T. E.

व्यावसायिक परीक्षण रिपोर्ट
COMMERCIAL TEST REPORT (Initial)

संख्या / No. : T-1124/1650/2017
माह / Month : December, 2017

KUBOTA, B 2741 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
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Manufacturer : **M/s. KUBOTA Corporation**
700/867 Moo 3, Amata Nakorn Industrial Estate, Tambon Nonggaka, Amphur Panthong, Chonburi 20160 - Thailand

Month: December	Test Report No. T-1124/1650/2017	Year : 2017

सत्यमेव जयते

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, 2017 to November, 2017
Test Report No.	:	**T-1124/1650/2017**
Month/Year	:	December, 2017

i) The results reported in this report are observed values and no corrections have been applied for atmospheric and site conditions.

ii) The data given in this report pertain to the particular machine submitted by the applicant, for tests.

iii) The results presented in this report do not in any way attribute to the durability of the machine.

iv) This report should not be reproduced in part or full without prior permission of the Director, Central Farm Machinery Training and Testing Institute, Budni (M.P.)

SELECTED CONVERSIONS & 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. KUBOTA Corporation 700/867 Moo 3, Amata Nakorn Industrial Estate, Tambon Nonggaka, Amphur Panthong, Chonburi 20160 - Thailand**

Test requested by (applicant) : i) **M/s. Kubota Corporation Chennai Liason** Office No. 15, Medavakkam Road, Sholinganallur, Chennai – 600 119, T.N., INDIA
ii) **M/s. Kubota Agriculture Machinery India Pvt. Ltd** No. 15 Medavakkam Road, Sholinganallur, Chennai – 600 119, T.N., INDIA

Selected for test by : Applicant
Place of running-in : At applicant's works
Duration of said running-in (h):
- Engine : 50
- Transmission : Nil

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	:	Kubota
Model	:	B 2741
Variants, if any		None
Brand name	:	None
Type	:	Four wheeled, four wheel driven (4WD), Unit Construction, General Purpose, Agricultural Tractor
Year of manufacture	:	KJ (i.e. October, 2016)
Chassis number	:	KBTB30TNCJTKPC001
Country of Origin	:	Thailand

1.2 **Engine:**

Make	:	Kubota, Japan
Model	:	D1305
Type	:	Four strokes, liquid cooled, naturally aspirated, compression ignition, Indirect injection, diesel engine.
Serial number	:	1GN7929

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

- Maximum speed at no load	:	2820
- Low idle speed	:	1050 to 1150
- Speed at maximum torque	:	1500 to 1900

Rated speed, (rpm):

- For PTO use	:	2600
- For drawbar use	:	2600

1.3	**Cylinder & Cylinder Head:**		
	Number	:	Three
	Disposition	:	Vertical, Inline
	Bore/stroke, (mm)	:	78 / 88
	Capacity as specified by the applicant, (cc)	:	1261
	Compression ratio, (apa)	:	24 : 1
	Type of cylinder head	:	Monoblock
	Type of cylinder liners	:	Wet, non replaceable
	Type of combustion chamber	:	indirect combustion, Swirl chamber
	Arrangement of valves	:	Overhead, Inline
	Valve clearance (cold/hot):		
	- Inlet valve, (mm)	:	0.145 to 0.185
	- Exhaust valve, (mm)	:	0.145 to 0.185
1.4	**Fuel System:**		
	Type of fuel feed system	:	Gravity and force feed
1.4.1	**Fuel tank:**		
	Capacity, (l)	:	22.5
	Location	:	Above the clutch housing
	Provision for draining of sediments/ water	:	**Not provided**
	Material of fuel tank	:	Plastic
1.4.2	**Water Separator**		
	Make	:	Taiyo Giken
	Type	:	Gravity separation with fuel filter element.
	Location	:	On RHS of engine between fuel tank & primary fuel feed pump
1.4.3	**Fuel feed pump:**		
	Make	:	Kyosan-Denki, Japan (apa)
	Type	:	Cam operated diaphragm
	Model/Group combination No.	:	Not specified
	Provision of sediment bowl	:	**Not Provided**
	Method of drive	:	Through cam shaft of FIP
1.4.4	**Fuel filters:**		
	Make	:	Taiyo Giken, Thailand
	Model/Group combination No.	:	Not specified
	Numbers	:	One
	Type of elements	:	Paper
	Capacity of final stage filter, (l)	:	0.10
1.4.5	**Fuel Injection pump:**		
	Make	:	Zexel
	Model/Group combination No.	:	NP.PER3 (apa)
	Type	:	Inline, Plunger
	Serial number	:	16032
	Method of drive	:	Through timing gears
1.4.6	**Fuel injectors:**		
	Make	:	Zexel Bosch
	Holder Number	:	0281 C 65508
	Nozzle Number	:	655 . Z . NP – DN4PDN165
	Type	:	Pintle (single hole)
	Manufacturer's production pressure setting, (MPa)	:	13.7 to 14.7
	Injection timing	:	18 degree before TDC
	Firing order	:	1 – 2 – 3

1.4.7 Governor:

Make	:	Nihon IET, Japan (apa)
Model/Group combination No.	:	Not specified
Type	:	Mechanical, centrifugal, variable speed
Rated engine speed, (rpm)	:	2600
Governed range of engine speed, (rpm)	:	1050 to 2820

1.5 Air Intake system:

1.5.1 Pre-cleaner: : **Not provided**

1.5.2 Air cleaner:

Make	:	Wako Enter Technology, Japan (apa)
Type	:	Dry
Location	:	On RHS, behind radiator, under the bonnet
Range of suction pressure at maximum power, (kPa)	:	4.1

Details of elements:		**Primary element**	**Secondary element**
No. of elements	:	One	One
Type	:	Paper	fabric
Size,(mm) (OD/ID)	:	87.0/44.1	35.4/30.8
Length	:	178.8	163.1
Air flow restriction indicator	:	**None**	
Whether dust unloading valve has been provided	:	Yes	

Maintenance schedule :
- i) Clean the primary element after every 100 hours of operation or more often in dusty conditions.
- ii) Replace primary element in 1000 hours or one year which come faster.
- iii) Replace secondary element in 1000 hours of operation on one year, which come faster.

1.6 Exhaust System:

Type of silencer	:	Horizontal, Cylindrical, Downdraft
Position of silencer outlet with respect to SIP, (mm):		
- Downward	:	530
- Longitudinal	:	1670
- Lateral	:	160 (on LHS)
Range of exhaust gas pressure at maximum power, (kPa)	:	5.5 to 5.7
Provision of spark arresting device	:	**None**
Provision against entry of rain water	:	A bend is provided at exit end of exhaust pipe.

1.7 Lubricating system:

Type	:	Force feed cum splash
Oil sump capacity, (l)	:	3.2
Total lub oil capacity, (l)	:	3.8
Oil change period	:	First change after 50 hours and subsequently after every 100 hours of operation.
Cooling device, (if any)	:	**None**

1.7.1 Filters:

Make	:	Nippon Donaldson, Japan (apa)
Type	:	Full flow, spin on, throw away
Number (s)	:	One

1.7.2 Pump:

Make	:	Hino Seiki, Japan (apa)
Type	:	Rotary lobe
Method of drive	:	Through crankshaft gear
Pressure release setting, (kPa)	:	400
Minimum permissible pressure, (kPa)	:	49

1.8 Cooling system:

Type	:	Forced circulation of liquid
Coolant as recommended	:	Kubota Genuine
Coolant and water ratio	:	1:1 (apa)
Details of pump	:	Centrifugal pump with semi-open impeller of 68.8 mm outer diameter, having six numbers of vanes and driven through crankshaft pulley by a cogged V-belt common to alternator.
Details of fan	:	Suction type having five polypropylene blades of 320 mm of outer diameter and mounted on common shaft of water pump
Means of temperature control	:	Thermostat
Bare radiator capacity, (l)	:	2.00
Capacity of expansion flask, (l)	:	0.60
Total coolant capacity, (l)	:	4.1
Radiator cap pressure, kPa (kg/cm^2)	:	88 (0.9)

1.9 Starting System:

Type	:	12V, DC, Electrical
Aid for cold starting	:	Provided in glow plug
Any other device provided for easy starting.	:	None

1.10 Electrical System:

1.10.1 Battery:

Make & Model	:	Exide
Type	:	Lead acid
Capacity and rating	:	12V, 45 Ah at 20 hours discharge rate
Location	:	In front of radiator, under the bonnet

1.10.2 Starter:

Make	:	Mitsubishi electric corporation
Model	:	M000T90284
Voltage/Type	:	Pre-engaging, solenoid operated
Capacity and rating	:	12V & 0.95 kW
Serial Number	:	6622

1.10.3 Generator:

Make	:	Denso
Model	:	6T10
Type	:	Alternator
Serial number	:	100 211 - 4742
Output rating	:	12V, 40Amp
Method of drive	:	Driven through crank shaft 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, 35/35W	905	90 x 140	390
- Parking lights	2, 12V, 5W	935	85 x 105	225
- Turn-cum-Hazard Indicators	2, 12V, 21W	1020	85 x 105	225
Rear lights:				
- Parking-cum-Brake lights	2, 12V, 21/5W	950	75 x 90	225
- Turn-cum-Hazard Indicators	2, 12V, 21W	950	75 x 90	135
Reflectors (Red)	2	950	45 x 55	182
Registration plate Light	1, 12V, 5W	870	38 Ø	182

1.10.6 Main switch : Key turn type, having four positions viz: **OFF (Engine off), Circuit ON, Glow Plug ON** and **START**

1.10.7 Light switch : Rotary type having five positions viz.
i) Off
ii) Parking lights + dashboard lights + Head lights (short beam)
iii) Head light long beam + parking light + dashboard light
iv) Turn indicator switch
v) Hazard light switch

1.10.8 Horn:
Make : Minda
Type : 12V, 2B, electromagnetically vibrated diaphragm
Location : In-front of radiator, under the bonnet

1.10.9 Fuse box : Contains seven numbers of fuses of following capacities :-

Capacity	50A	20A	15A	10A	5A
Number	01	02	01	02	01

1.10.10 Details of other electrical accessories:
1.10.10.1 Flasher Unit:
Make : Mecurex
Capacity: 12V
- Turn signal : 21W x 2 + 2W x 1
- Hazard signal : 21W x 4 + 2W x 2
Flashes/Min. : 85

1.10.10.2 Seven pin socket for trailer lights : Provided

1.10.10.3 Safety against accidental start : Tractor will not start until the main gear shifting lever & PTO engage lever is in neutral position.

1.11 Instrument panel details:

i) Engine speed-cum-cumulative digital run hour meter
ii) Coolant temperature gauge with colour zone
iii) Fuel level gauge with colour zone
iv) Battery charging warning indicator lamp
v) Head light long beam ON indicator light
vi) Lubricating oil pressure indicator
vii) Turn-cum-hazard indicator lights indicator
viii) Horn push button
ix) Hand accelerator lever
x) Main switch (Key turn type)
xi) Light switch (rotary type)
xii) Rear view mirror
xiii) Steering control wheel

1.12 Transmission System:

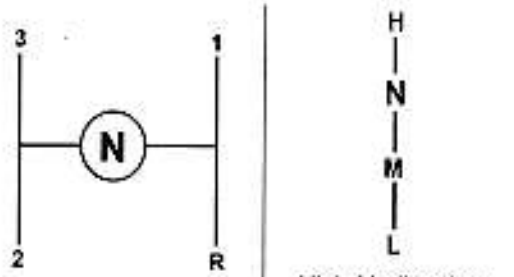
1.12.1 Clutch:

Make	:	Exedy Japan (apa)
Type	:	Single, diapharm, dry friction plate
No. of friction plate (s)	:	One
Size, OD/ID, (mm)	:	200.0/ 140.0 Ø
Method of operation:	:	By depressing clutch pedal fully provided on LHS of operator's seat
Material of clutch lining	:	UF91A1 (apa)

1.12.2 Gear box:

Make	:	SIAM Kubota Corporation Ltd. (apa)
Model	:	Not specified
Type	:	Mechanical, sliding mesh gears
No. of speeds:		
- Forward	:	09
- Reverse	:	03

Gear shifting pattern :



Main gear shifting lever | High-Medium-Low Range selection lever

Location of gear shifting levers	:	Side shift
Main gear shifting lever	:	RHS of the operator's seat
Range selection lever	:	LHS of the operator's seat
Oil capacity, (l)	:	12.5 (Common with differential, rear axle, final drive, hydraulic, steering & brake systems).
Oil changing period	:	After every 400 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 **8.3-20** size tyres of **430** mm radius index. (kmph)
Forward	L1	409.84	1.03
	L2	219.44	1.92
	L3	158.79	2.65
	M1	126.16	3.35
	M2	67.75	6.20
	M3	48.86	8.62
	H1	58.29	7.23
	H2	31.14	13.55
	H3	22.52	18.72
Reverse	LR	231.61	1.82
	MR	71.29	5.90
	HR	33.00	12.79

1.12.3.1 **Number of front revolution for one revolution of rear wheel (for 4WD)** : 1.49

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 : 6.167:1 (37/6T)

Oil capacity, (l) : 12.5 (Common with gearbox, rear axle, final drive, hydraulic, steering & brake systems).

Oil changing period : After every 400 hours of operation.

Differential lock:

Type : Dog clutch

Location : RHS of differential housing

Method of operation : By pressing a foot pedal provided on RHS of operator's seat.

1.12.5 **Rear axle & final drive:**

Type : Bull & pinion, accommodated Outside the differential housing

Reduction through final drive : 6.444:1 (58/9T)

Oil capacity of final drive, (l) : 12.5 (Common with gearbox, differential, hydraulic, steering & brake systems).

Oil changing period : After every 400 hours of operation.

1.12.6 **Front Differential Unit:**

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

Reduction through crown wheel and bevel pinion : 2.30 : 1 (23/10T)

Oil capacity, (l) : 3.0 (Common with front axle and front final drive)

Oil changing period : After every 400 hours of operation.

1.12.7 Front axle & front final drive:

Type	:	Crown wheel & bevel pinion located at the end of front axle housing near front wheel
Reduction through bevel & pinion	:	1.600 : 1 (16/10T)
Reduction ratio at wheel hub	:	4.222 : 1 (38/9T)
Oil capacity of final drive, (l)	:	3.0 (Common with front differentia housing)
Oil changing period	:	After every 400 hours of operation.

1.13 Power lift Hydraulic System:

Make	:	SIAM KUBOTA Corporation Ltd.
Type	:	Open centre, live & ADDC
No. and type of cylinder	:	One, single acting
Type of linkage lock for transport	:	A knob is provided on hydraulic top cover, when fully closed acts as a transport lock.

1.13.1 Hydraulic pump:

Make	:	Kubota corporation, Japan (apa)
Type	:	Gear pump
Location & drive	:	On RHS of the engine & through FIP camshaft
No. & type of filters	:	One, Full flow, spin-on, throw away paper element type.
Hydraulic oil capacity, (l)	:	12.5 (Common with transmission, steering & brake systems).
Oil change period	:	After every 400 hours of operation.
Provision for external tapping	:	Provided
Details of control levers	:	i) Position control lever ii) Draft control lever iii) A knob is provided on hydraulic top cover
Method of draft sensing	:	Through top link

1.13.2 Three point linkage:

S. No.	Parameters	As per IS: 4468-(Part-1) -1997, **(Cat.I / Cat.I N)**, (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 / 19.30 to 19.51	19.38	Conforms to Cat. I & IN
	b) Width of ball	44.0 (max.) / 44.0 (max.)	39.7	Conforms to Cat. I & IN
II.	**Lower hitch points:**			
	a) Dia of hitch pin hole	22.40 to 22.65 / 22.40 to 22.73	22.50	Conforms to Cat. I & IN
	b) Width of ball	34.8 to 35.0 / 34.8 to 35.0	35.0	Conforms to Cat. I & IN
III.	Lateral distance from lower hitch point to centre line of tractor	359 / 435	359	Conforms to Cat. IN
IV.	Lateral movement of lower hitch points.	100 (min) / 50 (min)	75.0	Conforms to Cat. IN
V.	Distance from end of power take-off to centre of lower hitch point (lower links in horizontal position)	450 to 575 / 300 to 375	465	Conforms to Cat. I & IN

1	2	3	4	5
VI.	Transport height	820 (min)/ 600 (min)	765	Conforms to Cat. IN
VII.	Power range (without load)	560(min)/ 420 (min)	480	Conforms to Cat. IN
VIII.	Leveling adjustment	100 (min)/ 75 (min)	200	Conforms to Cat. I & IN
IX.	Lower hitch point tyre clearance	100 (min)/ 100 (min)	220	Conforms to Cat. I & IN
X.	Lower hitch point height	200 (max)/ 200 (max)	180	Conforms to Cat. I & IN

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

The following are dimensions observed, corresponding to **420** 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	540	540
2.	Length of lift arm	B	225	225
3.	Length of lift rods	C	370, 410 & 450	450
4.	Length of top link	D	485 to 670	485
5.	Distance of lift rod connection point from pivot point of lower link	E	260 and 325	325
6.	Distance of lower link pivot point from rear wheel axis:			
	-Horizontally	F	160, behind	160, behind
	-Vertically	G	20, below	20, below
7.	Distance of upper link pivot point from rear wheel axis:			
	-Horizontally	H	230, 230 & 230 behind	230, behind
	-Vertically	J	265, 305 & 335, above	305, above
8.	Distance of lift arm pivot point from rear wheel axis:			
	-Horizontally	K	75, behind	75, behind
	-Vertically	L	275, above	275, above
9.	Height of lower hitch points relative to the rear wheel axis:			
	- In high position	M	190 to 345	215, above
	- In low position	N	-340 to -60	240, below
10.	Height of lower link hitch points when locked in transport position	215, above		

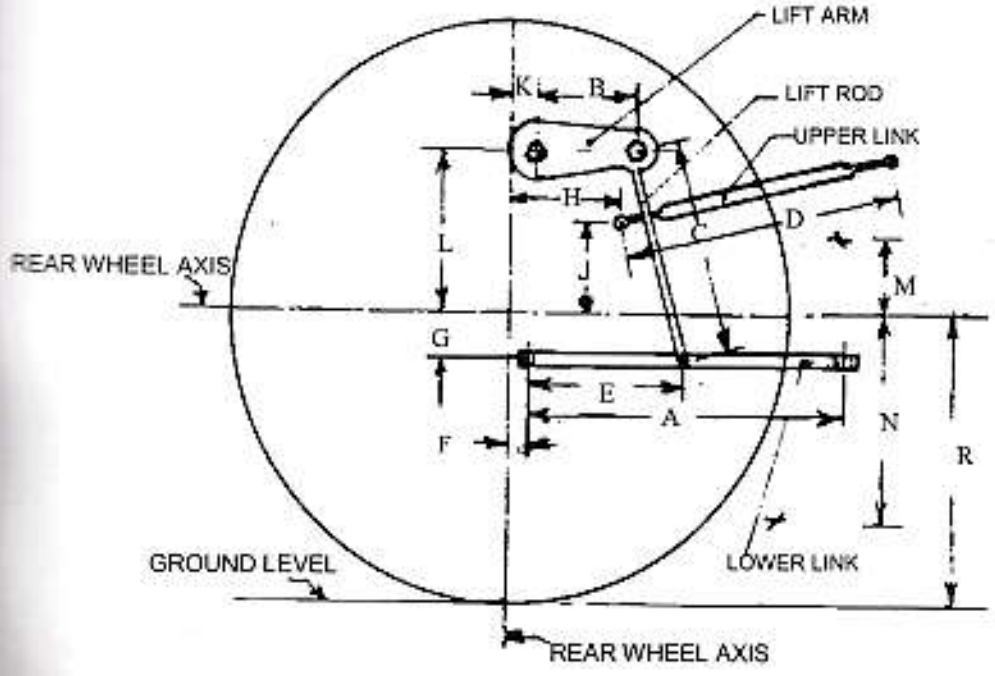


Fig.1 (a): DIMENSIONAL NOTATIONS FOR TABLE OF LINKAGE GEOMETRY

1.13.4 Drawbar:

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

Notation	As per IS: 12953-1990, **(Cat.I) / (Cat.IN)**, (mm)	As measured, (mm)	Remarks
A	683 ± 1.5 / 400 ± 1.5	682	Conforms to Cat. I
B	75 (min) / 75 (min)	75.1	Conforms to Cat. I & IN
C	30 (min) / 30 (min)	30.3	Conforms to Cat. I & IN
DØ	21.79 to 22.0 / 21.79 to 22.0	22.0	Conforms to Cat. I & IN
E	39.0 (min) / 39.0 (min)	39.0	Conforms to Cat. I & IN
FØ	12.0 (min) / 12.0 (min)	12.0	Conforms to Cat. I & IN
G	15.0 (min) /15.0 (min)	18.1	Conforms to Cat. I & IN
HØ	25 ± 1 / 25 ± 1	25.0	Conforms to Cat. I & IN
J	80 ± 1.5 / 80 ± 1.5	80.0	Conforms to Cat. I & IN
No. of holes	7 / 5	07	Conforms to Cat. I

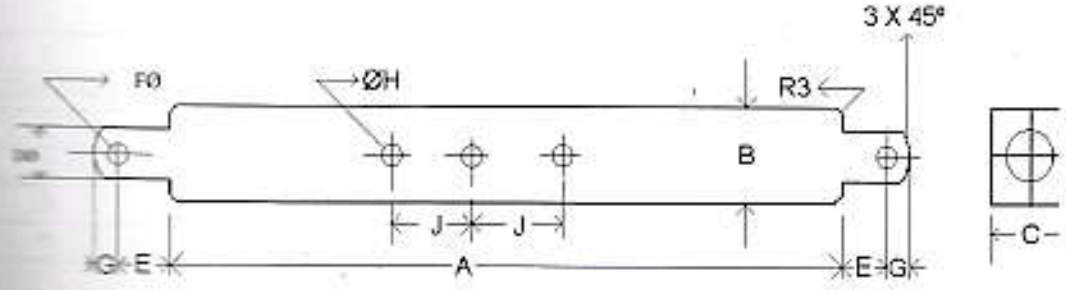


Fig.1 (b): DIMENSIONAL NOTATIONS FOR LINKAGE DRAWBAR

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

1.14 **Power take-off shaft:**

Type	:	Type-I, Not independent
Method of engaging	:	By a hand lever provided on LHS of operator's seat.
No. of shaft(s)	:	One
PTO speed corresponding to rated engine speed, (rpm)	:	554
Distance behind rear axle, (mm)	:	235
Engine to PTO speed ratio	:	4.694, 3.390
Whether the PTO shaft is capable of transmitting the full power of engine	:	Yes
Other speed corresponding to rated engine speed, rpm	:	767

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 of PTO shaft corresponds to 2535 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 50mm to right or left of the centre line of the tractor	In the center line of the tractor	Conforms
Dimensions, (mm) Refer Fig. 2 (a):			
D	34.79 ± 0.06	34.75	Conforms
d	28.91 ± 0.05	27.96	**Does not Conform**
B	29.4 ± 0.1	29.46	Conforms
A1 (Optional)	8.3 ± 0.1	NA	---
W	8.69 – 0.09 - 0.16	8.60	Conforms
a	7	7	Conforms
a (Optional)	25 ± 0.5	NA	—
c	38	38	Conforms
α	30°	30°	Conforms
S	76 (min)	52.0	**Does not Conform**
r	450 to 675	535	Conforms

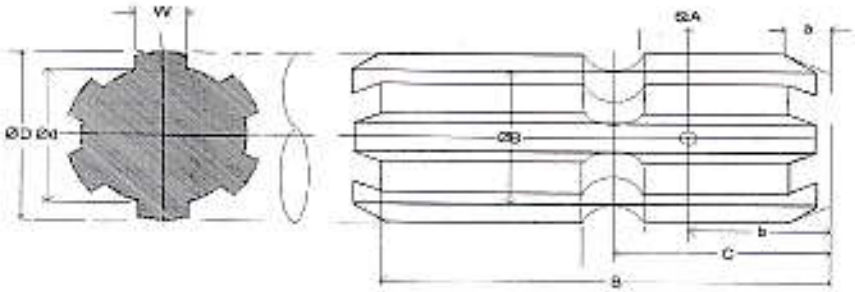


Fig.2 : DIMENSIONAL NOTATIONS FOR TYPE-I POWER TAKE-OFF SHAFT

1.14.2	**Power Take-off Master Shield**	:	**Not provided**
1.15	**Towing hitch:**		
1.15.1	**Front**	:	**Not provided**
1.15.2	**Rear:**		
	Type	:	Clevis
	Location	:	At the rear of transmission housing
	Height above ground level, (mm):		
	- Maximum	:	425
	- Minimum	:	325
	- No. of positions	:	02
	Type of adjustment	:	By changing and reversing the position of hitch on its mounting bracket.
	Distance of hitch point,(mm):		
	- From rear axle centre	:	325
	- From power take-off shaft end	:	90
	Dia of pin hole, (mm)	:	25.4
	Width of clevis, (mm)	:	75.0
1.16	**Steering:**		
	Make	:	KYB, Japan (apa)
	Type	:	Hydro power assisted, integral type power steering consisting of rotary type control valve.
	Location	:	Above clutch housing
	Method of operation	:	Manually by steering control wheel
	Diameter of steering control wheel, (mm)	:	370
	Make of distributor	:	KYB, Japan (apa)
	Make , type & number of hydraulic ram cylinder	:	Not applicable
	Steering oil capacity, (l)	:	12.5 (Common with, transmission, hydraulic & brake systems).
	Lubricant change period	:	After every 400 hours of operation.
1.16.1	**Steering pump:**		
	Make	:	**Not provided**
	Type	:	Gear, Tandem
	Location	:	On RHS of engine
	Method of drive	:	Through FIP camshaft
1.17	**Brakes:**		
1.17.1	**Service Brake:**		
	Make	:	SIAM KUBOTA Corporation Ltd.
	Type	:	Mechanical, Oil immersed multi discs
	Location	:	On rear half axle shaft outside the differential housing
	No. of disc(s)	:	Three (on each wheel side)
	Area of liners, (cm^2)	:	362.2 (on each wheel side)
	Material of liners	:	JFP-202S
	Method of operation	:	Independent or combined pedal operated by right foot.

1.17.2 **Parking Brake:**

Type	:	Pawl & ratchet arrangement
Location & Method of operation	:	Service brake acts as parking brake when locked in position by a latch provided on LHS of operator's seat

1.18 **Wheel Equipment:**

1.18.1 **Steered Wheel(s):**

Make	:	MRF
Number(s)	:	Two
Type of tyre	:	Pneumatic, traction
Size	:	180 / 85 D12
Ply rating	:	04
Maximum permissible load on each tyre at inflation pressure recommended for road work at 160 kPa, (kgf)	:	270
Recommended inflation pressure, (kPa) :		
- For field work	:	160
- For transport	:	160
Track width, (mm)	:	815 (std.)
Method of changing track width	:	Not applicable
Make & size of wheel rim	:	WILP & 5JA x 12

1.18.2 **Drive wheel(s):**

Make	:	MRF
Number (s)	:	Two
Type of tyre	:	Pneumatic, Traction
Size	:	8.3 - 20
Ply rating	:	06
Maximum permissible load on each tyre at inflation pressure recommended for road work at 160 kPa, (kgf)	:	560
Recommended inflation pressure, (kPa):		
- For field work	:	160
- For transport	:	160
Track width, (mm)	:	810 (std.), 900
Method of changing track width	:	By reversing the wheel disc
Make & size of wheel rim	:	WILP & W7 x 20

1.18.3 **Wheel base**, (mm) : 1560

Method of changing wheel base, if any, and range : **None**

1.19 **Operator's seat:**

Make	:	Shigeru, Thailand (apa)
Type	:	Cushioned with back rest
Type of Suspension	:	Two helical coil springs
Type of Dampening	:	**Not provided**
Range of adjustment,(mm):		
- Vertical (back rest)	:	Nil
- Lateral	:	Nil
- Longitudinal	:	± 50

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).

All parameters meet with the requirements of IS: 12343-1998: (Re-affirmed in March, 2009), **except the following**:-

i) Length of seat from seat index point.
ii) Width of seat from seat index point.
iii) Indicator pointer for adjustment of seat according to operator's weight is not provided.
iv) Vertical distance from seat index point to centre of clutch pedal.
v) Vertical distance from seat index point to centre of brake pedal.
vi) Vertical distance from seat index point to centre of steering control wheel.

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

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

i) Grease lubricant frequency chart
ii) Oil lubricant, type & frequency chart

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,

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) Spark arresting device in the exhaust system is not provided.

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 the position and draft control lever of hydraulic is less than the minimum requirement.
ii) Master shield has not been provided

1.20.6 Conformity with IS: 14683 – 1999 (Re-affirmed in March, 2009) :

All lighting arrangements meet the requirements of IS: 14683-1999.

1.20.7 Rear view mirror:

Rear view mirror has been provided.

1.20.8 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: Riveted on LHS of front engine support and provides the following information:-

Name of Manufacturer	M/s. Kubota corporation
Make	KUBOTA
Model	B2741
Year of manufacture	KJ (i.e. October, 2016)
Engine Serial Number	IGN7929
Chassis Serial Number	KBTB30TNCJTKPC001
Maximum PTO Power, kW	14.3
Specific fuel consumption, g/kWh	320

1.22 Ballast Mass, (kg):

Particulars		As used during drawbar test	As used during field test		As used during Haulage test
			Dry land	Puddling	
Front	C.I. weight	75	75	20 blades rotavator without any cage wheel	75
	Water	Nil	Nil		Nil
Rear	C.I. weight	Nil	Nil		Nil
	Water	80	80		80
	Additional weight, if any	Nil	Nil		Nil

1.23 Masses:

Particulars		Mass of the tractor without operator but with all the liquid reservoirs full, (kg)		
		Front	Rear	Total
i)	Unballast	315	370	685
ii)	With ballast as used during drawbar performance test.	410	430	840
iii)	With ballast as used during dry land field test	410	420	830
iv)	As used during wetland operation	410	430	840
v)	With ballast as used during haulage test with trailer hitch, canopy and drawbar.	410	430	840

1.24 Overall dimensions:

Condition	Length, (mm)	Width, (mm)	Height, (mm)		Ground Clearance, (mm)
			With exhaust pipe	Without exhaust pipe	
With standard ballast	2690	1020	510	1280 (steering wheel)	320 (below rear transmission housing)

1.25 Number of external lubricating points:

- Oiling : Nil
- Grease nipples : 09
- Grease cups : Nil

1.26 Colour of tractor:

Chassis & engine : Grey
Bonnet & Mudguard : Orange
Rim and disc : Orange

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.

2.2 Lubricants:

Sl. No.	Particulars	As recommended by the manufacturer	As used during the test
1.	Engine	SAE 10 W-30	20W40
2.	Gearbox, differential, rear axle, final drive, hydraulic, steering & brake system	Kubota super UDT fluid or SAE 75 W-80	Oil originally filled in the systems was not changed
3.	Front differential & front axle housing	Kubota super UDT fluid or SAE 75 W-80	--do--
5.	Grease	NLGI-2 or NLGI-1	MP Grease

2. PTO PERFORMANCE TEST

Date(s) of test : 09.05.2017 & 11.05.2017
Tractor run at the Institute prior to start of PTO test (h) : 0.25
Type of dynamometer bench : Eddy Current, SAJ - AG 250

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

Table – 1

Power, (kW)	Speed (rpm)		Fuel consumption			Specific energy (kWh/l)
	PTO	Engine	(l/h)	(kg/h)	Specific, (kg/ kWh)	
a) Maximum power – 2 hours test:						
14.0	554	2600	5.38	4.50	0.321	2.60
13.5	554	2600	5.21	4.35	0.322	2.59*
b) Power at rated engine speed (2600 rpm):						
14.0	554	2600	5.38	4.50	0.321	2.60
13.5	554	2600	5.21	4.35	0.322	2.59*
c) Power at standard power take-off speed (540 ± 10 rpm):						
13.9	540	2535	5.35	4.47	0.322	2.60
13.7	540	2535	5.24	4.38	0.320	2.61*
d) Varying loads at rated engine speed (2600 rpm):						
i) Torque corresponding to maximum power available at rated engine speed:						
14.0	554	2600	5.38	4.50	0.321	2.60
ii) 85% of the torque obtained in (i):						
12.3	571	2680	4.79	4.00	0.325	2.57
iii) 75% of the torque obtained in (ii) :						
9.3	575	2699	3.94	3.30	0.355	2.36
iv) 50% of the torque obtained in (ii):						
6.3	581	2727	3.19	2.66	0.422	1.97
v) 25% of the torque obtained in (ii):						
3.1	587	2755	2.47	2.06	0.665	1.26
vi) Unloaded:						
0.0	596	2798	1.83	1.53	0.000	0.00
e) Varying loads at Standard PTO Speed (540 ± 10 rpm):						
i) Torque corresponding to maximum power available at rated engine speed:						
13.9	540	2535	5.35	4.47	0.322	2.60
ii) 85% of the torque obtained in (i):						
11.9	544	2554	4.52	3.78	0.318	2.63
iii) 75% of the torque obtained in (ii) :						
9.0	549	2577	3.71	3.10	0.344	2.43
iv) 50% of the torque obtained in (ii):						
6.1	554	2600	2.99	2.50	0.410	2.04
v) 25% of the torque obtained in (ii):						
3.0	559	2624	2.30	1.93	0.643	1.30
vi) Unloaded:						
0.0	568	2666	1.69	1.41	0.000	0.00

***Under High ambient conditions**

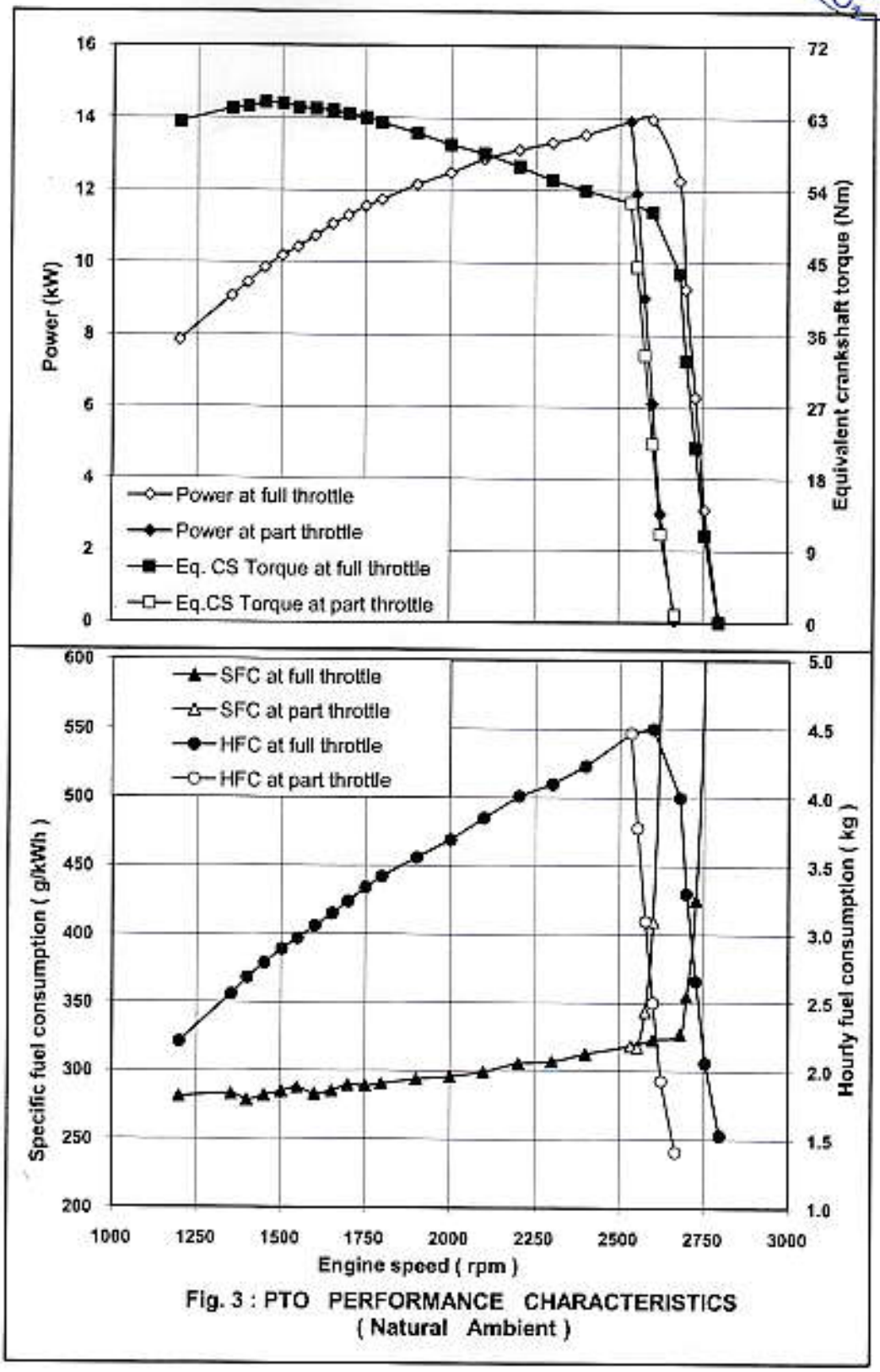


Fig. 3 : PTO PERFORMANCE CHARACTERISTICS
(Natural Ambient)

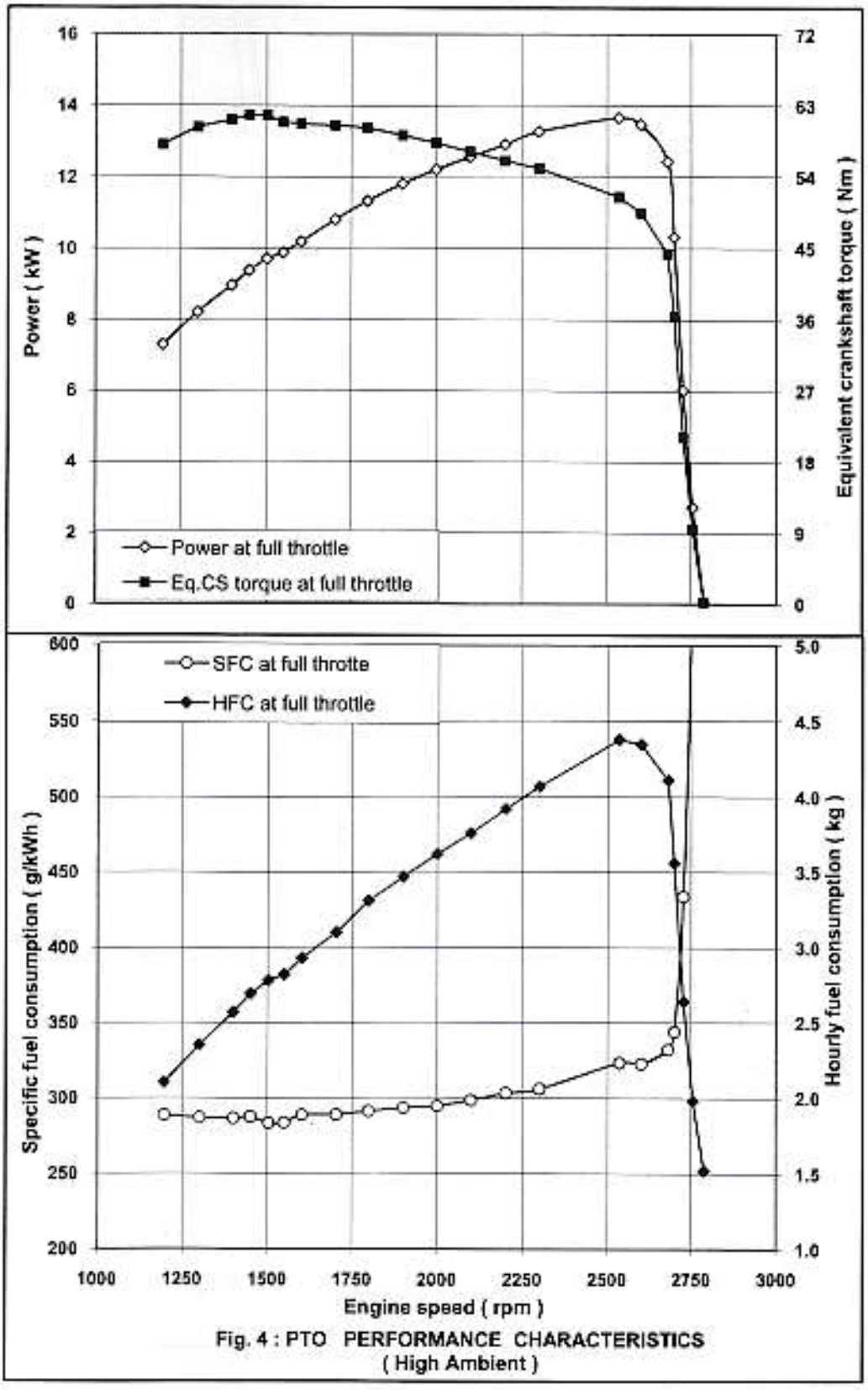


Fig. 4 : PTO PERFORMANCE CHARACTERISTICS
(High Ambient)

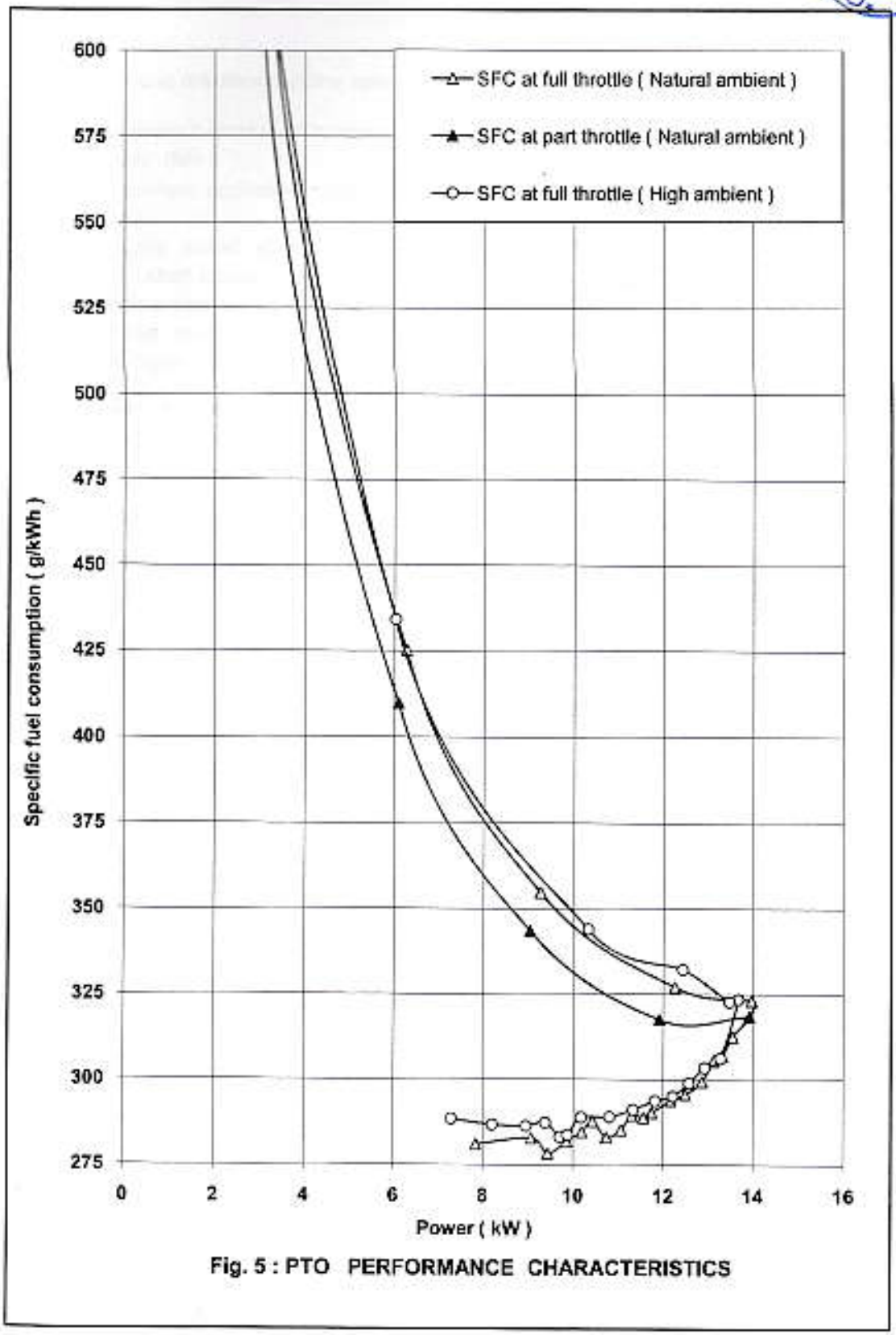


Fig. 5 : PTO PERFORMANCE CHARACTERISTICS

		Natural ambient	High ambient
-No load maximum engine speed, (rpm)	:	2798	2788
-Equivalent crankshaft torque at maximum power, (Nm)	:	51.3	49.5
-Maximum equivalent crankshaft torque, (Nm)	:	64.9	61.8
-Engine speed at maximum equivalent crankshaft torque, (rpm)	:	1450	1450
Backup torque, (%)	:	26.5	24.8
Smoke level (maximum light absorption coefficient, per meter)	:	0.22	---
- Range of atmospheric conditions:			
Temperature, (°C)	:	28 to 30	42 to 44
Pressure, (kPa)	:	98.2 to 98.6	99.5 to 99.8
Relative humidity, (%)	:	62 to 66	19 to 29
-Maximum temperatures, (°C):			
Engine oil	:	115	124
Coolant (Water + Coolant)	:	97	110
Fuel	:	31	45
Air intake	:	42	58
Exhaust gas	:	618	618
-Pressure at maximum power:			
Intake air, (kPa)	:	4.1	4.3
Exhaust gas, (kPa)	:	5.5 to 5.7	5.7 to 6.0
-Consumptions:			
Lub oil, (g/kWh)	:	--	0.47
Coolant (% of total coolant capacity)	:	--	Nil

3. DRAWBAR PERFORMANCE TEST

Date(s) of test	:	19.09.2017, 20.09.2017 & 22.09.2017
Tractor run at the Institute prior to start of drawbar test, (h)	:	38.1
Type of track	:	Concrete
Height of drawbar, (mm):		
- Without ballast	:	450
- With ballast	:	425

4.1 The results of drawbar performance test consisting of maximum power and pull with 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 (4 WHEEL IN ENGAGED POSITION)

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: R.H. (%)	Atmospheric conditions: Pressure (kPa.)	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 unballasted with 4 WD in engaged condition):																
L3	2.42	3.9	5.73	2746	15.0	0.630	2.94	1.33	30	76	98.1	42	80	82	95	6.75
M1	3.04	4.9	5.74	2737	15.3	0.552	3.24	1.51	29	76	98.1	40	80	84	95	6.73
M2	5.54	9.4	6.10	2689	15.1	0.470	5.28	1.78	27	80	98.2	38	80	88	96	6.59
M3	7.79	11.1	5.12	2606	11.4	0.423	5.62	1.98	26	79	98.3	37	75	89	98	6.64
H1	6.39	10.9	6.12	2651	14.8	0.429	5.55	1.96	26	83	98.3	36	59	92	97	6.72
ii) Maximum power test (Tractor ballasted with 4 WD in engaged condition):																
L3	2.37	4.9	7.49	2745	15.3	0.556	3.26	1.50	27	73	97.9	37	84	83	96	8.36
M1	2.98	6.1	7.34	2730	15.3	0.546	3.98	1.53	29	78	97.9	40	89	83	97	8.34
M2	5.33	10.8	7.28	2601	14.1	0.424	5.48	1.97	28	80	98.0	39	89	95	105	7.98
M3	8.01	11.0	4.92	2620	7.8	0.422	5.55	1.98	27	78	98.1	37	81	91	97	6.40
H1	6.44	11.3	6.31	2600	10.9	0.416	5.62	2.01	25	81	98.2	34	61	91	93	8.08

Table-2 Contd..

Contd..Table-2

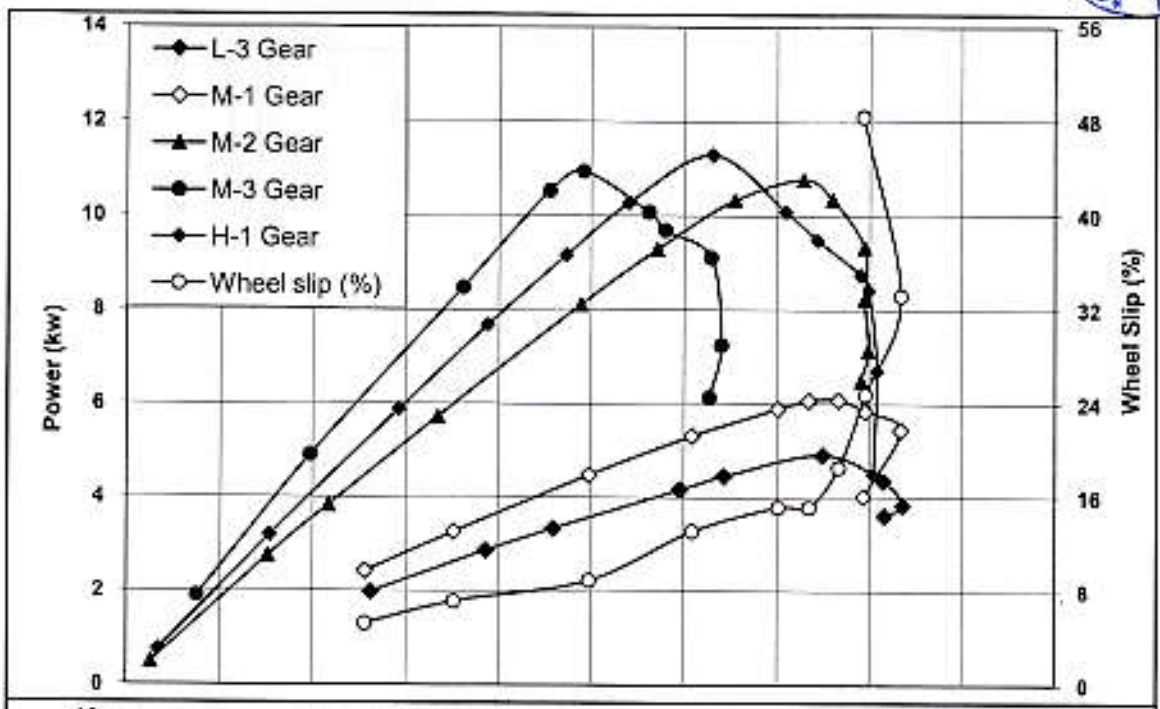
Gear	Travel Speed, (km/h)	Draw-bar power, (kW)	Draw-bar pull, (kN)	Engine Speed, (rpm)	Wheel Slip, (%)	Fuel consumption (kg/kWh)	Fuel consumption (l/h)	Specific Energy, (kWh/l)	Atmospheric conditions: Temp (°C)	Atmospheric conditions: R.H. (%)	Atmospheric conditions: Pressure (kPa)	Temperature (°C): 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):																
M 2	5.96	9.0	5.47	2699	9.4	0.417	4.59	1.97	23 to 28	62 to 86	98.1 to 98.4	34 to 42	61 to 88	83 to 90	98 to 103	--
iv) Five hours test at pull corresponding to 15 percent wheel slip (ballasted wheeled tractor):																
M 1	3.07	6.3	7.35	2728	--	0.481	3.69	1.70	28 to 33	58 to 78	98.2 to 98.7	42 to 50	59 to 86	82 to 88	98 to 101	--

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

ii) Tyre Creeping, (mm):
- LHS : Nil
- RHS : Nil

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

Engine oil	:	106
Coolant (water)	:	101
Transmission oil	:	89
Fuel	:	46



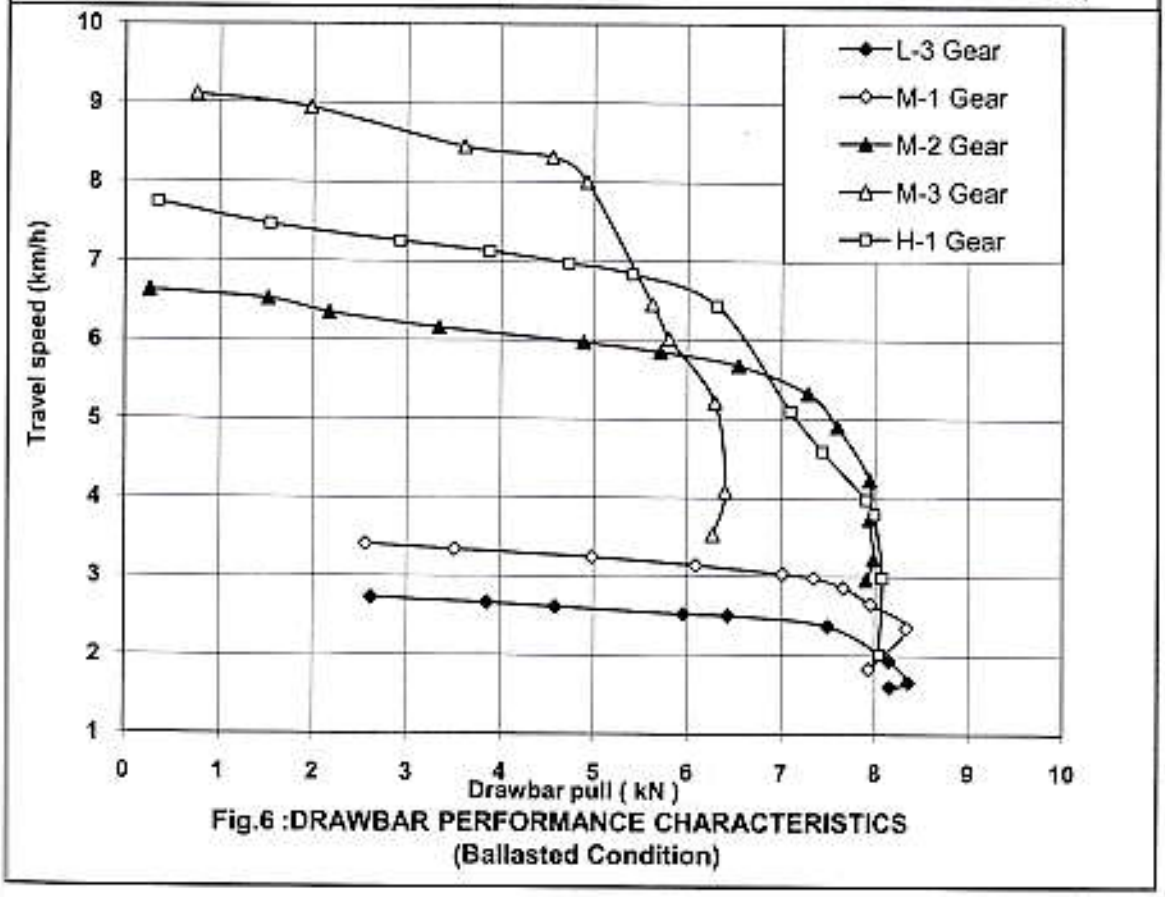


Fig.6 :DRAWBAR PERFORMANCE CHARACTERISTICS
(Ballasted Condition)

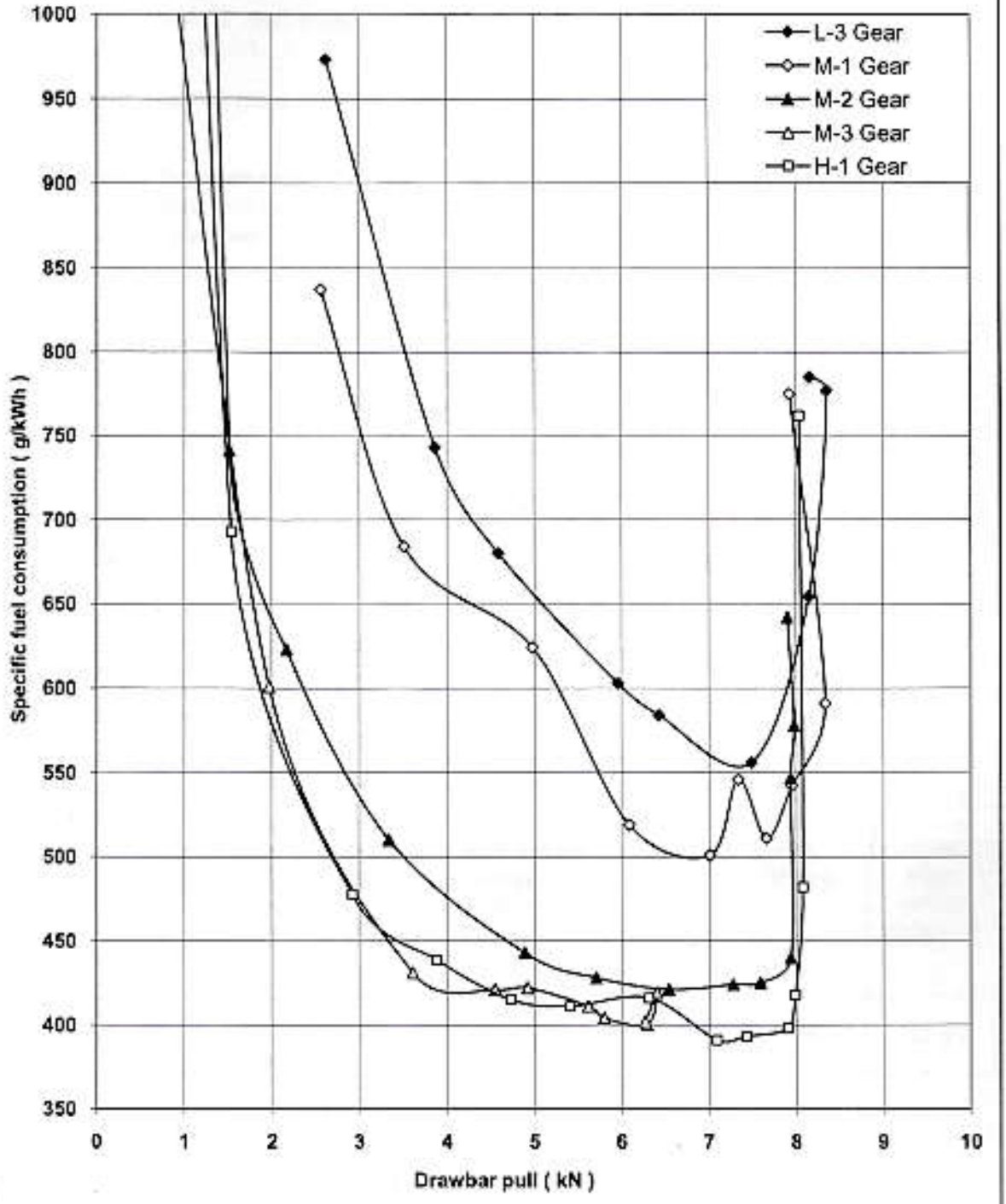


Fig. 7 : DRAWBAR PERFORMANCE CHARACTERISTICS (Ballasted Condition)

4. POWER LIFT AND HYDRAULIC PUMP PERFORMANCE TEST

Date(s) of test : 15.05.2017 & 16.05.2017
Tractor run at the Institute prior to start of hydraulic test, (h) : 12.91

Pump speed at rated engine speed, (rpm) : 2184

5.1 Hydraulic power test:

Pump delivery rate at minimum pressure and rated engine speed, (l/min) : 17.88
Maximum hydraulic power, (kW) : 3.1
Pump delivery rate at maximum hydraulic power, (l/min) : 15.87
Pressure at maximum hydraulic power, (MPa) : 11.55
Sustained pressure of the open relief valve, (MPa) : 15.0

Tapping point:

a) Relief valve test : At external circuit
b) Pump performance test : At pump outlet
Temperature of hydraulic fluid, (°C) : 60 to 64

5.2 Lifting capacity test:

Test	Height of lower hitch point above ground in down position, (mm)	Vertical move-ment with lifting forces, (mm)	Maximum corrected force exerted through full range, (kN)	Correspo nding pressure, (MPa)	Moment about rear axle, (kN-m)	Max. tilt angle of mast from vertical (degrees)
At hitch points	180	465	5.61	13.5	3.93	--
On the standard frame	180	465	4.03	13.5	5.28	22.8

5.3 Maintenance of lift load:

Force applied at the frame, (kN) : 3.62
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)	01	01	01	01	01	02

5.BRAKE TEST

6.1 Service brake:

6.1.1 Cold brake test:

Date of test(s) : 19.05.2017
Type of Track : Concrete
Maximum attainable speed (kmph):
-Without Ballast : 20.4
-With Road Ballasted : 20.4

		At maximum attainable speed			
Un ballasted tractor	Braking device control, force (N)	468	390	300	225
	Mean deceleration, (m/sec^2)	5.03	4.65	3.49	2.50
	Stopping distance, (m)	3.19	3.45	4.60	6.42
Road ballasted tractor	Braking device control force(N)	500	430	350	280
	Mean deceleration, (m/sec^2.)	3.53	2.95	2.76	2.50
	Stopping distance, (m)	4.55	5.43	5.82	6.42

6.1.2 Brake fade test:

	At maximum attainable speed			
Braking device control force (N)	512	430	350	295
Mean deceleration, (m/ sec^2)	3.33	2.77	2.61	2.50
Stopping distance, (m)	4.82	5.8	6.15	6.42

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

6.2 Parking brake test:

Particulars	18 percent slope		12 percent slope with trailer of 0.815 tonnes.	
	Up	Down	Up	Down
Braking device control force, (N)	415	423	343	372
Efficacy of parking brake	----------Effective----------			

7. NOISE MEASUREMENT

7.1 Noise at bystander's position:

Date of test : 22.05.2017
Type of track : Concrete
Background noise level, dB (A) : 62 dB (A)

Atmospheric conditions:

Temperature, (°C) : 39
Pressure, (kPa) : 98.1
Relative humidity, (%) : 23
Wind velocity, (m/s) : 1.0

Test Data:

S. No.	Gear	Traveling speed before acceleration, (kmph)	Noise level, dB (A)
1.	L1	0.83	77
2.	L2	1.55	77
3.	L3	2.15	77
4.	M1	2.69	77
5.	M2	5.03	77
6.	M3	6.94	77
7.	H1	5.85	77
8.	H2	10.84	78
9.	H3	14.96	78

7.2 Noise at operator's ear level:

Date of test : 19.09.2017
Type of track : Concrete
Background noise level, dB(A) : 56
Atmospheric conditions:
Temperature, (°C) : 30
Pressure, (kPa) : 98.0
Relative humidity, (%) : 71
Wind velocity, (m/s) : 1.4

Test Data:

Gear	Drawbar pull at which the tractor developed the max. noise level, (kN)	Corresponding traveling speed, (kmph)	Noise level, dB(A)
L3	3.73 to 5.73	2.61 to 2.42	89
M1	5.52 to 5.77	3.07 to 3.04	89
M2	4.60 to 6.02	5.87 to 5.54	90
M3*	1.69 to 5.08	8.94 to 7.79	91
H1	5.92 to 6.12	6.41 to 6.39	92

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

8. MECHANICAL VIBRATION MEASUREMENT

Date of test : 21.06.2017
Type of test surface : Concrete

Sl. No.	Measuring points		Vibration, microns			
			At load corresponding to 85% of max. PTO power		At no load	
			VD	HD	VD	HD
1	2		3	4	5	6
i)	Foot rest	Left	40	50	20	40
		Right	30	40	70	30
ii)	Steering wheel		50	50	30	40
iii)	Seat	Bottom	40	60	60	20
		Back	30	20	10	10
iv)	Mudguard	Left	90	70	30	60
		Right	60	40	70	30
v)	Head light	Left	70	140*	60	60
		Right	70	120*	90	70
vi)	Battery base, centre		100	150*	150*	160*
vii)	Tail light	Left	60	90	100	50
		Right	60	50	60	70

1	2	3	4	5	6	
viii)	Plough light			--NA--		
ix)	Gear shifting lever		70	60	40	30
x)	Accelerator lever	Hand	130*	100	150*	80
		Foot	70	40	30	80
xi)	Brake pedal	Left	150*	80	130*	140*
		Right	60	80	60	100
xii)	Clutch pedal		40	120*	60	100
xiii)	Main hydraulic control lever		60	40	20	20
xiv)	PTO engaging lever		30	30	20	20
xv)	Differential lock lever		30	60	60	30

***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)	592.6
	Distance forward from the vertical plane containing the axis of rear wheels, (mm)	693.3
	Distance from the median plane parallel to the longitudinal axis of tractor bisecting the track, (mm)	2.6 (in RHS)

10. TURNING ABILITY

Characteristics	Minimum turning diameter, (m)		Minimum clearance diameter, (m)	
	LHS	RHS	LHS	RHS
Brakes released	5.18	4.93	5.56	5.31
Brake applied	4.85	4.60	5.21	4.96

11. OPERATORS'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** as per the following details:

1. The non visible space in front is **4100 mm** which is **2.62** times of its wheel base i.e. 1560 mm.
2. The non visible space in LHS & RHS is **860 mm** which is **1.08** times of its rear standard track width i.e. 810 mm.

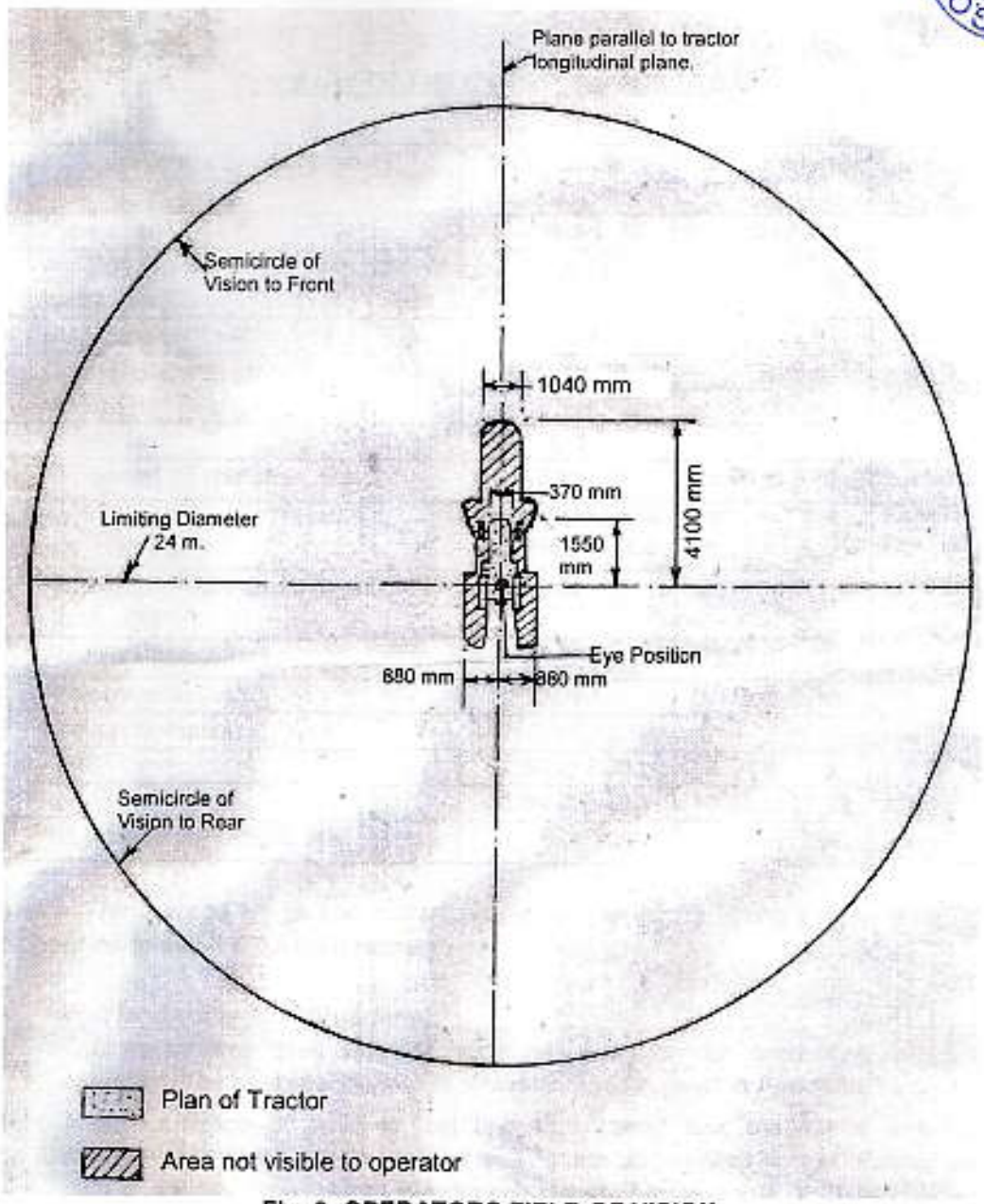


Fig. 8: OPERATORS FIELD OF VISION

12. FIELD TEST

12.1 The field tests comprising of MB ploughing, Rotavation and Wet land cultivation (including puddling and water proof) were conducted for 10.51, 10.76 and 15.03 hours respectively. All the field tests were conducted at the full accelerator settings, when the no load speed of the engine varied from 2774 to 2800 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, rotavator and half cage wheel with puddler are given in **Table – 3.**

Table – 3

SUMMARY OF FIELD PERFORMANCE TEST

S No.	Parameter/operation	MB Ploughing	Rotavation	Puddling
i)	Type of soil	Heavy	Heavy	Heavy
ii)	Av. Soil moisture, (%)/ Av. Depth of water, (cm)	11 to 13	15 to 17	11 to 17
iii)	Bulk density of soil, (g/cc)	1.6 to 1.7	2.6 to 2.9	--
iv)	Cone index,(kg/cm^2)/ Puddling index, (%)	6.81 to 7.6	5.1 to 6.3	80.2 to 80.9
v)	Gear used	L-3	M-1	M-1
vi)	Av. Speed of operation, (kmph)	2.48 to 2.49	3.66 to 3.70	2.94 to 3.09
vii)	Av. Wheel slip / Av. Travel reduction, (%)	Front: 12.3 to 13.4 Rear: 10.5 to 11.5	Front: -33.9 to -6.0 Rear: -13.7 to -5.8	Front: -4.44 to -3.3 Rear: -3.0 to -2.4
viii)	Av. Depth of cut / depth of puddle ,(cm)	11	8 to 9	26 to 27
ix)	Av. Working width,(cm)	34 to 37	117 to 123	--
x)	Area covered,(ha/h)	0.077	0.379 to 0.389	--
xi)	Fuel consumption:			
	- (l/h)	2.59 to 2.68	4.16 to 4.54	4.02 to 4.05
	- (l/ha)	33.64 to 34.80	10.98 to 11.68	--
xii)	Av. Draft of implement, (kN)	6.35	--	--

Remarks: The average lub oil and coolant (water) consumptions during the entire field tests were observed to be **nil** & **0.8 ml/h** respectively.

12.4 Wet land cultivation (Puddling):

12.4.1 The tractor was fitted with 20 blade rotavator only for conducting the puddling operation. The brief specification of rotavator used is given in **Annexure –I**.

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

S. No.	Location	Whether ingress of mud and/or water	Remarks
1.	Front axle, LHS & RHS final drive housing oil	No	None
2.	Centre pin assembly	No	
3.	Clutch housing	No	
4.	Lubricating oil in engine sump, transmission, hydraulic, steering & brake system oil	No	
5.	Starter motor	No	
6.	Alternator	No	

13. HAULAGE TEST

Type of trailer	:	**Two Wheel (Single axle)**
Gross mass of trailer (Tonne)	:	1.5
Height of trailer hitch above ground level, (mm)	:	405
Gear used during the test for negotiating slopes upto 8%	:	H-3
Average travel speed,(kmph)	:	19.06 to 19.60
Average fuel consumption:		
- (l/h)	:	2.56 to 2.64
- (ml/km/(Tonne)	:	89.3 to 89.8
Average distance traveled per litre of fuel consumption, (km)	:	7.42 to 7.47
General observations:		
Effectiveness of brakes	:	Effective
Maneuverability of tractor-trailer combination	:	Satisfactory

14. COMPONENTS/ASSEMBLY INSPECTION

The engine and other assemblies were dismantled after **89.2 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.	78.012	78.003	78.009	78.000	78.012	78.001	78.15
2.	78.009	78.008	78.003	78.011	78.000	78.012	
3.	78.018	78.000	78.016	78.002	78.019	78.015	

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.	77.603	77.508	77.950	***	77.85	0.062	0.30
2.	77.586	77.512	77.954	***		0.058	
3.	77.609	77.505	77.943	***		0.076	

(***) 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			
	Top	Middle	Bottom	Top	Middle	Bottom	Top	Middle	Bottom	
1st comp. ring	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	1.25
2nd comp. ring	0.50	0.50	0.50	0.55	0.55	0.55	0.55	0.55	0.55	1.25
Oil ring	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	1.25

14.1.4 Ring side clearance:

Rings	Ring side clearance, (mm)			Max. permissible clearance limit, (mm)
	Piston-I	Piston-II	Piston-III	
1st Compression ring	--Tappered --			
2nd Compression ring	0.111	0.111	0.100	0.20
Oil ring	0.035	0.035	0.023	0.15

14.1.5 Main Bearing:

Bearing No.	Diametrical Clearance, (mm)	Crankshaft end float, (mm)	Max. permissible wear limit, (mm)	
			Diametrical clearance	Crankshaft end float
1.	0.090 to 0.091	0.212	0.40	0.50
2.	0.092 to 0.096			
3.	0.115 to 0.118			
4.	0.097 to 0.103			

14.1.6 Big end bearings:

Bearing No.	Clearance, (mm)		Max. permissible wear limit,(mm)	
	Diametrical	Axial	Diametrical	Axial
1.	0.092 to 0.094	0.28	0.40	0.50
2.	0.083 to 0.087	0.28		
3.	0.093 to 0.097	0.28		

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):

Intake valve spring	:	19.12 to 19.61	Against discard limit of 100N/31mm
Exhaust valve spring	:	19.12 to 19.45	

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

- Intake valve	:	0.041 to 0.45	Against discard limit of 0.10 mm
- Exhaust valve	:	0.042 to 0.047	

14.2 Clutch:

Any marked wear on clutch friction plate	:	None	
Condition of clutch release bearing	:	Normal	
Condition of pilot bearing	:	Normal	
Condition of diapharm spring	:	Normal	
Presence of oil in clutch housing	:	None	
Any marks on fly wheel/ pressure plate	:	None	
Overall thickness of plate:		8.26 to 8.34	Against discard limit of 0.30 mm from rivet head to plate surface.
Height of lining over rivet head, (mm):		1.42 to 1.79	

14.3 Transmission gears:

Any visual damage, pitting & chipping of any transmission gear teeth	:	None	
Backlash between crown wheel and pinion, (mm)	:	0 .27	Against the discard limit of 0.60 mm

14.4 Brakes:

Description	Initial specified thickness of brake disc, (mm)	Measured overall thickness of brake disc after test, (mm)	Measured depth of oil groove, (mm)	Minimum permissible depth of lining over metal plate (mm)
Left	3.30 to 3.50	3.34 to 3.38	0.18 to 0.37	2.0
Right	3.30 to 3.50	3.38 to 3.44	0.19 to 0.42	2.0

14.5 Front axle : Front axle final drive reduction unit case is located near front wheel, accommodated inside the front axle housing & common with differential housing. Ball bearings are provided at bevel gears & front axle case.

Condition of front axle seals & bearings	:	Normal	
Any visual damage, pitting & chipping of front axle transmission gear teeth	:	None	
Bearing number of front axle (king pin)	:	Two ball bearing is provided of size 6204 & 6304	
Bearing number of final drive bevel gear shaft (stub axle)	:	Two ball bearing is provided of size 6206 & 6205	
Clearance between centre pin and bush, (mm)	:	0.12 to 0.14	Against discard limit of 0.45 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

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

16. SUMMARY OF OBSERVATIONS, COMMENTS & RECOMMENDATIONS.

16.1 Evaluative (mandatory) / Non-evaluation (Non-mandatory) parameters 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)/ Require-ment (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	14.3 (D)	14.0	Yes
b)	Power at rated engine speed, (kW)	Non Evaluative	-do-	14.3 (D)	14.0	Yes
c)	Specific fuel consumption corresponding to maximum power, (g/kWh)	Non Evaluative	+ 5%	320 (D)	321	Yes
d)	Maximum equivalent crankshaft torque, (Nm)	Non Evaluative	± 8%	65.8 (D)	64.9	Yes
e)	Back-up torque, percent	Non Evaluative	10 percent, minimum.	25.3%	26.5	Yes
f)	**Maximum operating temperature (^{0}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.	140 (D)	124	Yes
	2) Coolant	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.	130 (D)	110	Yes
g)	Engine oil consumption, (g/kWh)	Evaluative	Not exceeding 1% of SFC at maximum power under High ambient conditions.	Maximum 0.95 (D)	0.47	Yes
h)	Smoke level,m^{-1}	Evaluative	Maximum light absorption coefficient of 3.25 per meter or equivalent BOSCH No. 5.2 or 75 Hatridge value (As per CMVR)	3.25 per meter	0.22	Yes

1	2	3	4	5	6	7
16.1.2	**Drawbar performance :**					
a)	Maximum drawbar pull with ballast corresponding to 15 percent wheel slip, (kN)	Non Evaluative	Minimum 65% of static mass with ballast	5.5 (D) 5.35 (R)	7.49	Yes
b)	Maximum drawbar pull without ballast corresponding to 15 percent wheel slip, (kN)	Evaluative	Minimum 65% of static mass of tractor without ballast or with standard ballast as the case may be.	5.0 (D) 4.37 (R)	6.12	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.	11.4 (D) 10.5 (R)	11.1	Yes
d)	Maximum transmission oil temperature (°C)	Non Evaluative	The declared value should not exceed the maximum value specified by oil company	120 (D)	89	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	To be declared by manufacturer [Tolerance of minus 10%]	5.6 (D)	5.61	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 and it should be 16 kg/engine hp where the tractor is not provided with a PTO shaft	3.4 (D) 3.3 (R)	4.03	Yes
b)	Maximum drop in the height of the point of application of the force after each 5 minutes interval for a total duration of 30 minute, (mm)	Non Evaluative	Observed value should not exceed 50 mm.	11 (D)	02	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 road ballast, (m):					
	1) Cold brake	Evaluative	10 (R)	10 (D)	4.55	Yes
	2) Hot brake	Evaluative	10 (R)	10 (D)	4.82	
b)	Maximum force exerted on the brake pedal to achieve a deceleration of 2.5 m/s^2 (N).	Evaluative	600 (R)	600 (D)	280 to 295	Yes
c)	Whether parking brake is effective at a force of 600 N at foot pedal(s) or 400 N at hand lever, N.	Evaluative	Yes / No	Yes	423	Yes

1	2	3	4	5	6	7
16.1.5	**Noise measurement :**					
a)	Maximum ambient noise emitted by the traclor dB(A)	Evaluative	As per CMVR	85 (R)	78	Yes
b)	Maximum noise at operator's ear level dB(A)	Evaluative	As per CMVR	96 (R)	92	Yes
16.1.6	**Amplitude of mechanical vibrations at :**					
	1) Left foot rest	Non Evaluative	100 microns (max)	100 (D)	50	Yes
	2) Right foot rest			100 (D)	70	Yes
	3) Seat (with driver seated)		-do-	100 (D)	60	Yes
	4) Steering wheel		-do-	100 (D)	50	Yes
16.1.7	**Air cleaner**					
	Air cleaner oil pull over (%).	Non Evaluative	0.25% (maximum)	Not applicable	--	--
16.1.8	**Haulage requirements :**					
a)	Gross mass of the trailers, (tones):					
	1) Two wheel	Non Evaluative	--	1.5 (D)	1.5	Yes
b)	Distance travelled / litre of fuel consumption, (km/l):					
	1) Two wheel	Non Evaluative	--	7.8 ± 1 (D)	7.42 to 7.47	Yes
c)	Fuel consumption (ml/km/ton):					
	1) Two wheel	Non Evaluative	--	84 ± 5 (D)	89.30 to 89.80	**No**
16.1.9	**Wetland cultivation :**					
	Sealing for the following assemblies:	Evaluative	The identified assemblies should essentially meet the requirement of IS: 11082. No water ingress in the identified assembly given in column-2. If tractor does not meet the requirements of wetland cultivation, it may be recommended for dry land operation only.	There should be no ingress of water and/or mud (R)	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-				

1	2	3	4	5	6	7
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)		Meets the requirement	Yes
b)	Lighting arrangement	Evaluative	As per CMVR		Meets the requirement	Yes
c)	Seating requirements (Tactor having more than 1150 mm rear track width)	Non Evaluative	Should meet the requirements of IS 12343 (as amended from time to time)		Not applicable	Not applicable
d)	Technical requirements for PTO shaft	Non Evaluative	Should meet the requirements of IS 4931 (as amended from time to time)		**Does not Meet the requirement**	**No**
e)	Dimensions of three point linkage	Non Evaluative	Should meet the requirements of IS 4468 (part 1) (as amended from time to time)		Meets the requirement	Yes
f)	Specifications of linkage drawbar	Non Evaluative	Should meet the requirements of IS 12953 and IS 12362 (part 3) (as amended from time to time)		Meets the requirement	Yes
g)	Specifications of swinging drawbar	Non Evaluative			Not provided	NA
16.1.11	**Labeling of tractors (Provision of labeling plate):**					
	1) Make	Evaluative	Should conform to the requirements of CMVR	--	KUBOTA	Yes
	2) Model	Evaluative		--	B2741	Yes
	3) Year of manufacture	Evaluative		--	KJ (i.e. October, 2016)	Yes
	4) Engine serial number	Evaluative		--	IGN7929	Yes
	5) Chassis serial number	Evaluative		--	KBTB30TNCJTKPC001	Yes
	6) Declaration of PTO power, (kW)	Evaluative		--	14.3	Yes
16.1.12	**Discard limit for:**					
(a)	Cylinder bore diameter, (mm)	Evaluative	To be specified by the manufacturer and supported by printed literature	78.15	78.00 to 78.02	Yes
(b)	Clearance between piston & cylinder liner at skirt, (mm)	Non Evaluative		0.30	0.058 to 0.076	Yes
(c)	**Ring end gap (mm):**					
	- Top comp. ring.	Evaluative	To be specified by the manufacturer and supported by printed literature	1.25	0.30	Yes
	- 2nd comp. ring.		-do-	1.25	0.50 to 0.55	Yes
	- Oil ring.		-do-	1.25	0.35	Yes
(d)	**Ring groove clearance (mm):**					
	- Top comp. ring.	Evaluative	-do-	--Tappered--		Yes
	- 2nd comp. ring.		-do-	0.20	0.100 to 0.111	Yes
	- Oil ring.		-do-	0.15	0.023 to 0.035	Yes

1	2	3	4	5	6	7
(e)	**Clearance of main bearings (mm):**					
	- Diametrical clearance	Evaluative	-do-	0.40	0.090 to 0.118	Yes
	- Crankshaft end float	Evaluative	-do-	0.50	0.212	Yes
(f)	**Clearance of big end bearings, (mm):**					
	- Diametrical	Evaluative	-do-	0.40	0.083 to 0.097	Yes
	- Axial	Evaluative	-do-	0.50	0.28	Yes
(g)	Clearance between king pin and bush, (mm)	Non Evaluative	-do-	In place of king pin & bush bearing are provided.		Yes
(h)	Clearance between center pin and bush, (mm)	Non Evaluative	-do-	0.45	0.12 to 0.14	Yes
16.1.13	**Literature as per IS:8132 (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.	**Characteristic**	**Category (Evaluative / Non Evaluative)**	**Requirements as per IS: 12207-2014**	**As observed**	**Whether meets the require-ments (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

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	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, linkage drawbar may be provided.	Front tow hook is not provided	**No**

16.3 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)]	:	**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/ISO 730-1:1994 (Reaffirmed in March, 2009)]	:	Conforms
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) (Reaffirmed in March, 2009) (Tractor having more than 1150 mm rear track width)	:	**Not applicable**
vi)	Guide for safety & comfort of operator of agricultural tractors: Part 1 General requirements (first revision) : [IS 12239 (PT-1) 1996/ISO 4254-1:1989 (Reaffirmed in (Reaffirmed in March, 2007)]	:	**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 & Part-2) –2006 & 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) (Reaffirmed 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) (Reaffirmed in March, 2009)]	:	**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) The maximum PTO power was recorded as **14.0 kW** against the declaration of **14.3 kW,** which meets the requirement of IS: 12207-2014 with regard to tolerance limit.

ii) The specific fuel consumption corresponding to maximum power was recorded as **321 g/kWh** against the declaration of **320 g/kWh**, which is within the tolerance limit of IS: 12207-2014.

iii) The maximum equivalent crankshaft torque was recorded as **64.9 N-m** against the declaration of **65.8 N-m**, which is within the tolerance limit of IS: 12207-2014.

iv) The backup torque is **26.5 %.**

16.4.1.2 Hydraulic Performance:

i) The moment about rear axle with standard frame was calculated as **5.28 kN-m**. Whereas, the moment about front axle was calculated as **4.82 kN-m** under standard ballasted condition. The moment about rear axle is on higher side as compared to the moment about front axle under standard ballasted condition. It is, therefore, recommended that the lifting capacity of the hydraulic system may be reduced suitably or ballast recommendation may be reviewed to avoid the front lifting of the tractor.

16.4.1.3 Mechanical Vibration:

The amplitude of mechanical vibration on various assemblies marked as (*) in Chapter-8 of this test report is on higher side, especially at left, right foot rest and steering control wheel. This calls for dampening down of vibrations to improve the operational comfort and service life of components.

16.4.1.4 Three Point Linkage:

Some of the parameters of three point linkages conform to Cat I and some of them conform to Cat. 1N. Keeping in view the spirit of standardization, necessary improvements may be incorporated.

16.4.1.5 Linkage Drawbar:

The some of the parameters of linkage drawbar meet to the Cat.I and some of Cat. 1N of IS 12953 (Part-I): 1990. This should be looked into for necessary corrective action.

16.4.1.6 Specifications of Power Take-off Shaft:

The dimension "dØ" of PTO shaft Refer Fig.2 (a) of PTO shaft does not meet the requirement of IS: 4931:1995. This should be looked into for corrective action.

16.5 Field and haulage test:

16.5.1 Wet land cultivation (Puddling operation):

No ingress of mud/or water was noticed during puddling operation of the 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).

16.5.2. Haulage test:

Fuel consumption, (ml/km/ton) was recorded as **89.30 to 89.80 ml/km/ton** against the declaration of **84 ± 5 ml/km/ton** , which does not meet the requirement of IS: 12207-2014. This should be looked into for necessary corrective action.

16.6 Maintenance / Service Problems:

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

16.7 Recommendation with regard to safety on tractor:

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

i) Provision of spark arrester in the exhaust system.
ii) Working clearance between the position and draft control lever of hydraulic is less than the minimum requirement.
iii) Rear wheel are not covered fully.
iv) Suspension system should be provided in the operator's seat.
v) There should be provision of master shield.

16.8 Adequacy of Literature supplied with machine:

16.8.1 The following literature has been supplied with the tractor for reference during the testing.

i) Operator' of **KUBOTA A211N, A211N-Optional, B2441 & B2741** tractors.
ii) Spare part's catalogue of **KUBOTA A211N-Optional, A211N, B2441 & B2741** tractors.
iii) Service manual of **KUBOTA A211N-Optional, A211N, B2441 & B2741** tractors.

16.8.2 The supplied literature was found adequate, **except the following**:-

i) This oil change period should be examined as the present available lubricants require longer change periods.

16.8.3 These literatures may also be brought out in national & other regional languages for the guidance of user's and service personnel.

17. CITIZEN CHARTER

Duration of Test	Time frame for Testing & Evaluation as per Citizen Charter	Whether the Test Report is released within the time frame given in Citizen Charter	Remarks
07 Months (May, 2017 to November, 2017)	10 Months	Yes	---

TESTING AUTHORITY:

RAJNEESH PATEL
AGRICULTURAL ENGINEER

Y.K. RAO
SENIOR AGRICULTURAL ENGINEER

J.J.R. NARWARE
DIRECTOR

report is compiled by: **Sh. Rajneesh Patel**, Agricultural Engineer.

18. APPLICANT'S COMMENTS

Para No.	Our Reference	Applicant's comments
--None--		

ANNEXURE- I

BRIEF SPECIFICATION OF IMPLEMENTS USED DURING FIELD TEST

S. No.	Parameters	MB Plough	Rotavator
1	Make	Mahindra & Mahindra	Kubota
2	Type	Mounted	Mounted
3	No. of Discs / Blades	Two	20 in 5 flanges
4	Type of Bottom / Blades	General purpose	Hatchet
5	Size of Bottom / Blades (mm)	255	230 x 60 x 6.5
6	Spacing of Bottom /Flanges, (mm)	170	258
7	Lower hitch point span, (mm)	480	486
8	Mast height, (mm)	375	380
9	Overall Dimensions (mm):		
	Length	1035	955
	Width	760	1460
	Height	840	925
10	Gross Mass, (Kg)	95	205

ANNEXURE-III

TRACTOR RUN HOURS DURING TEST

A.	LABORATORY AND TRACK TESTS:	HOURS
1.	Running-in	--
2.	PTO performance test	12.30
3.	Power lift and hydraulic pump performance test	3.39
4.	Drawbar performance test	15.17
5.	Turning ability	0.10
6.	Location of centre of gravity	0.10
7.	Operator's field of vision	0.10
8.	Brake test	1.99
9.	Noise measurement	1.92
10.	Mechanical vibration test	0.83
11.	Theoretical speed test	2.21
B.	**FIELD TEST:**	
1.	Disc ploughing	10.51
2.	Rotavation	10.76
3.	Wetland cultivation (including water proof)	15.03
C.	**HAULAGE TEST:**	8.59
D.	Miscellaneous test and other run hours including idle run, transportation, trials and preparation for test	6.18
	TOTAL:	**89.18**