAULAGE TEST

Type of trailer	:	Two wheel (Single axle)	Four wheel (Double axle)
Gross mass of trailer, (tonne)	:	4.0	5.0
Height of trailer hitch above ground level, (mm)	:	600	615
Gear used during the test for negotiating slopes up to 8%	:	H4	H4
Average travel speed, (kmph)	:	26.34 to 26.68	27.21 to 27.57
Average fuel consumption:			
- (l/h)	:	3.90 to 4.04	3.95 to 4.01
- (ml/km/tonne)	:	36.6 to 38.4	29.0 to 29.1
Average distance traveled per litre of fuel consumption, (km)	:	6.51 to 6.84	6.88 to 6.89
General observations:			
Effectiveness of brakes	:	Effective	Effective
Maneuverability of tractor-trailer combination	:	Satisfactory	Satisfactory

15. COMPONENTS / ASSEMBLY INSPECTION

The engine and other assemblies were dismantled after 90.4 hours of tractor operation at this institute.

15.1 Engine:

15.1.1 Cylinder bore:

Cylinder No.	Cylinder bore dia, (mm)						Maximum permissible wear limit, (mm)
	Top position		Middle position		Bottom position		
	Thrust side	Non-thrust side	Thrust side	Non-thrust side	Thrust side	Non-thrust Side	
1	88.97	88.96	88.96	88.96	88.96	88.96	89.20
2	88.97	88.96	88.96	88.96	88.95	88.96	
3	88.97	88.95	88.97	88.96	88.97	88.96	

15.1.2 Piston:

Piston No.	Piston dia, (mm)				Max. permissible wear limit of piston dia, (mm)	Clearance between piston and cylinder liner at the skirt of the piston, (mm)	
	Top (above top compression ring)		At skirt			As observed	Maximum permissible limit
	Thrust side	Non-thrust side	Thrust side	Non-thrust side			
1	88.400	88.275	88.819	88.524	piston is to be discarded when the piston ring groove clearance exceeds 0.25 mm	0.151	0.60
2	88.439	88.296	88.830	88.554		0.140	
3	88.426	88.308	88.823	88.570		0.147	

15.1.3 Ring end gap, (mm)

Rings	Cylinder No.1			Cylinder No.2			Cylinder No.3			Maximum permissible limit
	T	M	B	T	M	B	T	M	B	
1 st comp. ring	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	2.5
2 nd comp. ring	0.40	0.40	0.40	0.35	0.35	0.35	0.40	0.40	0.40	2.5
Oil Ring	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	2.5

T: Top, M: Middle, B: Bottom

15.1.4 Ring side clearance:

Rings	Ring side clearance, (mm)			Max. Permissible clearance limit, (mm)
	Piston-I	Piston-II	Piston-III	
1 st Compression ring	0.074	0.079	0.078	0.35
2 nd Compression ring	0.069	0.063	0.066	0.35
Oil ring	0.048	0.051	0.047	0.40

15.1.5 Main bearings:

Bearing No.	Diametrical Clearance, (mm)	Crankshaft end float, (mm)	Max. permissible clearance limit, (mm)	
			Diametrical clearance	Crankshaft end float
1	0.104 to 0.108	0.20	0.60	0.65
2	0.110 to 0.149			
3	0.109 to 0.110			
4	0.103 to 0.123			

15.1.6 Big end bearings:

Bearing No.	Clearance, (mm)		Max. permissible clearance limit, (mm)	
	Diametrical	Axial	Diametrical	Axial
1	0.111 to 0.160	0.25	0.60	0.65
2	0.105 to 0.126	0.20		
3	0.122 to 0.151	0.25		

15.1.7 Valves, guides and timing gears:

Any marked sign of overheating of valves : None

Pitting of seat/faces of valves : None

Any visual damage to the teeth of timing gears : None

Spring Rate, (N/mm):

-Intake valve : 13.61 to 13.85

-Exhaust valve : 13.48 to 14.10

Discard limit of 9.80

Clearance between valve guide and valve stem, (mm):

Intake valve : 0.098 to 0.103

Exhaust valve : 0.089 to 0.100

Against the discard limit of 0.155 mm



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15.2 Clutch:

Any marked wear on clutch friction plates : None
 Condition of clutch release bearing : Normal
 Condition of release levers & springs : Normal
 Condition of pilot bearing : Normal
 Presence of oil in clutch housing : None
 Any marks on fly wheel/ pressure plate : None

Overall thickness of clutch plate, (mm):

-Transmission : 10.95 to 11.05

Height of lining over rivet head, (mm):

-Transmission : 2.76 to 3.09

Against discard limit of 0.2 mm over rivet head.

15.3 Transmission gears:

Any visual damage, pitting & chipping of any transmission gear teeth : None

Backlash between crown wheel and pinion, (mm) : 0.40

Discard limit not specified.

15.4 Brakes:

Description	Initial specified overall thickness of brake disc, (mm)	Measured thickness of brake disc after test, (mm)	Measured height of lining over rivet head, (mm)	Discard limit, (mm)
Left	4.75 to 4.90	4.80 to 4.84	1.00 to 1.39	Against discard limit of 0.2 mm over rivet head.
Right	4.75 to 4.90	4.78 to 4.82	0.98 to 1.17	

15.5 Front axle:

Observation

Any marked wear of king pins : None
 Any marked wear of king pin bushes : None
 Clearance between king pin and bushes, (mm) : 0.076 to 0.100
 Condition of bearings for stub axles : Normal
 Condition of thrust bearings : Normal
 Condition of seals for stub axles and king pins : Normal

Against the discard limit of 0.50 mm

Clearance between centre pin and bushes, (mm) : 0.095 to 0.123

Against the discard limit of 0.40 mm

15.6 Steering system:

Visual condition of the components of complete steering assembly : Normal

15.7 Starter motor & Alternator:

Presence of soil/oil in housing : None
 Condition of bearings and other components : Normal



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16. ADJUSTMENTS, DEFECTS, BREAKDOWNS AND REPAIRS

Sl. No.	Adjustments / Defects / Breakdowns and Repairs	Tractor run hours
1.	During Air cleaner pull over test leakage of hydraulic fluid was observed from the joints of suction line connecting to the hydraulic pump which was due to improper alignment and aligned properly.	6.9

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.	Characteristic	Category (Evaluative / Non Evaluative)	Requirements as per IS: 12207-2008	Values declared by the applicant/ requirement	As observed	Whether meets the requirements (Yes/No.)
1	2	3	4	5	6	7
17.1.1	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	23.9	25.1	Yes
b)	Power at rated engine speed, (kW)	Non Evaluative	-do-	23.9	25.1	Yes
c)	Specific fuel consumption corresponding to maximum power, (g/kWh)	Non Evaluative	+ 5%	252	257	Yes
d)	Maximum equivalent crankshaft torque, (Nm)	Non Evaluative	± 8%	142 (D)	135.7	Yes
e)	Back-up torque, percent	Non Evaluative	10 percent, min.	10 percent, min (D)	13.2	Yes



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1	2	3	4	5	6	7
f)	Maximum operating temperature ($^{\circ}\text{C}$)					
	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.	135 (D)	123	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.	115 (D)	105	Yes
g)	Engine oil consumption, (g/kWh)	Evaluative	Not exceeding 1% of SFC at max. power under High ambient conditions	2.61 (R) 2.51 (D)	1.22	Yes
	Smoke level	Evaluative	Maximum light absorption coefficient of 3.25 per meter or equivalent BOSCH No. 5.2 or 75 Hatridge value (As per CMVR)	3.25 per meter (R)	0.17	Yes
17.1.2	Drawbar performance :					
a)	Max. drawbar pull with ballast corresponding to 15 percent wheel slip, (kN)	Non Evaluative	Minimum 65% of static mass with ballast	15.59(R) 15.7 (D)	18.75	Yes
b)	Max. drawbar pull with Un ballasted corresponding to 15 percent wheel slip, (kN)	Evaluative	Minimum 65% of static mass of tractor without ballast/ with standard ballast	12.21(R) 12.3 (D)	14.48	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 having 1500 kg total static mass of tractor Minimum 75 % of the engine power as referred in SI No. i) a) of engine performance in case of tractors which do not have a PTO shaft.	20.1 (R) 19.1 (D)	23.6	Yes \rightarrow



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1	2	3	4	5	6	7
d)	Maximum transmission oil temperature (°C)	Non Evaluative	The declared value should not exceed the maximum value specified by oil company	115 (D) ↓	63 ↓	Yes
17.1.3	Power lift and hydraulic pump performance:					
a)	Maximum lifting capacity throughout the range of lift. (kN):					
1)	At hitch points	Non Evaluative	[Tolerance of minus 10%]	11.7 (D)	11.78	Yes
2)	With the standard frame	Evaluative	The lift capacity should at least be 24 kg/PTO kW, and it should be 21.5 kg/engine kW where the tractor is not provided with a PTO shaft.	5.91 (R) 9.8 (D)	10.61	Yes
b)	Maximum drop in the height of the point of application of the force after each 5 minutes interval for a total duration of 30 minute. (mm)	Non Evaluative	The observed value should not exceed 50 mm	50 (D)	33	Yes
17.1.4	Brake performance at 25 kmph:					
a)	Maximum stopping distance at a force, equal to or less than 600 N on brake pedal with road ballasted (m):					
1)	Cold brake	Evaluative	10	10	5.19	Yes
2)	Hot brake	Evaluative	10	10	8.52	Yes
b)	Maximum force exerted on the brake pedal to achieve a deceleration of 2.5 m/s ² (N)	Evaluative	600	600	238 to 330	Yes
c)	Whether parking brake is effective at a force of 600 N at foot pedal(s) or 400 N at hand lever	Evaluative	Yes / No	Yes	Yes	Yes
17.1.5	Noise measurement :					
a)	Maximum ambient noise emitted by the tractor dB(A)	Evaluative	As per CMVR	88	82	Yes
b)	Maximum noise at operator's ear level dB(A)	Evaluative	As per CMVR	98	96	Yes



1	2	3	4	5	6	7
17.1.6	Amplitude of mechanical vibrations at :					
	1) Right foot rest	Non Evaluative	100 microns (max.)	100 micron (max)	110	No
	left foot rest				130	No
	2) Seat (with driver sealed)				60	Yes
	3) Steering control wheel				120	No
17.1.7	Haulage requirements :					
a)	Gross mass of the trailers, (tones):					
	1) Two wheel	Non Evaluative	--	4.0 (D)	4.0	Yes
	2) Four wheel		--	5.0 (D)	5.0	Yes
b)	Distance travelled / litre of fuel consumption, (km/l):					
	1) Two wheel	Non Evaluative	--	5.0 to 5.5	6.51 to 6.84	Yes
	2) Four wheel		--	5.0 to 6.5	6.88 to 6.89	Yes
c)	Fuel consumption (ml/km/tonne):					
	1) Two wheel	Non Evaluative	--	30 to 35	36.6 to 38.4	No
	2) Four wheel		--	30 to 35	29.0 to 29.1	Yes
17.1.8	Wetland cultivation :					
	Sealing for the following assemblies:	Evaluative	The identified assemblies should essentially meet the requirement of IS 11082. No water ingress in the identified assembly given in column-2. If tractor does not meet the requirements of wetland cultivation, it may be recommended for dry land operation only.	There should be no ingress of water and/or mud	No ingress of water was observed during water proof test	Yes
	1) Clutch assembly	-do-				
	2) Brake housings	-do-				
	3) Front axle hubs	-do-				
	4) Engine Oil	-do-				
	5) Transmissi on Oil	-do-				
17.1.9	Safety features :					
a)	Guards against moving and hot parts	Evaluative	As per CMVR	---	Provided	Yes
b)	Lighting arrangement	Evaluative	As per CMVR		Provided	Yes
c)	Sealing requirements (Tractors having more than 1150 mm rear track width)	Non Evaluative	Should meet the requirements of IS: 12343 (As amended from time to time)	--	Does not Meet the requirements	No



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1	2	3	4	5	6	7
d)	Technical requirements for PTO shaft	Non Evaluative	Should meet the requirements of IS: 4931 (As amended from time to time)	--	Meets the requirements	Yes
e)	Dimensions of three point linkage	Non Evaluative	Should meet the requirements of IS: 4468 (Part-I) (As amended from time to time)	- -	Does not Meet the requirements	No
f)	Specifications of linkage	Non Evaluative	Should meet the requirements of IS 12953 and IS 12362 (Part 3) (As amended from time to time)	--	Meets the requirements	Yes
	Swinging drawbar				Not Provided	Not applicable
17.1.10	Labelling of tractors (Provision of labelling plate):					
	1) Make	Evaluative	Should conform to the requirements of CMVR along-with declared value of PTO HP	--	EICHER	Yes
	2) Model	Evaluative		--	EICHER 371	Yes
	3) Year of manufacture	Evaluative		--	2015	Yes
	4) Chassis number	Evaluative		--	S324E18133	Yes
	5) Engine number	Evaluative		--	923714250116	Yes
	6) Declaration of PTO power, (kW)	Evaluative		--	23.9	Yes
17.1.11	Discard limit for:					
(a)	Cylinder bore diameter, (mm)	Evaluative	To be declared by the manufacturer	89.2	88.96 to 88.97	Yes
(b)	Clearance between piston & cylinder liner at skirt, (mm)	Non Evaluative	-do-	0.60	0.140 to 0.151	Yes
(c)	Ring end gap (mm):					
	- Top comp. ring.	Evaluative	-do-	2.50	0.35	Yes
	- 2 nd comp. ring		-do-	2.50	0.35 to 0.40	Yes
- Oil ring.	-do-		2.50	0.35	Yes	
(d)	Ring groove clearance (mm):					
	- Top comp. ring.	Evaluative	-do-	0.35	0.074 to 0.079	Yes
	- 2 nd comp. ring.		-do-	0.35	0.063 to 0.069	Yes
- Oil ring.	-do-		0.40	0.047 to 0.051	Yes	
(e)	Clearance of main bearings (mm):					
	- Diametrical clearance	Evaluative	-do-	0.60	0.103 to 0.149	Yes
	- Crankshaft end float	Evaluative	-do-	0.65	0.20	Yes



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1	2	3	4	5	6	7
(g)	Clearance of big end bearings, (mm):					
	- Diametrical	Evaluative	To be declared by the manufacturer	0.60	0.105 to 0.160	Yes
	- Axial	Evaluative	-do-	0.65	0.20 to 0.25	Yes
(h)	Clearance between king pin and bush, (mm)	Non Evaluative	-do-	0.50	0.079 to 0.100	Yes
(i)	Clearance between center pin and bush, (mm)	Non Evaluative	-do-	0.40	0.095 to 0.123	Yes

17.1.12 Literature

(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

17.1.12 CATEGORY OF BREAKDOWNS / DEFECTS :

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



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17.2 Optional requirements as per Clause-4 (Table-2) of IS:12207-2014:				
S. No.	Characteristic	Requirements as per IS: 12207-2014	AS observed	Remarks
1	2	3	4	5
1	Air cleaner oil pull over, max. oil pull over (%)	0.25% (max.)	0.07%	Yes
2.	Seating requirements	Should meet the requirements of IS: 12343-1998	Does not conform	No
3.	Fitment of ROPS	With a provision for fitment of ROPS. If ROPS fitted it should meet the requirement of IS: 11821-1992	Not provided	--
4.	Technical requirements for PTO shaft & its Master shield	Should meet the requirements of IS: 4931 -1995	Does not conform	No
5.	Dimensions of three point linkage	Should meet the requirements of IS: 4468 (Part-I)-1997	Does not conform	No
6.	Specifications of linkage drawbar.	Should meet the requirements of IS: 12953-1990	conforms	Yes
7.	Specifications of swinging drawbar	Should meet the requirements of IS:12362 Part 3-1994.	Not provided	--
8.	Accessories	Trailer hitch, front low hook, linkage drawbar may be provided.	Provided	Yes

17.3 Conformity with following IS:

- i) Guidelines for declaration of power and specific fuel consumption and labeling of agricultural tractors (First revision) [IS 10273:1987 (Reaffirmed in March, 2009)] : Conforms
- ii) Agricultural tractors – Rear mounted power take-off - Types 1, 2 and 3 (third revision) [IS: 4931-1995 (Reaffirmed in March, 2009)] : Conforms
- iii) Agricultural wheeled tractors - Rear mounted three-point linkage: Part 1 Categories 1, 2, 3 & 4 (fourth revision) [IS 4468 (Part-I):1997 (Reaffirmed in February, 2012)] : Does not conform
- iv) Drawbar for agricultural tractors – Link type [IS 12953:1990 (Reaffirmed in February, 2012)] : Conforms
- v) Agricultural tractors - Operator's seat technical requirement [IS 12343 -1998 (First revision) (Reaffirmed in March, 2009)] : Does not conform
- vi) Guide for safety & comfort of operator of agricultural tractors: Part 1 General requirements (first revision) : [IS 12239 (Part-1)-1996 (Reaffirmed in February, 2012) / ISO 4254-1:1989] : Does not conform
- vii) Tractors and machinery for agriculture and forestry – Technical means for ensuring safety Part 2: Tractors (first revision) IS 12239 (Part-2)-1999 (Reaffirmed in March, 2009)] : Does not conform



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- viii) Tractors and machinery for agriculture and forestry, powered lawn and garden equipment – Symbols for operator controls and other displays – Symbols for Agricultural Tractors and Machinery [IS: 6283 (Part-2) – 2007(Reaffirmed in March, 2009) / ISO 3767-2:1991] : Does not conform
- ix) Guidelines for location and operation of operator controls on agricultural tractors and machinery (first revision) (IS: 8133 – 1983) (Reaffirmed in March, 2009) / ISO 3789:1982] : Conforms
- x) Agricultural Tractor & Machinery Lighting device for travel on public roads [IS: 14683-1999 (Reaffirmed in March, 2009)] : Conforms

17.4 Salient Observations:**17.4.1 Laboratory tests:****17.4.1.1 PTO Performance:**

- i) The specific fuel consumption corresponding to maximum power was recorded as **257 g/kWh** against the declaration of **252 g/kWh**, which is within the tolerance limit of IS: 12207-2014.
- ii) Back up torque is 13.2%

17.4.1.2 Drawbar performance test:

During 10 hour drawbar test, the creeping of LHS & RHS rear tyre over the rims was observed as 40 mm on each side, which was considered on higher side. This may 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 are on higher side especially at the steering control wheel, left and right foot rest. This calls for dampening down of vibrations to improve the operational comfort and service life of components.

17.4.1.4 Three point linkage:

The lateral distance from lower hitch point to center line of tractor does not meet the requirements of IS: 4468(Part I)-1997. This should be looked into for necessary corrective action.

17.4.1.5 Linkage drawbar:

Some of the parameters of the drawbar linkage conform to Cat-I and some of them conform to Cat-II. Keeping in view of the spirit of standardization, the necessary improvements may be incorporated.

17.4.2 Field performance test:**17.4.2.1 Haulage performance:**

- ii) The fuel consumption (ml/km/tonne) with two wheel was observed as 36.6 to 38.4 ml/km/tonne against the declaration of 30 to 35 ml/km/tonne. This does not meet the requirement of IS: 12207-2014 and therefore, should be looked into for necessary corrective action.

17.4.2.2 Wet land cultivation (Puddling operation):

The manufacturer has recommended that the tractor is suitable for wetland cultivation (puddling operation). After completion of the test No ingress of water and / or mud in various assemblies / components was observed. The tractor is suitable for wetland cultivation (puddling operation).



- 17.5 **Maintenance / Service Problems:**
No noticeable maintenance/ 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) Provision of vertical retainers on both sides of clutch and brake pedals.
 - iii) Provision of differential lock.
 - iv) Provision of PTO shaft master shield.
- 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) Operator's manual (for Eicher - 371 tractor)
 - ii) Parts catalogue (for Eicher - 371 tractor)
 - iii) Service manual (for Eicher - 371 tractor)
- 17.7.2 The literatures should also be brought out in national as well as other regional languages for the guidance of users and service personnel.

18. CITIZEN CHARTER

Time frame for Testing & Evaluation as per Citizen Charter	Duration of Test	Whether the Test Report is released within the time frame given in Citizen Charter	Remarks
10 Months	12 Months (May, 2016 to April, 2017)	No	Pre Occupation of test set up

TESTING AUTHORITY:


NITESH KUMAR VERMA
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	17.4.1.2	Have taken up with Tyre manufacture for the improvement.
19.2	17.4.1.3, 17.4.1.4 & 17.4.1.5	These are minor non conformance and will not affect the tractor performance; however necessary quality check implemented in the quality system.
19.3	17.6	Recommendations are being looked into w.r.t. Design, Development & Implementation.

ANNEXURE -I

BRIEF SPECIFICATION OF IMPLEMENTS USED DURING FIELD TEST

S. No	Item	Disc Plough	Rotavator
1	2	3	4
1.	Make	Field King	Shaktiman
2.	Type	Mounted	Mounted
3.	No. of Disc/blades	2	30 in 6 flanges
4.	Type of Disc/blades	Plain concave	Hatchet
5.	Size of bottoms/blades. (mm)	650	220 x 80 x 7
6.	Spacing of bottoms/flanges. (mm)	660	210
7.	Lower hitch point span. (mm)	860	730
8.	Mast height. (mm)	615	540
9.	Overall dimensions. (mm):		
	- Length	1850	1210
	- Width	855	1600
	- Height	1200	950
10.	Gross mass. (kg)	295	280

ANNEXURE -II

BRIEF SPECIFICATION OF FULL CAGE WHEELS

SI No.	Items	Specification
1.	Type	Full cage wheel
2.	Outer diameter, (mm)	1353
3.	Width, (mm)	1000
4.	No. and types of lugs	32, Straight lugs made of M.S. angle section welded to angle iron frame.
5.	Size of angle section. (mm)	40 x 40 x 5
6.	Length of lug, (mm)	490
7.	Spacing of lug, (mm)	175
8.	Weight of each cage wheels, (kg)	155



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EICHER, EICHER 371 TRACTOR - Commercial (Initial)

ANNEXURE -III**TRACTOR RUN HOURS DURING TEST**

A.	LABORATORY AND TRACK TESTS:	HOURS
1.	Running-in	--
2.	PTO performance test	10.6
3.	Power lift and hydraulic pump performance test	4.2
4.	Drawbar performance test	18.0
5.	Turning ability	0.2
6.	Location of centre of gravity	0.2
7.	Operator's field of vision	Nil
8.	Brake test	1.6
9.	Noise measurement	2.3
10.	Air Cleaner oil pullover test	3.5
11.	Mechanical vibration test	1.0
12.	Nominal speed test	0.6
B.	FIELD TEST:	
1.	Disc Plough	10.2
2.	Rotavation	10.6
3.	Welland cultivation (including water proof)	15.3
C.	HAULAGE TEST:	6.1
D.	Miscellaneous test and other run hours including idle run, transportation, trials and preparation for test	6.0
	TOTAL:	90.4