T-6

व्यावसायिक परीक्षण रिपोर्ट
COMMERCIAL TEST REPORT (Initial)

संख्या / No. : T-1098/1624/2017
माह / Month : August, 2017

PREET 7549 AGRITRAC 4WD TRACTOR

सत्यमेव जयते

भारत सरकार
कृषि एवं किसान कल्याण मंत्रालय
(कृषि, सहकारिता एवं किसान कल्याण विभाग)
GOVERNMENT OF INDIA
MINISTRY OF AGRICULTURE AND FARMERS WELFARE
(DEPARTMENT OF AGRICULTURE, CO-OPERATION AND FARMERS WELFARE)
केन्द्रीय कृषि मशीनरी प्रशिक्षण एवं परीक्षण संस्थान
ट्रैक्टर नगर, बुदनी (म.प्र.) ४६६ ४४५
CENTRAL FARM MACHINERY TRAINING & TESTING INSTITUTE
(An ISO : 9001 - 2008 Certified Institute)
Tractor Nagar, Budni (M.P.) 466 445
E-mail fmti-mp@gov.in Website : http://www.fmttibudni.gov.in
Telephone : 07564 - 234729 Fax : 07564 - 234743

Manufacturer : **M/s. Preet Tractors Pvt. Ltd.**
Post Box No. 28, Patiala Road,
Nabha (Punjab) - 147 201

Month: August	Test Report No. T- 1098/1624/2017	Year : 2017

सत्यमेव जयते

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

E-mail: fmti-mp@gov.in
Telephone: 07564-234729
Web site: http://www.fmttibudni.gov.in
FAX: 07564-234743

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	:	March, 2016 to July, 2017
Test Report No.	:	**T- 1098/1624/2017**
Month/Year	:	**August , 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.

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SELECTED CONVERSIONS & ABBREVIATIONS

SELECTED CONVERSIONS

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

ABBREVIATIONS

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

CONTENTS

Manufacturer	:	**M/s. Preet Tractors Pvt. Ltd.** **Post Box No. 28, Patiala Road,** **Nabha (Punjab) -147 201**
Test requested by (applicant)	:	The manufacturer
Selected for test by	:	The manufacturer
Place of running - in	:	At manufacturer's work
Duration of running-in, (h):		
- Engine	:	28
- Transmission	:	25
Method of Selection:	:	The test sample was selected by the applicant, hence method of selection is not known.

1. SPECIFICATIONS

1.1 Tractor:

Make	:	PREET
Model	:	7549 AGRITRAC 4WD

*Variants, if any:

S. No.	Variants Model	Brand name if any	Variant feature
1.	PREET 9049 4WD	PREET	PTO Power : 59.0 kW

***The variant model has not been tested at this institute yet.**

Brand name	:	PREET
Type	:	Four wheeled, four-wheel drive, standard, agricultural tractor.
Year of manufacture	:	2015
Chassis number	:	XCM75AG00001/B
Country of origin	:	India

1.2 Engine:

Make	:	PREET
Model	:	8049
Type	:	Four stroke, water cooled, direct injection, turbocharged diesel engine.
Engine Serial number	:	P480-00003

1.2.1 Engine speed (Manufacturer's recommended production setting), (rpm):

- Maximum speed at no load	:	2350 to 2450
- Low idle speed	:	600 to 700
- Speed at max. torque	:	1200 to 1400
Rated speed, (rpm):		
- For PTO use	:	2200
- For drawbar use	:	2200

1.3 Cylinder & Cylinder Head:

Number	:	Four
Disposition	:	Vertical, inline
Bore/stroke, (mm)	:	105/118 (apa)
Capacity as specified by the applicant, (cc)	:	4087
Compression ratio	:	18.5 (±1) : 1
Type of cylinder head	:	Individual
Type of cylinder liners	:	Wet, replaceable
Type of combustion chamber	:	Re-entrant cavity on piston crown
Arrangement of valves	:	Overhead, Inline

	Valve clearance, (cold/hot)	:	0.30/0.30
	- Inlet valve, (mm)	:	0.40/0.40
	- Exhaust valve, (mm)	:	
1.4	**Fuel System:**		
	Type of fuel feed system	:	Gravity and force feed
1.4.1	**Fuel tank:**		
	Capacity, (l)	:	52.3
	Location	:	Above clutch housing
	Provision for draining of sediments/ water	:	Not provided
	Material of fuel tank	:	Metallic
1.4.2	**Water separator:**		
	Make	:	Alerts
	Type	:	Gravity separation, Inverted funnel type
	Location	:	Mounted on LHS of engine in between fuel tank and fuel feed pump.
	Capacity, (l)	:	0.45
1.4.3	**Fuel feed pump :**		
	Make	:	Bosch, India
	Model/Group combination No.	:	FP/KE 22AD48/2, 9 440 030 011
	Type	:	Plunger with hand primer
	Provision of sediment bowl	:	Provided (metallic)
	Method of drive	:	Through camshaft of fuel injection pump
1.4.4	**Fuel filters:**		
	Make	:	Bosch, India
	Model/Group combination No.	:	9 450 030 118
	Number	:	Two
	Type of elements:		
	- Primary	:	Cloth
	- Secondary	:	Paper
	Capacity of final stage filter, (l)	:	0.42
1.4.5	**Injection pump:**		
	Make	:	Bosch, India
	Model/Group combination No.	:	E040296900
	Type	:	Inline, plunger
	Serial number	:	31062287
	Method of drive	:	Through timing gears
1.4.5	**Fuel injectors:**		
	Make	:	Bosch, India
	Nozzle holder number	:	F002 C70 555
	Nozzle number	:	DSLA 146P V3 392
	Type	:	Multi hole (Five holes)
	Manufacturer's production pressure setting, (MPa)	:	25 ± 0.8
	Injection timing	:	8 ± 1 degree before TDC
	Firing order	:	1- 3 - 4 - 2

1.4.6 Governor:

Make	:	Bosch, India
Model/Group combination No.	:	RSV 325 ...1100A5C 1754R
Type	:	Mechanical, Centrifugal, Variable speed
Governed range of engine speed, (rpm)	:	600 to 2450
Rated engine speed, (rpm)	:	2200

1.5 Air Intake System:

1.5.1 Pre-cleaner : Not provided

1.5.2 Air cleaner:

Make	:	LUMAN
Type	:	Dry Type
Location	:	In front of radiator under the bonnet.
Range of suction pressure at maximum power, (kPa)	:	5.20 to 5.33

Details of element :

		Primary element	Secondary element
- **Size (OD/ID)**	:	160.3/95.0	75.0/90.1
- **Length, (mm)**	:	347	337
- **Type**	:	Paper	Fabric
- **No of element**	:	One	One

Air flow restriction indicator	:	Provided on the dashboard
Dust Unloading valve	:	Provided
Service maintenance schedule	:	i) Take out dust element after every 50 to 60 hours of operation, squeezing rubber of dust unloader. ii) Clean paper filter every 120 to 150 hours of operation and change subsequently after every 250 hours of operation. iii) Secondary filter should be change after every 1500 hours of operation.

1.6 Exhaust System:

Type of silencer	:	Updraft, (Cylindrical)
Position of silencer outlet with respect to SIP, (mm):		
- Vertical	:	1000
- Longitudinal	:	1370
- Lateral	:	490 (on RHS)
Range of exhaust gas pressure at maximum power, (kPa)	:	150.50 to 152.23
Provision of spark arresting device	:	None
Provision against entry of rain water	:	A bend is provided on the outlet of silencer

1.6.1 Turbocharger:

Make	:	Holset
Model	:	HE200WG
Serial number	:	D1505275003
Type	:	Fixed geometry /Waste gate having 6 vanes in compressor unit and 12 numbers in turbine unit of outlet vanes.
Speed at rated engine speed,(rpm)	:	142000 (apa)
Method of lubrication	:	Force feed lubrication from main oil gallery of engine.
Location	:	Upon exhaust manifold

1.6.2 **Exhaust Gas Recirculation (EGR)**

Make	:	Posch
Model	:	Not specified
Serial number/Part No.	:	P011003400
Type/Function	:	Natural feeding of exhaust gas to inlet
Location	:	On RHS of engine at air intake manifold

Charge Air Cooler:

Make	:	Not specified
Model	:	Not specified
Overall dimension ,(mm)	:	
Length, (mm)	:	400
Width, (mm)	:	50
Height, (mm)		200
Number of tubes	:	Fifteen number of heat exchanger tubes were provided.
Location & operation	:	Charge air cooler is provided in front of radiator, under the bonnet. Air drawn from the secondary filter element of air cleaner was supplied to turbocharger. The turbocharger forces pressurized air to charge air cooler through hose. The air flows from charge air cooler to cylinder head through hose.

1.7 **Lubricating system:**

Type	:	Force feed-cum-splash
Oil sump capacity,(l)	:	9.62
Total lub oil capacity, (l)	:	10.22
Oil change period	:	First change after 50 hours and subsequently after every 250 hours of operation.
Cooling device, (if any)	:	Not provided

1.7.1 **Filters:**

Type	:	Full flow Spin on Paper element
Number	:	One

1.7.2 **Pump:**

Type	:	Gear
Method of drive	:	Through timing gear
Pressure release setting, (kPa)	:	441 - 490 (apa)
Minimum permissible pressure, (kPa)	:	147

1.8 **Cooling system:**

Type	:	Forced circulation of coolant
1.8.1 Details of Pump	:	Centrifugal, semi open impeller of 90 mm dia. having 12 vanes, and driven through crankshaft pulley by a cogged 'V' belt in common with alternator.
1.8.2 Details of fan	:	Suction type, having six metallic blades of 400 mm diameter and mounted on water pump shaft.
Means of temperature control	:	Thermostat
Bare radiator capacity, (l)	:	5.37
Coolant expansion tank capacity, (l)	:	1.0
Total coolant capacity, (l)	:	11.5
Radiator cap pressure, (kPa)	:	90.0

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 & Model	:	Exide express & MHD1000
Number	:	One
Type	:	Lead acid
Capacity and rating	:	12V, 100 Ah at 20 hours discharge rate
Location	:	On RHS of clutch housing in a separate metallic box.

1.10.2 Starter:

Make	:	Bosch, India
Model	:	F002G20062
Type	:	Pre-engaging, solenoid operated
Power rating	:	12 V, 2.7 kW
Serial number	:	DE114L

1.10.3 Generator:

Make	:	Panalfa
Model	:	Not provided
Type	:	Alternator
Serial number	:	PT- 034 1134 - A
Output rating	:	12V, 42 A
Method of drive	:	Through crankshaft pulley by a cogged 'V' belt common to water pump.

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)
1	2	3	4	5
Front Lights:				
- Head lights	2,12V,60/55W	1210	160 x 100	840
- Parking lights	2, 12V, 5W	1400	65 x 85	275
- Turn Indicator-cum-Hazard warning lights	2, 12V, 21W	1430	70 x 90	270
Rear lights:				
- Brake light-cum-Tail light	2, 12V, 21/5 W	1420	70 x 85	280
-Turn indicator-cum-Hazard warning lights	2,12V, 21 W	1420	55 x 85	225
- Plough light (on RHS)	1, 12V, 35 W	1530	125 ϕ	380
- Reflectors	2, Red	1420	20 x 50	280
- Registration plate light (RHS)	Part of tail lamp in rear Parking Light			

1.10.6 Main switch : Key turn type, having three position viz:
i) OFF
ii) Circuit ON
iii) START

1.10.7	**Horn:**		
	Make	:	Addon
	Type	:	2B, Electromagnetically vibrated diaphragm
	Location	:	In front of radiator, under the bonnet
1.10.8	Light switch	:	Rotary type having six positions viz. i) OFF ii) Parking light + Dash board light 'ON' iii) Head lights (long beam) + (ii) iv) Head lights (short beam) +(ii) v)Turn Indicator switch vi) Horn push button
1.10.9	**Fuse box**	:	Contains 6 fuses of 15 A capacities each.
1.10.10	**Details of other electrical accessories:**		
1.10.10.1	**Flasher Unit:**		
	Make	:	Hella
	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	**Starting Safety switch**	:	Starter will not operate only when the reversal/forward gear lever is in neutral position.

1.11 Instrument panel details:

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

1.12	**Transmission System:**		
1.12.1	**Clutch:**		
	Make	:	Luk ,India
	Type	:	Dual, dry friction plates & pads with diaphragm
	No. of friction plate(s)	:	Two
	Size, (OD/ID),(mm):		
	- Transmission	:	310.6/196.4 ϕ (26.6 cm^2 contact area of each pad having 06 pads)
	- PTO	:	310.1/196.0 ϕ (26.3 cm^2 contact area of each pad having 04 pads)
	Material of clutch lining	:	Ceramic
	Method of operation:		
	Transmission	:	By depressing a pedal on LHS, halfway
	PTO	:	By depressing the same clutch pedal fully.

1.12.2 **Gear box:**

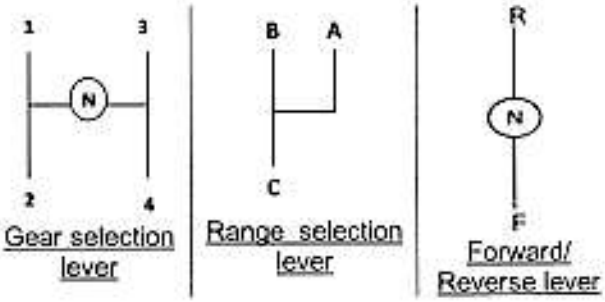
Make : Carraro, India

Type : Mechanical, Combination of synchromesh & constant mesh

No. of speeds:

- Forward : 12
- Reverse : 12

Gear shifting pattern



Gear selection lever | Range selection lever | Forward/ Reverse lever

Location of gear shifting lever:

- Main gear shifting lever : RHS of operator's seat.
- High/Low range shifting lever : RHS of operator's seat.
- Forward/Reverse shifting lever : LHS of operator's seat.

Oil changing period : Change after every 1000 hours of operation.

1.12.3 Nominal Speed:

1.12.3.1 During the nominal speed test, leakage of coolant from the upper tank of radiator was observed and to rectify the problem, the breezing of upper tank of radiator was done and nominal speed test was conducted.

Movement	Gear No.	No. of engine revolutions for one revolution of driving wheel	Nominal speed at rated engine speed when fitted with **16.9 - 30** size tyres of **695** mm radius index, (kmph)
1	2	3	4
Forward	A-1	361.15	1.60
	A-2	244.01	2.36
	A-3	166.98	3.45
	A-4	118.62	4.86
	B-1	142.06	4.06
	B-2	96.24	5.99
	B-3	65.77	8.76
	B-4	46.78	12.32
	C-1	53.64	10.75
	C-2	36.27	15.89
	C-3	24.76	23.28
	C-4	17.62	32.71
Reverse	RA-1	432.46	1.33
	RA-2	290.11	1.99
	RA-3	199.15	2.89
	RA-4	141.66	4.07
	RB-1	169.62	3.40
	RB-2	114.53	5.03
	RB-3	78.56	7.34
	RB-4	55.68	10.35

1	2	3	4
	RC-1	63.80	9.04
	RC-2	43.24	13.33
	RC-3	29.56	19.50
	RC-4	21.02	27.42

1.12.3.2 Number of revolution of front wheels for one revolution of rear - wheels : 1.39:1

1.12.4 Differential unit:

Type : Crown wheel and bevel pinion with differential unit, accommodated inside the differential housing.

Reduction through crown wheel and bevel pinion : 2.846: 1 (37/13 T)

Oil capacity of differential unit, (l) : 32.0 (Common to gear box ,final drive hydraulic system, and brake system)

Oil changing period : Change after every 1000 hours of operation.

Differential lock

- Type : Dog type
- Location : On RHS of differential housing
- Method of operation : By depressing pedal, provided on RHS of operator's seat.

1.12.5 Rear axle & final drive:

Type : Planetary reduction unit, accommodated inside the differential housing.

Reduction through final drive : 6.857:1 (Sun gear – 14 T, Planet gear – 33 T & Ring gear – 82 T)

Oil capacity of final drive, (l) : 32.0 (Common to gear box ,differential unit hydraulic system, and brake system)

Oil changing period : Change after every 1000 hours of operation.

1.12.6 Front differential unit:

Type : Crown wheel & bevel pinion type with differential unit, accommodated inside the differential housing.

Reduction through crown wheel and bevel pinion : 2.133:1 (32T/15T)

Oil capacity of differential unit, (l) : 4.0

Oil changing period : Change after every 500 hours of operation

Differential lock : Not provided

1.12.7 Front axle & final drive:

Type : Planetary reduction unit

Reduction through final drive : 6:1 (Sun gear – 12 T, Planet gear – 23 T & Ring gear – 60 T)

Oil capacity of final drive, (l) : 0.70

Oil changing period : Change after every 500 hours of operation.

1.13 Power lift (Hydraulic system):

- Make : MITA (apa)
- Type : Open center, live, ADDC
- No. and type of cylinder : One, single acting
- Type of linkage lock for transport : Hydraulic, response control knob in its fully locked position acts as transport lock.

1.13.1 **Hydraulic pump:**

- Make	:	VBC Hydraulics
- Type	:	Gear
- Location & drive	:	On RHS of engine & through timing gears
No. & Type of filter	:	One, full flow paper element
Hydraulic oil capacity, (l)	:	32.0 (Common to gear box ,differential unit , final drive and brake system)
Oil change period	:	Change after every 1000 hours of operation.
Provision for external tapping	:	Not provided
Details of control levers	:	i) Position control lever (Yellow) ii) Draft control lever (Red) iii) Response control knob
Method of draft sensing	:	Through top link

1.13.2 **Three point linkage:**

S. No.	Observations		As per IS: 4468-(Part-1) -1997, **(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	25.70	Conforms to Cat.II
	b)	Width of ball	44.0 (max.) / 51.0 (max)	50.87	Conforms to Cat.II
II.	**Lower hitch points:**				
	a)	Dia of hitch pin hole	22.40 to 22.65 / 28.70 to 29.00	28.91	Conforms to Cat.II
	b)	Width of ball	34.80 to 35.00 / 44.80 to 45.00	44.88	Conforms to Cat.II
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	600	Conforms to Cat.II
VI.	Transport height		820 (min)/ 950 (min)	935	Conform to cat. I
VII.	Power range (without load)		560 (min)/ 650 (min)	645	Conforms to Cat. I & II
VIII.	Leveling adjustment		100 (min)/ 100 (min)	315	Conforms to Cat. I & II
IX.	Lower hitch point tyre clearance		100 (min)/ 100 (min)	270	Conforms to Cat. I & II
X.	Lower hitch point height		200 (max) / 200 (max)	200	Conforms to Cat. I & II

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

The following are dimensions observed, corresponding to **695** mm as tyre dynamic radius index:

S. No.	Parameter	Notation	Dimension or range, (mm)	Setting used during test, (mm)
(1)	(2)	(3)	(4)	(5)
1.	Length of lower link	A	920	920
2.	Length of lift arm	B	260	260
3.	Length of lift rods	C	555 to 620	600
4.	Length of top link	D	580 to 860	765
5.	Distance of lift rod connection point from pivot point of lower link	E	410 , 475	475
6.	Distance of lower link pivot point from rear wheel axis:			
	-Horizontally	F	75, behind	75, behind
	-Vertically	G	195, below	195, below
7.	Distance of upper link pivot point from rear wheel axis:			
	-Horizontally	H	245, 240 & 260 behind	240, behind
	-Vertically	J	225, 260 & 285 above	260, above
8.	Distance of lift arm pivot point from rear wheel axis:			
	-Horizontally	K	20, behind	20, behind
	-Vertically	L	310, above	310, above
9.	Height of lower hitch points relative to the rear wheel axis:			
	- In high position	M	45 to 240	150
	- In low position	N	- 655 to – 375	495
10.	Height of lower link hitch points when locked in transport position		150	

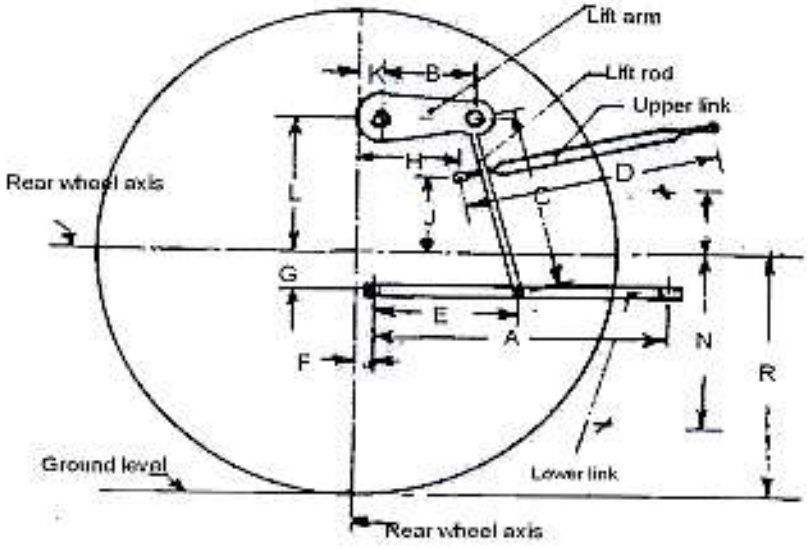
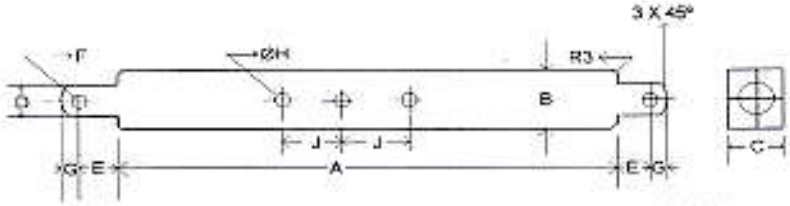


Fig.1 (a): DIMENSIONAL NOTATIONS FOR TABLE OF LINKAGE GEOMETRY

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
1	2	3	4
A	683 ± 1.5 / 825 ± 1.5	684	Conforms to Cat-I
B	75 (min) / 75 (min)	75	Conforms to Cat-I & II
C	30 (min) / 30 (min)	35.28	Conforms to Cat-I & II
DØ	21.79 to 22.00 / 27.79 to 28.00	27.94	Conforms to Cat-II
E	39.0 (min) / 49.0 (min)	55.50	Conforms to Cat- I & II
FØ	12.0 (min) / 12.0 (min)	12.3	Conforms to Cat- I & II
G	15.0 (min) /15.0 (min)	15.8	Conforms to Cat-I & II
HØ	25 ± 1 / 25 ± 1	24.84	Conforms to Cat- I & II
J	80 ± 1.5 / 80 ± 1.5	80.0	Conforms to Cat- I & II
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**

1.13.4.3 **Provision for coupling of trailer brakes** : **Not provided**

1.14 **Power take-off shaft:**

Type	:	Type-I, 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)	:	562
Distance behind rear axle, (mm)	:	395
Engine to PTO speed ratio	:	3.916:1
Whether the PTO shaft is capable of transmitting full power of the engine.	:	Yes
Other speeds, if any	:	None

1.14.1 **Specifications of Power Take-Off Shaft: -**

Specification	As per IS:4931-1995 (Type-I)	As observed	Remarks
1	2	3	4
Nominal speed, (rpm)	540 ± 10	540 and 1000 multi speed (540 rpm of PTO shaft corresponding to 2111 rpm of engine)	Conforms
No. of splines	6	6	Conforms

1	2	3	4
Direction of rotation	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	Conforms
Dimensions, (mm) (See Fig. 2):			
DØ	34.79 ± 0.06	34.74	Conforms
dØ	28.91 ± 0.05	28.10	**Does not conform**
BØ	29.4 ± 0.1	29.75	**Does not conform**
AØ	8.3 ± 0.1	8.30	Conforms
W	8.69 – 0.09 - 0.16	8.60	Conforms
a	07	07	Conforms
b	25 ± 0.5	25.5	Conforms
c	38	38	Conforms
X	30°	30°	Conforms
B	76 (min)	86.6	Conforms
h	450 to 675	695	Conforms

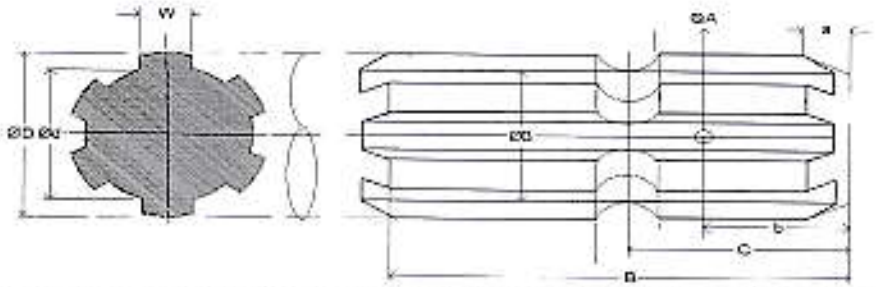


Fig.2: **DIMENSIONAL NOTATIONS FOR TYPE-I POWER TAKE-OFF SHAFT**

1.14.2 Power Take-off Master Shield : Not provided

1.15 Towing hitch:

1.15.1 Front:

Type : Clevis
Location : At the front support bracket
Height above ground level,(mm) : 710
Type of adjustment : None
Width of clevis,(mm) : 117
Diameter of pin hole : 29.0

1.15.2 Rear:

Type : Clevis
Location : At the rear of transmission housing
Height above ground level, (mm):
- Maximum : 750
- Minimum : 565
- No. of positions : 8

Type of adjustment : By changing the position of hitch & reversing it on the mounting bracket

Distance of hitch point,(mm):

- From rear axle centre	:	530
- From power take-off shaft end	:	135
Dia of pin hole, (mm)	:	41.56
Width of clevis, (mm)	:	79.0

1.16 **Steering:**

1.16.1 **Power Steering:**

Make of distributor	:	Ognibene
Type	:	Hydrostatic, Power steering
Location	:	Above Clutch housing
Method of operation	:	Manual, by steering control wheel
Diameter of steering control wheel, (mm)	:	430
Make & type of pump	:	Gear (tandem), VBC
Location	:	On RHS of the engine
Method of drive	:	Through engine timing gears
Make, type & number of hydraulic ram cylinder	:	Double acting double connecting & one
Location of ram cylinder	:	Centrally located behind the front axle
Lubricant capacity, litre	:	2.0
Lubricant change period	:	First change after 50 hours and subsequently after every 1000 hours of operation.

1.17 **Brakes:**

1.17.1 **Service Brake:**

Make	:	Not Specified
Type	:	Mechanical, Oil immersed multi discs
Location	:	On half axle shaft outside the differential housing.
No. of friction disc	:	04 (on each side)
Area of liners. (cm^2)	:	927.64 (on each side)
Material of liners	:	Paper based (apa)
Method of operation	:	Independent/combined pedal operation by right foot.

1.17.2 **Parking Brake:**

Type	:	Pawl and ratchet arrangement to lock service brake in position.
Location & Method of operation	:	Service brake acts as parking brake when locked in position by a hand lever provided on RHS of operator's seat.

1.18 **Wheel Equipment:**

1.18.1 **Steered Wheel:**

Make	:	BKT
Number	:	Two
Type of tyre	:	Pneumatic, traction
Size	:	11.2 - 24
Ply rating	:	10
Maximum permissible loading capacity of each tyre at 234 kPa pressure, (kgf)	:	660

Recommended inflation pressure, (kPa) :

- for field work	:	172
- for transport	:	206
Track width, (mm)	:	1465, 1485, 1565 (Std.), 1645, 1675, 1695, 1765 & 1805

	Method of changing track width	:	By reversing the wheel discs & changing the position of wheel disc on offset rim lugs.
	Make & size of wheel rim	:	WIL & W10 x 24
1.18.2	**Driving wheel:**		
	Make	:	BKT
	Number	:	Two
	Type of tyre	:	Pneumatic, traction
	Size	:	16.9 - 30
	Ply rating	:	12
	Maximum permissible loading capacity of each tyre at 140 kPa pressure, (kgf)	:	1930
	Recommended inflation pressure, (kPa):		
	- for field work	:	110
	- for transport	:	124
	Track width, (mm)	:	1390, 1510 (Std.), 1580, 1690, 1800 & 1910
	Method of changing track width	:	By reversing the wheel disc and changing the position of wheel disc on off-set rim lugs.
	Make & Size of wheel rim	:	WILP, W15Lx30
1.18.3	**Wheel base, (mm)**	:	2325
	Method of changing wheel base, if any and range	:	None
1.19	**Operator's seat :**		
	Make	:	Sukata (apa)
	Type	:	Cushioned
	Type of suspension	:	Two helical coil springs.
	Type of dampening	:	Hydraulic shock absorber.
	Range of adjustment,(mm):		
	- Vertical (back rest)	:	Nil
	- Lateral	:	Nil
	- Longitudinal	:	± 65

1.20 **Provision for safety and comfort of operator:**

1.20.1 **Operator's Seat: Conformity with IS: 12343-1998: (Re-affirmed in March, 2009).**

The operator's seat meet the minimum requirements of IS: 12343-1998, (Re-affirmed in March,2009),**except the following**:

i) Longitudinal distance from seat index point to centre of steering control wheel.

1.20.2 **Conformity with IS: 6283 (Part-1) – 2006 (Reaffirmed in March, 2009) & IS:6283 (Part-2) – 2007 (Reaffirmed in March, 2009)**:

Controls are identifiable with symbols as per IS: 6283 (Part-1 & 2)-1998, **except the following**:

i) Oil, grease lubrication type and its frequency is not mentioned.

1.20.3 **Conformity with IS:8133-1983 (Re-affirmed in March, 2009):**

Location and movement of various controls meet the requirement of IS: 8133-1983, **except the following**:

i) The fuel shut off lever does not remain in 'STOP' position without sustained manual effort.

1.20.4 **Conformity with IS: 12239 (Part-1)-1996 (Re-affirmed in February, 2012):**
Meets the requirements of IS:12239 (Part-1)-1996,**except the following:**

i) Provision of spark arresting device in the exhaust system is not provided.
ii) Width of foot step is 160 mm against the minimum requirement of 200 mm.

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) Working clearance between draft control lever and position control lever is less than 70mm.
ii) PTO master shield has not been provided.

1.20.6 **Conformity with IS:4468 (Part-1)-1997:**
Meets the requirements of **IS:4468 (Part-1)-1997, except the following:**

i) Lateral distance from lower hitch point to center line of tractor.

1.20.7 **Conformity with IS: 14683 – 1999 (Re-affirmed in March, 2009) :**
All lighting arrangements meet the requirements of IS: 14683-1999.

1.20.8 **Rear view mirror:**
Rear view mirror has been provided.

1.20.9 **Slow moving emblem:**
Slow moving emblem has been provided.

1.21 **Labelling of tractor as per IS: 10273-1987 (Reaffirmed in March, 2009):**
Location of labelling plate:- The labelling plate is riveted on LHS of clutch housing and provides the following information:

Name of Manufacturer	:	**PREET TRACTORS PRIVATE LIMITED PATIALA ROAD, NABHA (Pb) INDIA**
Make	:	PREET
Model	:	7549 AGRITRAC 4WD
Engine serial number	:	P480 - 00003
Chassis serial number	:	XCM75AG00001/B
Year of manufacture	:	December, 2015
Max. P.T.O Power, kW (hp)	:	50 (68)
Specific Fuel Consumption, kg/kWh (kg/hph)	:	0.292 (0.218)

1.22 **Ballast Mass (kg) :**

Particular		As used during drawbar test	As used during dry land field test	As used during road/haulage test
Front	C.I. weight	200	200	200
	Water	60	60	Nil
Rear	C.I. weight	560	560	560
	Water	400	400	Nil
	Additional weight	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) Standard ballast	1085	1470	2555
ii) With ballast as used during drawbar performance test	1435*	2340	3755
iii) With ballast as used during field test (ploughing)	1435*	2340	3755
iv) With ballast as used during haulage test	1355*	1960	3315

*The difference in weight is due to weight transfer.

1.24 **Overall dimensions:**

Condition	Length, (mm)	Width, (mm)	Height, (mm)		Ground Clearance, (mm)
			With exhaust pipe	Without exhaust pipe	
Without ballast	3900	1950	2390	1725 (steering wheel)	380 (below front differential housing

1.25 **Number of external lubricating points:**

- Oiling : Nil
- Grease nipples : 15
- Grease cups : Nil

1.26 **Colour of tractor:**

Chassis & engine : Black
Bonnet & Mudguard : Green
Rim and disc : White

1.27 **Optional features, if any** : None

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 during test.

2.2 **Lubricants:**

S. No.	Particulars	As recommended by the manufacturer	As used during the test
1.	Engine oil	SAE 20W40 (Valvoline)	SAE 20W40 (Valvoline)
2.	Transmission, brake, and hydraulic system oil	Tractelf 2900	Oil originally filled in the systems were not changed
3.	Front differential housing	API GL4	-do-
4.	Front wheel hub	API GL4	-do-
5.	Steering	SAE 20W40 (Valvoline)	SAE 20W40 (Valvoline)
6.	Grease	MP Grease - 3	MP Grease - 3

3. PTO PERFORMANCE TEST

Date(s) of test : 29.08.2016, 30.08.2016, 31.08.2016, 02.09.2016 & 09.09.2016

Tractor run at the Institute prior to start of PTO test (h) : 10.83

Type of dynamometer bench : Eddy Current, Fuchino ESF-1000S

3.1.1 During high ambient test, the leakage from upper tank of radiator was observed and to rectify the problem, the breezing of upper tank of radiator was done and PTO performance test was conducted. This breakdown/defects has been categorized in minor (Mn - 6) breakdown as per IS: 12207-2014.

3.1.2 Again during Max. Power search under high ambient test, the leakage observed from the high pressure pipe line from FIP to injector and to rectify the problem the high pressure pipe line replace with new one vide part number P0108133. This breakdown/defects has been categorized in minor (Mn - 10) breakdown as per IS:12207-2014

Thereafter, PTO performance test was conducted & the results of Power take-off performance are tabulated in Table-1 and graphically represented in **Fig. 3, 4 & 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:						
51.1	516	2022	16.90	14.13	0.277	3.02
47.9	517	2024	16.23	13.57	0.283	2.95*
b) Power at rated engine speed (2200 rpm):						
49.4	562	2200	17.17	14.35	0.290	2.88
46.3	562	2200	16.94	14.16	0.306	2.74*
c) Power at standard power take-off speed (540 ± 10 rpm):						
50.4	539	2111	17.24	14.41	0.286	2.92
47.8	540	2115	16.76	14.01	0.293	2.85*
Varying loads at rated engine speed:						
i) Torque corresponding to maximum power available at rated engine speed:						
49.4	562	2200	17.17	14.35	0.290	2.88
ii) 85% of the torque obtained in (i):						
43.7	584	2287	16.00	13.38	0.306	2.73
iii) 75% of the torque obtained in (ii) :						
33.3	593	2322	12.66	10.58	0.318	2.63
iv) 50% of the torque obtained in (ii):						
22.4	600	2350	10.12	8.46	0.378	2.21
v) 25% of the torque obtained in (ii):						
11.3	605	2369	7.54	6.30	0.558	1.50
vi) Unloaded:						
1.4	612	2397	5.54	4.63	3.307	0.253
e) Varying loads at Standard PTO Speed:						
i) Torque corresponding to maximum power available at standard PTO speed (540 ± 10 rpm):						
50.4	539	2111	17.24	14.41	0.286	2.92

1	2	3	4	5	6	7
ii) 85% of the torque obtained in (i):						
42.5	548	2146	14.72	12.31	0.282	2.96
iii) 75% of the torque obtained in (ii):						
33.1	555	2173	11.60	9.70	0.293	2.85
iv) 50% of the torque obtained in (ii):						
22.3	561	2197	9.17	7.67	0.344	2.43
v) 25% of the torque obtained in (ii):						
11.3	567	2220	6.78	5.67	0.502	1.67
vi) Unloaded:						
1.3	574	2248	4.78	4.0	3.077	0.27

*Under High ambient conditions

		Natural ambient	High ambient
-No load maximum engine speed, (rpm)	:	2397	2397
-Equivalent crankshaft torque at maximum power,(Nm)	:	241.43	225.93
-Maximum equivalent crankshaft torque, (Nm)	:	280.66	261.97
-Engine speed at maximum equivalent crankshaft torque, (rpm)	:	1249	1351
Backup torque, (%)	:	16.25	15.95
Smoke level (maximum light absorption coefficient, per meter)	:	2.53	--
- Range of atmospheric conditions:			
Temperature, (°C)	:	26 to 28	41 to 44
Pressure, (kPa)	:	97.42 to 97.99	99.44 to 100.03
Relative humidity, (%)	:	63 to 76	22 o 46
-Maximum temperatures, (°C):			
Engine oil	:	115	126
Coolant (Water)	:	103	113
Fuel	:	54	67
Air intake	:	35	49
Exhaust gas	:	626	645
-Pressure at maximum power:			
Intake air, (kPa)	:	5.20 to 5.33	4.93 to 5.07
Exhaust gas, (kPa)	:	150.50 to 152.23	135.03 to 137.17
-Consumptions:			
Lub oil, (g/kWh)	:	--	0.41
Coolant (% of total coolant capacity)	:	--	0.52

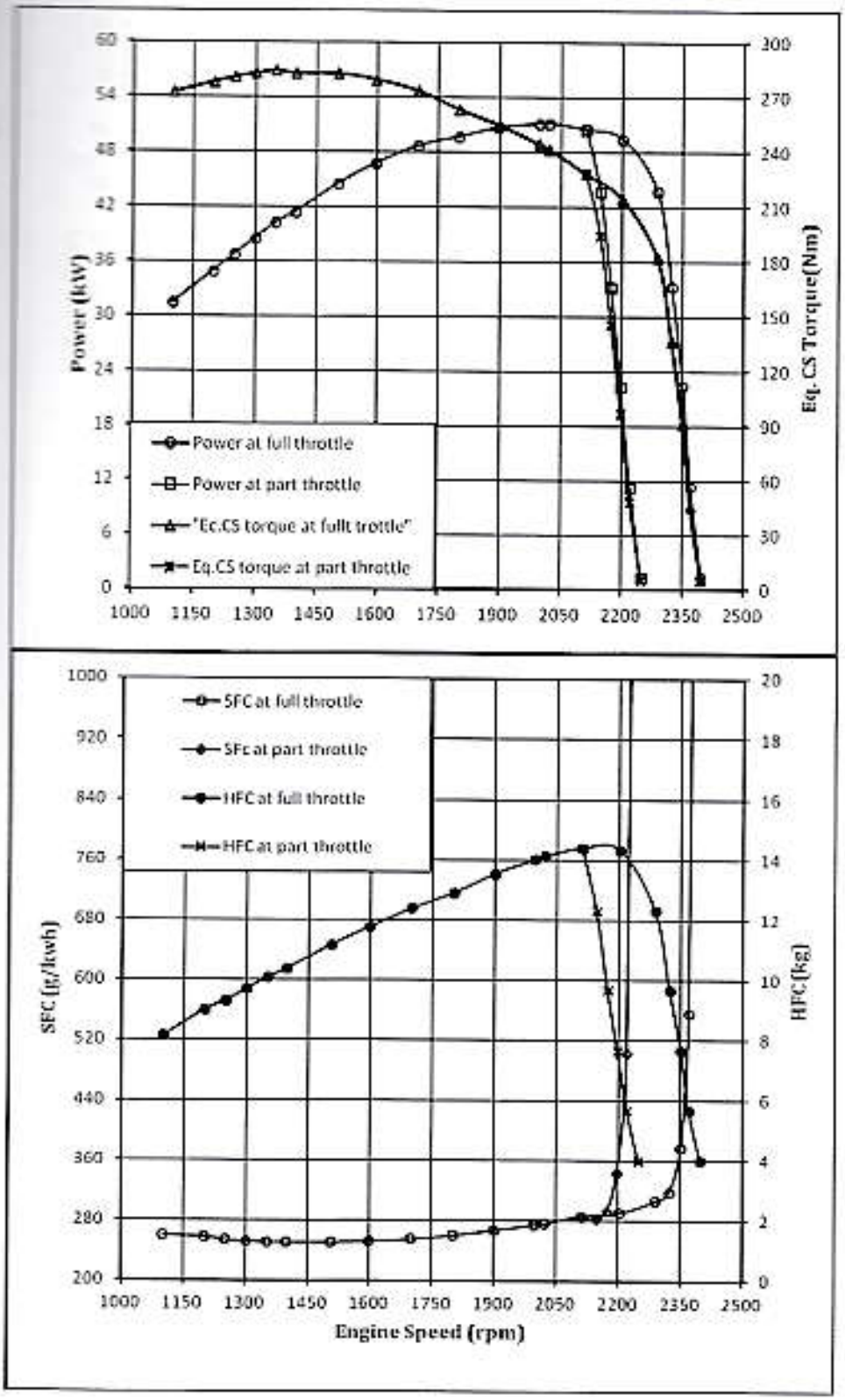


Fig.3: PTO PERFORMANCE CHARACTERISTICS (NATURAL AMBIENT)

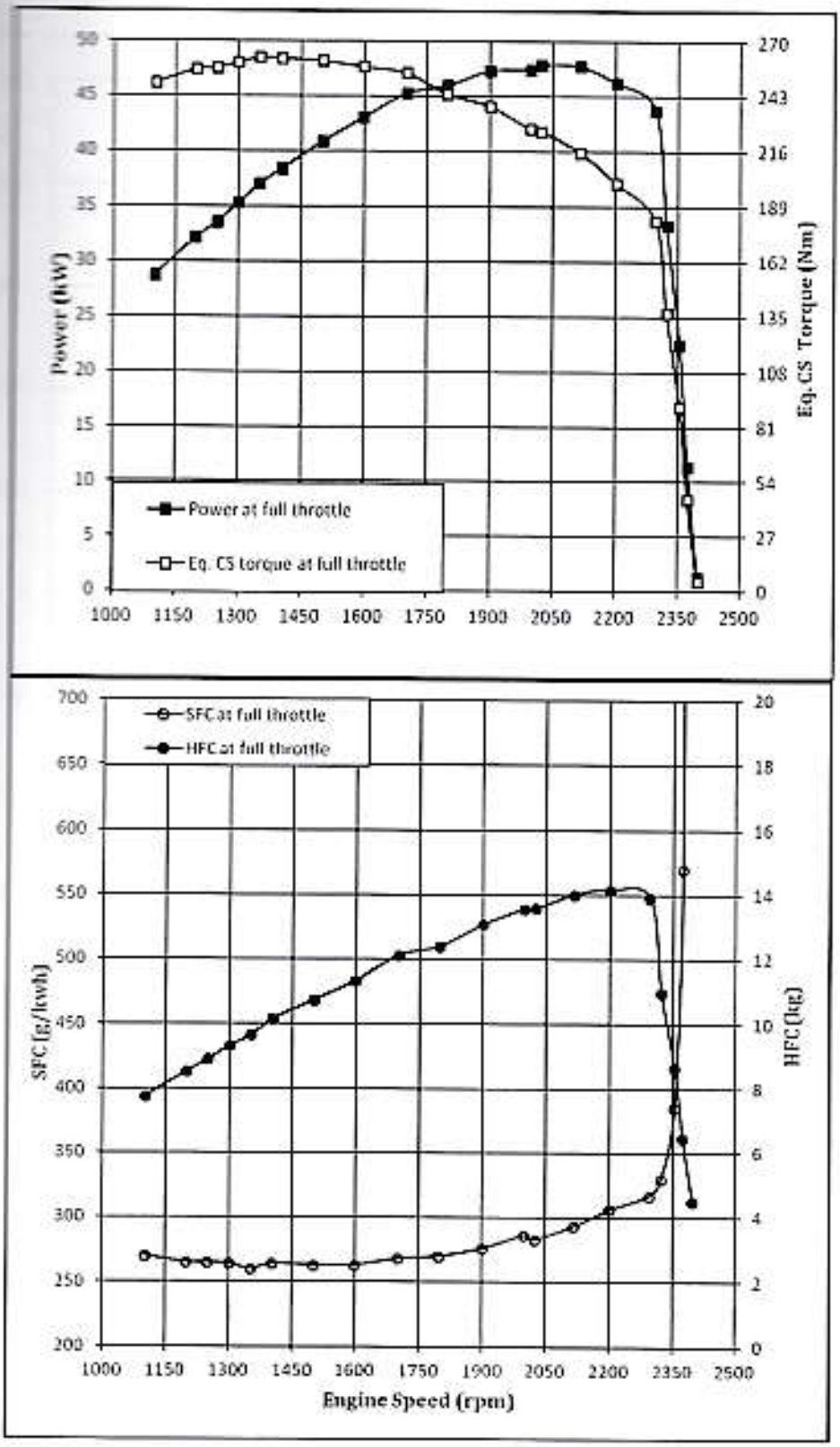


Fig.4: PTO PERFORMANCE CHARACTERISTICS (HIGH AMBIENT)

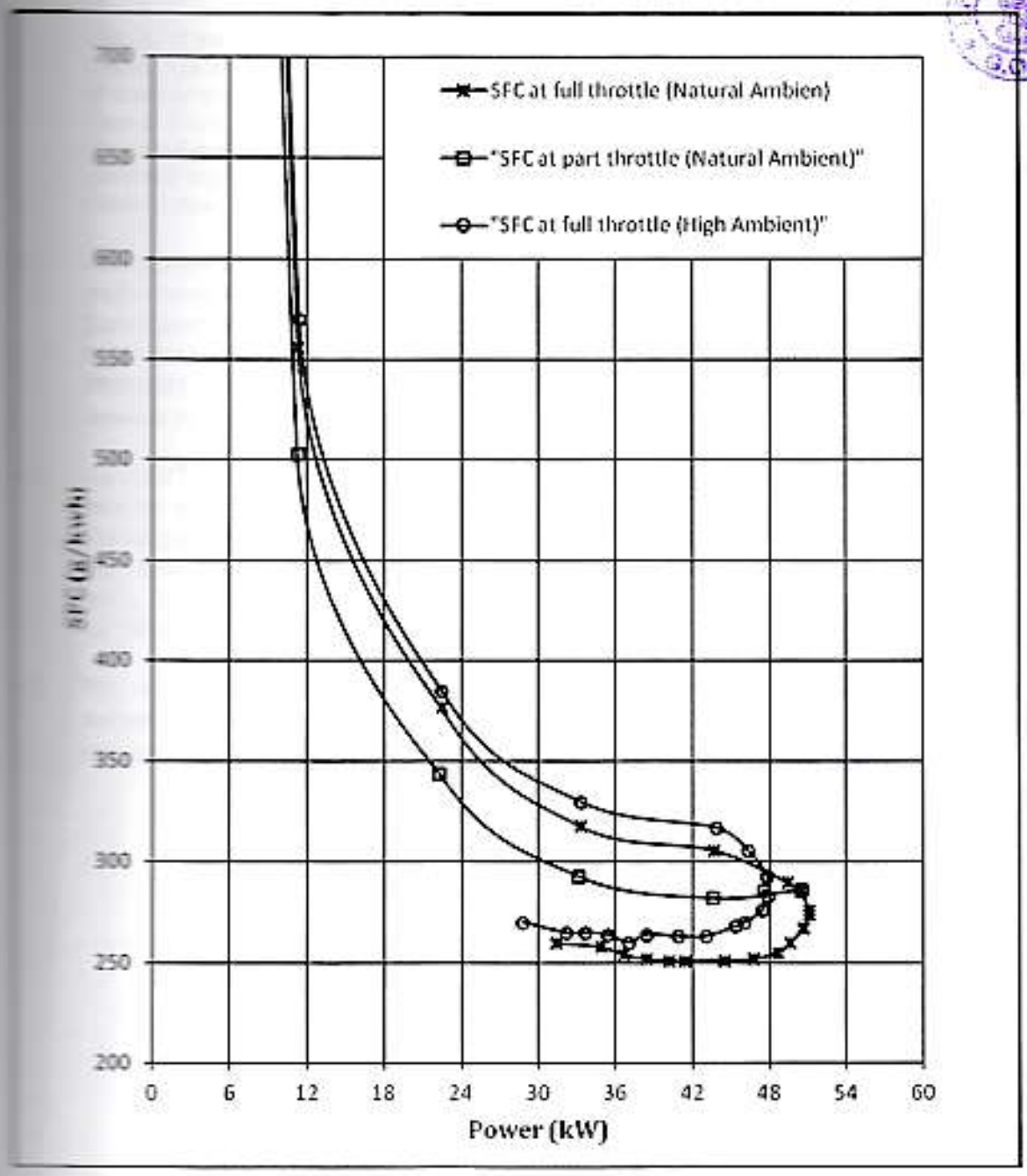


Fig.5: PTO PERFORMANCE CHARACTERISTICS

4. DRAWBAR PERFORMANCE TEST

Date(s) of test	:	21.03.2017 , 22.03.2017 & 24.03.2017
Tractor run at the Institute prior to start of drawbar test, (h)	:	28.55
Type of track	:	Concrete
Height of drawbar, (mm):		
- Without ballast	:	525
- With ballast	:	500

4.1 After completion of nominal speed test, the tractor was prepared for conduction of drawbar performance test, again leakage of coolant was observed from the bottom tank of radiator. Consequent upon the request received from the applicant vide letter no. nil dated 01.02.2017 for change of radiator assembly with new and same specification (Part No. P0201027) under **"Supplementary Test"** as per clause 3.2.4 of IS 12207-2014 and drawbar performance test was conducted.

4.2 During 2nd five hour at 15% wheel slip under ten hour drawbar performance test, forward & reverse gear shifting lever was disengaged itself 3 to 4 times on loading condition. Consequent upon the request received from the applicant for change of clutch assembly with new and same specification (Clutch cover/housing, Part No: P030403, PTO clutch plate, Part No: P0303404 & Clutch plate, Part No: 74801). This breakdown is categorized as **"Mj-8"** as per IS: 12207-2014.

4.3 The results of drawbar performance test consisting of maximum power and pull standard 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.**

Table - 2

DRAWBAR PERFORMANCE TEST

Gear	Travel Speed, (Km/h)	Draw-bar power (kW)	Draw-bar pull, (kN)	Engine Speed, (rpm)	Wheel Slip, (%)	Fuel consumption (kg/kWh)	Fuel consumption (l/h)	Specific Energy, (kWh/l)	Atmospheric conditions: Temp (°C)	Atmospheric conditions: Pressure (kPa)	Atmospheric conditions: R.H. (%)	Temperature (°C): Fuel	Temperature (°C): Trans. oil	Temperature (°C): Coolant (Water)	Temperature (°C): Engine oil	Max. sustained pull, (kN)
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
i) Maximum power test (Tractor with Standard ballasted condition with 4WD engaged):																
A2	2.20	13.5	22.01	2359	15.4	0.562	9.08	1.49	33	98.8	18	41	100	88	100	23.31
A3	3.20	20.7	23.23	2324	14.6	0.452	11.19	1.85	32	98.9	15	40	100	87	101	24.31
A4	4.43	28.6	23.25	2292	14.9	0.420	14.37	1.99	32	98.9	15	40	86	96	105	23.63
B1	3.76	23.3	22.28	2327	14.8	0.427	11.90	1.96	33	98.9	16	41	80	90	102	23.71
B2	5.65	34.6	22.01	2273	11.2	0.375	15.52	2.23	30	99.3	24	38	86	98	108	23.32
B3	7.72	40.7	18.98	2042	7.7	0.347	16.89	2.41	30	99.4	25	38	81	105	109	21.70
C1	9.58	42.5	15.96	2018	5.5	0.330	16.78	2.53	28	99.5	28	36	63	103	107	18.63
ii) Maximum power test (Tractor ballasted):																
A2	2.14	17.3	29.12	2312	14.9	0.503	10.41	1.66	37	98.6	16	44	111	90	108	30.59
A3	3.07	26.4	31.16	2277	15.2	0.428	13.57	1.95	38	987	17	44	111	106	114	32.39
A4	4.37	36.2	29.83	2200	11.3	0.376	16.28	2.22	35	98.7	18	43	106	101	111	32.34
B1	3.58	31.5	31.65	2259	15.3	0.403	15.19	2.07	35	98.8	18	42	102	98	110	32.43
B2	5.02	39.5	28.33	2025	10.2	0.346	16.35	2.42	34	98.8	18	43	100	111	109	31.67
B3	7.76	41.4	19.21	2028	5.2	0.337	16.69	2.48	33	98.9	22	41	80	108	109	22.79
C1	9.54	42.3	15.91	2022	4.7	0.329	16.65	2.53	32	99.0	23	39	64	106	105	19.19

Contd. Table-2

Gear	Travel Speed, (Km/h)	Draw-bar power, (kW)	Draw-bar pull, (kN)	Engine Speed, (rpm)	Wheel Slip, (%)	Fuel consumption (kg/kWh)	Fuel consumption (l/h)	Specific Energy, (kWh/l)	Atmospheric conditions Temp (°C)	Atmospheric conditions Pressure (kPa)	Atmospheric conditions R.H. (%)	Temperature (°C) Fuel	Temperature (°C) Trans. oil	Temperature (°C) Coolant (Water)	Temperature (°C) Engine oil	Max. sustained pull, (kN)
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):																
A4	4.77	29.7	22.39	2283	15.3	0.390	14.07	2.11	22 to 34	98.9 to 99.1	24 to 38	29 to 48	55 to 114	78 to 104	87 to 112	--
iv) Five hours test at pull corresponding to 15 percent wheel slip (ballasted wheeled tractor):																
B1	3.71	32.6	31.61	2268	--	0.377	14.90	2.24	24 to 33	98.5 to 98.7	25 to 33	34 to 40	63 to 103	83 to 113	95 to 109	--

i) The coolant and lub. oil consumption during 10 hours test were observed as Nil respectively.

ii) Tyre Creeping, (mm):
- -LHS : 20
- -RHS : 25

III) Maximum temperatures during entire drawbar test, (°C):
- Engine oil : 121
- Coolant : 117
- Transmission oil : 114
- Fuel : 48

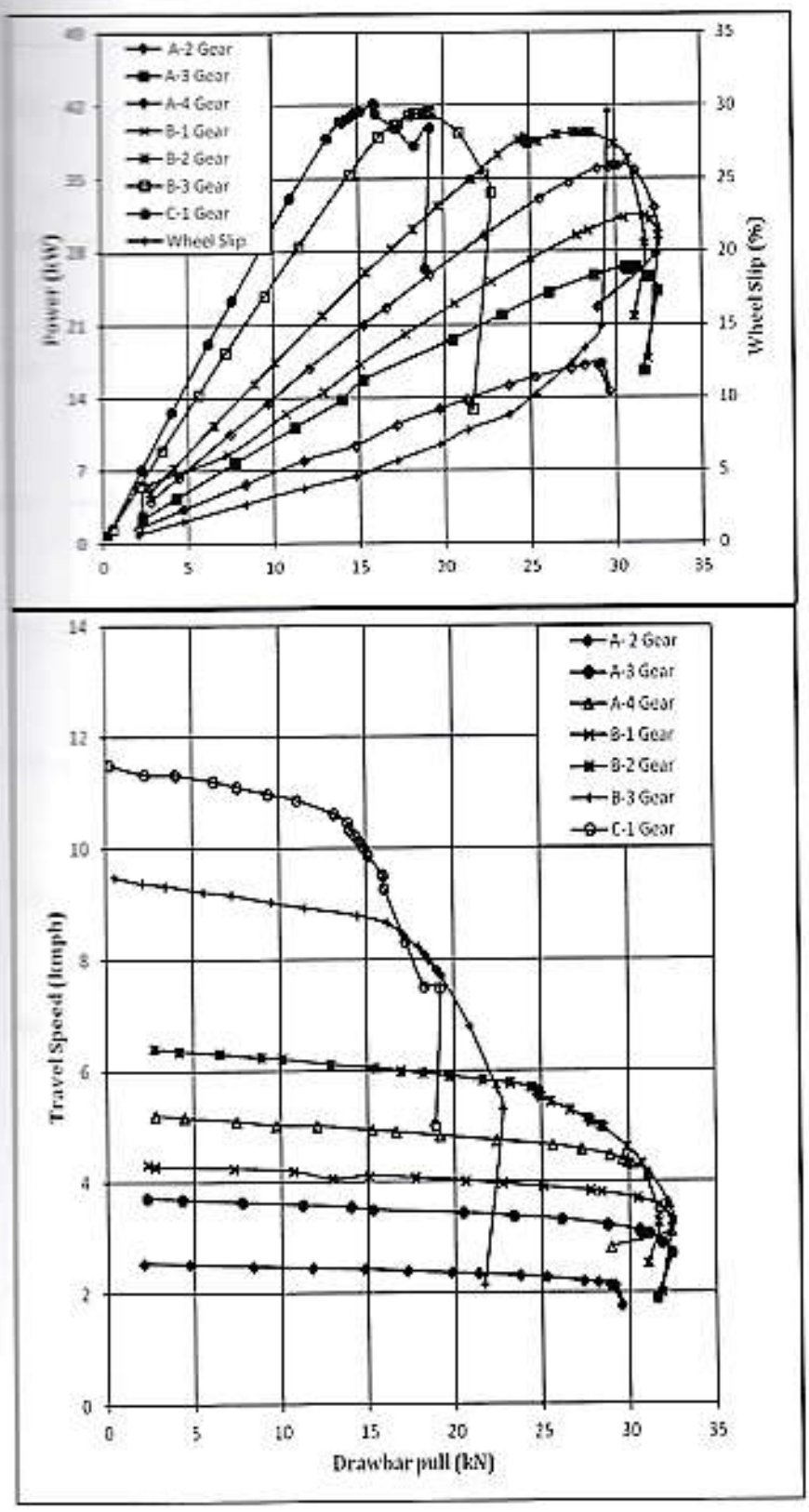


Fig.6: DRAWBAR PERFORMANCE CHARACTERISTICS (Ballasted Condition)

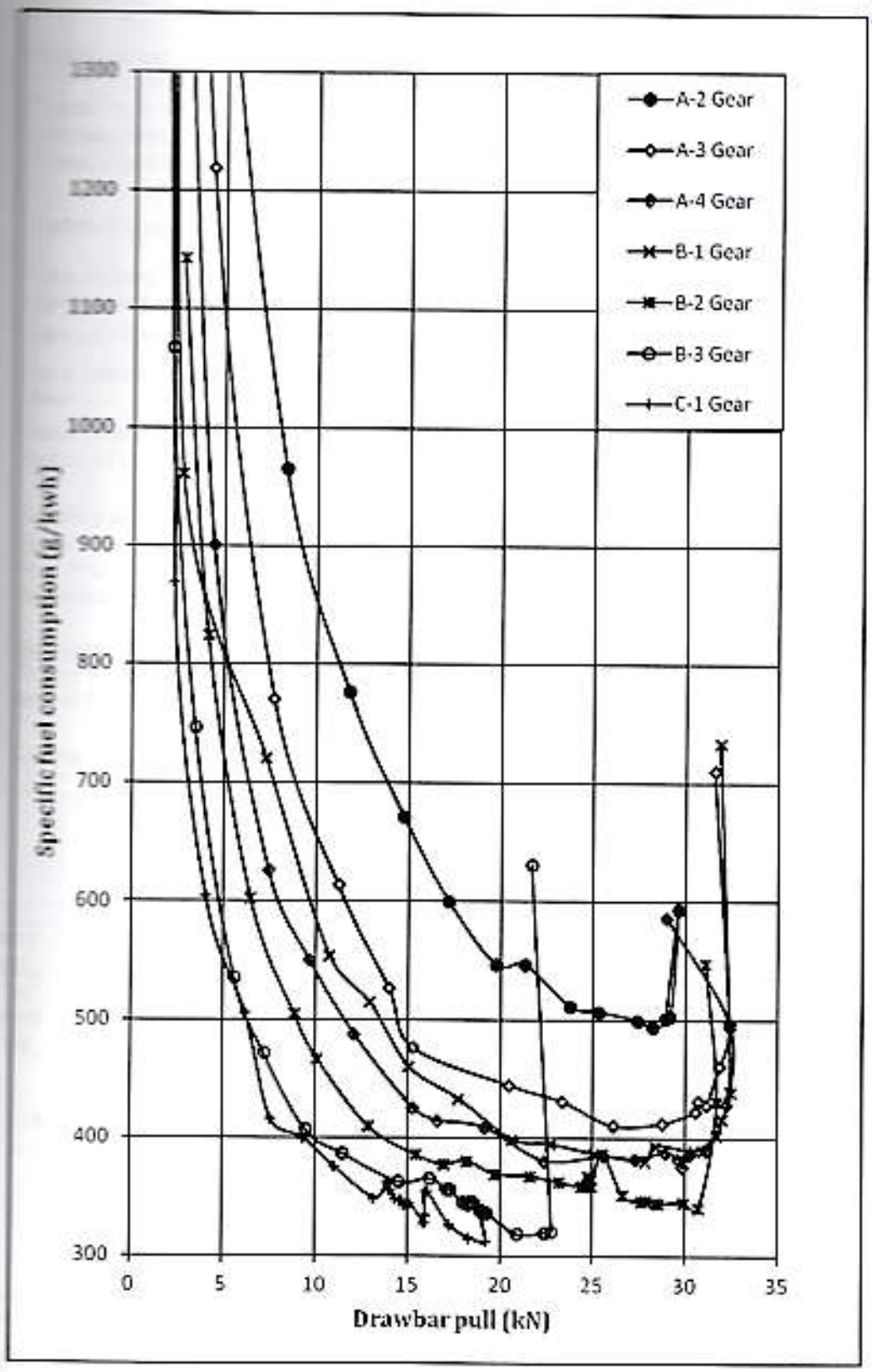


Fig.7: DRAWBAR PERFORMANCE CHARACTERISTICS
(Ballasted Condition)

5. POWER LIFT AND HYDRAULIC PUMP PERFORMANCE TEST

[redacted] of test	:	01.08.2016, 02.08.2016 & 03.08.2016
Tractor run at the Institute prior to start of hydraulic test, (h)	:	5.93
Pump speed at rated engine speed, (rpm)	:	2200

[redacted] Hydraulic power test:

Pump delivery rate at minimum pressure and rated engine speed, (l/min)	:	29.55
Maximum hydraulic power, (kW)	:	9.0
Pump delivery rate at maximum hydraulic power, (l/min)	:	28.54
Pressure at maximum hydraulic power, (MPa)	:	19.0
Sustained pressure of the open relief valve, (MPa)	:	23.0

Tapping point:

a) Relief valve test	:	At "T-Joint" adopter
b) Pump performance test	:	At pump outlet
Temperature of hydraulic fluid, (°C)	:	60 to 75

Remarks:
During the pressure relief valve test, the oil temperature exceed the limit 75 ^{0}C against the limit of 65 ± 5 ^{0}C.

[redacted] Lifting capacity test:

Test	Height of lower hitch point above ground in down position, (mm)	Vertical movement with lifting forces, (mm)	Maximum corrected 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	630	24.64	22.7	24.52	--
On the standard frame	200	580	18.70	22.8	30.01	24.2

[redacted] Maintenance of lift load:

Force applied at the frame, (kN)	:	16.83
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)	00	00	05	10	10	15

6. BRAKE TEST

6.1 Service brake:

6.1.1 Cold brake test:

Date of test(s) : 13.06.2016 & 09.06.2016

Type of Track : Concrete

Maximum attainable speed (kmph):

- Without Ballast : 35.0
- Ballasted : 35.0

		At 35 Kmph travel speed			
Standard ballast tractor	Braking device control, force (N)	451	401	351	301
	Mean deceleration, (m/sec^2)	2.99	2.90	2.77	2.50
	Stopping distance, (m)	15.89	16.32	17.09	18.90
Ballasted tractor	Braking device control force(N)	499	438	378	317
	Mean deceleration, (m/sec^2.)	3.00	2.87	2.76	2.50
	Stopping distance, (m)	16.00	16.45	17.13	18.90

		At 25 kmph travel speed			
Standard ballast tractor	Braking device control, force(N)	441	393	346	299
	Mean deceleration, (m/ sec^2)	3.09	3.03	2.89	2.50
	Stopping distance, (m)	7.88	7.96	8.34	9.65
Ballasted tractor	Braking device control force,(N)	411	385	359	331
	Mean deceleration, (m/sec^2)	3.11	2.91	2.68	2.50
	Stopping distance, (m)	7.97	8.29	9.01	9.65

6.1.2 Brake fade test:

	At 35 Kmph travel speed			
Braking device control force (N)	521	460	399	338
Mean deceleration, (m/ sec^2)	2.96	2.87	2.75	2.50
Stopping distance, (m)	16.02	16.45	17.19	18.90

	At 25 kmph travel speed			
Braking device control force,(N)	429	397	365	334
Mean deceleration, (m/ sec^2)	3.05	2.88	2.73	2.50
Stopping distance, (m)	8.12	8.36	8.82	9.65

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

Abnormal vibration : None

The brakes were heated by : Self braking

6.1.3 Parking brake test:

Particulars	18 percent slope		12 percent slope with trailer of 2.58 tones.	
	Up	Down	Up	Down
Braking device control force, (N)	258	280	327	359
Efficacy of parking brake	----------Effective----------			

7. NOISE MEASUREMENT

7.1 **Noise at bystander's position:**

Date of test : 06.06.2016

Type of track : Concrete

Background noise level, dB (A) : 55.3

Atmospheric conditions:

Temperature, (°C) : 40

Pressure, (kPa) : 96.1

Relative humidity (%) : 28

Wind velocity, (m/s) : 1.70

Test Data:

S. No.	Gear	Traveling speed before acceleration, (kmph)	Noise level, dB (A)
1.	A-1	1.29	83
2.	A-2	1.85	83
3.	A-3	2.68	84
4.	A-4	3.76	83
5.	B-1	3.13	84
6.	B-2	4.62	84
7.	B-3	6.61	83
8.	B-4	9.62	83
9.	C-1	8.07	83
10.	C-2	11.93	82
11.	C-3	17.70	82
12.	C-4	34.50	81

7.2 **Noise at operator's ear level:**

Date of test : 22.03.2017

Type of track : Concrete

Background noise level, dB(A) : 57.1

Atmospheric conditions:

Temperature, (°C) : 30

Pressure, (kPa) : 99.3

Relative humidity, (%) : 24

Wind velocity, (m/s) : 1.5

Test Data:

Gear	Drawbar pull at which the tractor developed the max. noise level, (kN)	Corresponding traveling speed, (kmph)	Noise level, dB(A)
A-2	1.99 to 22.01	2.58 to 2.20	93
A-3	16.73 to 23.23	3.51 to 3.20	94
A-4	5.03 to 23.25	5.22 to 4.43	94
B-1	10.35 to 22.28	4.27 to 3.76	94
B-2	6.82 to 22.76	6.37 to 5.43	94
*B-3	3.07 to 94.1	9.47 to 8.54	94
C-1	9.05 to 13.17	11.17 to 10.68	94

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

8. MECHANICAL VIBRATION MEASUREMENT

Date of test : 21.10.2016
Type of test surface : Concrete

Sl. No.	Measuring points		Vibration, microns			
			At no load		At load corresponding to 85% of max. PTO power	
			VD	HD	VD	HD
1	2		3	4	5	6
i)	Foot rest	Left	60	80	150*	120*
		Right	140*	40	250*	90
ii)	Steering wheel		60	40	150*	130*
iii)	Seat	Bottom	80	50	60	40
		Back	50	90	50	30
iv)	Mudguard	Left	30	20	50	50
		Right	30	40	40	40
v)	Head light	Left	60	80	70	60
		Right	30	40	100	130*
vi)	Battery base, centre		60	40	170*	160*
vii)	Tail light	Left	30	60	40	60
		Right	40	30	220*	110*
viii)	Plough light		90	40	40	100
ix)	Gear shifting lever		70	60	60	110*
x)	Accelerator lever	Hand	190*	60	190*	120*
		Foot	90	120*	170*	160*
xi)	Brake pedal	Left	180*	240*	170*	250*
		Right	180*	230*	170*	200*
xii)	Clutch pedal		190*	170*	90	100
xiii)	Main hydraulic control lever		40	40	40	30
xiv)	PTO engaging lever		60	40	30	60
xv)	Differential lock lever		40	40	40	70

*The amplitude of mechanical vibration is on higher side.

9. LOCATION OF CENTRE OF GRAVITY

Condition	Particulars	Coordinates
Tractor under standard ballasted condition but with all the liquid reservoirs full & the operator replaced by a 75 kg mass on the seat	Height above ground, (mm)	820.81
	Distance forward from the vertical plane containing the axis of rear wheels, (mm)	1332.30
	Distance from the median plane parallel to the longitudinal axis of tractor bisecting the track, (mm)	11.31 (in RHS)

10. TURNING ABILITY

Characteristics	Minimum turning diameter, (m)		Minimum clearance diameter, (m)	
	LHS	RHS	LHS	RHS
Brakes released	9.54	9.27	9.90	9.63
Brake applied	8.71	8.41	9.01	8.71

11. OPERATOR'S FIELD OF VISION

The operator's field of vision to the front and rear from the operator's seat is represented in Fig.8

- The non visible space in front is 7300 mm which is **3.14** times of wheel base (i.e.2325 mm).
- The non-visible space in LHS & RHS is 3200 mm each which is **2.12** times of rear track width (i.e.1510 mm).
- Silencer creates masking effect.

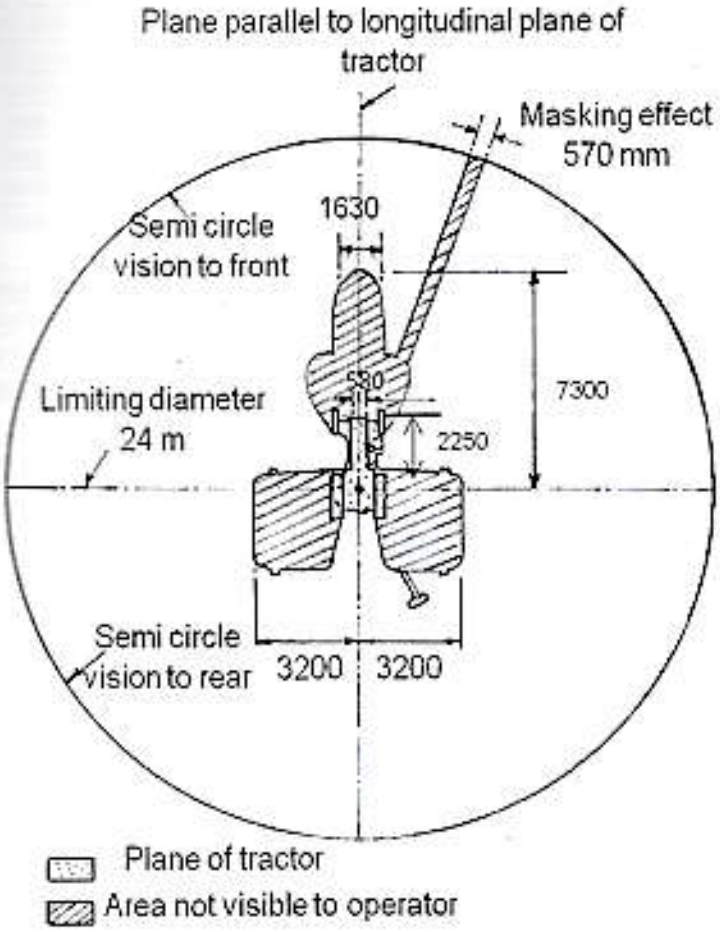


Fig.8: OPERATOR'S FIELD OF VISION

12. FIELD TEST

12.1 The field tests comprising of Disc ploughing and rotavation were conducted for 15.8 and 20.2 hours respectively.

All the field tests were conducted at the full accelerator settings, when the no load speed of the engine varied from 2260 to 2389 rpm.

12.2 The brief specifications of the implements used during field tests are given in **Annexure – I**

12.3 The summary of field test observation with Disc plough and rotavator is given in Table – 3.

Table – 3

SUMMARY OF FIELD PERFORMANCE TEST

S.No.	Parameter/operation	Disc Ploughing	Rotavation
i)	Type of soil (refer IS:7926-1975)	Heavy	Heavy
ii)	Av. Soil moisture, (%)	11	6.9 to 11.6
iii)	Bulk density of soil, (g/cc)	1.60	1.4 to 1.8
iv)	Cone index,(kg/cm^2)	6.30 to 7.66	6.30 to 8.17
v)	Gear used	A-3	A-3
vi)	Av. Speed of operation, (kmph)	3.06 to 3.39	
vii)	Av. Wheel slip, (%)	Front - 7.4 to 16.4	Front - -2.9 to -3.2
		Rear - 9.3 to 15.8	Rear - - 0.1 to -1.1
viii)	Av. Depth of cut ,(cm)	18 to 22	7
ix)	Av. Working width,(cm)	80 to 94	204 to 222
x)	Area covered,(ha/h)	0.218 to 0.263	0.610 to 0.728
xi)	**Fuel consumption:**		
	- (l/h)	7.83 to 8.52	8.67 to 9.68
	- (l/ha)	30.95 to 35.92	12.43 to 14.21
xii)	Av. Draft of implement, (kN)	5.1 to 6.6	—

Remarks: The average lub oil and coolant (water) consumptions during the entire field tests were observed to be **3.05** ml/h & **7.79** ml/h respectively.

12.4 **Wet land cultivation (Puddling Operation):**

The manufacturer does not recommend **for wet land cultivation (puddling operation).** Hence, **test was not** conducted.

13. HAULAGE TEST

		Two wheel (Single axle)	**Four wheel (Double axle)**
Type of trailer	:		
Gross mass of trailer (tonne)	:	5.0	7.0
Height of trailer hitch above ground level, (mm)	:	610	665
Gear used during the test for negotiating slopes upto 8%	:	H4	H4
Average travel speed,(kmph)	:	31.81	30.41 to 31.09
Average fuel consumption:			
- (l/h)	:	10.15 to 10.46	9.84 to 9.92
- (ml/km/tonne)	:	63.82 to 65.76	45.24 to 46.62
Average distance traveled per litre of fuel consumption, (km)	:	3.04 to 3.13	3.06 to 3.15
General observations:			
Effectiveness of brakes	:	Effective	Effective
Maneuverability of tractor-trailer combination	:	Satisfactory	Satisfactory

14. COMPONENTS/ASSEMBLY INSPECTION

The engine and other assemblies were dismantled after **98.89** hours of tractor operation at this Institute.

14.1 Engine:

14.1.1 Cylinder bore:

Cylinder No.	Cylinder bore dia, (mm)						Max. 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.	105.02	104.98	105.02	104.99	105.00	104.99	105.40
2.	105.01	104.99	105.02	105.00	105.03	105.00	
3.	105.00	104.99	105.01	104.99	105.02	104.99	
4.	105.00	104.99	105.00	104.99	105.00	104.99	

14.1.2 Piston:

Piston No.	Piston dia, (mm)				Max. permissible wear limit, for piston dia. at the skirt (mm)	Clearance between piston to cylinder liner at the skirt (mm)	
	Top (above top compression ring)		At skirt			As measured	Max. permissible limit
	Thrust side	Non-thrust side	Thrust side	Non-thrust Side			
1.	104.484	104.431	104.918	*	104.383	0.102	0.80
2.	104.498	104.436	104.925	*		0.095	
3.	104.503	104.450	104.927	*		0.093	
4.	104.499	104.468	104.930			0.090	

***Not measured due to piston design features.**

14.1.3 Ring end gap:

Rings	Ring end gap, (mm)												Max. permissible ring end gap limit.(mm)
	Cylinder No. 1			Cylinder No. 2			Cylinder No. 3			Cylinder No. 4			
	Top	Middle	Bottom	Top	Middle	Bottom	Top	Middle	Bottom	Top	Middle	Bottom	
1st comp. ring	0.50	0.50	0.50	0.40	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.50	2.0
2nd comp. ring	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.60	0.60	
Oil ring	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	

14.1.4 Ring side clearance:

Rings	Ring side clearance, (mm)				Max. Permissible clearance Limit, (mm)
	Piston-I	Piston-II	Piston-III	Piston-IV	
1st Compression ring	--Tappered ring--				--
2nd Compression ring	0.099	0.09	0.087	0.100	0.35
Oil ring	0.041	0.052	0.051	0.056	

14.1.5 Main bearings:

Bearing No.	Diametrical Clearance, (mm)	Crankshaft end float, (mm)	Max. permissible clearance limit, (mm)	
			Diametrical clearance	Crankshaft end float
1.	0.025 to 0.044	0.20	0.9	1.0
2.	0.049 to 0.050			
3.	0.048			
4.	0.049 to 0.059			
5.	0.039 to 0.048			

14.1.6 Big end bearings:

Bearing No.	Clearance, (mm)		Max. permissible clearance limit, (mm)	
	Diametrical	Axial	Diametrical	Axial
1.	0.074 to 0.086	0.25	0.90	1.0
2.	0.057 to 0.067	0.25		
3.	0.059 to 0.067	0.25		
4.	0.069 to 0.079	0.25		

14.1.7 Valve, guides and timing gears: **Observation**

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):

		Inner	Outer
Intake valve spring	:	2.45 to 2.64	8.14 to 8.73
Exhaust valve spring	:	2.35 to 2.64	7.95 to 8.63
Against discard limit (N/mm)		1.5	5

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

- Intake valve	:	0.049 to 0.068	Against discard limit of 0.15 mm
- Exhaust valve	:	0.037 to 0.067	

14.2 Clutch:

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

Overall thickness of clutch plate, (mm):

- Transmission	:	10.57 to 11.12	Against the discard limit of wear up to rivet head
- PTO	:	7.63 to 7.77	
Height of lining over rivet head, (mm):			
- Transmission	:	2.63 to 2.87	
- PTO	:	0.91 to 1.08	

14.3 Transmission gears:

Any visual damage, pitting & chipping of any transmission gear teeth	:	None	
Backlash between crown wheel and pinion, (mm)	:	0.11	Against the discard limit of 0.30 mm

14.4 **Brakes:**

Description	Initial specified overall thickness of brake disc, (mm)	Measured thickness of brake disc after test, (mm)	Measured depth of oil groove, (mm)	Minimum permissible depth of oil groove, (mm)
Left	4.70 4.80	4.75 to 4.98	0.40 to 0.66	Up to oil groove
Right	4.70 4.80	4.75 to 4.87	0.44 to 0.63	

14.5 **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)	:	Not measured due to spherical design of bush.	
Condition of bearings for stub axles	:	Normal	
Condition of thrust bearings	:	Normal	
Condition of seals for stub axles and king pins	:	Normal	
Clearance between centre pin and bushes, (mm)	:	0.12 to 0.16	Against the discard limit of 0.80 mm

14.6 **Steering system:**

Visual condition of the components of complete steering assembly : Normal

14.7 **Starter motor & Alternator:**

Presence of soil/oil in housing : None

Condition of bearings and other components : Normal

15. ADJUSTMENTS, DEFECTS, BREAKDOWNS AND REPAIRS

Sl. No	Adjustment/Defects/Breakdowns and Repairs	Category of breakdown	Tractor run hours
1.	During PTO performance test under high ambient condition, leakage of coolant was observed from the upper tank of radiator. To rectify the problem, breezing of radiator upper tank was done.	Mn-6	18.05
2.	During the max. power search under high ambient condition, leakage of fuel was observed from high pressure pipe line to injector. The high pressure pipe line was replaced with new one having same specification (Part no. P0108133).	Mn-10	18.62
3.	During nominal speed test, leakage of coolant was observed from the upper tank of radiator. To rectify the problem, breezing of radiator upper tank was again done.	Mn-6	23.76
4.	During preparation of tractor for drawbar performance test, again leakage of coolant was observed from the bottom tank of radiator. Consequent upon the request received from the applicant for change of radiator assembly with new having same specification (Part No. P0201027) under **"Supplementary Test"** as per clause 3.2.4 of IS 12207-2014, the radiator was changed and drawbar performance test was conducted.	-	29.41

5.	During 2nd five hour at 15% wheel slip under ten hour drawbar performance test, forward & reverse gear shifting lever was disengaged itself 3 to 4 times on loading condition. Consequent upon the request received from the applicant for change of clutch assembly with new having same specification (Clutch cover/housing, Part No: P030403, PTO clutch plate, Part No: P0303404 & Clutch plate, Part No: 74801) were replaced.	Mj-8	48.11

16. SUMMARY OF OBSERVATIONS, COMMENTS & RECOMMENDATIONS

16.1 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: 12207-2014	Values declared by the applicant (D)/ Requirement (R)	As observed	Whether meets the require-ments (Yes/No.)
1	2	3	4	5	6	7
16.1.1	**PTO Performance :**					
a)	Maximum 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	50 (D)	51.1	Yes
b)	Power at rated engine speed, (kW)	Non Evaluative	-do-	50 (D)	49.4	Yes
c)	Specific fuel consumption corresponding to maximum power, (g/kWh)	Non Evaluative	± 5%	292 (D)	277	Yes
d)	Maximum equivalent crankshaft torque, (Nm)	Non Evaluative	± 8%	300(D)	280.7	Yes
e)	Back-up torque, percent	Non Evaluative	10 percent, min.	10 percent, min. (D)	16.25	Yes
f)	Maximum operating temperature, (°C)					
	1) Engine oil	Non Evaluative	The declared value should not exceed the max. Value specified by the oil company and the observed value under high ambient condition should not exceed the declaration.	130 (D)	126	Yes

1	2		3	4	5	6	7
	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.	118 (D)	113	Yes
g)	Engine oil consumption, (g/kWh)		Evaluative	Not exceeding 1% of SFC at max. power under High ambient conditions	Maximum 2.83 (R)	0.41	Yes
h)	Smoke level		Evaluative	Maximum light absorption coefficient of 3.25 per metre or equivalent BOSCH No. 5.2 or 75 Hatridge value **(As per CMVR)**	3.25 per meter (R)	2.53	Yes
16.1.2	**Drawbar performance :**						
a)	Max. drawbar pull with ballast corresponding to 15 percent wheel slip,(kN)		Non Evaluative	Minimum 65% of static mass with ballast	24.34 (D) 24.07 (R) Minimum	31.65	Yes
b)	Max. drawbar pull with standard ballast corresponding to 15 percent wheel slip,(kN)		Evaluative	Minimum 65% of static mass of tractor without ballast	16.57 (D) 16.29 (R) Minimum	23.25	Yes
c)	Maximum drawbar power without ballast, (kW).		Evaluative	Minimum 80 % of PTO power as referred in Sl No. i) a) of PTO performance in case of tractors having total static mass > 1500 kg Minimum 75 % of PTO power as referred in Sl 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 Sl No. i) a) of engine performance in case of tractors which do not have a PTO shaft.	40.0 (D) 40.9 (R) Minimum	40.7	Yes
d)	Max. transmission oil temperature,(°C)		Non Evaluative	The declared value should not exceed the maximum value specified by oil company	130 (D)	114	Yes
16.1.3	**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%]	23.53 (D)	24.64	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	14.0 (D) 12.03 (R) Minimum	18.70	Yes

1	2	3	4	5	6	7
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 Minutes, (mm)	Non Evaluative	Observed value should not exceed 50 mm.	50 (D)	15	Yes
16.1.4	**Brake performance at 25 kmph:**					
a)	Maximum stopping distance at a force, equal to or less than 600 N on brake pedal with Un ballast* (m):					
	1) Cold brake	Evaluative	10	10 (R)	7.97	Yes
	2) Hot brake	Evaluative	10	10 (R)	8.12	Yes
b)	Maximum force exerted on the brake pedal to achieve a deceleration of 2.5 m/s^2 (N)	Evaluative	600	600 (R)	331 to 334	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 (R)	Yes	Yes
16.1.5	**Noise measurement :**					
a)	Maximum ambient noise emitted by the tractor, dB(A)	Evaluative	As per CMVR	88 (R)	84	Yes
b)	Maximum noise at operator's ear level dB(A)	Evaluative	As per CMVR	96 (R)	94	Yes
16.1.6	**Amplitude of mechanical vibrations at :**					
	1) Left foot rest	Non Evaluative	100 microns (max)	100 (R)	150	**No**
	2) Right foot rest			100 (R)	250	**No**
	3) Seat (with driver seated)			100 (R)	90	Yes
	4) Steering wheel			100 (R)	150	**No**

16.1.7	**Air cleaner pull over (%)**	Non Evaluative	0.25% (Max)	Dry type air cleaner is provided		-
16.1.8	**Haulage requirements :**					
a)	Gross mass of the trailers, (tones):					
	1) Two wheel	Non Evaluative	--	5.0	5.0	Yes
	2) Four wheel		--	7.0	7.0	Yes
b)	Distance travelled / litre of fuel consumption, (km/l):					
	1) Two wheel	Non Evaluative	--	8.0	3.04 to 3.13	No
	2) Four wheel		--	7.0	3.06 to 3.15	No
c)	Fuel consumption (ml/km/tonne):					
	1) Two wheel	Non Evaluative	--	46.0	63.82 to 65.76	No
	2) Four wheel		--	39.0	45.24 to 46.62	No

16.1.9	**Wetland cultivation :**						
	Sealing for the following assemblies: 1) Clutch assembly 2) Brake housing 3) Front axle hubs 4) Engine oil 5) Transmission oil	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.**	The manufacturer has recommended that the tractor is not suitable for wetland cultivation (puddling operation).	**Not recommend**	Not applicable

16.1.10	**Safety features :**					
a)	Guards against moving and hot parts	Evaluative	Belt drives, pulley, silencer, hydraulic pipes As per IS 12239 (part 2)	Requirements as per clause no.4 of table no.1	Meets the requirement	Yes
b)	Lighting arrangement	Evaluative	As per CMVR	--do--	Meets the requirement	Yes
c)	Seating requirement (Tractors having more than 1150 mm rear track width)	Non Evaluative	Should meet the requirements of IS 12343 (as amended from time to time)	--do--	**Does not meets the requirement**	**No**
d)	Technical requirements for PTO shaft	Non Evaluative	Should meet the requirements of IS 4931 (as amended from time to time)	--do--	**Does not meets the requirement**	**No**
e)	Dimension of three point linkage	Non Evaluative	Should meet the requirements of IS 4468 (part 1) (as amended from time to time)	--do--	**Does not meets the requirement**	**No**
f)	Specification of linkage drawbar	Non Evaluative	Should meet the requirements of IS 12953 and IS 12362 (part 3) (as amended from time to time)	--do--	Meets the requirement	Yes
g)	Specification of swinging drawbar	Non Evaluative		--do--	Not provided	N.A.

16.1.1	**Labelling of tractors (Provision of labelling plate):**					
	1) Make	Evaluative	Should conform to the requirements of CMVR along-with declared value of PTO HP	--	PREET	Yes
	2) Model	Evaluative		--	7549 AGRITRAC 4WD	Yes
	3) Year of manufacture	Evaluative		--	December, 2015	Yes
	4) Engine number	Evaluative		--	P480 - 00003	Yes
	5) Chassis number	Evaluative		--	XCM75AG00001/B	Yes
	6) Declaration of PTO power, (kW)	Evaluative		--	50	Yes

16.1.11	**Discard limit for:**					
(a)	Cylinder bore diameter, (mm)	Evaluative	To be declared by the manufacturer	105.40	104.98 to 105.02	Yes
(b)	Clearance between piston & cylinder liner at skirt, (mm)	Non Evaluative	-do-	0.80	0.090 to 0.102	Yes
(c)	**Ring end gap (mm):**					
	- Top comp. ring.	Evaluative	-do-	2.0	0.45 to 0.50	Yes
	- 2nd comp. ring.		-do-	2.0	0.60 to 0.70	Yes
	- Oil ring.		-do-	2.0	0.50	Yes
(d)	**Ring groove clearance (mm):**					
	- Top comp. ring.	Evaluative	-do-	0.35	Tappered	--
	- 2nd comp. ring.		-do-	0.35	0.087 to 0.100	Yes
	- Oil ring.		-do-	0.35	0.041 to 0.056	Yes
(e)	**Clearance of main bearings (mm):**					
	- Diametrical clearance	Evaluative	-do-	0.90	0.025 to 0.059	Yes
	- Crankshaft end float	Evaluative	-do-	1.0	0.20	Yes
(f)	**Clearance of big end bearings, (mm):**					
	- Diametri-cal	Evaluative	To be declared by the manufacturer	0.90	0.057 to 0.079	Yes
	- Axial	Evaluative	-do-	1.0	0.25	Yes
(g)	Clearance between king pin and bush, (mm)	Non Evaluative	-do-	0.6	Not measured due to spherical design of bush.	-
(h)	Clearance between center pin and bush, (mm)	Non Evaluative	-do-	0.8	0.12 to 0.16	Yes

16.1.12	**Literature (Submission to test agency)**					
(a)	Operator manual	Evaluative	Provided/Not Provided	Provided	Provided	Yes
(b)	Parts Catalogue	Evaluative	Provided/Not Provided	Provided	Provided	Yes
(c)	Workshop/ Service manual	Evaluative	Provided/Not Provided	Provided	Provided	Yes

16.1.14	CATEGORY OF BREAKDOWNS / DEFECTS :				
S. 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	01	Yes
3.	Minor	Evaluative	Not more than five and frequency of each should not be more than two.	03	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.	04	Yes

16.2	Optional requirements as per Clause-4 (Table-2) of IS:12207-2014:			
S. No.	Characteristic	Requirements as per IS: 12207-2014	As observed	Whether meets the requirements (Yes/No.)
1.	Fitment of ROPS	With a provision for fitment of ROPS.	Not provided	No
		If ROPS fitted it should meet the requirement of IS: 11821-1992.	Not provided	Not applicable
2.	Accessories	Trailer hitch, front tow 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)] : **Does not conform**

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**

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] : **Does not conform**

x) Agricultural Tractor & Machinery Lighting device for travel on public roads [IS: 14683-1999 (Reaffirmed in March, 2009)] : Conforms

16.4 Salient Observations:

16.4.1 Laboratory tests:

16.4.1.1 PTO Performance:

i) During PTO performance test under high ambient condition, leakage of coolant was observed from the upper tank of radiator. To rectify the problem, breezing of radiator upper tank was done.

ii) During the max. power search test under high ambient condition, leakage of fuel was observed from high pressure pipe line to injector. The high pressure pipe line was replaced with new one having same specification (Part no. P0108133).

iii) The maximum PTO power was recorded as **51.1 kW** against the declaration of **50.0 kW**, which meets the requirement of IS: 12207-2014 with regard to tolerance limit.

iv) The specific fuel consumption corresponding to maximum power was recorded as **277 g/kWh**, against the declaration of **292 g/kWh**, which is within the tolerance limit of IS: 12207-2014.

v) The backup torque is **16.25%**.

16.4.1.2 Drawbar Performance :

i) During preparation of tractor for drawbar performance test, again leakage of coolant was observed from the bottom tank of radiator. Consequent upon the request received from the applicant for change of radiator assembly with new having same specification (Part No. P0201027) under **"Supplementary Test"** as per clause 3.2.4 of IS 12207-2014, the radiator was changed & drawbar performance test was conducted.

ii) During 2nd five hour at 15% wheel slip under ten hour drawbar performance test, forward & reverse gear shifting lever was disengaged itself 3 to 4 times on loading condition. Consequent upon the request received from the applicant for replacement of clutch assembly with new having same specification (Clutch cover/housing, Part No: P030403, PTO clutch plate, Part No: P0303404 & Clutch plate, Part No: 74801) replaced. This breakdown is categorized as **"Mj-8"** as per IS: 12207-2014.

16.4.1.3 Hydraulic Performance:

i) The external circuit tapping point is not provided in the tractor's hydraulic system. This should be looked into.

ii) During the pressure relief valve test, the oil temperature exceed the limit 75 ^{0}C against the limit of 65 ± 5 ^{0}C. This should be looked into for necessary corrective action.

16.4.1.4 Nominal speed test:

The nominal speed of the tractor recorded as **27.42 kmph** in high reverse gear (RC-4). The speed recorded in reverse gear RC-4 is not safe as far as the reversing of tractor is concerned. This should be looked into for necessary corrective action.

16.4.1.5 Mechanical Vibration:

The amplitude of mechanical vibration marked as (*) in chapter-8 of this report is on higher side especially at LHS and RHS foot rest & & steering control wheel. This calls for reduction in amplitude of vibration in view of improving service life of the component(s) and the operator's comfort.

16.4.1.6 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.

16.4.1.7 Operator's Seat :

The Longitudinal distance from seat index point to centre of steering control wheel of operator's seat does not meet the minimum requirements of IS: 12343-1998 (Re-affirmed in March, 2009).This should be looked into for corrective action.

16.4.1.8 Symbols for operator's controls and displays:

Oil, grease lubrication type and its frequency are not identifiable with the symbols as per IS: 6283 (Part I & II)-1998.This should be looked into for corrective action.

16.4.1.9 Location and movement of operator's controls:
The fuel shut-off knob for stop does not remain in stop position without application of sustains manual effort. This should be looked into for corrective action.

16.4.1.10 Operator's work place:
Operator's work place meets the requirements of IS-12239(part-I)—1996,**except the following:**

i) Spark arresting device in the exhaust system is not provided.
ii) Width of foot step is not provided as per the above standard.

16.4.1.11 Constructional requirement with regard to safety:
The working clearance between Position control and draft control lever has not been provided as per IS: 12239(Part-II) 1999. This should be looked into for corrective action.

16.4.1.12 Specification of Power Take Off Shaft:
The dimensions "dø" of the PTO shaft does not meet the requirements of IS-4931-1995. This should be looked into for necessary corrective action.

16.4.1.13 PTO Master shield:
PTO master shield not provided on tractor as per the requirements of IS: 4931-1995. This should be looked into.

16.4.2 Field performance:

16.4.2.1 Wet land cultivation (Puddling Operation):
The manufacturer has recommended that the tractor is not suitable for wetland cultivation (puddling operation) and therefore, the wetland cultivation (puddling operation) was not conducted. It is recommended that in all the literature this fact that the tractor is not suitable for wetland (puddling) operation should be mentioned clearly & boldly in all the relevant literature of the tractor & also a cautionary notice regarding non-suitability of tractor for puddling operation may be displayed on the bonnet of the tractor.

16.5 Maintenance / Service Problems:
Noticeable maintenance or service problems, observed during the test. , have been tabled in chapter no.15. Therefore, it should be looked into for necessary quality improvement.

16.6 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 the exhaust system.
ii) PTO shaft master shield should be provided to avoid the accident.
iii) The fuel shut-off lever does not remain in "STOP" position.
iv) The working clearance between the draft control lever & position control lever should be provided as per the requirement of relevant Indian Standard.
v) The rear tyres should be guarded so that operator's feet may not come in contact with the wheels.
vi) The lateral distance from lower hitch point to center line of tractor should be provided as per the requirement of relevant Indian Standard.
vii) Longitudinal distance from seat index point to centre of steering control wheel should be within the limit for easy and comfortable controlling of tractor.

16.7 **Adequacy of Literature supplied with machine:**
The following literature was supplied with the tractor for reference during the test.

a) Operator's Manual in respect of PREET 7549 AGRITRAC 4WD tractor.

b) Tractor Parts Catalogue in respect of PREET 7549 AGRITRAC 4WD tractor.

c) Service Manual in respect of PREET 7549 AGRITRAC 4WD tractor.

16.7.1 The supplied literature was found adequate.

16.7.2 The literatures supplied by applicant should also in national as well as other regional languages for the guidance of users and service personnel.

17. 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	16 Months (March, 2016 to July, 2017)	Yes	Due to frequent break down on the test sample.

TESTING AUTHORITY:

C.V.CHIMOTE
TEST ENGINEER

Y.K. RAO
SENIOR AGRICULTURAL ENGINEER

J.J.R.NARWARE
DIRECTOR

This test report is compiled by **Shri. Shwetabh Singh, Senior Tech. Assistant**

18. APPLICANT'S COMMENTS

Para No.	Our Reference	Applicant's Comments
18.1	16.1.6, (1), (2) & (4)	We will look into for corrective action
18.2	16.1.10 (c)	
18.3	16.1.10 (d)	
18.4	16.10.1 (e)	

Annexure-I

BRIEF SPECIFICATION OF IMPLEMENTS USED DURING FIELD TEST

S. No.	Item	Rotavator	Disc Plough
1.	Make	Sonalika	Field King
2.	Type	Mounted	Mounted
3.	No. of blades/bottoms, (mm)	54, in 10 flanges	Three
4.	Type of blades/ bottoms, (mm)	L shape	Concave
5.	Size of blades/ bottoms, (mm)	220 X 85 X 8	385
6.	Spacing of blades / bottoms, (mm)	250	280
7.	Lower hitch point span, (mm)	640	785
8.	Mast height, (mm)	510	510
9.	**Overall dimensions, (mm):**		
	- Length	920	1920
	- Width	2480	1040
	- Height	1005	1180
10.	Gross mass	480	345

Annexure - II

TRACTOR RUN HOURS DURING TEST

A.	LABORATORY AND TRACK TESTS:	HOURS
1.	Running-in	--
2.	PTO performance test	12.09
3.	Power lift and hydraulic pump performance test	4.93
4.	Drawbar performance test	24.73
5.	Turning ability	0.20
6.	Location of centre of gravity	0.20
7.	Operator's field of vision	--
8.	Brake test	1.83
9.	Noise measurement	1.75
10.	Mechanical vibration test	1.0
11.	Nominal speed test	4.34
B.	**FIELD TEST:**	
1.	Rotavation	20.19
2.	Disc Ploughing	15.76
C.	**HAULAGE TEST:**	5.42
D.	Miscellaneous test and other run hours including idle run, transportation, trials and preparation for test	6.45
	TOTAL:	**98.89**