व्यावसायिक परीक्षण रिपोर्ट (प्रारंभिक)
COMMERCIAL TEST REPORT (Initial)

संख्या / No. : T-1101/1627/2017
माह / Month : August, 2017

TAFE, MF 7250 DI V1.1 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 - 2015 Certified Institute)
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Manufacturer	:	M/s. Tractors and Farm Equipment Limited, P.O. Box No.3302, 35, Mahatma Gandhi Road, Nungambakkam, Chennai- 600 034
Test requested by (applicant)	:	M/s. Tractors and Farm Equipment Limited, P.O. Box No.3302, 35, Mahatma Gandhi Road, Nungambakkam, Chennai- 600 034

Month: August	Test Report No. T-1101/1627/2017	Year : 2017

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 June, 2017
Test Report No.	:	T-1101/1627/2017
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 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

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. Tractors and Farm Equipment Ltd.** **Post Box No. 3302** **35, Mahatma Gandhi Road,** **Nungambakkam,** **Chennai – 600 034 (Tamil Nadu)**
Location of plant (s)	:	**i)Tractors and Farm Equipment Ltd.,** Kalladipatti Plant, 10/205, Kalladipatti (P.O.) – 624 201, Dindigul District (Tamil Nadu) **ii)Tractors and Farm Equipment Ltd.,** Doddapallapur Plant, Plot No. 1, Kiadb Industrial Estate, Doddapallapur, Bangalore – 561 203 (Karnataka)
Test requested by (applicant)	:	The manufacturer
Selected for test by	:	Applicant
Place of running-in	:	At manufacturer's works
Duration of said running-in (h):		
- Engine	:	12
- Transmission	:	24
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	:	TAFE Ltd.
Model	:	MF 7250 DI V1.1
Variants, if any	:	None
Brand name	:	None
Type	:	Four wheeled, Rear wheel driven, General Purpose Agricultural Tractor.
Year of manufacture	:	HE (i.e.August,2014)
Chassis number	:	MEA 8B1DDHE3000034
Country of Origin	:	INDIA

1.2 **Engine:**

Make	:	SIMPSON & Co. Ltd.
Model	:	T III ASJ 327-F3
Type	:	Four stroke, naturally aspirated, liquid cooled, direct injection, diesel engine.
Serial number	:	SJ32752831
Engine speed (Manufacturer's recommended production setting), (rpm) :		
- Maximum speed at no load,(rpm)	:	2300 to 2475
- Low idle speed, (rpm)	:	600 to 800
- Speed at max. torque, (rpm)	:	1300 to 1500
Rated speed, (rpm):		
- For PTO use	:	2250
- For drawbar use	:	2250

1.3 **Cylinder & Cylinder Head:**

Numbers	:	Three
Disposition	:	Vertical, inline
Bore/stroke, (mm)	:	95/127
Capacity as specified by the applicant, (cc)	:	2700
Compression ratio, (apa)	:	18.3 : 1
Type of cylinder head	:	Monoblock
Type of cylinder liners	:	Dry, replaceable
Type of combustion chamber	:	Re-entrant, cavity on piston crown
Arrangement of valves	:	Overhead, inline
Valve clearance (cold/hot):		
- Inlet valve, (mm)	:	0.30/0.30
- Exhaust valve, (mm)	:	0.30/0.30

1.4 **Fuel System:**

Type of fuel system	:	Gravity and force feed

1.4.1 **Fuel tank:**

Capacity, (l)	:	62.4
Location	:	Above clutch housing under bonnet
Provision for draining of sediments/water	:	Not provided
Type of fuel tank	:	Metallic

1.4.2 **Water separator:**

Make	:	Engine tech
Type	:	Gravity separation, inverted funnel type
Location	:	On RHS of engine
Capacity, (l)	:	0.43

1.4.3 **Fuel feed pump:**

Make	:	Bosch, India
Type	:	Plunger
Model/Group combination No.	:	FP/KEG 22AD312,944 003 0033
Provision of sediment bowl	:	Not Provided

1.4.4 **Fuel filters:**

Make	:	Bosch, India
Model/Group combination No.	:	F002 H20 149
Numbers	:	One
Type of elements:		
- Primary	:	Paper
- Secondary	:	Not provided
Capacity of final stage filter, (l)	:	0.50

1.4.5 **Fuel Injection pump:**

Make	:	Bosch, India
Model/Group combination No.	:	F 002 AOZ 787 PES 3A 95D 320LS 3500
Type	:	Inline, plunger
Serial number	:	45453046
Method of drive	:	Through timing gears

1.4.6 **Fuel injectors:**

Make	:	Bosch, India
Nozzle holder number	:	F 002 C80 018
Nozzle number	:	DSLA 145 P 1150, 454 130 877
Type	:	Multi hole (Six holes)
Manufacturer's production pressure setting, (MPa)	:	25.0 to 25.8
Injection timing	:	12 +0/-2° Before TDC
Firing order	:	1-2-3

1.4.7 **Governor:**

Make	:	Bosch, India
Model/Group combination No.	:	RSV 375...1125A 4C1626R
Type	:	Mechanical, centrifugal, variable speed.
Rated engine speed, (rpm)	:	2250
Governed range of engine speed, (rpm)	:	600 – 2475

1.5 **Air Intake System:**

1.5.1 **Pre-cleaner:**

Make	:	TAFE
Type	:	Cyclonic with transparent dust collector
Location	:	On the top of air cleaner intake pipe above the bonnet.

1.5.2 **Air cleaner:**

Make	:	TAFE
Type	:	Oil bath
Location	:	In front of the radiator under the bonnet
Oil capacity, (l)	:	0.9
Range of suction pressure at maximum power, (kPa)	:	3.0 to 3.1
Oil change period	:	Change air cleaner oil after every 100 hours of operation.

1.6 **Exhaust System:**

Type of silencer	:	Up-draught, (cylindrical)
Position of silencer outlet with Respect to SIP, (mm):		
- Upward	:	990
- Longitudinal	:	1550
- Lateral	:	410 (on RHS)
Range of exhaust gas pressure at maximum power, (kPa)	:	6.1 to 6.7
Provision of spark arresting device	:	None
Provision against entry of rain water	:	A bend is provided on the outlet of silencer.

1.7	**Lubricating system:**		
	Type	:	Force feed cum splash
	Oil sump capacity, (l)	:	6.80
	Total lube oil capacity, (l)	:	7.35
	Oil change period	:	First change after 100 hours and subsequently after every 300 hours of operation.
	Cooling device, (if any)	:	None
	Filters:		
	Type	:	Full flow, spin-on, throwaway
	Numbers	:	One
	Pump:		
	Make	:	SIMPSON & Co. Ltd.
	Type	:	Rotary, lobe
	Method of drive	:	Through timing gears.
	Pressure release setting, (kPa)	:	352 to 457
	Minimum permissible pressure, (kPa)	:	88
1.8	**Cooling system:**		
	Type	:	Forced circulation of water
	Details of pump	:	Centrifugal, semi-open impeller of 74.6 mm diameter, having 6 vanes and driven through crankshaft pulley by a cogged V-belt common to alternator.
	Details of fan	:	Suction type, having seven numbers of polyvinyl chloride blades of 385 mm diameter and mounted on water pump shaft.
	Means of temperature control	:	Thermostat
	Bare radiator capacity, (l)	:	2.60
	Capacity of expansion tank, (l)	:	1.35
	Total coolant capacity, (l)	:	8.70
	Radiator cap pressure, (kPa)	:	88
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	:	AMCO & N70ZMF
	Type	:	Lead acid,
	Capacity and rating	:	12 V, 75 Ah at 20 hours discharge rate
	Location	:	In front of radiator,under the bonnet.
1.10.2	**Starter:**		
	Make	:	Lukas TVS
	Model	:	M14 (apa)
	Type	:	Pre-engaging, solenoid operated
	Capacity and rating	:	12V, 2.2 kW
	Serial Number	:	260246A

1.10.3 **Generator:**

Make	:	Auto Lek
Model	:	DA 84122 (apa)
Type	:	Alternator
Serial number	:	Not available
Output rating	:	12V, 36 Amp
Method of drive	:	Through crankshaft pulley by a cogged V-belt common to water pump pulley.

1.10.4 **Voltage regulator:** : In built with alternator

1.10.5 **Details of lights:**

Description	No. & capacity of bulbs	Height of the centre of beam above ground level,(mm)	Size of beam, (mm)	Distance between centre of the beam and outside edge of tractor at standard rear track setting, (mm)
Front Lights:				
- Head lights	2, 12V, 60/55W	1200	155 x 95	705
- Parking lights	2, 12V, 5W	1380	55 x 45	230
- Turn Indicators-cum-hazard light	2, 12V, 21W	1380	110 x 45	150
Rear lights:				
- Stop/Tail light	2, 12V, 21/5W	1380	90 x 75	235
- Turn Indicators-cum-hazard light	2, 12V, 21W	1380	90 x 75	140
Plough light	1, 12 V, 55W	1500	70 x 130	370
Registration plate Light	1, 12V, 5W	1175	20 x 80	862
Reflectors (Red)	2	1380	45 x 55	190

1.10.6 **Main switch** : Key turn type having three positions viz. OFF; ON & START

1.10.7 **Light switch** : Rotary type having five positions viz.
i) OFF
ii) Parking + dash board light
iii) Head light (short beam) + (ii)
iv) Head light (long beam) + (ii)
v) Head light long beam only

1.10.8 **Horn:**

Make	:	Addon
Type	:	2B, 12V, electromagnetic vibrator type
Location	:	In front of radiator, under the bonnet

1.10.9 **Fuse box** : Contains five numbers fuses of following capacity.

Capacity	20 A	15 A	10A
Numbers	1	3	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

1.11 **Instrument panel details:**

i) Engine speed-cum-cumulative run hour meter (0-30)*100
ii) Water temperature gauge (with coloured zones)
iii) Lubricant oil pressure gauge (with coloured zones)
iv) Battery volt meter gauge (with coloured zones)
v) Fuel level gauge (with coloured zones)
vi) Battery charging indicator
vii) Turn/hazard indicator
viii) Head light long beam on indicator
ix) Left/Right Turn indicator switch
x) Hazard light switch
xi) Horn push button
xii) Hand accelerator lever
Xiii Steering control wheel
xiv) Back view mirror
xv) Engine stop knob
xvi Main switch (Key turn type)
xvii Light switch (Rotary type)

1.12 **Transmission System:**

1.12.1 **Clutch:**

Make : AMREP, India

Type : Dual ,diaphragm type, Dry friction plate

No. of friction plate(s) : Two

Details		Transmission	PTO
Material	:	F30C (apa)	F30C(apa)
Size, [OD/ID (mm)]		302/196.6	253.8/172.3
Method of operation		By pressing LHS foot pedal halfway	By fully pressing LHS foot pedal

1.12.2 **Gear box:**

Make : TAFE

Model : Not specified

Type : Mechanical, constant mesh with epicyclic high-low reduction unit

No. of speeds:

Forward : 08

Reverse : 02

Gear shifting pattern :

Range selection lever

Main gear shift lever

Location of gear shifting levers	:	Side shifting
Main gear shifting lever & Range shifting lever	:	Both levers are located in RHS of the operator's seat.
Oil capacity, (l)	:	59.6 (common to gear box, differential unit hydraulic systems& brake system)
Oil changing period	:	First change after 300 hours and thereafter,every 900 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 **14.9- 28** size tyres of **640** mm radius index, (kmph)
Forward	L1	190.57	2.85
	L2	133.58	4.06
	L3	90.67	5.98
	L4	61.32	8.86
	H1	48.42	11.21
	H2	33.97	15.94
	H3	23.00	23.59
	H4	15.56	34.87
Reverse	LR	146.58	3.71
	HR	37.18	14.61

1.12.4 Differential unit:

Type	:	Crown wheel and bevel pinion with differential assembly accommodated inside the differential housing.
Reduction through crown wheel & pinion	:	3.23 : 1 (42/13 T)
Oil capacity of final drive, (l)	:	59.6 (common to gear box, differential unit hydraulic & brake systems)
Oil changing period	:	First change after 300 hours and thereafter every 900 hours of operation
Differential lock	:	Not provided

1.12.5 Rear axle & Final drive : Bull gear & pinion accommodated inside the differential housing

Reduction through final drive	:	4.818:1
Oil capacity of final drive, (l)	:	59.6 (common to gear box, differential unit & hydraulic systems)
Oil changing period	:	First change after 300 hours and thereafter, every 900 hours of operation

1.13 Power lift (Hydraulic System):

Make	:	TAFE
Type	:	Open centre, Live, ADDC
No. and type of cylinder	:	One, single acting
Type of linkage lock for transport	:	Hydraulic

1.13.1 Hydraulic pump :

- Make	:	TAFE
- Type	:	Redial piston pump (Scotch Yoke)
- Location & drive	:	Inside differential housing and driven through lay shaft of gear box.
No. & type of filters	:	One, strainer accommodated inside differential housing.

Hydraulic oil capacity, (l) : 59.6 (common to gearbox, differential unit & final drive and brake systems)

Oil change period : First change after 300 hours and thereafter every 900 hours of operation

Provision for external tapping : Provided (a plug on oil gallery)

Details of control levers :
i) Position control lever (Orange strip)
ii) Draft control lever (Yellow strip)
iii) Transport lock

Method of draft sensing : Through top link

1.13.2 Three point linkage:

S. No.	Observations	As per IS: 4468-(Part-I) 1997 (Category I / 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	25.86	Conforms to Cat. II
	b) Width of ball	44.0 (max)/ 51.0 (max)	43.70	Conforms to Cat. II
II.	**Lower hitch points:**			
	a) Dia. of hitch pin hole	22.40 to 22.65/ 28.70 to 29.00	22.6/28.89	Conforms to Cat. I & II
	b) Width of ball	34.8 to 35.0/ 44.8 to 45.0	44.2/44.69	-do-
III.	Lateral distance from lower hitch point to centre line of tractor	359/435	664	**Does not conform**
IV.	Lateral movement of lower hitch points	100 (min)/ 125 (min)	110	Conforms to Cat. 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	535	Conforms to Cat. I
VI.	Transport height	820 (min) / 950 (min)	865	Conforms to Cat. I
VII.	Power range (without force)	560 (min)/ 650 (min)	675	Conforms
VIII.	Leveling adjustment	100 (min)/ 100 (min)	285	Conforms
IX.	Lower hitch point tyre clearance	100 (min)/ 100 (min)	205	Conforms
X.	Lower hitch point height	200 (max) / 200 (max)	190	Conforms

1.13.3 **Linkage geometry dimensions {Refer Fig.-1(a)}:**
The following are dimensions observed, corresponding to **640 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	770	770
2.	Length of lift arm	B	260	260
3.	Length of lift rods	C	675	675
4.	Length of top link	D	585 to 810	595
5.	Distance of lift rod connection point from pivot point of lower link	E	410	410
6.	Distance of lower link pivot point from rear wheel axis:			
	-Horizontally	F	100, behind	100, behind
	-Vertically	G	125, below	125, below
7.	Distance of upper link pivot point from rear wheel axis:			
	-Horizontally	H	80,forward	80,forward
	-Vertically	J	280,above	280, above
8.	Distance of lift arm pivot point from rear wheel axis:			
	-Horizontally	K	225, behind	225,behind
	-Vertically	L	360, above	360, above
9.	Height of lower hitch points relative to the rear wheel axis:			
	- In high position	M	225	225, above
	- In low position	N	440	440, below
10.	Height of lower link hitch points when locked in transport position	--	225, above	

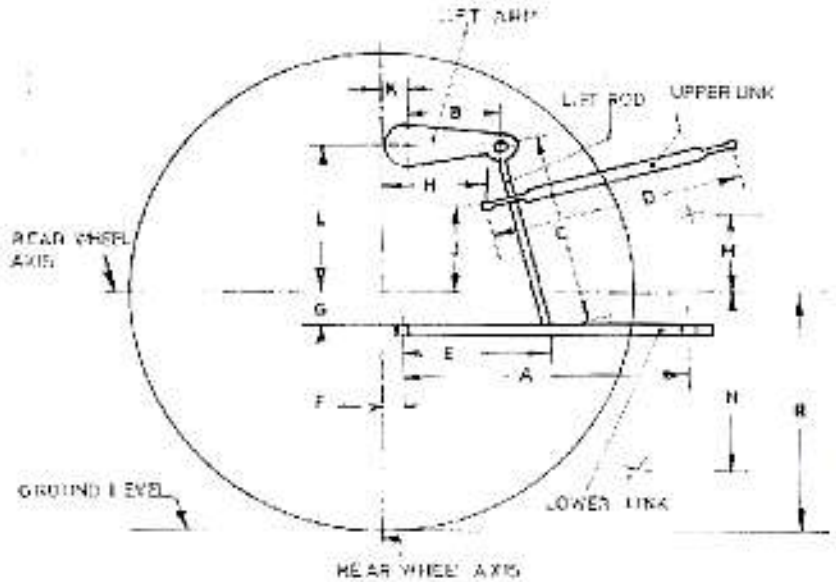


Fig. 1 (a): **DIMENSIONAL NOTATIONS FOR TABLE OF LINKAGE GEOMETRY**

1.13.4 Drawbar:

1.13.4.1 Linkage Drawbar [Refer Fig.1(b)]:

Notation	As per IS: 12953-1990 (Cat. I)/ (Cat. II), (mm)	As measured, (mm)	Remarks
A	683 ± 1.5/825 ± 1.5	683	Conforms
B	75 (min)/75 (min)	76.25	Conforms
C	30 (min) / 30 (min)	38.0	Conforms
DØ	21.79 to 22.0/27.79 to 28.0	21.84	Conforms to Cat. I
E	39.0 (min/)49.0 (min)	50.1	Conforms
FØ	12.0 (min)/12.0 (min)	12.0	Conforms
G	15.0 (min)/15.0 (min)	15.0	Conforms
HØ	25 ± 1/25 ± 1	25.0	Conforms
J	80 ± 1.5/80 ± 1.5	80.1	Conforms
No. of holes	7/9	7	Conforms to Cat. I

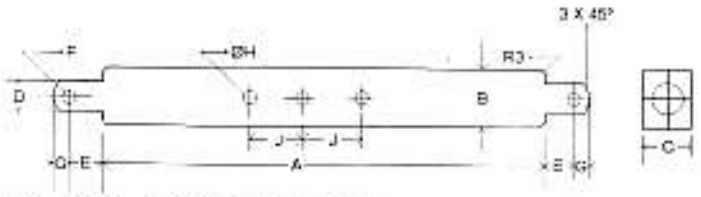


Fig. 1 (b): DIMENSIONAL NOTATIONS FOR LINKAGE DRAWBAR

1.13.4.2 **Swinging drawbar:** : **Not provided**

1.14 **Power take-off shaft:**

Type	:	Type-I, Independent
Method of engaging	:	By a hand lever located on LHS of operator's seat
No. of shaft (s)	:	One
PTO speed corresponding to rated engine speed, (rpm)	:	701
Distance behind rear axle, (mm)	:	335
Engine to PTO speed ratio	:	3.210 : 1
Whether PTO Shaft is capable of transmitting the full power of engine	:	Yes
Other speeds, if any	:	Not provided

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 rpm PTO shaft corresponding to 1733 rpm of engine	Conforms
No. of splines	6	6	Conforms
Direction of rotation	Clockwise	Clockwise	Conforms
Location	The position of the centre of the end of PTO shaft shall be within 50 mm to right or left of the centre line of the tractor.	In centre	Conforms

1	2	3	4
Dimensions (mm) [See Fig. 2]:			
DØ	34.79±0.06	34.79	Conforms
dØ	28.91 ± 0.05	28.86	Conforms
BØ	29.4 ± 0.1	29.43	Conforms
AØ (Optional)	8.3 ± 0.1	8.40	Not Applicable
W	8.69 - 0.09, - 0.16	8.59	Conforms
a	7	7	Conforms
b (Optional)	25 ± 0.5	25.3	Not Applicable
c	38	38	Conforms
x	30°	30°	Conforms
B	76 (min)	84	Conforms
h	450 to 675	650	Conforms

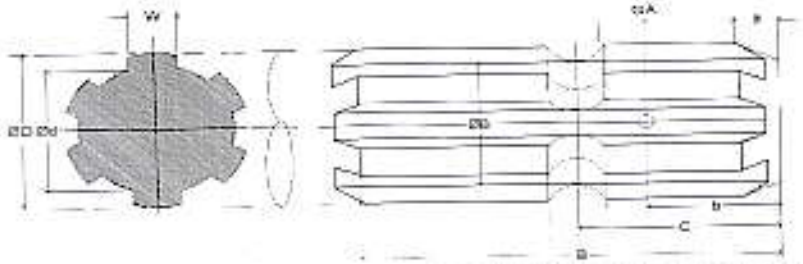


Fig. 2: DIMENSIONAL NOTATIONS FOR TYPE-I POWER TAKE-OFF SHAFT

1.14.2 **PTO Master Shield** : **Not provided**

1.15 **Towing hitch:**

1.15.1 **Front:**

Type	:	Clevis
Location	:	At front of tractor below bumper
Height above ground level, (mm):	:	640
Type of adjustment	:	None (fixed)
Dia. of pin hole, (mm)	:	33.3
Width of clevis, (mm)	:	55.4

1.15.2 **Rear:**

Type	:	Clevis
Location	:	At rear of differential housing
Height above ground level, (mm):		
Maximum	:	790
Minimum	:	675
Number of positions	:	04
- Type of adjustment	:	By changing the position of hitch on mounting bracket & reversing the hitch.
Distance of hitch point, (mm):		
- From rear wheel centre	:	465
- From power take-off shaft end	:	130
Dia. of pin hole, (mm)	:	30.95
Width of clevis, (mm)	:	85.0

1.16 **Steering:**

Make	:	Danfoss (apa)
Type	:	Open centre, Hydrostatic
Location	:	Above gear box
Diameter of steering control wheel (mm)	:	450
Method of operation	:	Manually, by steering control wheel
Type & make of pump	:	Gear ,Rexroth
Location	:	On LHS of engine
Method of drive	:	Through timing gears
Make, Number & Type of hydraulic ram cylinder	:	Ognibene, One & Double acting and located centrally behind the front axle
Oil capacity of steering system, (l)	:	0.7
Oil change period	:	Change for the first 100 hrs and subsequently after every 500 hours of operation.

1.17 **Brakes:**

1.17.1 **Service Brake:**

Make	:	JMI
Type	:	Mechanical, Oil Immersed discs brake
Location	:	On half axle shaft outside the differential housing.
No. of disc(s)	:	04 (on each wheel brake)
Area of liners, (cm^2)	:	956.34 (on each wheel side)
Material of liners	:	Paper based (apa)
Method of operation	:	Individual and combined, pedal operated by right foot

1.17.2 **Parking Brake:**

Type	:	Paul & Ratchet arrangement
Location & Method of operation	:	Service brake acts as parking brake when locked in position by a hand lever provided on LHS of operator's seat.

1.18 **Wheel Equipment:**

1.18.1 **Steered Wheel(s):**

Make	:	Apollo krishak
Numbers	:	2
Type of tyre	:	Pneumatic, ribbed
Size	:	6.00-16
Ply rating	:	8
Maximum permissible loading capacity of each tyre at 450 kPa pressure, (kgf)	:	675 (apa)
Recommended inflation pressure, (kPa) :		
- For field work	:	200
- For transport	:	230
Track width, (mm)	:	1310 (std). & 1540
Method of changing track width	:	By reversing the wheel disc and changing position of disc on offset rim lugs.
Make & size of rim	:	Wheels India ltd. 4.5 E x 16

1.18.2 **Drive wheel(s):**

Make	:	MRF
Numbers	:	2
Type of tyre	:	Pneumatic, traction
Size	:	14.9-28
Ply rating	:	12
Maximum permissible loading capacity of each tyre at 230 kPa pressure, (kgf)	:	1180
Recommended inflation pressure, (kPa):		
- For field work	:	98
- For transport	:	110
Track width, (mm)	:	1350 (std),1420,1530,1570,1670,1760 &1870
Method of changing track width	:	By reversing the wheel disc.
Make & size of rim	:	Wheels India ltd.W13 x 28

1.18.3 **Wheel base, (mm)** : 1930
Method of changing wheel base, if any : None

1.19 **Operator's seat:**

Make	:	Harita seating system ltd.
Type	:	Cushioned seat with back rest
Type of suspension	:	Two helical springs
Type of dampening	:	Hydraulic shock absorber
Range of adjustment, (mm):		
Vertical	:	NIL
Lateral	:	NIL
Longitudinal	:	± 100

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

1.20.1 **Operator's Seat:**
All parameters meets the minimum requirements of IS: 12343-1998, (Re-affirmed in March, 2009), **except the following:**
i) Width of seat doesn't meet the requirement.
ii) Vertical distance from seat index point to centre of clutch pedal & accelerator pedal

1.20.2 **Conformity with IS: 6283 (Part 1 & 2)-1998 (Re-affirmed in March, 2009)**
All the controls are identifiable with symbols as per IS: 6283(Part 1 & 2) -1998,. **except the following:**
i) Power Take –off (On- Off) identification symbol has not provided.

1.20.3 **Conformity with IS : 8133-1983 (Re-affirmed in March, 2009) , except the following:**
Location and movement of various controls meets the requirement of IS: 8133-1983.
i) Provision of differential lock is not provided

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.

1.20.5 **Conformity with IS:12239 (Part-2)-1999 (Re-affirmed in March, 2009) :**
Meets the requirements of IS: 12239 (Part-2)-1999, **except the following:**
i) The working clearance around hand operated lever is not as per the standard.

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:**
Back view mirror has been provided.

1.21 **Labelling of tractor as per IS: 10273-1987 (Reaffirmed in March, 2009):**
Location: The labeling plate riveted on LHS of dash board of the tractor provides the following information:

Name of Manufacturer	**TAFE TRACTORS & FARM EQUIPMENTS LIMITED, CHENNAI, INDIA**
Make	TAFE
Model	MF 7250 DI V1.1
Year of manufacturer	2014
Engine Serial Number	SJ32752831
Chassis Serial Number	MEA8B1DDHE3000034
Maximum PTO Power, kW	31.80
Specific fuel consumption, g/kWh	265

1.22 **Ballast Conditions:**

	Particulars	Ballast mass as used, (kg)			
		Front		Rear	
		Water	C.I. weight	Water	C.I. weight
i)	As used during drawbar performance test	NIL	100	230	490
ii)	As used during field test, except rotavator	NIL	50	230	280
iii)	As used during haulage test	NIL	50	230	280
iv)	As use during wet land operation (with full cage wheel)	NIL	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)	With standard ballast	830	1230	2060
ii)	With ballast as used during drawbar performance test.	950	1940	2890
iii)	With ballast as used during dry land operation, except rotavator.	930	1690	2625
iv)	Without ballast as used during wet land operation with full cage wheels	870	1210	2080
v)	As used during the haulage test with trailer hitch, canopy and drawbar.	920	1755	2675

1.24 **Overall dimensions:**

Condition	Length, (mm)	Width, (mm)	Height, (mm)		Ground Clearance, (mm)
With standard ballast	3605	1725	2340	1805 (from the top of pre air cleaner)	425 (below front axle)

1.25 **Number of external lubricating Points:**
- Oiling : Nil
- Greasing cups : 02
- Greasing nipples : 13

1.26 **Colour of tractor:**
Chassis & engine : Smoke grey
Sheet metal:
Bonnet : Red
Mudguard : Red
Wheel rims & discs : Silver

1.27 **Optional features** : **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/cm³** at 15°C was used.

2.2 Lubricants:

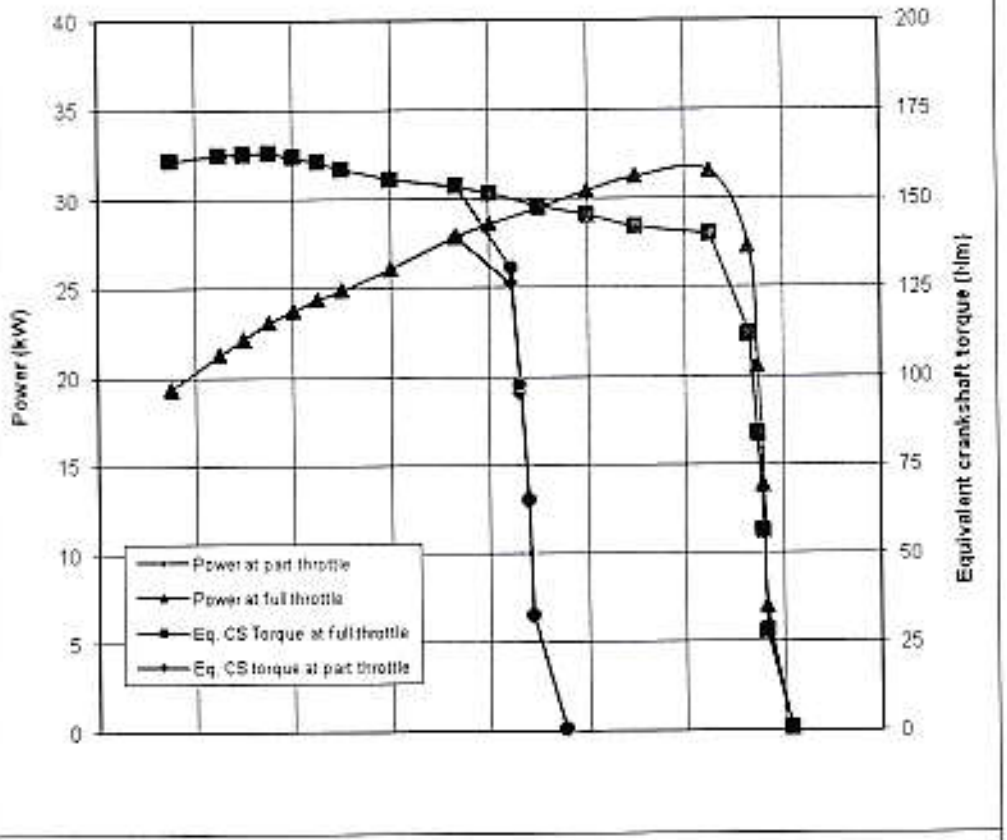
Sl. No.	Particulars	As recommended by the manufacturer	As used during the test
1.	Air cleaner oil	SAE 20 W 40	As recommended
2.	Engine oil	SAE 20 W 40	As recommended
3.	Transmission, differential, hydraulic rear final drive and brake system	SAE 20 W 40	Oil originally filled in the tractor was not changed
4.	Steering system	Servo transfluid'A'/Castrol TQ/Bharat Petroleum ATF type'A'	--do—
5.	Grease	Servo grease MP3	Servo grease MP

3. PTO PERFORMANCE TEST

Date(s) of test : 07.09.2016 to 08.09.2016
Tractor run at the Institute prior to start of PTO test (h) : 11.3
Type of dynamometer bench : Eddy Current, Fuchino ESF 1000S

Table-1.

Power (kW)	Speed, (rpm)		Fuel consumption			Specific energy, (kWh/l)
	P.T.O.	Engine	l/h	kg/h	Specific, (kg/ kWh)	
1	2	3	4	5	6	7
a) Maximum power - 2 hours test:						
31.6	670	2151	9.38	7.84	0.248	3.36
29.6	670	2151	9.03	7.55	0.255	3.27*
b) Power at rated engine speed (2250 rpm):						
31.6	670	2151	9.38	7.84	0.248	3.36
29.6	670	2151	9.03	7.55	0.255	3.27*
c) Power at standard power take-off speed (540 ± 10 rpm):						
27.9	540	1733	7.86	6.57	0.235	3.55
26.4	540	1733	7.67	6.41	0.243	3.44*
d) Varying loads at rated engine speed (2250 rpm):						
i) Torque corresponding to maximum power available at rated engine speed:						
31.6	670	2151	9.38	7.84	0.248	3.36
ii) 85% of the torque obtained in (i) :						
27.3	726	2330	8.36	6.99	0.256	3.26
iii) 75% of the torque obtained in (ii) :						
20.6	731	2347	6.59	5.51	0.267	3.13
iv) 50% of the torque obtained in (ii) :						
13.9	735	2359	5.13	4.26	0.307	2.70
v) 25% of the torque obtained in (ii):						
7.0	737	2366	3.76	3.15	0.450	1.85
vi) Unloaded:						
0.2	752	2414	2.56	2.14	10.70	0.06



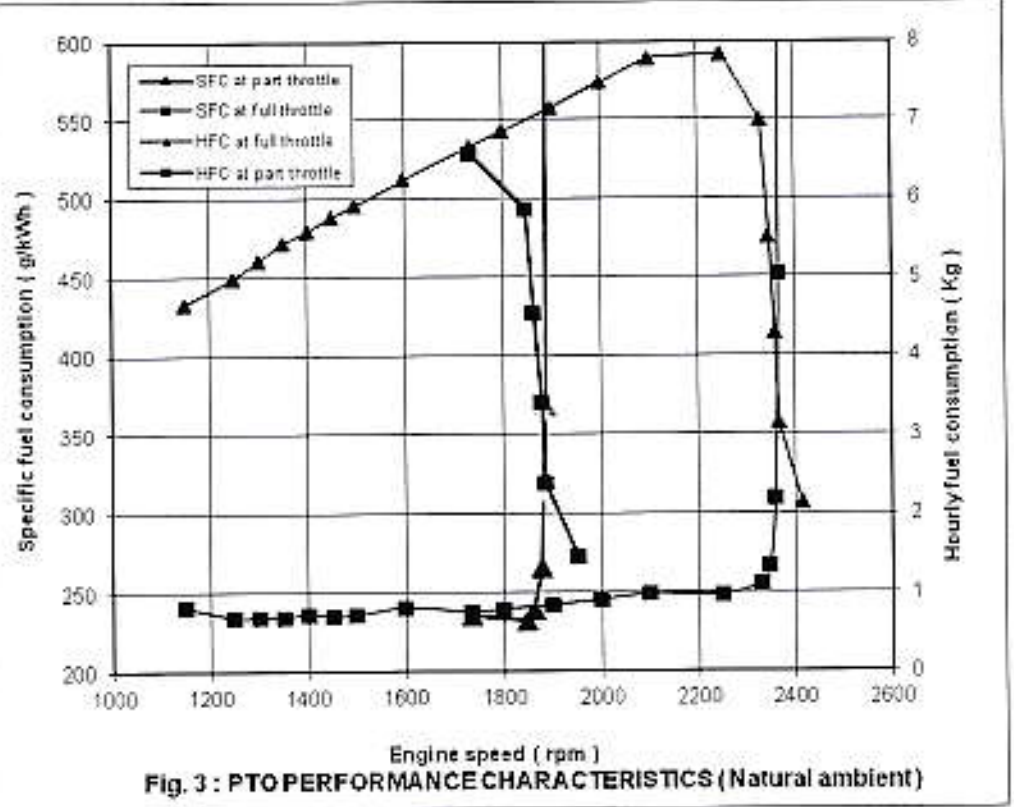
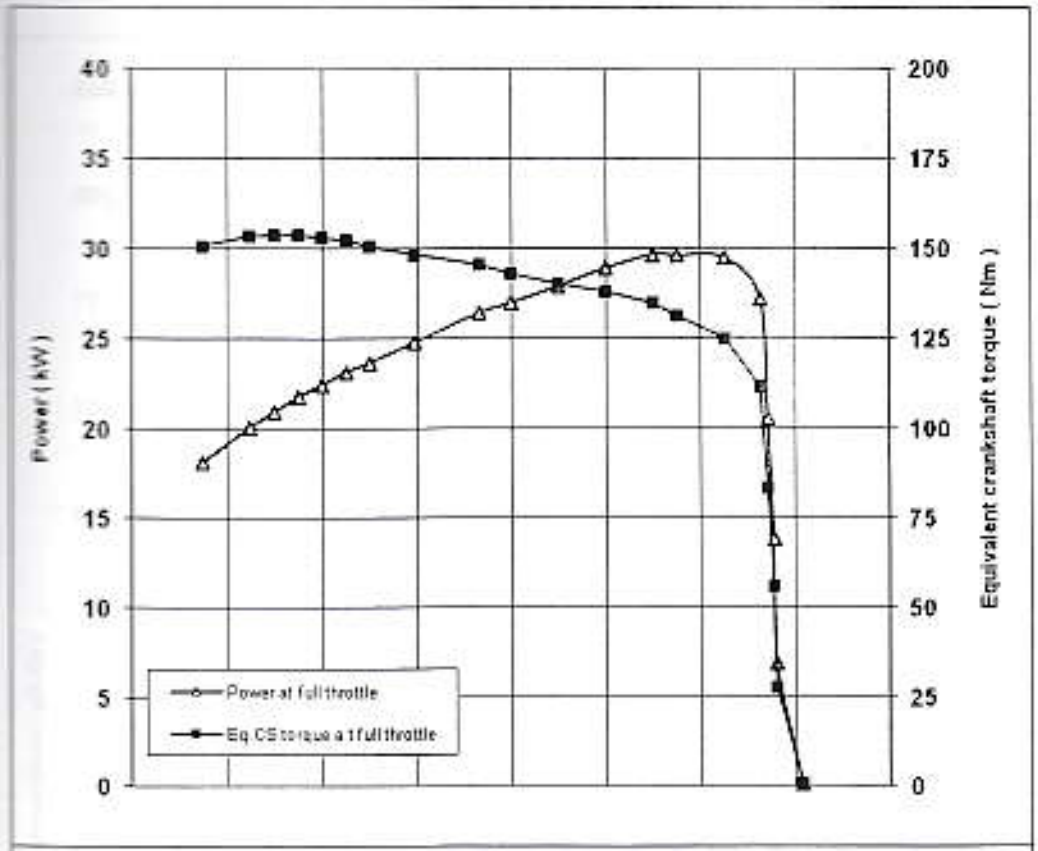


Fig. 3 : PTO PERFORMANCE CHARACTERISTICS (Natural ambient)



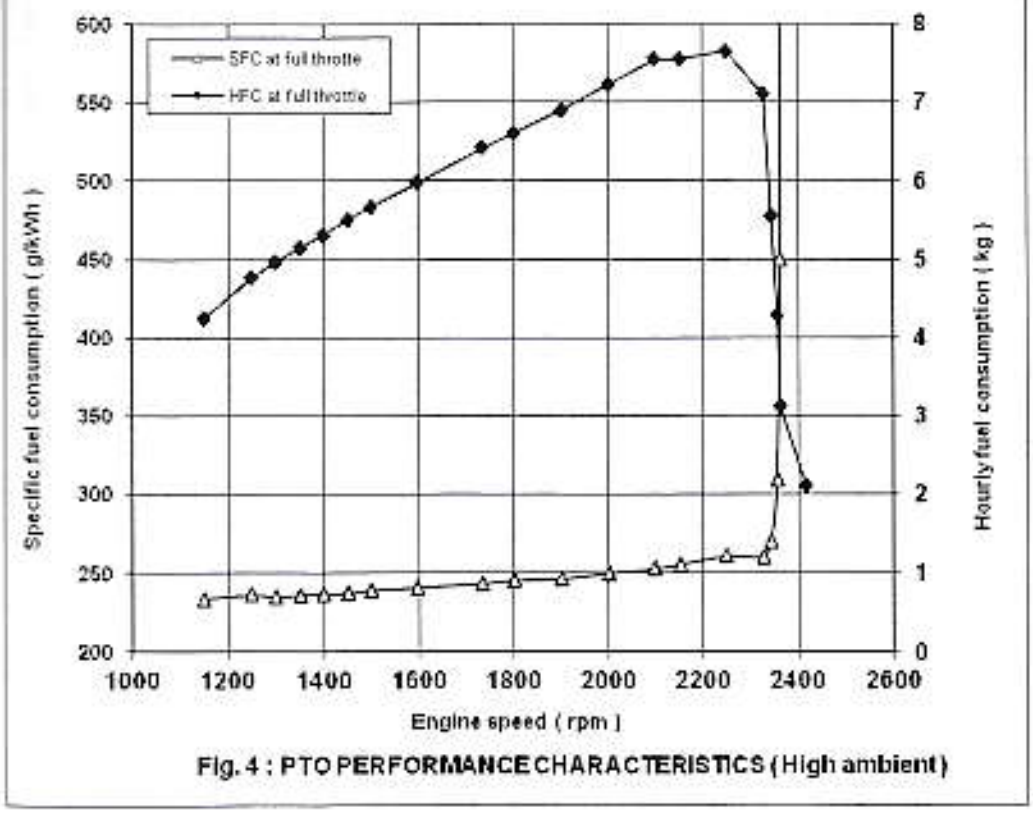


Fig. 4 : PTO PERFORMANCE CHARACTERISTICS (High ambient)

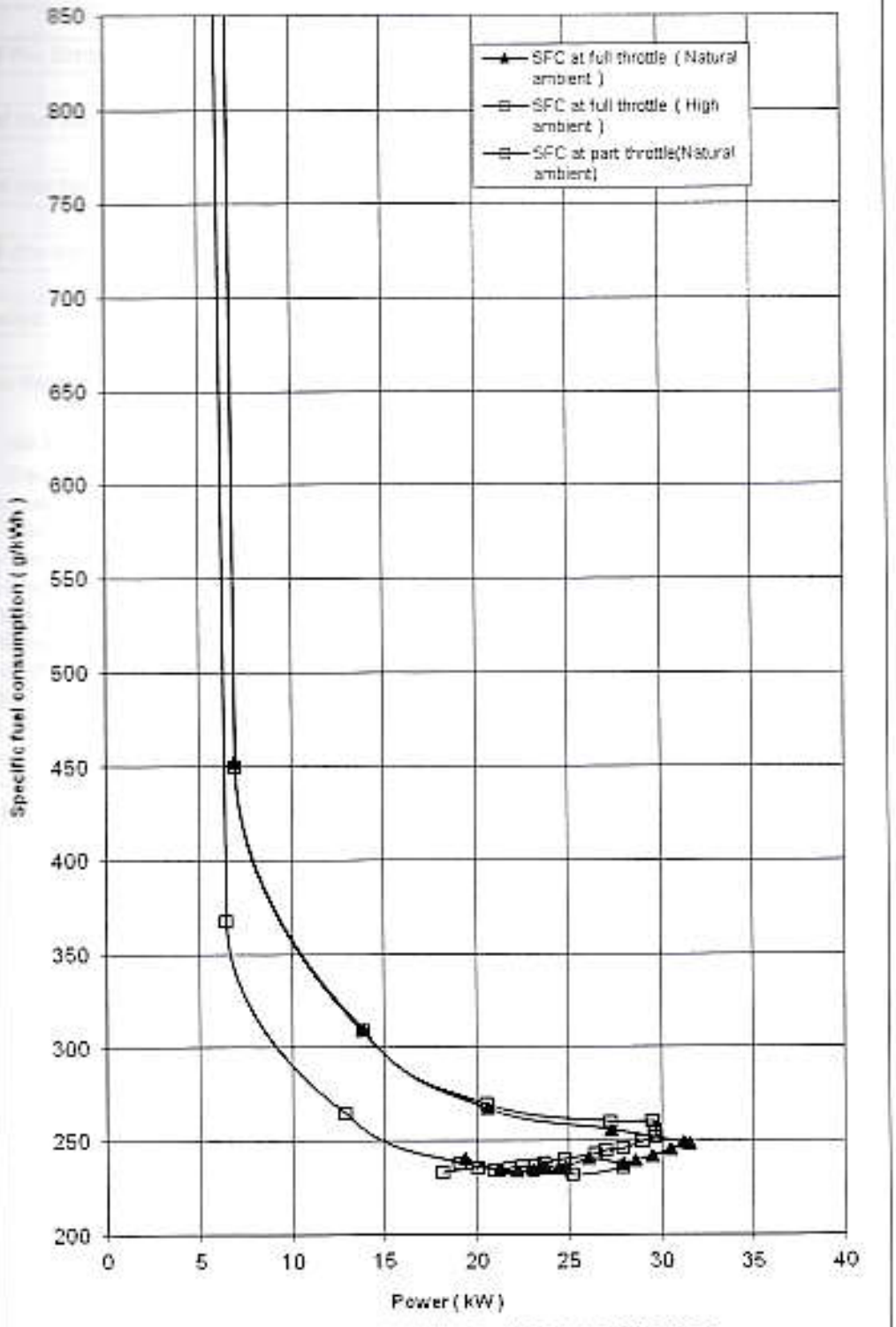


Fig. 5 : PTO PERFORMANCE CHARACTERISTICS
(Natural ambient)

v) Varying loads at standard PTO speed(540 ± 10 rpm):						
i) Torque corresponding to maximum power available at standard PTO speed						
27.9	540	1733	7.86	6.57	0.236	3.55
ii) 85% of the torque obtained in (i) :						
25.2	575	1846	7.01	5.86	0.233	3.60
iii) 75% of the torque obtained in (ii) :						
19.1	580	1862	5.44	4.55	0.238	3.50
iv) 50% of the torque obtained in (ii) :						
12.9	585	1878	4.07	3.41	0.264	3.15
v) 25% of the torque obtained in (ii):						
6.5	588	1887	2.85	2.38	0.366	2.27
vi) Unloaded:						
0.1	608	1952	1.74	1.46	14.60	0.07

* Under high ambient conditions

		Natural ambient	High ambient
-No load maximum engine speed, (rpm)	:	2414	2417
-Equivalent crankshaft torque at maximum power, (Nm)	:	140.1	131.5
-Maximum equivalent crankshaft torque, (Nm)	:	163.2	154.0
- Backup torque (%)	:	16.5	17.1
-Engine speed at maximum Equivalent crankshaft torque, (rpm)	:	1351	1351
Smoke level, maximum light absorption coefficient (per meter)	:	0.16	---
Range of atmospheric conditions:			
- Temperature, (deg.C)	:	25 to 29	41 to 45
- Pressure, (kPa)	:	99 to 100	99.7 to 100
- Relative humidity, (%)	:	63 to 71	39 to 47
Maximum temperatures (°C):			
- Engine oil	:	107	112
- Coolant	:	81	91
- Fuel	:	51	65
- Air intake	:	36	52
- Exhaust gas	:	621	629
Pressure at maximum power:			
- Intake air, (kPa)	:	3.0 to 3.1	3.1 to 3.2
- Exhaust gas,(kPa)	:	6.1 to 6.7	5.1 to 5.5
Consumptions:			
- Lub. oil, (g/kWh)	:	--	0.22
- Coolant, (% of total coolant capacity)	:	--	Nil

4. DRAWBAR PERFORMANCE TEST

Date(s) of test	:	05.04.2017,07.04.2017 & 08.04.2017
Tractor run at the Institute prior to start of drawbar performance test, (h)	:	25.5
Type of track	:	Concrete
Height of drawbar, (mm):		
- With standard ballast	:	590
- With Drawbar ballast	:	560

4.1 The results of drawbar performance test consisting of maximum power and pull with un ballast/ with ballast and ten hours test are tabulated in **Table - 3**. 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		Specific Energy, (kWh/l)	Atmospheric conditions			Temperature (°C)				Max. sust-ained pull, (kN)
						(kg/ kWh)	(l/h)		Temp (°C)	Pre-ssure (kPa)	R.H. (%)	Fuel	Trans - oil	Cool-ant (water)	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	2.66	12.4	16.86	2351	14.8	0.362	5.37	2.31	31	98.8	34	38	77	76	97	17.68
L2	3.76	17.3	16.53	2339	15.1	0.328	6.79	2.55	31	98.8	32	37	77	76	97	17.26
L3	5.44	24.7	16.34	2253	13.4	0.305	9.01	2.74	27	98.8	30	36	64	78	98	16.95
L4	8.55	26.8	11.26	2251	8.0	0.291	9.33	2.87	26	98.8	32	33	59	77	95	14.31
H1	10.94	28.4	9.34	2247	6.8	0.265	9.00	3.16	31	98.8	34	37	77	79	96	11.24
ii) Maximum power test (Tractor Ballasted):																
L1	2.53	15.7	22.43	2238	15.4	0.340	6.39	2.46	31	96.9	29	40	78	77	97	23.57
L2	3.57	22.0	22.12	2317	15.4	0.323	8.50	2.59	32	96.9	27	39	80	80	100	23.11
L3	5.59	26.5	17.04	2252	7.5	0.295	9.35	2.83	28	98.9	29	35	63	79	94	21.19
L4	8.48	27.4	11.57	2254	5.4	0.287	9.34	2.91	24	98.8	29	32	58	78	94	14.94
H1	10.89	27.6	9.12	2258	4.1	0.284	9.38	2.94	21	98.8	32	29	52	77	91	11.49

Contd.Table-2

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):																
L3	5.90	20.9	12.77	2334	5.8	0.310	7.75	2.70	19 to 31	98.9 to 99.1	15 to 30	26 to 39	50 to 83	76 to 80	87 to 101	--
iv) Five hours test at pull corresponding to 15 percent wheel slip (Ballasted wheeled tractor):																
L2	3.60	22.2	22.15	2309	--	0.321	8.52	2.61	32 to 35	98.4 to 99.0	10 to 14	41 to 44	83 to 84	75 to 78	97 to 100	--

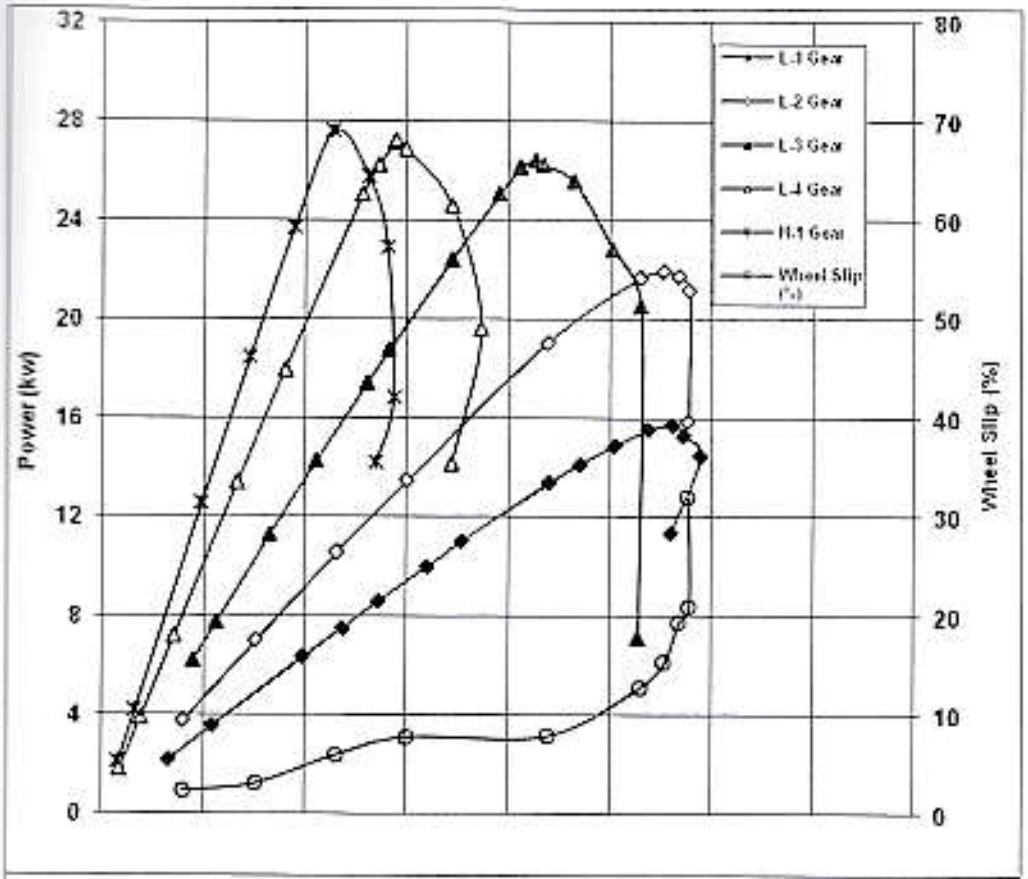
i) The coolant (water) and lub. oil consumption during 10 hours test were observed as 4.8 ml/hr and **Nil** ml/h respectively.

ii) Tyre Creeping, (mm):

-LHS	:	Nil
-RHS	:	45

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

Engine oil	:	101
Coolant (water)	:	81
Transmission oil	:	84
Fuel	:	45



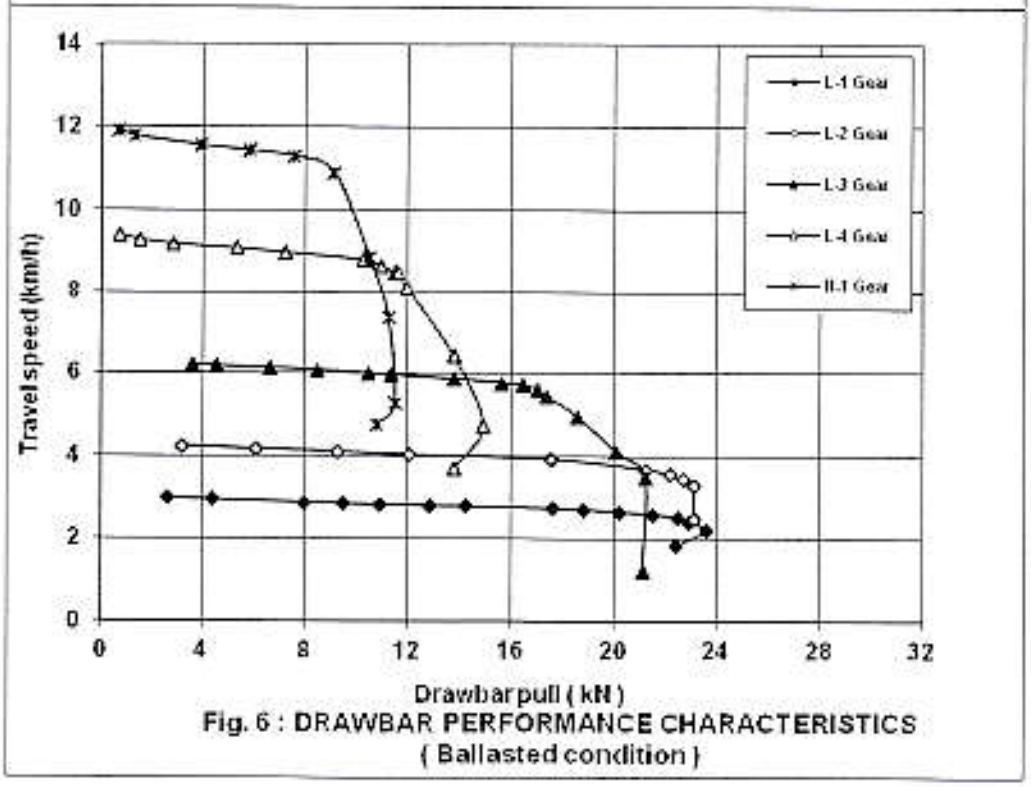


Fig. 6 : DRAWBAR PERFORMANCE CHARACTERISTICS
(Ballasted condition)

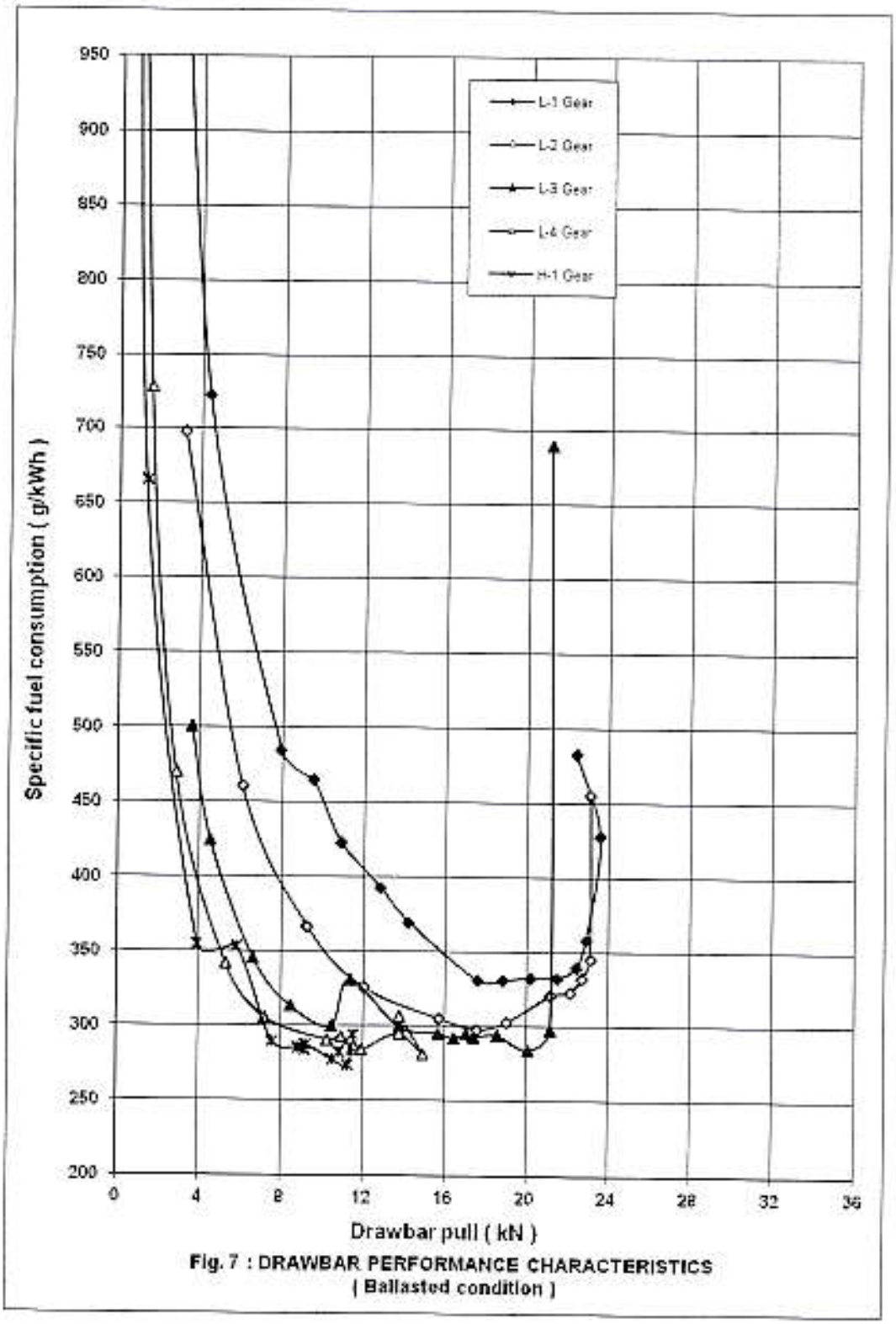


Fig. 7 : DRAWBAR PERFORMANCE CHARACTERISTICS
(Ballasted condition)

5. POWER LIFT AND HYDRAULIC PUMP PERFORMANCE TEST

Date(s) of test : 27.07.2016 & 28.07.2016
Tractor run at the Institute prior to start of hydraulic test, (h) : 3.6
Pump speed at rated engine speed,(rpm) : 701

5.1 Hydraulic power test:

Pump delivery rate at minimum pressure and rated engine speed (l/min) : 18.40
Maximum hydraulic power,(kW) : 4.17
Pump delivery rate at maximum hydraulic power, (l/min) : 15.65
Pressure at maximum hydraulic power, (MPa) : 16.5
Sustained pressure of the open relief valve, (Mpa) : 19.0

Tapping point:

a) Relief valve test : At external circuit
b) Pump performance test : At external circuit
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 corrected force exerted through full range, (kN)	Corresp-onding pressure, (Mpa)	Moment about rear axle, (kN-m)	Maximum tilt angle of mast from vertical , (degrees)
At hitch points	190	600	15.71	17.1	13.67	--
On the standard frame	190	600	13.55	17.1	20.05	18.9

5.3 Maintenance of lift load:

Force applied at the frame, (kN) : 12.2
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)	74	96	109	118	124	127

6. BRAKE TEST

6.1 Service brake:

6.1.1 Cold brake test:

Date of test : 25.08.2016 & 01.09.2016
Type of track : Concrete
Maximum attainable speed (kmph):
- with standard ballast : 35.00
-With road ballast : 35.00

		At maximum attainable speed			
Std. ballasted tractor	Braking device control force, (N)	488	413	338	262
	Mean deceleration, (m/sec.sq.)	3.15	3.10	3.03	2.50
	Stopping distance, (m)	14.99	15.23	15.59	18.89
Road ballasted tractor	Braking device control force, (N)	500	428	357	285
	Mean deceleration, (m/sec.sq.)	3.03	2.95	2.80	2.50
	Stopping distance, (m)	15.57	15.99	16.86	18.89

		At 25 kmph travel speed			
Std. ballasted tractor	Braking device control force, (N)	529	426	323	219
	Mean deceleration, (m/sec.sq.)	3.13	3.05	2.96	2.50
	Stopping distance, (m)	7.69	7.91	8.16	9.65
Road ballasted tractor	Braking device control force, (N)	569	473	377	280
	Mean deceleration, (m/sec.sq.)	3.10	2.98	2.89	2.50
	Stopping distance, (m)	7.76	8.08	8.34	9.65

6.1.2 **Brake fade test:**

		At maximum attainable speed			
Road ballasted trctor	Braking device control force, (N)	559	475	391	307
	Mean deceleration, (m/sec.sq.)	3.02	2.83	2.68	2.50
	Stopping distance, (m)	15.64	16.69	17.60	18.89
		At 25 kmph travel speed			
Road ballasted tractor	Braking device control force, (N)	572	501	430	359
	Mean deceleration, (m/sec.sq.)	3.04	2.91	2.78	2.50
	Stopping distance, (m)	7.91	8.30	8.68	9.65

Max. 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	Parked on 18 percent slope		Parked on 12 percent slope with trailer of 2.06 tonnes.	
	Facing up	Facing down	Facing Up	Facing Down
Braking device control force, (N)	260	280	339	356
Efficacy of parking brake	---------- Effective ----------			

7. NOISE MEASUREMENT

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

Date of test : 13.06.2016
Type of track : Concrete
Background noise level, dB (A) : 57.1

Atmospheric conditions:

Temperature, (°C) : 35
Pressure, (kPa) : 97.6
Relative humidity, (%) : 47
Wind velocity, (m/s) : 1.9

Test Data:

S. No.	Gear	Travelling speed before acceleration, (kmph)	Noise level, dB (A)
1.	L1	2.33	83
2.	L2	3.28	83
3.	L3	4.83	83
4.	L4	7.15	83
5.	H1	9.02	82
6.	H2	12.83	82
7.	H3	19.05	82
8.	H4	28.12	81

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

Date of test	:	05.04.2017
Type of track	:	Concrete
Background noise level, dB (A)	:	54
Atmospheric conditions:		
Temperature, (°C)	:	33
Pressure, (kPa)	:	98.7
Relative humidity, (%)	:	56
Wind velocity, (m/s)	:	1.7

Test Data:

Gear	Drawbar pull at which the tractor develops the max. noise level, (kN)	Corresponding travelling speed, (kmph)	Noise level dB (A)
L1	11.64 to 16.86	2.84 to 2.66	93.0
L2	9.32 to 16.53	4.11 to 3.76	93.0
L3	9.78 to 16.32	5.97 to 5.35	95.0
L4*	10.82	8.71	95.0
H1	6.75 to 9.05	11.53 to 11.00	94.0

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

8. AIR CLEANER OIL PULL-OVER TEST

Date of test	:	14.06.2016
Tractor run at the Institute prior to start of air cleaner oil pull-over test, (h)		1.1
Atmospheric conditions:	:	
Temperature, (°C)	:	38 to 39
Pressure, (kPa)	:	97.4 to 96.8
Relative humidity, (%)	:	29 to 31
Mass of oil before test, (g)	:	771.8

Sl. No	Position of tractor	Loss of oil(g)	Oil pull-over(%)	Remark
i)	Tractor parked on level ground	0.20	1.60	**The oil consumption of oil on mass basis is beyond limit**
ii)	Tractor tilted 15° laterally on RHS	3.97*	69.3	
iii)	Tractor tilted 15° laterally on LHS	0.23	1.80	
iv)	Tractor tilted 15° longitudinally with front end up	1.04*	8.00	
v)	Tractor tilted 15° longitudinally with rear end up	11.0*	84.9	

***Remark: The oil pull over measured in these positions is higher than the tolerance limit of 0.25% as per IS: 12207:2014**

9. 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 maximum PTO power	
			VD	HD	VD	HD
1	2		3	4	5	6
i)	Foot rest	Left	40	60	170*	140*
		Right	170*	150*	180*	170*
ii)	Steering wheel		100	70	70	100
iii)	Seat	Bottom	30	60	130*	100
		Back	30	20	60	50
iv)	Mudguard	Left	30	20	60	40
		Right	40	70	70	110*
v)	Head light	Left	60	60	100	100
		Right	60	70	60	80
vi)	Battery base, centre		140*	130*	130*	90
vii)	Tail light	Left	20	130*	90	70
		Right	40	90	70	130*
viii)	Plough light		170*	90	130*	150*
ix)	Gear shifting lever		30	30	40	120*
x)	Accelerator lever	Hand	150*	60	100	70
		Foot	40	60	60	100
xi)	Brake pedal	Left	120*	110*	90	140*
		Right	50	100	40	60
xii)	Clutch pedal		210*	80	70	70
xiii)	Main hydraulic control lever		30	40	100	170*
xiv)	PTO engaging lever		30	30	30	30

*** The amplitude of mechanical vibration is on higher side.**

10. LOCATION OF CENTRE OF GRAVITY

Condition	Particulars	Coordinates
Tractor under unballasted condition but with all the liquid reservoirs full & the operator replaced by a 75 kg mass on the seat	Height above ground, (mm)	825
	Distance forward from the vertical plane containing the axis of rear wheels, (mm)	808
	Distance from the median plane parallel to the longitudinal axis of tractor bisecting the track, (mm)	In centre

11. TURNING ABILITY

Characteristics	Minimum turning diameter,(m)		Minimum clearance diameter,(m)	
	RHS	LHS	RHS	LHS
Brake applied	6.34	6.34	7.28	7.28
Brakes released	7.11	6.99	7.87	7.75

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 **Fig. 8.** The observations are as under:

i) The non visible space in front is 8400 **mm** which is **4.35** times of wheel base (i.e. 1930 mm).
ii) The non-visible space on LHS and RHS is 2500 mm which is 1.86 times of rear track width (i.e. 1340 mm).
iii) Pre clener creates masking effect .

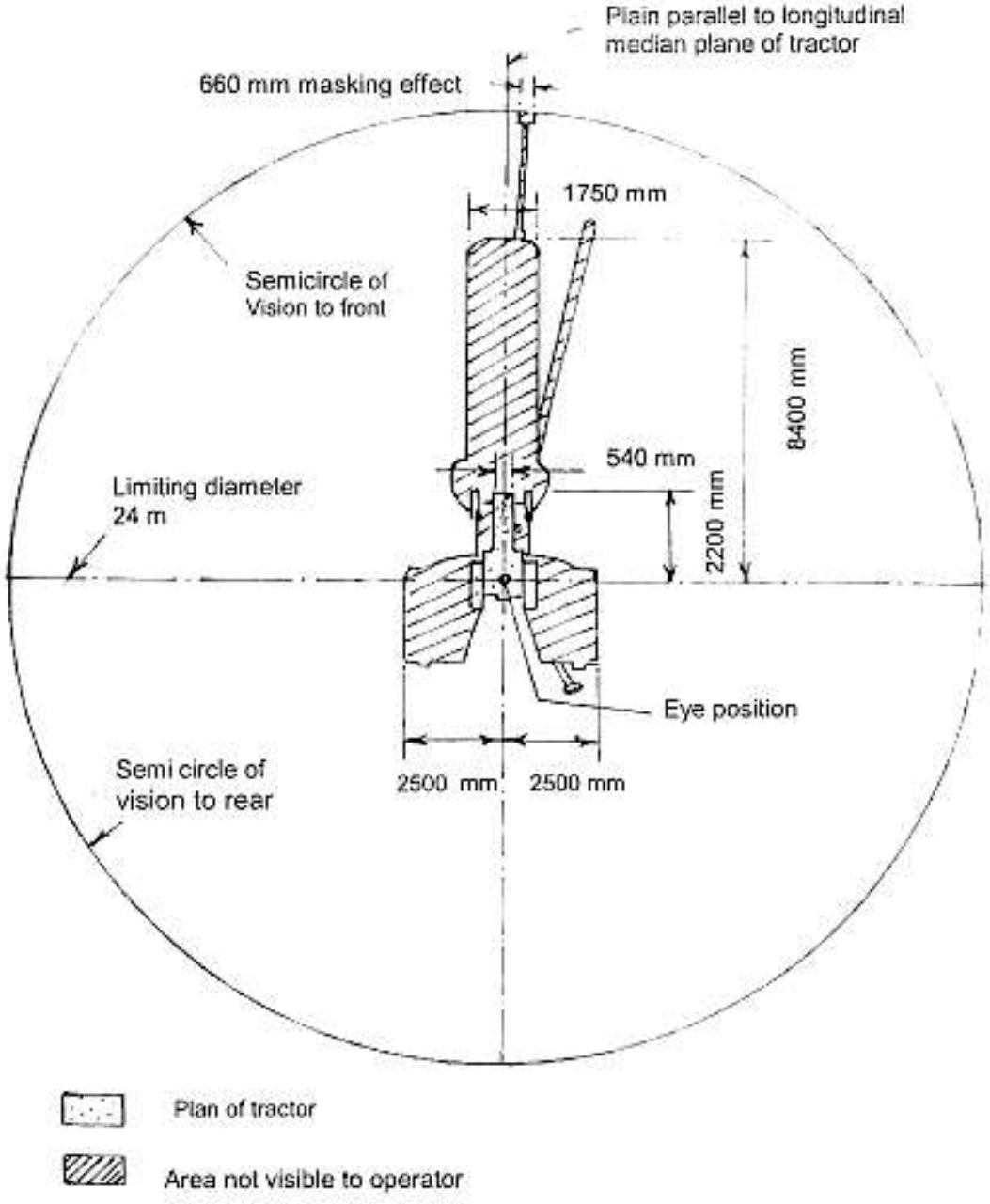


Fig. 8: OPERATOR'S FIELD OF VISION

13. FIELD TEST

13.1 The field tests comprising of disc ploughing, rotavation and puddling (including water proof test for five hours) were conducted for **10.4, 10.6 and 15.1** hours respectively.
All the field tests were conducted at the full accelerator settings, when the no load speeds of the engine varied from 2400 to 2408 rpm.

13.2 The brief specifications of the implements used during field tests are given in **Annexure-I & II.**

13.3 The summary of field test observation with disc plough; rotavator and puddling is given in **Table – 4.**

Table – 4

SUMMARY OF FIELD PERFORMANCE TEST

Sl. 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)	6 to 7	7	10.1
iii)	Bulk density of soil, (g/cc)	1.30 to 1.40	2.10	--
iv)	Cone index, (kg/sq.cm)/ puddling index, (%)	8.2 to 10.4	7.3 to7.7	68 to 81
v)	Gear used	L-2	L-1	L-2
vi)	Av. speed of operation, (kmph)	3.58 to 3.93	2.97	3.87 to 3.90
vii)	Av. wheel slip, (%)/Av. Travel reduction, (%)	6 to 15	-2.75 to -0.63	2 to 4
viii)	Av. depth of cut, (cm)/ Av. depth of puddle, (cm)	15 to 16	6	17 to 20
ix)	Av. working width, (cm)	66 to 77	153 to 159	--
x)	Area covered, (ha/h)	0.203 to 0.218	0.377 to 0.406	--
xi)	**Fuel consumption:**			
	- (l/h)	4.25 to 4.44	5.25 to 5.40	3.53 to 3.73
	- (l/ha)	20.37 to 20.93	13.39 to 13.94	--
xii)	Av. draft of implement, (kN)	6.32	NA	--

Remarks: The average lub oil and coolant consumptions during the entire field tests were observed as 3.7 & 4.1 ml/hr respectively.

13.4 **Wet land cultivation (Puddling):**

13.4.1 The tractor was fitted with full cage wheel for carrying out 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.

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.	Lubricating oils of engine sump, transmission, hydraulic, differential, brakes, steering system & air cleaner.	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, (ton)	:	5.0	5.0
Height of trailer hitch above ground Level, (mm)	:	630	630
Gear used during the test for negotiating slopes up to 8%	:	H-4	H-4
Average travel speed, (kmph)	:	28.33 to 28.92	27.95 to 28.92
Average fuel consumption:			
- (l/h)	:	6.10 to 6.33	4.53 to 4.66
- (ml/km/ton)	:	29.50 to 30.61	32.21 to 32.40
Average distance traveled per litre of fuel consumption, (km)	:	6.53 to 6.78	6.17 to 6.21
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 88.5 hours of tractor operation at this Institute.

15.1 Engine:

15.1.1 Cylinder bore:

Cylinder No.	Cylinder bore dia, (mm)						Max. permissible limit, (mm)
	Top position		Middle position		Bottom position		
	Thrust side	Non-thrust side	Thrust side	Non-thrust side	Thrust side	Non-thrust side	
1.	95.03	95.01	95.02	95.01	95.02	95.01	95.180
2.	95.03	95.02	95.02	95.01	95.02	95.02	
3.	95.02	95.02	95.03	95.02	95.02	95.01	

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		At skirt			As observed	Maximum Permissible limit
	Thrust side	Non-thrust side	Thrust side	Non-thrust side			
1.	94.422	94.301	94.859	**	Piston is discarded when the ring groove clearance exceeds 0.25 mm with new ring.	0.171	0.25
2.	94.424	94.294	94.842	**		0.188	
3.	94.425	94.282	94.863	**		0.167	

**** Not measured due to piston design constraints**

15.1.3 Ring end gap:

Rings	Ring end gap, (mm)									Maximum Permissible end gap limit, (mm)
	Cylinder No.1			Cylinder No.2			Cylinder No.3			
	Top	Middle	Bottom	Top	Middle	Bottom	Top	Middle	Bottom	
1st comp ring	0.45	0.45	0.50	0.45	0.45	0.45	0.50	0.50	0.50	1.50
2nd comp ring	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.50
Oil ring	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	1.50

15.1.4 Ring side clearance:

Rings	Ring side clearance, (mm)			Max. Permissible clearance Limit, (mm)
	Piston-I	Piston-II	Piston-III	
1st Compression ring	Taper face ring			0.25
2nd Compression ring	0.088	0.071	0.084	
Oil ring	0.056	0.069	0.061	

15.1.5 Main bearing:

Bearing No.	Diametrical Clearance, (mm)	Crankshaft end float, (mm)	Max. Permissible clearance limit, (mm)	
			Diametrical clearance	Crankshaft end float
1	0.103 to 0.109	0.12	0.50	0.50
2	0.099 to 0.109			
3	0.118 to 0.118			
4	0.095 to 0.084			

15.1.6 Big end bearings:

Bearing No.	Clearance, (mm)		Max. Permissible clearance limit,(mm)	
	Diametrical	Axial	Diametrical	Axial
1	0.082 to 0.093	0.25	0.50	0.75
2	0.100 to 0.102	0.25		
3	0.100 to 0.104	0.25		

15.1.7 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):

- Intake valve spring : 15.50 to 16.87
- Exhaust valve spring : 15.99 to 16.19

Against discard limit of 19.61 N/mm.

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

- Intake valve : 0.031 to 0.038
- Exhaust valve : 0.050 to 0.053

Against discard limit of 0.152 mm

15.2 **Clutch:**

Any marked wear on clutch friction plate(s)	:	None	
Condition of clutch release bearing	:	Normal	
Condition of pilot bearing	:	Normal	
Condition of springs and release levers	:	Normal	
Presence of oil in clutch housing	:	None	
Any marks on fly wheel/ pressure plate	:	None	
Overall thickness of clutch plate, (mm) :			
-Transmission	:	9.74 to 9.79	Against discard limit of 5.5 mm
-PTO	:	8.04 to 8.34	
Height of lining over rivet head, (mm):			
-Transmission	:	1.71 to 1.83	Against discard of Wear up to rivet head
-PTO	:	1.50 to 1.64	

15.3 **Transmission gears:**

Any visual damage, pitting & chipping of any transmission gear teeth.	:	None	
Backlash between crown wheel and Pinion, (mm)	:	0.28	Against discard limit of 0.50 mm

15.4 **Brakes:**

Description	Initial specified thickness of brake lining, (mm)	Measured thickness of brake lining after test, (mm)	Measured depth of oil groove , (mm)	Minimum permissible depth of oil groove of brake lining, (mm)
Left	6.3	4.711 to 4.744	0.65 to 0.78	Wear up disappearance of the oil groove
Right	6.3	4.702 to 4.739	0.66 to 0.74	

15.5 **Front axle:**

Any visual damage, pitting & chipping of front axle transmission gear teeth	:	None	
Any marked wear of king pins	:	None	
Any marked wear of king pin bushes	:	None	
Clearance between king pins and bushes, mm	:	0.112 to 0.139	Against discard limit of 0.35 mm
Condition of thrust bearings	:	Normal	
Clearance between centre pin and bush, mm	:	0.078 to 0.091	Against discard limit of 1.25 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

16. ADJUSTMENTS, DEFECTS, BREAKDOWNS AND REPAIRS

Sl. No.	Adjustments / Defects / Breakdowns and Repairs	Tractor run hours
	-None-	

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: 12207-2014	Values declared by the applicant(D)/ Requirement (R)	As observed	Whether meets the requirements (Yes/No.)
1	2	3	4	5	6	7
17.1.1	**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 >26kW. -7.5/+10% for PTO power ≤ 26kW	31.8 (D)	31.6	Yes
b)	Power at rated engine speed, (kW)	Non Evaluative	-do-	31.8 (D)	31.6	Yes
c)	Specific fuel consumption corresponding to maximum power, (g/kWh)	Non Evaluative	+ 5%	265 (D)	248	Yes
d)	Maximum equivalent crankshaft torque, (Nm)	Non Evaluative	± 8%	161.5 (D)	163.2	Yes
e)	Back-up torque, percent	Non Evaluative	10 percent, min.	10 percent, min (R)	16.5	Yes
f)	**Maximum operating temperature (^{D}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.	132 (D)	112	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.	112 (D)	91	Yes
g)	Engine oil consumption, (g/kWh)	Evaluative	Not exceeding 1% of SFC at max. power under high ambient conditions	2.61 (R) 1% of SFC, max. (D)	0.22	Yes

1	2	3	4	5	6	7
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 metre (R)	0.16 per meter	Yes
17.1.2	**Drawbar performance:**					
a)	Maximum drawbar pull with ballast corresponding to 15 percent wheel slip, (kN).	Non Evaluative	Minimum 65% of static mass of tractor with ballast	18.5(D) 18.42 (R) Minimum	22.43	Yes
b)	Maximum drawbar pull with Std. ballast corresponding to 15 percent wheel slip, (kN).	Evaluative	Minimum 65% of static mass of tractor without ballast	13.0(D) 13.13(R) Minimum	16.86	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. Minimum 75% of the engine power as referred in Sl. No. i) a) of PTO performance in case of tractors which do not have a PTO shaft.	25.4 (D) 25.2 (R) Minimum	28.4	Yes
d)	Maximum transmission oil temperature (°C)	Non Evaluative	The declared value should not exceed the maximum value specified by oil company.	122 (D)	84	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%]	15.0 (D)	15.71	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	11.5 (D) 7.4 (R) Minimum	13.55	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 minute, (mm)	Non Evaluative	The observed value should not exceed 50 mm	50 (D) 50 (R)	127	No
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 ballast, (m):					
	1) Cold brake	Evaluative	10	10 (R)	7.76	Yes
	2) Hot brake	Evaluative	10	10 (R)	7.91	Yes
b)	Maximum force exerted on the brake pedal to achieve a deceleration of 2.5 m/s^2, (N)	Evaluative	600	600 (R)	280 to 359	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
17.1.5	**Noise measurement:**					
a)	Maximum ambient noise emitted by the tractor, dB(A)	Evaluative	As per CMVR	88 (R)	83	Yes
b)	Maximum noise at operator's ear level, dB(A)	Evaluative	As per CMVR	96 (R)	95	Yes
17.1.6	**Amplitude of mechanical vibrations at:**					
	1) Left foot rest	Non Evaluative	100 microns (max)	100 (R)	180	**No**
	2) Right food rest			100 (R)	180	**No**
	3) Seat (with driver seated)			100 (R)	130	**No**
	4) Steering wheel			100 (R)	100	Yes
17.1.7	**Air cleaner:**					
	Air cleaner oil pull over, (%)	Non Evaluative	0.25 % (maximum)	0.25 % (maximum)	11.0	**No**
17.1.8	**Haulage requirements:**					
a)	Gross mass of the trailers, (tones):					
	1) Two wheel	Non Evaluative	--	5.0 (D)	5.0	Yes
	2) Four wheel		--	5.0 (D)	5.0	Yes
b)	Distance travelled / litre of fuel consumption, (km/l):					
	1) Two wheel	Non Evaluative	--	4.8 to 6.5 (D)	6.10 to 6.33	Yes
	2) Four wheel		--	4.8 to 6.5 (D)	4.53 to 4.66	Yes

1	2		3	4	5	6	7
c)	**Fuel consumption, (ml/km/tonne):**						
	1)	Two wheel	Non Evaluative	--	36.0 to 45.0 (D)	29.5 to 30.6	**No**
	2)	Four wheel		--	35.0 to 40.0 (D)	32.2 to 32.4	**No**
17.1.9	**Wetland cultivation (Puddling Operation):**						
	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 and/or mud was observed	Yes
	1)	Clutch assembly	-do-				
	2)	Brake housings	-do-				
	3)	Front axle hubs	-do-				
	4)	Engine oil	-do-				
	5)	Transmission oil	-do-				
17.1.10	**Safety features:**						
a)	Guards against moving and hot parts		Evaluative	Belt drives, pulleys, silencer, hydraulic pipes (As per IS 12239 Part 2)	--	Meets the requirement	Yes
b)	Lighting arrangement		Evaluative	As per CMVR	--	Meets the requirements	Yes
c)	Seating requirements (Tractors having more than 1150 mm track width)		Non Evaluative	Should meet the requirements of IS 12343 (as amended from time to time)	--	**Does not meet the requirement**	**No**
d)	Technical requirements for PTO shaft		Non Evaluative	Should meet the requirements of IS 4931 (as amended from time to time)	--	Meets the requirements	Yes
e)	Dimensions of three point linkage		Non Evaluative	Should meet the requirements of IS 4468 (Part 1) (as amended from time to time)	--	**Does not meet the requirement**	**No**
f)	Specifications of linkage drawbar		Non Evaluative	Should meet the requirements of IS 12953 (as amended from time to time)	--	Meets the requirements	Yes
	Specifications of swinging drawbar		Non Evaluative	Should meet the requirements of IS 12362 (Part 3) (as amended from time to time)	--	Not provided	NA

1	2		3	4	5	6	7
17.1.11	**Labeling of tractors (Provision of labeling plate):**						
	1)	Make	Evaluative	Should conform to the requirements of CMVR	--	TAFE	Yes
	2)	Model	Evaluative		--	MF 7250 DI V1.1	Yes
	3)	Year of manufacture	Evaluative		--	HE (i.e. August,2014)	Yes
	4)	Engine serial number	Evaluative		--	SJ32752831	Yes
	5)	Chassis number	Evaluative		--	MEA631DDHE3000034	Yes
	6)	Declaration of PTO power, (kW)	Evaluative		--	31.80	Yes
17.1.12	**Discard limit for:**						
(a)	Cylinder bore diameter, (mm)		Evaluative	To be specified by the manufacturer and supported by printed literature.	95.18	95.01 to 95.03	Yes
(b)	Clearance between piston & cylinder liner at skirt, (mm)		Non Evaluative		0.180	0.167 to 0.188	Yes
(c)	**Ring end gap (mm):**						
	-	Top comp. ring.	Evaluative	-do-	1.50	0.45 to 0.50	Yes
	-	2nd comp. ring.		-do-	1.50	0.95 to 1.00	Yes
	-	Oil ring.		-do-	1.50	0.45	Yes
(d)	**Ring groove clearance (mm):**						
	-	Top comp. ring.	Evaluative	-do-	0.25	Tapper face	--
	-	2nd comp. ring.		-do-	0.25	0.071 to 0.088	Yes
	-	Oil ring.		-do-	0.25	0.056 to 0.069	Yes
(e)	**Clearance of main bearings (mm):**						
	-	Diametrical clearance	Evaluative	-do-	0.50	0.099 to 0.118	Yes
	-	Crankshaft end float	Evaluative	-do-	0.50	0.12	Yes
(f)	**Clearance of big end bearings, (mm):**						
	-	Diametrical	Evaluative	-do-	0.50	0.082 to 0.104	Yes
	-	Axial	Evaluative	-do-	0.75	0.25	Yes
(g)	Clearance between king pin and bush, (mm)		Non Evaluative	-do-	0.35	0.112 to 0.139	Yes
(h)	Clearance between center pin and bush, (mm)		Non Evaluative	-- do--	1.25	0.078 to 0.091	Yes
17.1.13	**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

1	2	3	4	5	6	7
17.1.14	CATEGORY OF BREAKDOWNS / DEFECTS :					
S. No.	Characteristic	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
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		Whether meets the requirements (Yes/No.)
1	2	3		4		5
1.	Fitment of ROPS	With a provision for fitment of ROPS.		Provided		Yes
		If ROPS fitted it should meet the requirement of IS: 11821-1992.		ROPS not fitted		Not applicable
2.	Accessories	Trailer hitch, front tow hook may be provided.		Trailer hitch is provided		Yes
				Front tow hook is provided		Yes

17.3 Conformity with following IS:

i) Guide lines 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 - Three-point linkage: Part 1 Categories 1, 2, 3 & 4 (Fourth Revision) [IS 4468 (Part-1):1997/ ISO 730-1:1994 (Reaffirmed in March, 2009)] : **Does not conform**

iv) Drawbar for agricultural tractors – Link type [IS 12953:1990 (Reaffirmed in March, 2007)] : Conforms

v) Agricultural tractors - Operator's seat technical requirement [IS 12343 –1998 (First revision) (Re-affirmed in March, 2009)] : **Does not conform**

vi) Guide for safety & comfort of operator of agricultural tractors: Part 1 General requirements (first revision): [IS 12239 (PT-1) 1996 (Reaffirmed in February, 2012)/ISO 4254-1:1989] : **Does not conform**

vii)	Tractors and machinery for agriculture and forestry, powered lawn and garden equipment – Symbols for operator controls and other displays [IS: 6283 (Part-1) – 2006 (Reaffirmed in March, 2009) and IS: 6283 (Part-2)-2007 (Reaffirmed in March, 2009)]/ISO 3767-2:1991]	:	**Does not conform**
viii)	Tractors and machinery for agriculture and forestry – Technical means for ensuring safety Part 2: Tractors (first revision) [(IS 12239 (PT-2) 1999) (Re-affirmed in March, 2009)]	:	**Does not conform**
ix)	Guide lines for location and operation of operator controls on agricultural tractors and machinery (first revision) (IS: 8133 – 1983) (Re-affirmed in March, 2009)	:	Conforms
x)	Agricultural Tractor & Machinery Lighting device for travel on public roads (IS: 14683-1999) (Re-affirmed in March, 2009)	:	Conforms

17.4 Salient Observations:

17.4.1 Laboratory tests:

17.4.1.1 PTO Performance:

i) The maximum PTO power was observed as 31.6 kW against the declaration of 31.8 kW which meets the requirement of IS: 12207-2014 with regard to tolerance limit.

ii) The specific fuel consumption corresponding to maximum power was recorded as **248 g/kWh** against the declaration of **265 g/kWh**, which is within the tolerance limit of IS: 12207-2014.

iii) The backup torque is **16.5** %.

17.4.1.2 Hydraulic Performance:

i) The lifting capacity on standard frame was recorded as 13.55 kN respectively. The moment about rear axle was computed as 20.05 kN-m respectively, which is on higher side in compare to the moment about front axle i.e. 15.71 kN-m. Therefore, it is recommended that the lifting capacity should be reduced suitably or standard mass at front axle may be provided to avoid front lifting of tractor.

ii) 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) was recorded as **127** mm against the declaration of 50 mm which does not meet the requirements of IS: 12207-2014 with regard to tolerance. This should be looked into for necessary corrective action.

17.4.1.3 Mechanical Vibration:

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

17.4.1.4 Air cleaner oil pull over test:

The Air cleaner oil pull over was recorded as 84.9 % against the maximum limit of 0.25 % which calls for the necessary improvement in the air intake system of the tractor.

17.4.1.5 Three point linkage:

The lateral distance from lower hitch point to centre line of tractor does not meet the requirement of IS: 4468 (Part-1) -1997. This should be looked into for necessary corrective action.

17.4.1.6 Technical Requirements for Power Take Off Shaft:

The master shield for Power take off shaft has not been provided as per the requirement of IS: 12953-1995. This should be looked into for necessary corrective action.

17.4.1.7 **Operator's Seat:**

i) Width of seat from seat index point.

ii) Vertical distance from seat index point to centre of clutch & accelerator pedal.

17.4.2 **Field performance test:**

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

No ingress of water/or mud in various assemblies/components was noticed during wetland cultivation of tractor. Hence, it meets the requirements of IS: 11082-1984 (technical requirements of agricultural tractors for wetland operation). The tractor is found suitable for wetland operation (Puddling).

17.4.3 **Component assembly inspection**

The spring index of valve clearance was recorded as 15.50 to 16.87 N/mm against the declaration of 19.61 N/mm for inlet and exhaust valves respectively. The initial specified declared limit is not corrected in the applicant specified document. This should be looked into for necessary corrective action.

17.4.4 **Maintenance / Service Problems:**

No maintenance or service problems observed during the test.

17.5 **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 PTO shaft master shield.

17.6 **Adequacy of Literature supplied with machine:**

17.6.1 The following literature was supplied with the tractor for reference:

i) Operator's Instruction Book

ii) Parts Book

iii) Workshop Service Manual

17.6.2 The printed literature supplied with the test sample is in English. The literature may be brought out as per IS: 8132-1999 (Reaffirmed in March, 2009) for the guidance of user and service personnel in national as well as other regional languages.

18. CITIZEN CHARTER

Time frame for Testing & Evaluation as per Citizen Charter	Duration of test	Whether the report is released within the time frame given in the Citizen Charter	Remark
10 Months	14 Months (May, 2016 to June,2017)	No	Due to pre occupied PTO test bed & Drawbar test.

TESTING AUTHORITY:

C.S. RAGHUWANSHI
AGRICULTURAL ENGINEER

C. V. CHIMOTE
TEST ENGINEER

Y. K. RAO
SENIOR AGRICULTURAL ENGINEER

J.J.R. NARWARE
DIRECTOR

19. APPLICANT'S COMMENTS

Para No.	Our Reference	Applicant's comments
19.1	1.20,17.3(iii),(v),(vi),(vii) & (viii)	We shall study and initiate to incorporate in production

ANNEXURE - I

BRIEF SPECIFICATION OF IMPLEMENTS USED DURING FIELD TEST

Sl. No.	Item	Disc Plough	Rotavator
1.	Make	Field King	Maschio Itali
2.	Type	Mounted	Mounted
3.	No. of bottom / blades/discs	Three	42, in 8 flanges
4.	Type of bottom / blades/discs	General concave	Hatchet
5.	Size of bottom / blade/disc, (mm)	280	245 x 75 x 6
6.	Spacing of bottom/blade/disc, (mm)	385	245
7.	Lower hitch point span, (mm)	785	735
8.	Mast height, (mm)	510	470 & 610
9.	**Overall dimensions, (mm):**		
	- Length	1920	1020
	- Width	1040	1985
	- Height	1180	1045
10.	Gross mass, (kg)	395	440

ANNEXURE –II

BRIEF SPECIFICATION OF HALF CAGE WHEELS

Sl No.	Items	Specification
1.	Type	Full cage wheel
2.	Outer diameter , (mm)	1280
3.	Width, (mm)	850
4.	No. and types of lugs	24, Straight lugs made of M.S. angle section welded to angle iron frame
5.	Size of angle section, (mm)	50 x 50 x 6
6.	Length of lug, (mm)	425
7.	Spacing of lug, (mm)	160
8.	Weight of each cage wheels, (kg)	150

ANNEXURE-III

TRACTOR RUN HOURS DURING TEST

A.	LABORATORY AND TRACK TESTS:	HOURS
1.	Running-in	--
2.	PTO performance test	10.3
3.	Power lift and hydraulic pump performance test	4.5
4.	Drawbar performance test	17.2
5.	Turning ability	0.2
6.	Location of centre of gravity	0.2
7.	Operator's field of vision	0.2
8.	Brake test	1.8
9.	Noise measurement	1.7
10.	Air cleaner oil pull over test	2.5
11.	Mechanical vibration test	0.8
12.	Theoretical speed test	0.9
B.	FIELD TEST:	
1.	Disc ploughing	10.4
2.	Rotavation	10.6
3.	Wetland cultivation (including water proof)	16.2
C.	HAULAGE TEST:	5.8
D.	Miscellaneous test and other run hours including idle run, transportation, trials and preparation for test	5.2
	TOTAL:	88.5