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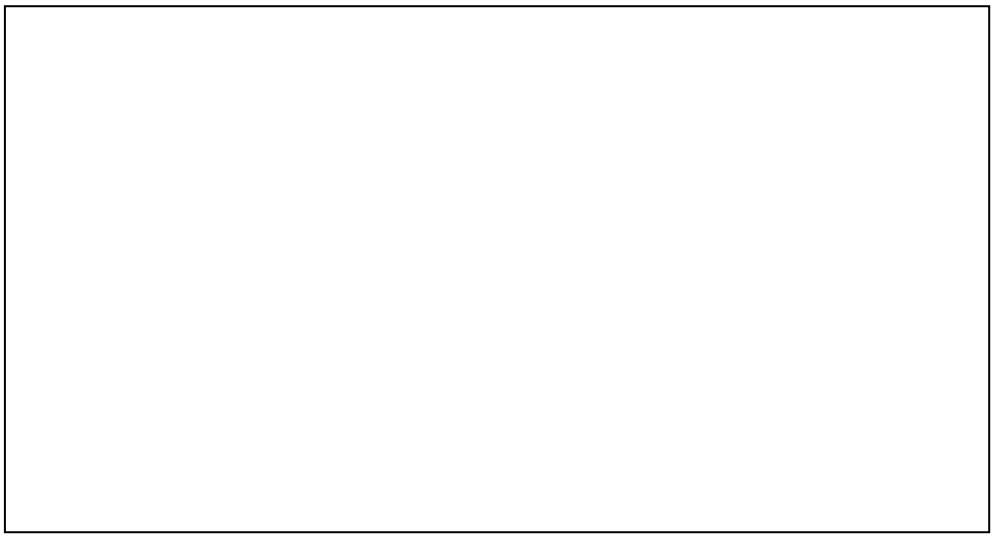
COMMERCIAL TEST REPORT (First Batch) ekg/Month : **April, 2019**

(यह परीक्षण रिपोर्ट 30/04/2024 तक वैध है / THIS TEST REPORT IS VALID UPTO 30/04/2024)



NEW HOLLAND 3230 TRACTOR

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GOVERNMENT OF INDIA
MINISTRY OF AGRICULTURE AND FARMERS WELFARE
(Department of Agricultural, Cooperation & Farmer's Welfare)
Mechanization & Technology Division

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CENTRAL FARM MACHINERY TRAINING & TESTING INSTITUTE
(An ISO 9001: 2015 Certified Institute)
TRACTOR NAGAR, BUDNI (M.P.) 466 445

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Telephone: 07564-234729 234743

Manufacturer : **M/s. CNH Industrial (India) Private Limited,**
Plot No.-3, Udyog Kendra,
Greater Noida – 201 306,
Distt. Gautam Budh Nagar,
Uttar Pradesh

Month: April	Test Report No. T- 1234/1761/2019	Year: 2019

GOVERNMENT OF INDIA
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Web site: fmttibudni.gov.in

Telephone: 07564-234729, 234743

Type of Test	:	**COMMERCIAL (First Batch Test)**
Test code/Procedure	:	IS: 5994-1998 (Reaffirmed in 2014) and IS: 12207-2014.
Period of Test	:	June,2018 to February, 2019
Test Report No.	:	**T- 1234/1761/2019**
Month/Year	:	**April, 2019**

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 randomly selected from the production line by the representative of testing authority 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.)

v) This is the first batch test report and therefore, should be read in conjunction with the Test Report of base model "**FORD 3230**" tractor bearing report No. **T-425/859** released on **September, 2001** and the supplementary report, **New Holland 3230** bearing report no. **T- 1223/1750/2019**, released in February 2019.

SELECTED CONVERSIONS

SELECTED CONVERSIONS		
Sl. No	**Units**	**Conversion Factor**
1	**Force:**	
	1 kgf	9.80665 N
		2.20462 lbf
2	**Power:**	
	1 Mechanical horsepower	1.01387 metric horsepower
		745.7 metric horsepower
	1 metric horsepower	735.5 W
	1 kW	1.35962 metric horsepower
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

C O N T E N T S

The tractor **"Ford 3230"** had undergone Initial Commercial Test at this Institute vide Test Report Number **T-425/859** was released in **September, 2001.** Thereafter, the firm had made modification in the specification of the tractor and permanently incorporated and tested under supplementary test vide test report No.**T-1223/1750/2019**, released in **February, 2019**. Now the applicant has submitted an application vide letter No PD-L116854 dated 28.09.2017 for **batch t**esting of **"New Holland 3230"** tractor.

In view of the above facts & considering the declarations made by the firm vide letter No. Nil, dated 19.09.2016, the following earlier test reports released by this Institute became invalid and hence shall not be considered for any purpose such as Institutional financing, etc. from the date the models became obsolete or the date of release this report whichever is earlier.

S.No.	Make & Model of Tractor	Nature of test	Test report No.
1.	Ford 3230	Commercial (Initial)	T-425/859 (September),2001

All necessary tests as per table-1 of clause 6.0 of IS: 5995 - 1998 (Reaffirmed in 2014) were carried out and test report released as under:-

Manufacturer	**:**	**M/s. CNH Industrial (India) Private Limited, Plot No.-3, Udyog Kendra, Greater Noida – 201 306, Distt. Gautam Budh Nagar, Uttar Pradesh**
Test requested by	**:**	The manufacturer
Selected for test by	**:**	The testing authority
Place of running-in	**:**	At manufacturer's works
Duration of said running-in, (h):		
- Engine	**:**	50
- Transmission	**:**	--
Method of Selection	**:**	The test sample was selected randomly out of five tractors from the production line by the representative of testing authority.

1. SPECIFICATIONS

1.1 Tractor:

Make	**:**	New Holland
Model	**:**	3230
Brand name	**:**	New Holland
Type	**:**	Four wheeled, Rear-wheel driven, General Purpose Agricultural Tractor.
Year of manufacture	**:**	HM (i.e. 2017,December)
Chassis number	**:**	NHN32300ZHM410844
Country of origin	**:**	India

1.2 Engine:

Make	:	Simpsons
Model	:	T III A S325/NHF2.1
Type	:	Four stroke, water cooled, naturally aspirated, direct injection, diesel engine.
Serial number	:	S325J19247
Country of origin	:	India

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

- Maximum speed at no load	:	2170 to 2230
- Low idle speed	:	600 to 750
- Speed at maximum torque	:	1100 to 1400
Rated speed, (rpm):		
- For PTO use	:	2000
- For drawbar use	:	2000

1.3 Cylinder & Cylinder Head:

Number	:	Three
Disposition	:	Vertical, Inline
Bore/stroke, (mm)	:	91.4 / 127 (apa)
Capacity as specified by the applicant, (cc)	:	2500
Compression ratio	:	18.5 (±0.3) : 1
Type of cylinder head	:	Monoblock
Type of cylinder liners	:	Dry, replaceable
Type of combustion chamber	:	Re-entrant cavity on piston head
Arrangement of valves	:	Overhead, Inline
Valve clearance (cold/hot):		
- Inlet valve, (mm)	:	0.30/0.25
- Exhaust valve, (mm)	:	0.30/0.25

1.4 Fuel System:

Type of fuel feed system	:	Gravity and force feed

1.4.1 Fuel tank:

Make	:	Simplast (apa)
Capacity, (l)	:	44.0
Location	:	Above clutch housing
Provision for draining of sediments/ water	:	Not Provided
Material of fuel tank	:	Metallic

1.4.2 Water separator : Not provided

1.4.3 Fuel feed pump:

Make	:	Bosch, India
Type	:	Plunger with hand prime
Model/Group combination No.	:	9 440 030 030, FP/KSG22AD45/2
Provision of sediment bowl	:	Provided
Method of drive	:	Through camshaft of fuel injection pump

1.4.4 Fuel filters:

Make	:	New Holland
Model/Group combination No.	:	F002 1120 138 (apa)
Number	:	Two
Type of elements:		
- Primary	:	Paper
- Secondary	:	Paper
Capacity of final stage filter, (l)	:	0.50

1.4.5 Fuel Injection pump:

Make	:	Bosch,India
Model/Group combination No.	:	F002 C70 018, PES3A80D320RS2000
Type	:	Inline, Plunger
Serial number	:	75923976
Method of drive	:	Through timing gears

1.4.6 Fuel injectors:

Make	:	Bosch, India
Holder Number	:	F002 C70 018
Nozzle Number	:	DSLA 146P 5514
Type	:	Multi hole (Five holes)
Manufacturer's production pressure setting, (MPa)	:	25.0 +0.8
Injection timing	:	14+0/- 2 degree BTDC
Firing order	:	1 - 2 - 3

1.4.7 Governor:

Make	:	Bosch, India
Model/Group combination No.	:	RSV375**…**1000A4C1617R
Type	:	Mechanical, centrifugal variable speed
Rated speed (rpm)	:	2000
Governed range of engine speed, (rpm)	:	600 to 2230

1.5 Air intake system:

1.5.1 Pre-cleaner:

Make	:	New Holland (apa)
Type	:	Centrifugal with transparent dust collector.
Location	:	Above main air cleaner inlet tube, outside the bonnet.

1.5.2 Air cleaner:

Make	:	New Holland (apa)
Type	:	Oil Bath
Location	:	In front of radiator, under the bonnet
Range of suction pressure at maximum power, (kPa)	:	2.6 to 2.7
Capacity of oil bath,(l)	:	0.50
Oil change period	:	Change after every 10 hours in dusty condition & 50 hours of operation in normal condition.

1.6 Exhaust System:

Make	:	New Holland (apa)
Type of silencer	:	Updraft (Cylindrical)
Position of silencer outlet with respect to SIP, (mm):		
- Vertical	:	1035
- Longitudinal	:	1375
- Lateral	:	175 (on LHS)
Range of exhaust gas pressure at maximum power (kPa)	:	2.3 to 2.8
Provision of spark arresting device	:	Not provided
Provision against entry of rain water	:	A bend is provided at the top of silencer

1.7 Lubricating system:

Type	:	Forced feed-cum-splash
Oil sump capacity,(l)	:	7.65
Total lub oil capacity, (l)	:	8.55

	Oil change period	:	First change after 50 hours and subsequently after every 300 hours of operation
	Type of cooling device, (if any)	:	Not provided
1.7.1	**Filters:**		
	Type	:	Spin-on throw away, paper element
	Number	:	One
1.7.2	**Pump:**		
	Type	:	Rotary lobe (Internal gear)
	Method of drive	:	Through Timing gear.
	Pressure release setting, (kPa)	:	Start opening at 343 and fully opens at 448 (apa)
	Minimum permissible pressure, (kPa)	:	39 (apa)
1.8	**Cooling system:**		
	Type	:	Forced circulation of coolant & water
	Brand name of the coolant	:	Zero-R
	Coolant water ratio		1:25 (apa)
1.8.1	**Details of Pump**	:	Centrifugal with semi open impeller having six vanes of 70 mm diameter and driven through crankshaft pulley by a cogged 'V'-belt.
1.8.2	**Details of fan**	:	Suction type having metallic blades and 380 mm diameter, and mounted on water pump shaft.
	Means of temperature control	:	Thermostat
	Bare radiator capacity, (l)	:	1.80
	Coolant expansion tank capacity,(l)	:	0.60
	Total coolant capacity, (l)	:	7.30
	Radiator cap pressure, (kPa)	:	88
1.9	**Starting System:**		
	Type	:	12 V, 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	:	Standard Farukuwa & SFN 75 L /TR
	Number	:	One
	Type	:	Lead Acid
	Capacity and rating	:	12V, 75 Ah at 20 hour discharge rating
	Location	:	In front of radiator, under the bonnet.
1.10.2	**Starter:**		
	Make & model	:	Spark Minda & SCL088 – 06N7
	Type	:	Pre-engaging, solenoid operated
	Power rating	:	Not available
	Serial number	:	Not available
1.10.3	**Generator:**		
	Make & model	:	PM 7048 (apa)
	Type	:	Alternator
	Serial number	:	30K17
	Output rating	:	Not available
	Method of drive	:	Through crank shaft pulley by a cogged V-belt common to water pump.
1.10.4	**Voltage regulator**	:	In-built with alternator

1.10.5 Details of lights:

Details of Lights:

Description	No. & capacity of bulb	Height of the centre of beam above ground level, (mm)	Size, (mm)	Distance between centre of the beam and outside edge of tractor at standard rear track setting,(mm)
Present Model:				
Front Lights:				
- Head lights	2,12V,35 / 35W	965	140 x 110	498
- Parking lights	2, 12V, 5W	1285	70 x 75	180
- Turn Indicators-cum-hazard lights	2, 12V, 21W	1285	110 x 75	90
Rear lights:				
-Tail-cum-brake light	2, 12V, 21/5W	1310	75 x 75	190
- Turn Indicators-cum-hazard lights	2,12V, 21W	1310	110 x 75	90
Plough light (on RHS mudguard)	1, 12V, 55W	1430	140 x 110	165
Reflectors (Red)	2	1310	20 x 60	340
Registration plate light	Part of rear RHS combination lamp assembly			

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

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

1.10.8 Horn:

Make : Nikko-Auto

Type : 12 V, 2B, Electromagnetically vibrated diaphragm

Location : In front of radiator, under the bonnet

1.10.9 Fuse box : Contains 06 number of fuses of following capacity:

Capacity	15 A	10 A
No. of fuse	03	03

1.10.10 Details of other electrical accessories:

1.10.11 Starting safety switch : Engine will not start unless the High-Low range shift lever is in neutral position.

1.10.12 Flasher Unit:

Make : Interface

Capacity:

- Turn signal : 12V, 21W x 2 +2W x 1
- Hazard signal : 12V, 21W x 4 + 2W x 2

Flashes/min. : 85

1.10.13 Seven pin trailer socket : Provided

1.11 Instrument panel details:

- **i)** Engine speed meter (0 – 25 x 100 rpm)
- **ii)** Digital cumulative run hour meter
- **iii)** Water temperature gauge (with colour zone)
- **iv)** Lub. oil pressure gauge (with colour zone)
- **v)** Fuel level gauge (with colour zones).
- **vi)** Battery charging warning indicator lamp
- **vii)** Main switch (key turn type)
- **viii)** Light switch (rotary type)
- **ix)** Turn indicator light switch (Two way)
- **x)** Hazard light switch
- **xi)** Parking light 'ON' indicator lamp
- **xii)** Head light long beam "ON" indicator lamp
- **xiii)** Turn indicator-cum-hazard indicator light tell-tale lamp
- **xiv)** Hand accelerator lever
- **xv)** Rear view mirror
- **xvi)** Steering control wheel
- **xvii)** Horn push button
- **xviii)** Fuel shut-off knob

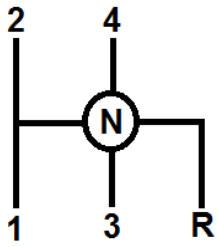
1.12 Transmission System:

1.12.1 Clutch:

Make	:	Luk
Type	:	Single, dry friction plates
No. of friction plate(s)	:	One
Size, (mm)	:	165/112 Ø
Method of operation	:	By pressing the foot pedal provided on LHS of operator's seat.

1.12.2 Gear box:

Make	:	Carraro (apa)
Type	:	Mechanical, Constant mesh gears
No. of speeds:		
- Forward	:	08
- Reverse	:	02
Location of gear shifting levers	:	Side shift arrangement with main gear shift lever on RHS, speed range selector lever on LHS of operator's seat.

Gear shifting pattern : 

Main gear shifting lever

Low- High range selector lever

Oil capacity (l) : 18.4 (Common with differential, brakes, and hydraulic system)

Oil changing period : Change after every 1200 hours of operation or 12 month whichever is earlier

1.12.3 Nominal Speed:

Movement	Gear No.	No. of engine revolutions for one revolution of driving wheel	Nominal speed at rated engine speed when fitted with 13.6-28 size tyres of 610 mm rolling index(kmph)
Forward	L1	157.96	2.92
	L2	107.83	4.25
	L3	73.61	6.25
	L4	51.19	9.00
	H1	43.04	10.69
	H2	29.46	15.61
	H3	20.09	22.90
	H4	13.94	33.03
Reverse	LR	127.86	3.60
	HR	34.86	13.20

1.12.4 Differential :

Type : Crown wheel & pinion with differential unit accommodated inside the differential housing

Reduction through crown wheel & bevel pinion : 4.091 **:** 1 (45/11 T)

Oil capacity (l) : 18.4 (Common with transmission , brakes, and hydraulic system)

Oil changing period : Change after every 1200 hours of operation or 12 month whichever is earlier

Differential lock:

Type : Mechanical, Pin type

Method of operation & Location : By pressing a pedal on RHS of operator's seat

1.12.5 Rear axle & final drive:

Type	:	Bull and pinion type accommodated inside the portal housing
Reduction through final drive	:	5.385:1 (70/13T)
Oil capacity of final drive, (l)	:	2.50 (on each wheel side)
Oil changing period	:	Change after every 1200 hours of operation.

1.13 Power lift (Hydraulic system):

- Make	:	Mita (apa)
- Type	:	Open centre, Live, ADDC
- No. and type of internal cylinder	:	One, single acting
- Type of linkage lock for transport	:	Hydraulic response control knob in its fully closed position acts as transport lock.

1.13.1 Hydraulic pump:

- Make & Model	:	Dynamatics
- Type	:	Gear (Tandem)
- Location & drive	:	On RHS of engine & driven through timing gears.
No. & Type of filter	:	One, spin on throw away
Hydraulic oil capacity, (l)	:	18.4 (Common with gearbox, differential and brakes system)
Oil change period	:	Change after every 1200 hours of operation.
Provision for external tapping	:	Provided

Details of control :

Sl. No.	Control	Functions
1.	Position control lever (Yellow)	To control depth of the implement
2.	Draft control lever (Red)	To control the draft of the implement
3.	Lift-o-matic button	To raise the implement quickly without altering the position of control lever 1 & 2
4.	Response control knob	Varies the speed of drop of lower links.
5.	Sensitivity control knob	Response timing of system
6.	Isolating valve	For external circuit

Method of draft sensing : Through top link

1.13.2 Three point linkage:

Sl. No.	Observations		As per IS:4468-1997(Part-I) Reaffirmed (Oct,2017) (Cat.I / Cat.II), (mm)	As measured (mm)	Remarks
1	**2**		**3**	**4**	**5**
I.	**Upper hitch points:**				
	a)	Dia of hitch pin hole	19.30 to 19.50 / 25.70 to 25.90	19.35 / 25.82	Conforms to cat –I & II
	b)	Width of ball	44.0 (max.) / 51.0 (max)	43.64 / 44.11	Conforms to cat –I & II
II.	**Lower hitch points:**				
	a)	Dia of hitch pin hole	22.40 to 22.65 / 28.70 to 29.00	28.77	Conforms to cat -II
	b)	Width of ball	34.8 to 35.0 / 44.8 to 45.0	34.87	Conforms to cat -I

1	2	3	4	5
III.	Lateral distance from lower hitch point to centre line of tractor	359 / 435	359	Conforms to cat -I
IV.	Lateral movement of lower hitch points	100 (min) / 125 (min)	165	Conforms to cat - I &II
V.	Distance from end of power take-off to centre of lower hitch point (lower links in horizontal position)	450 to 575 / 550 to 625	590	Conforms to cat -II
VI.	Transport height	820 (min) / 950 (min)	755 / 830	Conforms to cat- II
VII.	Power range (Without force)	560 (min) / 650 (min)	635 / 555	Conforms to cat- I
VIII.	Leveling adjustment	100 (min) / 100 (min)	248	Conforms to cat- I & II
IX.	Lower hitch point tyre clearance	100 (min)/ 100 (min)	135	Conforms to cat- I & II
X.	Lower hitch point height	200 (max) / 200 (max)	200	Conforms to cat- I & II

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

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

Sl. No.	Parameter	Notation	Dimension or range, (mm)	Setting used during test, (mm)
1	**2**	**3**	**4**	**5**
1.	Length of lower link	A	840	840
2.	Length of lift arm	B	270	270
3.	Length of lift rods	C	440 to 555	520
4.	Length of top link	D	605 to 795	660
5.	Distance of lift rod connection point from pivot point of lower link.	E	320, 390	320
6.	Distance of lower link pivot point from rear wheel axis:			
	-Horizontally	F	10, forward	10, forward
	-Vertically	G	160, below	160, below
7.	Distance of upper link pivot point from rear wheel axis:			
	-Horizontally	H	135,145,165 behind	165, behind
	-Vertically	J	260, 285, 355 above	345, above
8.	Distance of lift arm pivot point from rear wheel axis:			
	-Horizontally	K	25, forward	25, forward
	-Vertically	L	265, above	265,above
9.	Height of lower hitch points relative to the rear wheel axis:			
	- In high position	M	40 to 275	145, above
	- In low position	N	- 525 to -260	410, below
10.	Height of lower link hitch points when locked in transport position	--	Any height within the power range	145, 220, above

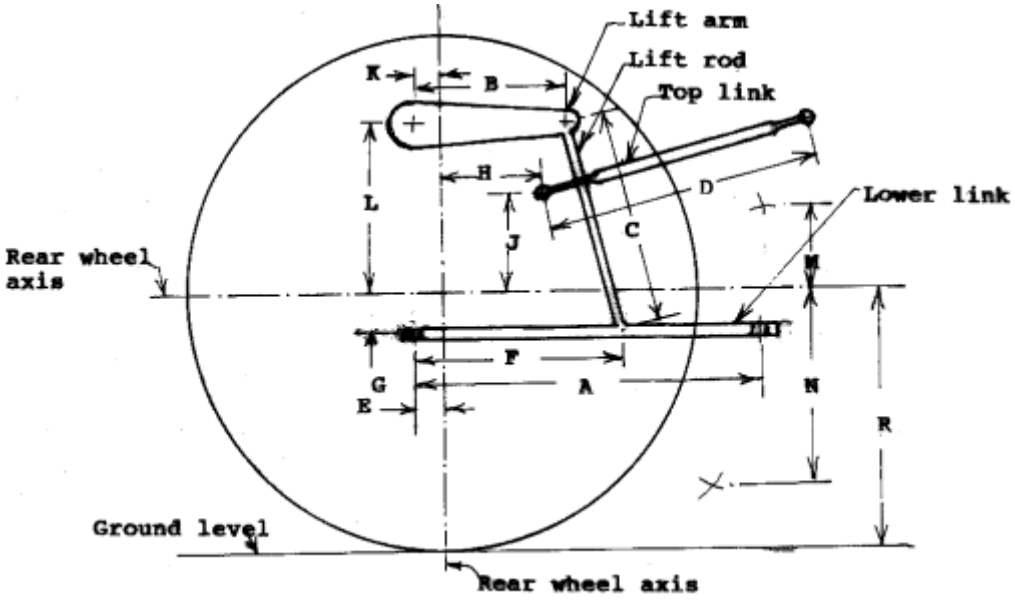


Fig. 1 (A): DIMENSIONAL NOTATIONS FOR TABLE OF LINKAGE GEOMETRY

1.13.4 Drawbar:

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

Notation	As per IS: 12953-1990, **(Cat.I),** (mm), Reaffirmed in Oct,2017)	As measured, (mm)	Remarks
A	683 ± 1.5 / 825 ± 1.5	683	Conforms to cat-I
B	75 (min) / 75 (min)	75.0	Conforms to Cat-I & II
C	30 (min) / 30 (min)	30.8	Conforms to Cat-I & II
D∅	21.79 to 22.00 / 27.79 to 28.00	28.0	Conforms to Cat- II
E	39.0 (min) / 49.0 (min)	54.2	Conforms to Cat-I & II
F∅	12.0 (min) / 12.0 (min)	12.0	Conforms to Cat-I & II
G	15.0 (min) / 15.0 (min)	16.0	Conforms to Cat-I & II
H∅	25 ± 1 / 25 ± 1	25.3	Conforms to Cat-I & II
J	80 ± 1.5 / 80 ± 1.5	80	Conforms to Cat-I & II
No. of holes	7 / 9	07	Conforms to cat-I

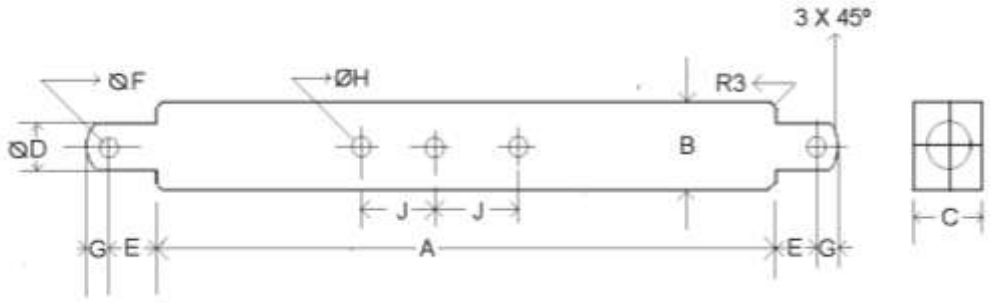


Fig. 1 (B): DIMENSIONAL NOTATIONS FOR LINKAGE DRAWBAR

1.13.4.2 Swinging drawbar : Not provided

1.14 Power take-off shaft:

Type	:	Type-I, Not Independent
Method of engaging	:	By operating the PTO lever for varying the PTO speed provided on LHS below the operator's seat.
No. of shaft(s)	:	One
PTO speed corresponding to rated engine speed of 2000 (rpm)	:	625
Distance behind rear axle, (mm)	:	210
Engine to PTO speed ratio	:	3.20 :1
Whether the PTO shaft is capable of transmitting the full power of engine	:	Yes
Other speeds corresponding to rated engine speed	:	None

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

Specification	As per IS: 4931-1995 Reaffirmed in :2014 (Type-I / Type II)	As observed	Remarks
1	**2**	**3**	**4**
Nominal speed (rpm)	540 ± 10	540 rpm of PTO corresponds to 1728 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	Centrally located	Conforms
Dimensions (mm) (See Fig. 2):			
D∅	34.79 ± 0.06	34.85	Conforms
d∅	28.91 ± 0.05	28.40	**Does not conform**
B∅	29.4 ± 0.1	30.05	**Does not conform**
A∅ (Optional)	8.3 ± 0.5	8.25	--
W	8.69 – 0.09 – 0.16	8.60	Conforms
a	7	7	Conforms
b (Optional)	25 ± 0.5	25.4	--
c	38	38	Conforms
X	30^o	30^0	Conforms
B	76 (min)	83.7	Conforms
h	450 to 675	615	Conforms

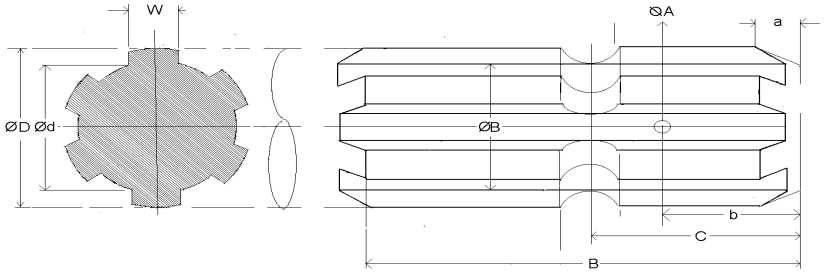


Fig. 2: DIMENSIONAL NOTATIONS FOR TYPE-I POWER TAKE-OFF SHAFT

1.14.2	**Master Shield of Power Take-Off Shaft**	**:**	**Not provided**
1.15	**Towing hitch:**		
1.15.1	**Front:**		
	Type	:	Clevis
	Location	:	At front of front engine support
	Height above ground level,(mm)	:	600 (fixed)
	Type of adjustment	:	None
	Width of clevis, (mm)	:	63.4
	Dia of pin hole, (mm)	:	26.3
1.15.2	**Rear:**		
	Type	:	Clevis
	Location	:	At rear of transmission housing
	Height above ground level, (mm):		
	- Maximum	:	770
	- Minimum	:	460
	No. of position	:	06
	- 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	:	125
	Dia of pin hole, (mm)	:	32.1
	Width of clevis, (mm)	:	71.5
1.16	**Steering:**		
	Make	:	Danfoss
	Type	:	Open centre, Hydrostatic
	Location	:	Above clutch housing
	Diameter of steering control wheel,(mm)	:	380
	Make & type of Steering drive pump	:	Dynamatics & gear type (tandem)
	Location	:	On RHS of engine
	Method of drive	:	Through timing gears
	Make, type & number of hydraulic ram cylinder	:	Ognibane (apa), double acting & one
	Location of ram cylinder	:	In front of the front axle
	Oil capacity of steering system, (l)	:	1.1 (separate reservoir).
	Oil change period	:	Change after every 1200 hours of operation.
1.17	**Brakes:**		
1.17.1	**Service Brake:**		
	Make	:	Carraro (apa)
	Type	:	Oil immersed multidisc
	Location	:	On half rear axle shaft on both side of inside the differential housing
	No. of discs	:	Three (on each wheel side)
	Area of liners. (cm^2)	:	691.4 (on each wheel side)
	Material of liners	:	Non asbestos

	Method of operation	:	Individual / combine RHS foot pedal operation
	Brake oil capacity, (l)	:	18.4 (Common with gearbox, differential and hydraulic system)
	Lubricant change period	:	Change after every 1200 hours of operation or 12 month whichever is earlier
1.17.2	**Parking Brake:**		
	Type	:	Pawl and ratchet arrangement
	Method of operation	:	Service brake acts as parking brake when locked in depressed position by a hand lever provided on RHS of foot rest.
1.18	**Wheel Equipment:**		
1.18.1	**Steered Wheel(s):**		
	Make	:	GOOD YEAR
	Number	:	Two
	Type of tyre	:	Pneumatic, ribbed
	Size	:	6.00 -16
	Ply rating	:	8
	Maximum permissible loading capacity of each tyre at 230 kPa pressure, (kgf)	:	560
	Recommended inflation pressure, kPa	:	
	- for field work	:	230
	- for transport	:	230
	Track width, (mm)	:	**1250 (Std.),**1370, 1450, 1570, 1650,1770
	Method of changing track width	:	By reversing the wheel disc & extending the telescopic front axle
	Make & size of rim	:	WIL, 4.50 E x 16 B
1.18.2	**Driving wheel:**		
	Make	:	GOOD YEAR
	Number	:	Two
	Type of tyre	:	Pneumatic, traction
	Size	:	13.6 -28
	Ply rating	:	12
	Maximum permissible loading capacity of each tyre at 230 kPa pressure, (kgf)	:	1510
	Recommended inflation pressure, (kPa)		
	- for field work	:	95
	- for transport	:	110
	Track width, (mm)	:	1230,**1330 (Std)**, 1420,1530,1630 & 1730
	Method of changing track width	:	By reversing the wheel disc and changing position of wheel disc on offset rim lugs.
	Make & size of rim	:	WIL, W13 x 28
1.18.3	**Wheel base, (mm)**	:	1925
	Method of changing wheel base, if any	:	None
1.19	**Operator's seat:**		
	Make	:	Harita seating system Limited
	Type	:	Cushioned with back rest
	Type of suspension	:	Two Helical coil springs
	Type of damping	:	Hydraulic shock absorber
	Range of adjustment,(mm):		
	- Vertical	:	± 25
	- Lateral	:	Nil
	- Longitudinal	:	± 90

1.20 Provision for safety and comfort of operator:

1.20.1 Conformity with IS: 12343-1998: (Re-affirmed in 2014).

Operator's seat meets the requirements, **except following**:

i) Inclination of seat toward the rear direction

ii) Longitudinal distance from SIP to the centre of differential lock pedal

iii) Vertical distance of SIP to from foot rest

1.20.2 Conformity with IS: 6283 (Part-1 & 2) -2006 & 2007 (Re-affirmed in 2014) -

Controls are identifiable with symbols meets the requirements. **except following**:

i) Cautionary identifiable symbol not provided

ii) Hand brake identifiable symbol not provided

1.20.3 Conformity with IS:8133-1983 (Re-affirmed in 2014):

Location and movement of various controls meets the requirement.

1.20.4 Conformity with IS: 12239 (Part-1)-1996 (Re-affirmed in Oct, 2017**):**

Meets the requirements of IS:12239 (Part-1)-1996, **except the following:**

i) Width of foot step

iii) Spark arrester is not provided in the exhaust system.

1.20.5 Conformity with IS:12239 (Part-2)-1999 (Re-affirmed in Oct, 2017):

Meets the requirements of IS:12239 (Part-2)-1999, **except the following**:

i) Power take off master shield is not provided.

ii) Rear wheel or track not fully guarded

iii) The working clearance between the position control lever & fender is 60 mm, which does not meet as per the requirement.

1.20.6 Conformity with IS: 14683 – 1999 (Re-affirmed in 2014) :

Lighting requirements conform to IS: 14683-1999.

1.20.7 Rear view mirror:

Rear view mirror is provided

1.20.8 Slow moving emblem: Provided

1.21 Labelling of tractor as per IS: 10273-1987 (Reaffirmed in March, 2009):

The labelling plate riveted on inner side of LHS mudguard, and meets the requirements of IS: IS: 10273-1987 provides the following information

Name of Manufacturer	CNH Industrial (India) Private Limited
Make	New Holland
Model	3230
Year of manufacturing	HM (i.e.2017, December)
Engine Number	S325J19247
Chassis Number	NHN32300ZHM410844
Maximum P.T.O Power, kW (hp)	28.6 (39)
Specific fuel consumption,(g/hph)	191

1.22 Ballast Mass, (kg):

Particular		As used during drawbar test	As used during field test	As used during haulage test
Front	C.I. weight	120	60	60
	Water	Nil	Nil	Nil
Rear	C.I. weight	440	330	550
	Water	210	210	Nil
	Additional weight, if any	Nil	Nil	Nil

1.22.1 Standard ballast, if any:

Particulars	Front	Rear
C.I. Weights, (kg)	50	140
Location	On front engine support	on Rear wheels

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	720	1195	1815
ii)	With ballast as used during drawbar performance test	890	1710	2590
iii)	With ballast as used during haulage test (including trailer hitch, canopy & linkage drawbar)	805	1665	2470

1.24 Overall dimensions:

Condition	Length, (mm)	Width, (mm)	Height, (mm)		Ground Clearance, (mm)
			With exhaust pipe	Without exhaust pipe	
With standard ballast	3330	1730	2280	1710 (at pre air cleaner)	383 (below front axle)

1.25 Number of external lubricating points:

- Oiling : Nil
- Grease nipples : 13
- Grease cups : 02

1.26 Colour of tractor:

Chassis : Black

Sheet metal:

Bonnet & : Blue

2. FUEL AND LUBRICANTS

2.1 Fuel : The High-speed diesel oil supplied by M/s Indian Oil Corporation Limited having density of 0.836 g/cc at 15°C was used.

2.2 Lubricants:

S. No.	Particulars	As recommended by the manufacturer	As used during the test
1.	Engine & air cleaner oil	NH334G, SAE 20W40,API CF4	As recommended
2.	Transmission , Steering housing, Hydraulic and brake system	NH420D, API GL4, SAE 20W30	Oil originally filled in the tractor systems were not changed.
3.	Steering system	NH524A,API GL-5, SAE 85W-140	As recommended
4.	Grease	NH 710A, NLGI3	MP Grease

3. PTO PERFORMANCE TEST

Date(s) of test : 07.08.2018, 10.08.2018 & 13.08.2018

Tractor run at the Institute prior to start of PTO test (h) : 5.31

Type of dynamometer bench used : SAJ- AG- 250 eddy current dynamometer

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)	
1	2	3	4	5	6	7
a) Maximum power – 2 hours test:						
28.7	625	2000	8.75	7.31	0.255	3.28
27.2	625	2000	8.38	7.01	0.256	3.25*
b) Power at rated engine speed (2000 rpm):						
28.7	625	2000	8.75	7.31	0.255	3.28
27.2	625	2000	8.38	7.01	0.256	3.25*****
c) Power at standard power take-off speed (540 ± 10 rpm):						
26.5	540	1728	7.85	6.57	0.248	3.38
25.2	540	1728	7.58	6.34	0.252	3.32*****
d) Varying loads at rated engine speed:						
i) Torque corresponding to maximum power available at rated engine speed:						
28.7	625	2000	8.75	7.31	0.255	3.28
ii) 85% of the torque obtained in (i):						
26.1	667	2143	8.01	6.70	0.257	3.26
iii) 75% of the torque obtained in (ii) :						
19.7	673	2154	6.34	5.30	0.269	3.11
iv) 50% of the torque obtained in (ii) :						
13.3	678	2170	4.87	4.07	0.306	2.73
v) 25% of the torque obtained in (ii) :						
6.7	688	2202	3.55	2.96	0.442	1.89
vi) Unloaded:						
0.2	696	2227	2.35	1.97	9.850	0.09
d) Varying loads at standard PTO speed:						
i) Torque corresponding to maximum power available at standard PTO speed:						
26.5	540	1728	7.85	6.57	0.248	3.38
ii) 85% of the torque obtained in (i):						
23.2	555	1776	6.72	5.62	0.242	3.45
iii) 75% of the torque obtained in (ii) :						
17.6	561	1795	5.26	4.40	0.250	3.34
iv) 50% of the torque obtained in (ii) :						
11.9	567	1814	3.99	3.34	0.281	2.98
v) 25% of the torque obtained in (ii) :						
6.0	575	1840	2.83	2.37	0.395	2.12
vi) Unloaded:						
0.1	588	1882	1.78	1.48	14.800	0.06

* Under high ambient condition

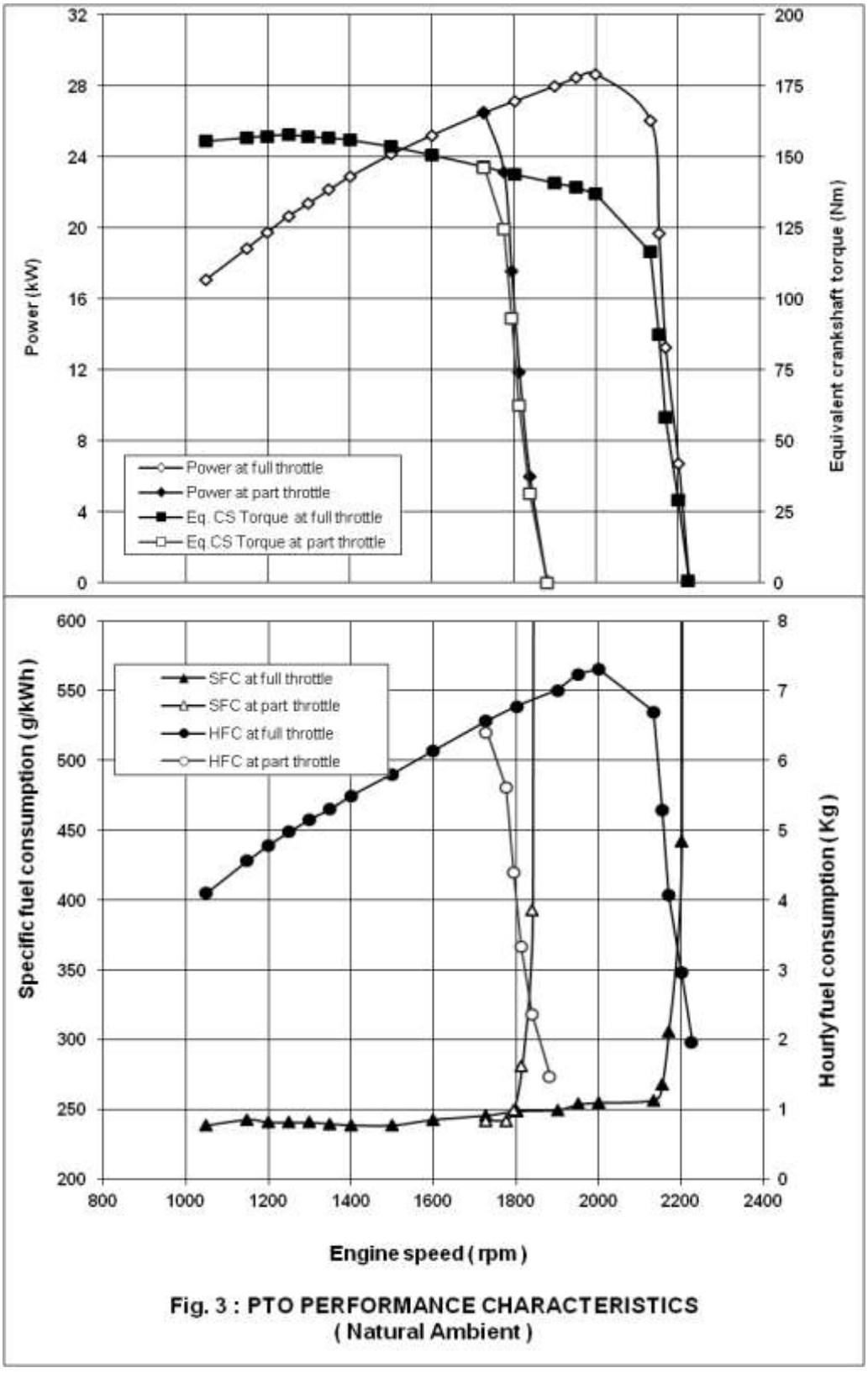


Fig. 3 : PTO PERFORMANCE CHARACTERISTICS
(Natural Ambient)

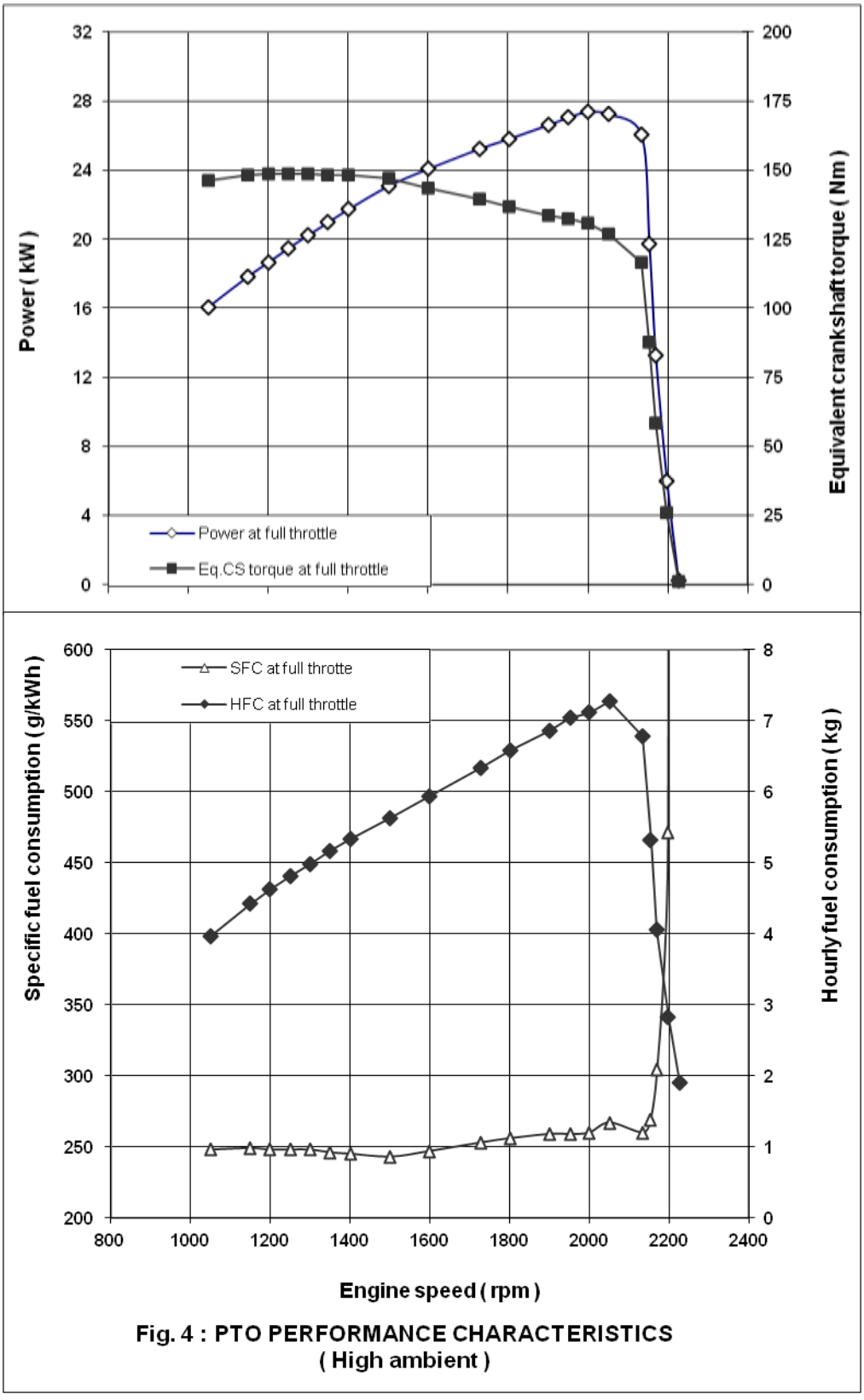


Fig. 4 : PTO PERFORMANCE CHARACTERISTICS
(High ambient)

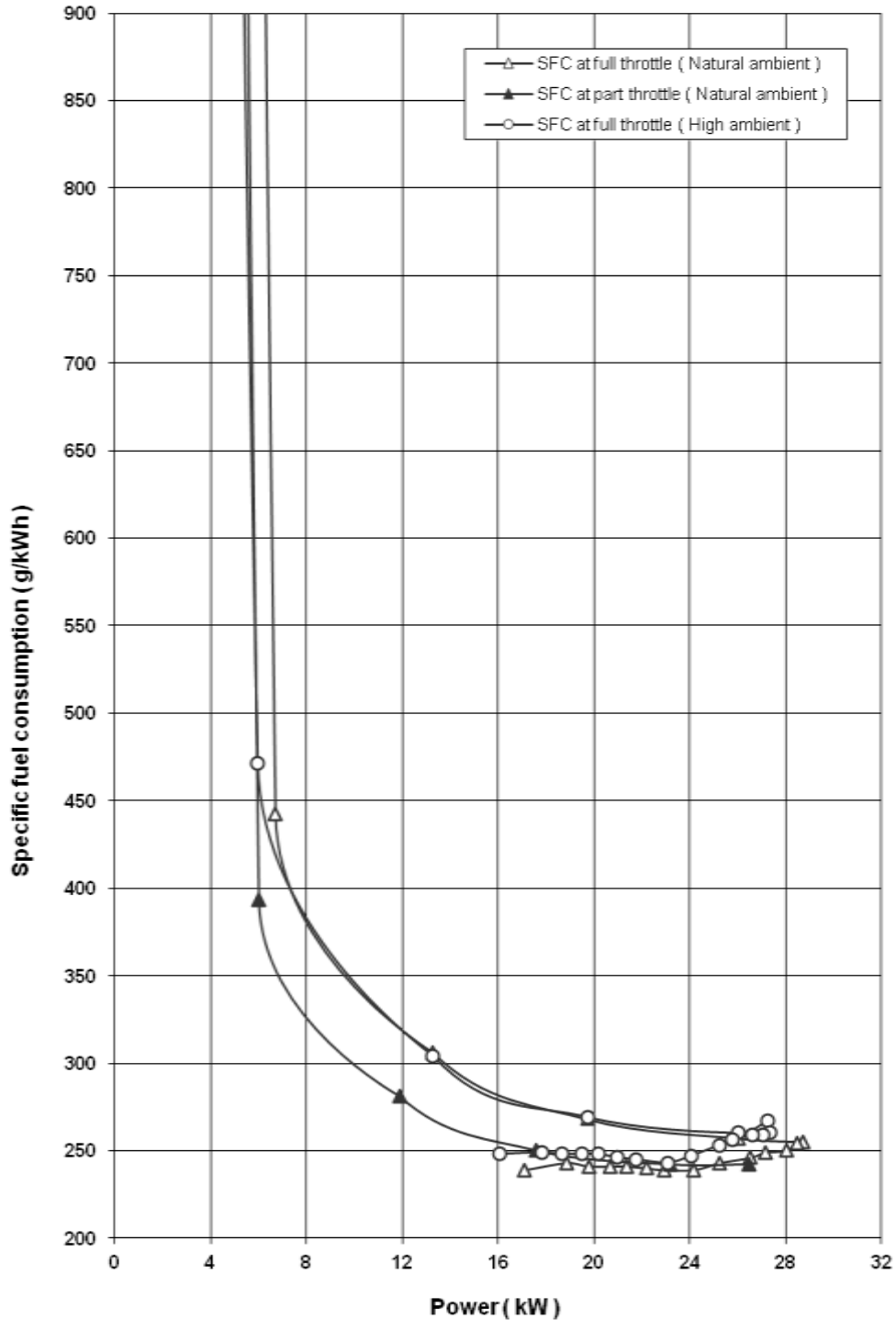


Fig. 5 : PTO PERFORMANCE CHARACTERISTICS

		Natural ambient	High ambient
-No load maximum engine speed (rpm)	:	2227	2227
-Equivalent crankshaft torque at maximum power, (Nm)	:	137.1	129.7
-Maximum equivalent crankshaft torque (Nm)	:	158.0	148.6
-Engine speed at maximum equivalent crankshaft torque (rpm)	:	1251	1251
- Backup torque, (%)	:	15.2	14.6
Smoke level, maximum light absorption coefficient, (per meter)	:	0.21	--
- Range of atmospheric conditions:			
Temperature (^{o}C)	:	26 to 27	42 to 44
Pressure, (kPa)	:	98.7 to 101.0	99.5 to 99.8
Relative humidity (%)	:	70 to 78	40 to 50
-Maximum temperatures, (^{o}C):			
Engine oil	:	115	126
Coolant	:	99	110
Fuel	:	52	67
Air intake	:	27	46
Exhaust gas	:	568	597
-Pressure at maximum power:			
Intake air, (kPa)	:	2.6 to 2.7	2.6
Exhaust gas, (kPa)	:	2.3 to 2.8	2.5 to 3.06
-Consumptions :			
Lub oil, (g/kWh)	:	--	1.15
Coolant (% of total coolant capacity)	:	--	2.05

4. DRAWBAR PERFORMANCE TEST

Date(s) of test	:	27.12.2018,02.01.2019,03.01.2019 & 04.01.2019
Tractor run at the Institute prior to start of drawbar performance test, (h)	:	29.7
Type of track	:	Concrete
Height of drawbar, (mm):		
- With standard ballast	:	600
- With ballast	:	550

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

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 standard ballasted):																
L1	2.79	13.1	16.94	2150	15.0	0.366	5.74	2.28	20	99.3	20	33	64	82	104	17.88
L2	4.03	18.5	16.55	2133	15.0	0.322	7.35	2.52	21	99.3	18	33	75	83	107	17.72
L3	5.83	24.4	14.95	2002	10.1	0.303	8.84	2.76	22	99.3	21	35	63	85	105	16.22
L4	8.95	25.0	10.03	2004	5.1	0.302	9.03	2.77	22	99.2	22	35	59	86	105	12.12
H1	10.71	25.6	8.60	1998	4.1	0.292	8.94	2.86	22	99.2	28	34	55	85	101	10.22
ii) Maximum power test (Tractor ballasted):																
L1	2.71	17.2	22.80	2135	15.1	0.344	7.07	2.43	24	99.6	25	38	80	83	110	23.97
L2	3.82	23.7	22.37	2000	12.3	0.316	8.94	2.65	23	99.7	24	37	80	86	113	23.07
L3	6.40	25.6	15.27	2000	5.7	0.293	8.99	2.85	23	99.8	28	36	75	86	112	17.84
L4	8.93	25.9	10.43	2003	3.3	0.295	9.13	2.84	21	99.9	29	34	61	86	107	12.50
H1	10.67	25.6	8.65	1997	2.4	0.294	9.01	2.85	21	99.9	34	34	55	85	105	10.11

Contd..Table-2

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	Coolant (water)	Eng-ine oil	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
iii) Five hours test at 75 percent of pull obtained at max. Power (ballasted wheeled tractor):																
L2	4.33	20.2	16.79	2130	6.6	0.303	7.97	2.53	23 to 25	99.5 to 99.9	19 to 33	35 to 38	56 to 78	80 to 83	108 to 111	--
iv) Five hours test at pull corresponding to 15 percent wheel slip (ballasted wheeled tractor):																
L1	2.78	17.6	22.81	2132	---	0328	6.91	2.55	22 to 25	99.6 to 99.9	22 to 29	36 to 39	78 to 80	80 to 83	109 to 111	--

i) The coolant (water) and lub oil consumption during 10 hours test were observed as 3.18 ml/h and 3.18 ml/h respectively.

ii) Tyre Creeping, (mm):
- LHS : 10
- RHS : 10

iii) Maximum temperatures during entire drawbar test, (°C):
Engine oil : 116
Coolant (water) : 92
Transmission oil : 81
Fuel : 39

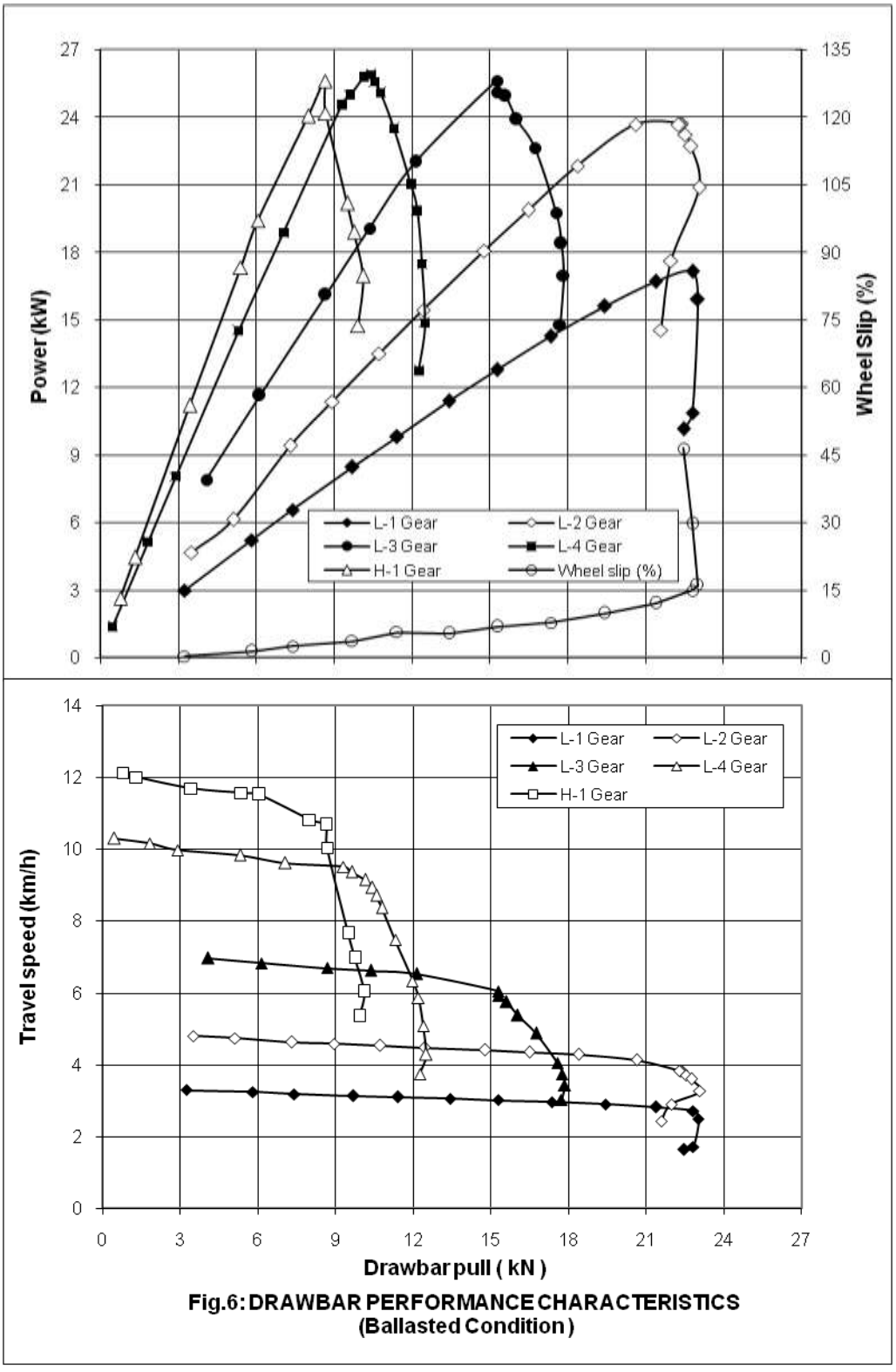


Fig.6: DRAWBAR PERFORMANCE CHARACTERISTICS (Ballasted Condition)

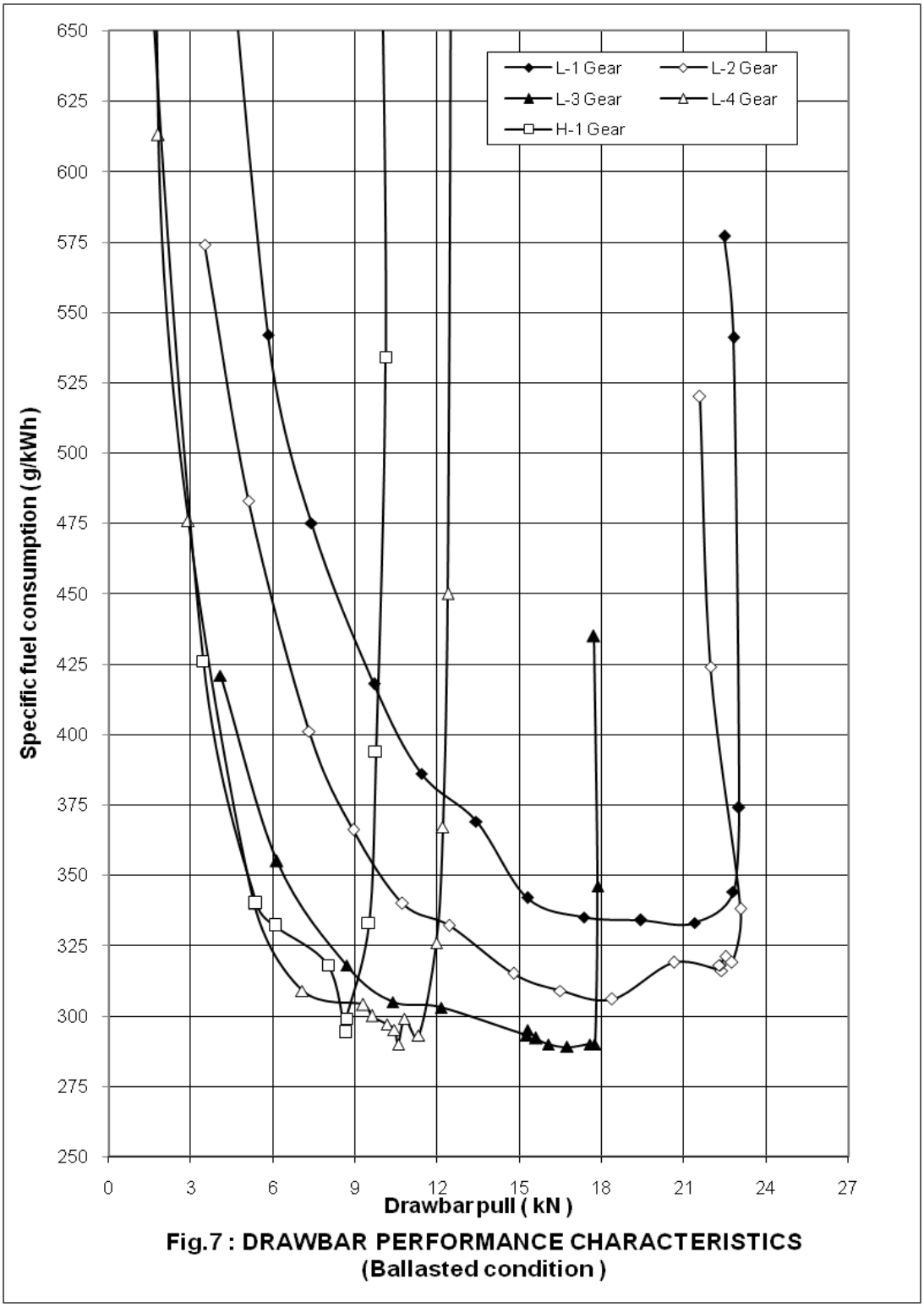


Fig.7 : DRAWBAR PERFORMANCE CHARACTERISTICS (Ballasted condition)

5. POWER LIFT & HYDRULIC PUMP PERFORMANCE TEST

Date(s) of test : 04.07.2018 05.07.2018 & 06.07.218
Tractor run at the Institute prior to start of hydraulic test, (h) : 5.3
Pump speed at rated engine speed (rpm) : 1800(apa)

5.1 Hydraulic power test:

Pump delivery rate at minimum pressure and rated engine speed, (l/min) : 19.1
Maximum hydraulic power,(kW) : 4.7
Pump delivery rate at maximum hydraulic power, (l/min) : 17.7
Pressure at maximum hydraulic power, (MPa) : 16.0
Sustained pressure of the open relief valve, (MPa) : 19.2

Tapping point:

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

5.2 Lifting capacity test :

Test	Height of lower hitch point above ground in down position, (mm)	Vertical move-ment with lifting forces, (mm)	Maximum corrected force exerted through full range, (kN)	Corres-ponding pressure, (MPa)	Moment about rear axle, (kN-m)	Maximum tilt angle of mast from vertical (degrees)
At hitch points	200	600	12.56	17.30	10.43	--
On the standard frame	200	605	11.58	17.30	16.68	9.5

5.3 Maintenance of lift load:

Force applied at the frame, (kN) : 10.4
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)	05	10	15	18	22	25

6. BRAKE TEST

6.1 Service brake:

6.1.1 Cold brake test:

Date of test(s) : 28.08.2018
Type of Track : Concrete
Maximum attainable speed (kmph):
- With standard Ballast : 35
- With Ballasted (Road work) : 35

		At maximum attainable speed			
Standard ballasted tractor	Braking device control, force (N)	546	416	286	156
	Mean deceleration, (m/sec^2)	3.60	3.32	3.18	2.50
	Stopping distance, (m)	13.52	14.26	14.85	18.90
Ballasted Tractor (Road work)	Braking device control force(N)	557	442	327	211
	Mean deceleration, (m/sec^2.)	3.57	3.26	2.98	2.50
	Stopping distance, (m)	13.69	14.51	15.87	18.90
		At 25 kmph travel speed			
Standard ballasted tractor	Braking device control, force(N)	406	322	239	155
	Mean deceleration, ($m/sec.^2$)	3.49	3.08	2.76	2.50
	Stopping distance, (m)	6.96	7.84	8.73	9.65
Ballasted Tractor (Road work)	Braking device control force,(N)	424	356	287	218
	Mean deceleration, ($m/sec.^2$)	3.23	3.00	2.76	2.50
	Stopping distance, (m)	7.75	8.03	8.74	9.65

6.1.2 Brake fade test:

		At maximum attainable speed			
Ballasted Tractor (Road work)	Braking device control force(N)	575	478	381	283
	Mean deceleration, ($m/sec.^2$)	3.45	3.11	2.92	2.50
	Stopping distance, (m)	13.76	15.18	16.21	18.90
		At 25 kmph travel speed			
Ballasted Tractor (Road work)	Braking device control force,(N)	445	384	322	2.61
	Mean deceleration, ($m/sec.^2$)	3.22	2.96	2.70	2.50
	Stopping distance, (m)	7.79	8.15	8.92	9.65

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

6.2 Parking brake test:

Particulars	18 percent slope		12 percent slope with trailer mass of 1.83 ton.	
	Facing up	Facing down	Facing up	Facing down
Braking device control force, (N)	460	483	348	315
Efficacy of parking brake	----------Effective ----------			

7. NOISE MEASUREMENT

7.1 Noise at bystander's position:

Date of test	:	12.07.2018
Type of track	:	Concrete
Background noise level, dB (A)	:	65
Atmospheric conditions:		
Temperature, (°C)	:	27
Pressure, (kPa)	:	96.6
Relative humidity, (%)	:	83
Wind velocity, (m/s)	:	2.7

TEST DATA:-

S. No.	G e a r	Travelling speed before acceleration, (kmph)	Noise level, dB (A)
1.	L1	2.46	84
2.	L2	3.61	83
3.	L3	5.29	84
4.	L4	7.65	83
5.	H1	9.05	83
6.	H2	13.12	83
7.	H3	19.41	84
8.	H4	27.66	84

7.2 Noise at operator's ear level:

Date of test	:	28.12.2018
Type of track	:	Concrete
Background noise level, dB(A)	:	55
Atmospheric conditions:		
Temperature, (°C)	:	19
Pressure, (kPa)	:	98.1
Relative humidity, (%)	:	39
Wind velocity, (m/s)	:	1.3

TEST DATA:

Gear	Drawbar pull at which the tractor develops the maximum noise level, (kN)	Corresponding travelling speed, (kmph)	Noise level dB (A)
L1	11.27 to16.94	3.06 to 2.79	93
L2	12.97 to 16.55	4.40 to 4.03	94
L3	14.17	6.16	96
L4*	8.72 to 10.03	9.47 to 8.95	95
H1	6.94 to 8.60	11.50 to 10.71	95

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

8. AIR CLEANER OIL PULL-OVER TEST

Date of test : 17.10.2018

Tractor run at the Institute prior to start of air cleaner oil pull-over test, (h) : 18.9

Atmospheric conditions:

Temperature, (°C) : 32 to 44

Pressure, (kPa) : 96.8 to 97.3

Relative humidity, (%) : 12 to 32

Mass of oil before test, (g) : 552.2

Sl. No	Position of tractor	Loss of oil (g)	Oil pull-over (%)	Engine oil pressure
i)	Tractor parked on level ground	1.20	0.22	Normal
ii)	Tractor tilted 15° laterally on RHS*	0.00	0.00	Normal
iii)	Tractor tilted 15° laterally on LHS*	0.20	0.04	Normal
iv)	Tractor tilted 15° longitudinally with front end up	0.70	0.13	Normal
v)	Tractor tilted 15° longitudinally with rear end up	0.00	0.00	Normal

9. MECHANICAL VIBRATION MEASUREMENT

Date of test : 28.09.2018

Type of test surface : Concrete

Sl. No.	Measuring points		Vibration, microns			
			At no load		At load corresponding to 85% of maximum PTO power	
			VD	HD	VD	HD
i)	Foot rest	Left	50	130*	250*	280*
		Right	100	70	170*	160*
ii)	Steering control wheel		120*	90	140*	130*
iii)	Seat	Bottom	60	40	70	50
		Back	40	20	40	30
iv)	Mudguard	Left	40	70	60	70
		Right	100	70	120*	60
v)	Head light	Left	90	90	130*	170*
		Right	60	100	150*	170*
vi)	Battery base, centre		130*	60	100	70
vii)	Tail light	Left	100	180*	120*	150*
		Right	250*	250*	120*	240*
viii)	Plough light		150*	180*	130*	190*
ix)	Gear shifting lever		40	60	40	30
x)	Accelerator lever	Hand	90	90	160*	180*
		Foot	70	100	100	130*
xi)	Brake pedal	Left	120*	190*	150*	160*
		Right	90	130*	160*	230*
xii)	Clutch pedal		130*	90	140*	150*
xiii)	Main hydraulic control lever		70	60	60	60
xiv)	PTO engaging lever		20	20	30	40
xv)	Diffrerential lock lever		30	30	40	40

*The amplitude of mechanical vibration is on higher side.

10. FIELD TEST

10.1 The major breakdowns were not observed in the field test during initial commercial testing of the tractor model having test report No. **T-425/859** released on **September 2001.** So, as per the provision as laid down in clause 7.2 of IS: 12207- 2014, the field test during the batch testing of this tractor model was not conducted.

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11. HAULAGE TEST

Type of trailer	:	**Two wheel (Single axle)**	**Four wheel (Double axle)**
Gross mass of trailer (tonne)	:	4.0	5.5
Height of trailer hitch above ground level, (mm)	:	550	640
Gear used during the test for negotiating slopes up to 8%	:	H-4	H-4
Average travel speed,(kmph)	:	27.95 to 28.14	31.10
Average fuel consumption:			
- (l/h)	:	4.4 to 4.7	5.82 to 5.93
- (ml/km/tonne)	:	39.5 to 41.8	34.0 to 34.7
Average distance traveled per liter of fuel consumption, (km)	:	5.98 to 6.33	5.24 to 5.34
General observations:			
Effectiveness of brakes	:	Effective	Effective
Maneuverability of tractor-trailer combination	:	Satisfactory	Satisfactory

12. COMPONENTS/ASSEMBLY INSPECTION

The engine and other assemblies were dismantled after **52.5 hours** of tractor operation at this Institute.

12.1 Engine:

12.1.1 Cylinder bore:

Cyli-nder 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.	91.483	91.477	91.472	91.477	91.469	91.474	91.66 to 91.68
2.	91.472	91.470	91.473	91.472	91.466	91.471	
3.	91.480	91.476	91.480	91.472	91.478	91.474	

12.1.2 Piston:

Piston No.	Piston dia, (mm)				Piston to cylinder liner clearance at skirt (mm)	
	Top (above top compression ring)		At skirt			
	Thrust Side	Non-thrust Side	Thrust side	Non-thrust side	As observed	Max. permissible limit,
1.	90.770	90.630	91.315	91.055	0.168	0.25
2.	90.765	90.620	91.335	91.060	0.137	
3.	90.770	90.625	91.332	91.055	0.148	

12.1.3 Ring end gap:

Rings	Ring end gap, (mm)									Maximum Permissible limit,(mm)
	Cylinder No.1			Cylinder No.2			Cylinder No. 3			
	Top	Middle	Bottom	Top	Middle	Bottom	Top	Middle	Bottom	
1st comp. ring	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	1.50
2nd comp. ring	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	1.50
Oil ring	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	1.80

12.1.4 Ring side clearance:

Rings	Ring side clearance, (mm)			Maximum Permissible Limit, (mm)
	Piston-I	Piston-II	Piston-III	
1st Compression ring	0.075	0.059	0.069	0.40
2nd Compression ring	0.052	0.050	0.075	0.40
Oil ring	0.070	0.060	0.069	0.40

12.1.5 Main bearings:

Bearing No.	Diametrical Clearance, (mm)	Crankshaft end float, (mm)	Maximum permissible limit, (mm)	
			Diametrical clearance	Crankshaft end float
1.	0.100 to 0.140	0.25	0.50	0.50
2.	0.117 to 0.140			
3	0.128 to 0.141			
4.	0.107 to 0.114			

12.1.6 Big end bearings:

Bearing No.	Clearance, (mm)		Maximum permissible limit,(mm)	
	Diametrical	Axial	Diametrical	Axial
1.	0.074 to 0.090	0.30	0.25	0.75
2.	0.051 to 0.071	0.30		
3.	0.084 to 0.145	0.30		

12.1.7 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 : 13.39 to 13.61
- Exhaust valve spring: 13.44 to 13.50

Against discard limit of 9.8 N/mm

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

- Intake valve : 0.077 to 0.087
- Exhaust valve : 0.077 to 0.080

Against discard limit of 0.2 mm

12.2 Clutch:

Any marked wear on clutch friction plates	:	None	
Condition of clutch release bearing	:	Normal	
Condition of springs and release levers	:	Normal	
Condition of pilot bearing	:	Normal	
Presence of oil in clutch housing	:	None	
Any marks on fly wheel/ pressure plate	:	None	
Overall thickness of clutch plate, (mm):	:	10.82 to10.88	Discard limit wear upto 0.2 mm above rivet head.
Height of lining over rivet head, (mm):		2.90 to 3.06	Discard limit wear up to 0.2 mm above the rivet head.

12.3 Transmission gears:

Any visual damage, pitting & chipping of any transmission gear teeth.	:	None	
Backlash between crown wheel and pinion, (mm)	:	0.27 to 0.28	Against the discard limit of 0.60 mm.

12.4 Brakes:

Description	Initial specified thickness of brake lining, (mm)	Measured thickness of brake lining after test, (mm)	Height of brake lining over oil groove, (mm)	Minimum permissible height of brake lining above oil groove, (mm)
Left	4.65 to 4.80	4.70 to 4.72	0.59 to 0.64	0.20
Right	4.65 to 4.80	4.71 to 4.78	0.56 to 0.60	

12.5 Front axle:

Any marked wear of king pins	:	None	
Any marked wear of king pin bushes	:	None	
Clearance between king pin and bushes, (mm)	:	0.11 to 0.15	Against the discard limit of 0.50 mm.
Condition of bearings for stub axles	:	Normal	
Condition of king pin bearings	:	Normal	
Condition of seals for stub axles and king pins	:	Normal	
Clearance between centre pin and bushes, (mm)	:	0.17 to 0.21	Against the discard limit of 0.50 mm.

12.6 Steering system:

Visual condition of the components of complete steering assembly	:	Normal	

12.7 Starter motor & Alternator:

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

13. ADJUSTMENTS, DEFECTS, BREAKDOWNS AND REPAIRS

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

14. COMPARISON OF SPECIFICATION AND PERFORMANCE CHARACTERISTICS OF PREVIOUS SAMPLE (ICT Test Report No. **T-425/859/2001(September), 2001** & Supplementary test report no. **T- 1223/1750/2019, February,2019**) and Present Sample

			Previous sample	Present sample
14.1	**Specification (*):**			
14.1.1	**Tractor**:			
	Make	:	New Holland	New Holland
	Model	:	Ford 3230	3230
14.1.2	**Engine (*):**			
	Make	:	Simpsons	Simpsons
	Model	:	S325/NH	T III A S325/NHF2.1
	Bore/Stroke, (mm)	:	91.4 / 127 (apa)	91.4 / 127 (apa)
	Specified cubic capacity, (cu.cm)	:	2500	2500
	Rated engine speed, (rpm)	:	2000	2000
14.1.2.1	**Fuel system (*):**			
	Make & model of fuel feed pump	:	MICO, LIC BOSCH 9440 030 030	Bosch, India & 9 440 30 030 FP/KSG22AD45/2
	Make & model of fuel filters	:	MICO, LIC BOSCH 0450 177 012	New Holland F0021120 138 (apa)
	Make and model of fuel injection pump	:	MICO, LIC BOSCH, F002 AOZ 224	Bosch, F002 AOZ 778, PES3A80D320RS2000
	Make & model of fuel injectors	:	MICO, LIC BOSCH 9430 031 269	Bosch ,India NA
	Type of injector	:	Multiholes (5)	Multiholes (5)
	Manufacturer's production pressure setting, (MPa)	:	23.5 to 24.3	25.0 + 0.8
	Injection timing	:	22 degree BTDC	14+0/- 2 degree BTDC
	Make & model of governor	:	MICO, LIC BOSCH RSV300…1125A2 C2123 R	Bosch ,India RSV375…1000A4 C1617R
14.1.2.2	**Lubricating system (**):**			
	Total lubricating oil capacity,(l)	:	8.55	8.55
	Cooling system:			
	Total coolant capacity, (l)	:	7.30	7.30
14.1.3	**Transmission (*) :**			
14.1.3.1	**Clutch:**			
	Type of clutch plate	:	Single, diaphragm friction plate	Single, dry friction plates
	Size, OD/ID,(mm):		240 Ø	165/112 Ø
14.1.3.2	**Gear Box:**			
	No. of speeds:			
	- Forward	:	08	08
	- Reverse	:	02	02

			Previous sample	Present sample
	Range of speed, (kmph) (**):			
	- Forward	:	2.92 to 33.03	2.92 to 33.03
	- Reverse	:	3.60 to 13.20	3.60 to 13.20
14.1.4	**Service Brake(*):**			
	Make	:	Carraro (apa)	Carraro (apa)
	Type	:	Mechanical oil immersed discs (on each wheel side)	
	No. of friction disc	:	--	03 (on each wheel side)
	Area of liners, (cm^2)	:	475.2	691.4(on each wheel side)
14.1.5	**Wheel equipment(*):**			
	Make & Size of tyres	:		
	- Front	:	MRF Krishi	GOOD YEAR
	- Rear	:	MRF Shakti	GOOD YEAR
	Standard Track width, (mm):			
	- Front	:	1320	1250
	- Rear	:	1325	1330
14.1.5.1	**Wheel base, (mm) (*):**	:	1910	1925
14.1.6	**Overall dimensions, (mm)(*):**			
	- Length	:	3270	3330
	- Width	:	1682	1730
	- Height (at steering wheel)	:	2260	2280
	- Ground clearance, (mm)	:	385	383
14.1.7	**Operational mass of Std. Ballasted tractor(kg)(*):**			
	- Front	:	680	720
	- Rear	:	1000	1095
	- Total	:	1680	1815

14.1.8	**Conformity with following IS(*):**		**Previous sample**	**Present sample**
i)	Guide lines for declaration of power and specific fuel consumption and labeling of agricultural tractors (First revision) [IS 10273:1987 (Reaffirmed in 2014)]	:	Conformed	**Does not conform**
ii)	Agricultural tractors – Rear mounted power take-off - Types 1, 2 and 3(third revision)[IS: 4931-1995 (Reaffirmed in 2014)]	:	**Did not conform**	**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 Oct, 2017)]	:	Conformed	Conforms
iv)	Drawbar for agricultural tractors – Link type [IS 12953:1990 (Reaffirmed in Oct, 2017)]	:	Conformed	Conforms
v)	Agricultural tractors - Operator's seat technical requirement [IS 12343 –1998 (First revision) (Reaffirmed in 2014)	:	**Did not conform**	Conforms
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 Oct, 2017)]	:	Conformed	**Does not conform**
vii)	Tractors and machinery for agriculture and forestry – Technical means for ensuring safety Part 2: Tractors (first revision) (IS 12239 (PT-2) 1999) (Reaffirmed in 2014)]	:	**Did not conform**	**Does not conform**

			Previous sample	Present sample
viii)	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 2014)]/ ISO 3767-2:1991)]	:	Conformed	**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 2014)]	:	Conformed	**Does not conform**
x)	Agricultural Tractor & Machinery Lighting device for travel on public roads (IS: 14683-1999) (Reaffirmed in 2014)]	:	Conformed	Conforms

			Previous sample	Present sample
14.2	**Performance Characteristics (*) :**			
14.2.1	**PTO Performance:**			
	Maximum Power, (kW)	:	28.6	28.7
	Power at Rated engine speed,(kW)	:	28.5	28.7
	Specific fuel consumption corresponding to maximum power, (g/kWh)	:	250	255
	Maximum equivalent crankshaft torque,(Nm)	:	158.8	158.0
	Back up torque, (%)	:	15.7	15.2
	Maximum temperatures (degree):			
	Engine oil	:	115	126
	Coolant	:	94	110
	Lub oil consumption, (g/kWh)	:	0.81	1.15
14.2.2	**Drawbar performance : (*)**			
	Maximum power with standard ballasted tractor, (kW)	:	23.2	25.6
	Maximum pull with std. ballasted Tractor, (kN)	:	12.2	16.94
	Maximum transmission oil temperature (deg. C)	:	92	81
14.2.3	**Hydraulic performance (*):**			
	Hydraulic pump discharge at minimum pressure and rated engine speed (l/min.)	:	19.5	19.1
	Maximum hydraulic power, (kW)	:	4.1	4.7
	Sustained pressure of the open relief valve, (MPa)	:	17.2	19.2
	Maximum lifting capacity, (kN):			
	- At the hitch point	:	10.12	12.56
	- At the standard frame	:	9.70	11.58
	Total drop in height of lift during load maintenance test, (mm)	:	08	25

14.2.4 Brake performance test at 25 kmph speed (max). (*)

Parameter	Cold	Hot	Cold	Hot
Maximum Stopping distance, (m)	8.5 to 8.6	8.8	7.75 to 7.79	7.79
Maximum force exerted on the brake Pedal effort required to achieve deceleration of 2.5 m/sq sec, (N)	240 to 274		218 to 261	
Weather parking brake is effective at a force of 600N at foot pedal (s) or 400 N at hand lever	Effective		Effective	

14.2.5 Noise measurement (*):

		Previous sample	Present sample
- Maximum noise at bystanders position, dB(A)	:	86	84
- Maximum noise at operator's ear level dB(A)	:	98	92

14.2.6 Mechanical vibration (*):

Maximum amplitude of vibration at (microns):

- Foot rest – LHS & RHS	:	150 & 280	60 & 80
- Steering wheel	:	100	140
-Driver's seat, (driver in seat):	:	70	150

14.2.7 Haulage Test (*):

		Two wheel trailer	Four wheel trailer	Two wheel trailer	Four wheel trailer
-Gross mass of trailer, (tonnes)	:	4.0	5.50	4.0	5.50
- Average speed, (kmph)	:	26.14 to 26.67	26.56 to 27.45	27.95 to 28.14	31.0
- Distance traveled per litre of fuel consumed, (km)	:	6.10 to 6.40	5.73 To 5.78	5.98 to 6.33	5.24 to 5.34
- Average fuel consumption (cc/km/tonne)	:	39.09 to 40.98	31.46 to 31.74	39.47 to 41.83	34.0 to 37.0

Remark- (*) Data was taken from commercial batch test report no. T- 425/859, September, 2001.
(**) Data was taken from supplementary test report no. T- 1223/1750/2019, (February, 2019), wherever required in the data.

14.3 Qualifying performance (comparable limit) for batch model in comparison to ICT model (please refer Clause 7.6 of IS: 12207-2014):

S. No.	Characteristic	Requirements as per IS: 12207-2014		As observed		Whether meets the requirement (Yes/No)
		Column 4 of Table-1	Clause 7.6	Previous sample	Present sample	
1	2	3	4	5	6	7
14.3.1	**Drawbar performance:**					
a)	Maximum drawbar pull with ballast corresponding to 15 percent wheel slip, (Kn)	Minimum 65% of static mass with ballast	The performance shall be within 7.5% of ICT or limit specified under Column 3 whichever is higher	17.7	22.80	**No**
b)	Maximum drawbar pull with standard ballast corresponding to 15 percent wheel slip, (Kn)	Minimum 65% of static mass of tractor without ballast		12.2	16.94	**No**
c)	Maximum drawbar power without ballast, (kW).	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.		23.2	25.68	**No**
d)	Maximum transmission oil temperature (^{o}C)	The declared value should not exceed the maximum value specified by oil company		92	81	Yes

1	2	3	4	5	6	7
14.3.2	**Hydraulic performance:**					
a)	Maximum lifting capacity throughout the range of lift, (kN):					
	1) At hitch points	[Tolerance of minus 10%]	The performance shall be within 7.5% of ICT or limit specified under Column 3 whichever is higher	10.12	12.56	**No**
	2) With the standard frame	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		9.70	11.58	**No**
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)	The observed value should not exceed 50 mm		08	25	Yes

14.4 Salient Observations:

14.4.1 Laboratory test:

	Previous sample		**Present sample**
i)	The backup torque was 15.7 %.	**i)**	The backup torque is 15.2 %.
ii)	The maximum PTO power was recorded as **28.6 kW** against the declaration of **27.2 kW,** which meets the requirement of IS: 12207-1999 with regard to tolerance limit.	**ii)**	The maximum PTO power was recorded as **28.7 kW** against the declaration of **28.6 kW,** which meets the requirement of IS: 12207-2014 with regard to tolerance limit.
iii)	The specific fuel consumption corresponding to maximum power was recorded as **250** g/kWh against the declaration of **256 g/kWh.**	**ii)**	The specific fuel consumption corresponding to maximum power was recorded as **255** g/kWh against the declaration of **256 g/kWh.**
iv)	The maximum equivalent crankshaft torque was recorded as **158.8 N-m** against the declaration of **127 N-m**, which is not within the permissible limit and hence, it does not meet the non – evaluative requirement of IS: 12207-1999. This should be looked into for necessary corrective action.	**iv)**	The maximum equivalent crankshaft torque was recorded as **158.0 N-m** against the declaration of **165 N-m**, which is within the permissible limit

14.4.2 Drawbar Performance Test:

i)	Maximum drawbar pull and with standard ballast corresponding to 15 percent wheel slip, (kN) was recorded as 17.7 & 12.2 **kN** respectively against the minimum requirement of **15.7 & 10.30 kN** respectively**.** Which meet the minimum requirement of IS: 12207-1999.	**i)**	Maximum drawbar pull and with standard ballast corresponding to 15 percent wheel slip, (kN) was recorded as 22.80 & 16.94 **kN** respectively against the minimum requirement of **15.7 & 10.30 kN** respectively**.** Which does not meet the minimum requirement of IS: 12207-2014. This should be looked into for necessary corrective action.

14.4.3 Hydraulic Performance Test:

i)	Maximum lifting capacity at hitch point and standard frame was recorded **10.12 & 9.70 kN** respectively against the declaration of 10.78 & 9.71 kN respectively**.** Which meet the minimum requirement of IS: 12207-1999.	**i)**	Maximum lifting capacity at hitch point and on the standard frame was recorded **12.56 & 11.56 kN** respectively against the declaration of **10.78 & 9.71 kN** respectively**.** Which meet the minimum requirement of IS: 12207-2014.

14.5 Adequacy of literature:

Following combined literature of **Ford 3230** tractor model was supplied with the test sample for reference during the test.

a) Operator's manual
b) Parts catalogue
c) Service manual

Following combined literature of **New Holland 3230** tractor model was supplied with the test sample for reference during the test.

a) Operator's manual
b) Parts catalogue
c) Service manual

15. SUMMARY OF OBSERVATIONS, COMMENTS & RECOMMENDATIONS

15.1 Evaluative (mandatory) / Non-evaluative (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:

Sl. 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
15.1.1	**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	28.6	28.7	Yes
b)	Power at rated engine speed, (kW)	Non Evaluative	-do-	28.5	28.7	Yes
c)	Specific fuel consumption corresponding to maximum power, (g/kWh)	Non Evaluative	+ 5%	256	255	Yes
d)	Maximum equivalent crankshaft torque, (Nm)	Non Evaluative	± 8%	166 (D)	158.8	Yes
e)	Back-up torque, percent	Non Evaluative	10 percent, min.	10% min. (D)	15.2	Yes
f)	Maximum operating temperature, (^{O}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.	131(D)	126	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.	119 (D)	110	Yes
g)	Engine oil consumption, (g/kWh)	Evaluative	Not exceeding 1% of SFC at max. power under High ambient conditions	2.58 Maximum (R)	1.15	Yes
h)	Smoke level	Evaluative	Maximum light absorption coefficient of 3.25 per meter or equivalent BOSCH No. 5.2 or 75 Hatridge value (**As per CMVR**)	3.25 per meter Maximum (R)	0.21	Yes

1	2	3	4	5	6	7
15.1.2	**Drawbar performance :**					
a)	Maximum drawbar pull with ballast corresponding to 15 percent wheel slip, (kN)	Non Evaluative	Minimum 65% of static mass with ballast	15.70 (D) 16.51 (R) Minimum	22.80	Yes
b)	Max. drawbar pull with standard ballast correspond-ing 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	10.30 (D) 11.57 (R) Minimum	16.94	Yes
c)	Maximum drawbar power with standard 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.	18.5 (D) 23.0 (R) Minimum	25.6	Yes
d)	Maximum transmission oil temperature (^{o}C)	Non Evaluative	The declared value should not exceed the maximum value specified by oil company	110 (D)	81	Yes
15.1.3	**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%]	10.78 (D)	12.56	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	9.71 (D) 6.05 (R) Minimum	11.58	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 Minutes, (mm)	Non Evaluative	The observed value should not exceed 50 mm	50 (D) Maximum	25	Yes
15.1.4	**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)	7.75	Yes
	2) Hot brake	Evaluative	10	10 (R)	7.79	Yes
b)	Maximum force exerted on the brake pedal to achieve a deceleration of 2.5 m/s^2 (N)	Evaluative	600	600 (R) Maximum	218 to 261	Yes
c)	Whether parking brake is effective at a force of 600 N at foot pedal(s) or 400 N at hand lever	Evaluative	Yes / No	Yes	Yes	Yes

1	2	3	4	5	6	7
15.1.5	**Noise measurement :**					
a)	Maximum ambient noise emitted by the tractor dB(A)	Evaluative	As per CMVR	88(R)	84	Yes
b)	Maximum noise at operator's ear level dB(A)	Evaluative	As per CMVR	96(R)	96	Yes
15.1.6	**Amplitude of mechanical vibrations at:**					
	1) Left foot rest	Non Evaluative	100 microns (max)	100(R)	280	**No**
	2) Right foot rest				170	**No**
	3) Seat (with driver seated)				70	Yes
	4) Steering wheel				140	**No**
15.1.7	**Air cleaner:**					
	Air cleaner oil pull over, (%)	Non Evaluative	0.25 % (maximum)	0.25 % (maximum)	0.22	Yes
15.1.8	**Haulage requirements :**					
a)	Gross mass of the trailers, (tones):					
	1) Two wheel	Non Evaluative	--	4.0 (D)	4.0	Yes
	2) Four wheel		--	5.5 (D)	5.5	Yes
b)	Distance travelled / liter of fuel consumption, (km/l):					
	1) Two wheel	Non Evaluative	--	4.0 to 6.0(D)	5.98 to 6.33	Yes
	2) Four wheel		--	4.0 to 6.0(D)	5.24 to 5.34	Yes
c)	Fuel consumption (ml/km/tonne):					
	1) Two wheel	Non Evaluative	--	32 to 40(D)	39.50 to 41.80	Yes
	2) Four wheel		--	32 to 40(D)	34.0 to 34.7	Yes
15.1.9	**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 observe during the batch test vide Test report No. **T-426/859 2001, (September)**	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
15.1.10	**Safety features :**					
a)	Guards against moving and hot parts	Evaluative	Belt drives, pullies, silencer, hydraulic pipes (As per IS 12239 (Part2)	--	Meets the requirement	Yes
b)	Lighting arrangement	Evaluative	As per CMVR	--	Meets the requirement	Yes
c)	Seating requirements (Tractors having more than 1150 mm rear track width)	Non Evaluative	Should meet the requirements of IS: 12343 (As amended from time to time)	--	**Does not meets the requirement**	**No**
d)	Technical requirements for PTO shaft	Non Evaluative	Should meet the requirements of IS: 4931 (As amended from time to time)	--	**Does not meets the requirement**	**No**
e)	Dimensions of three point linkage	Non Evaluative	Should meet the requirements of IS: 4468 (Part-I) (As amended from time to time)	--	Meets the requirement	Yes
f)	Specifications of linkage	Non Evaluative	Should meet the requirements of IS 12953 and IS 12362 (Part 3) (As amended from time to time)	--	Meets the requirement	Yes
	Swinging drawbar			--	--	--
15.1.11	**Labelling of tractors (Provision of labelling plate):**					
	1) Make	Evaluative	Should conform to the requirements of CMVR along-with declared value of PTO HP	--	New Holland	Yes
	2) Model	Evaluative		--	3230	Yes
	3) Year of manufacture	Evaluative		--	HM (i.e.2017, December)	Yes
	4) Engine number	Evaluative	Should conform to the requirements of CMVR along-with declared value of PTO HP	--	S325J19247	Yes
	5) Chassis number	Evaluative		--	NHN32300Z HM410844	Yes
	6) Declaration of PTO power, kW	Evaluative		--	28.6	Yes
15.1.12	**Discard limit for:**					
(a)	Cylinder bore diameter, (mm)	Evaluative	To be specified by the manufacturer and supported by the printed literature	91.66 - 91.68 (D)	91.47 to 91.48	Yes
(b)	Clearance between piston & cylinder liner at skirt, (mm)	Non Evaluative		0.25 (D)	0.137 to 0.168	Yes
(c)	**Ring end gap (mm):**					
	- Top comp. ring.	Evaluative	-do-	1.50(D)	0.50	Yes
	- 2nd comp. ring.		-do-	1.50(D)	0.45	Yes
	- Oil ring.		-do-	1.50(D)	0.50	Yes
(d)	**Ring groove clearance (mm):**					
	- Top comp. ring.	Evaluative	-do-	0.25 (D)	0.059 to 0.075	Yes
	- 2nd comp. ring.		-do-	0.25 (D)	0.050 to 0.075	Yes
	- Oil ring.		-do-	0.25 (D)	0.060 to 0.070	Yes
(e)	**Clearance of main bearings (mm):**					
	- Diametrical clearance	Evaluative	-do-	0.50 (D)	0.100 to 0.141	Yes
	- Crankshaft end float	Evaluative		0.50 (D)	0.25	Yes

1	2	3	4	5	6	7
(f)	**Clearance of big end bearings, (mm):**					
	- Diametrical	Evaluative	-do-	0.25 (D)	0.051 to 0.145	Yes
	- Axial	Evaluative	-do-	0.75 (D)	0.30	Yes
(g)	Clearance between king pin and bush, (mm)	Non Evaluative	-do-	0.50 (D)	0.11 to 0.15	Yes
(h)	Clearance between centre pin and bush, (mm)	Non Evaluative	-do-	0.50 (D)	0.17 to 0.21	Yes
15.1.13	**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

15.1.14 CATEGORY OF BREAKDOWNS / DEFECTS :

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

15.2 Optional requirements as per Clause-4 (Table-2) of IS:12207-2014:

S.No.	Characteristic	Requirements as per IS: 12207-2014	As observed	Remarks
1.	Fitment of ROPS	With a provision for fitment of ROPS.	Not provided	Not applicable
		If ROPS fitted it should meet the requirement of IS: 11821 (As amended from time to time) or equivalent International Standards	ROPS not provided	Not applicable
2.	Accessories	Trailer hitch, front tow hook, may be provided.	Provided	Yes

15.3 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 2014)] **: Does not conform**

ii) Agricultural tractors – Rear mounted power take-off - Types 1, 2 and 3(third revision)[IS: 4931-1995 (Reaffirmed in 2014)] **: 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 Oct, 2017)]	**:**	Conforms
iv)	Drawbar for agricultural tractors – Link type [IS 12953:1990 (Reaffirmed in Oct, 2017)]	**:**	Conforms
v)	Agricultural tractors - Operator's seat technical requirement [IS-12343 –1998 (First revision) (Reaffirmed in 2014)	**:**	Conforms
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 Oct, 2017)]	**:**	**Does not conform**
vii)	Tractors and machinery for agriculture and forestry – Technical means for ensuring safety Part 2: Tractors (first revision) (IS 12239 (PT-2) 1999) (Reaffirmed in 2014)]		**Does not conform**
viii)	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 2014)]/ ISO 3767-2:1991)]	**:**	**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 2014)]	**:**	**Does not conform**
x)	Agricultural Tractor & Machinery Lighting device for travel on public roads (IS: 14683-1999) (Reaffirmed in 2014)]	**:**	Conforms

15.4 Salient Observations:

15.4.1 Laboratory tests:

15.4.1.1 PTO Performance:

i) The maximum power in case of previous & present sample was observed as **28.6** & **28.7 kW** against the declaration of 27.2 & 28.6 **kW,** which meets the requirement of IS: 12207-2014 with regard to tolerance limit.

ii) The specific fuel consumption corresponding to maximum power in case of previous & present sample was recorded as **250 & 255 g/kWh** against the declaration of **256 g/kWh**, which does not meet the requirement of IS: 12207-2014 in case of present sample .

iii) The power drop under high ambient condition in compare to the natural ambient condition was recorded as 5.2 %. This should be look into for corrective necessary action.

15.4.1.2 Mechanical Vibration:

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

15.4.1.3 Operator's Seat:

i) Inclination of seat toward the rear direction

ii) Longitudinal distance from SIP to the centre of differential lock pedal

iii) Vertical distance of SIP to from foot rest

15.4.1.4 Specification of linkage drawbar:

i) Some of the parameters of linkage drawbar conforms to Cat. I and some of them conform to Cat. II. In view of the spirit of standardization, necessary improvements may be incorporated.

15.4.1.5 Specification of PTO shaft:

The dimension "dØ" of PTO shaft does not meet the requirement of the IS: 4931 -1995 (Reaffirmed in 2014). This should be looked into for necessary corrective action.

15.5 Maintenance / Service Problems:

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

Component assembly inspection

15.6 Recommendation with regard to safety on tractor:

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

i) Provision for spark arresting device in exhaust system.

ii) Provision for remain the Fuel shut-off knob in "STOP" position without application of sustainable manual effort.

iii) The minimum cautionary notice as per clause 11.2 of IS: 12239 (Part-2)-1999(Reaffirmed in 2014) should be provided.

iv) The working clearance between the hydraulic position & draft control levers should be provided as per the requirement of relevant Indian Standard.

v) Width of foot step should be provided as per IS: 12239 (Part-2)-1999 (Reaffirmed in 2014)

vi) PTO master shield has not been provided.

15.7 Adequacy of Literature supplied with machine:

15.7.1 The following literature was supplied with test sample for reference during the test.

a) Operator's manual for New Holland 3037 & 3230 tractor models.
b) Service manual for New Holland 3030, 3032, 3037 & 3230 models.
c) Service part's catalogue for New Holland 3032, 3037 NX3230 & 3230NX models.

15.7.2 The operator's manual submitted by the applicant was found adequate.

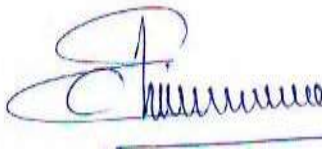
15.7.3 The literatures should also b
e brought out in national as well as other regional languages for the guidance of users and service personnel.

16. Citizen charter

Test duration under citizen charter	Duration of Test	Whether the report released within time frame given in the citizen charter	Remark
10 Months	09 ,Months (June, 2018 to February,2019)	Yes	None

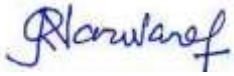
TESTING AUTHORITY:

C. S. RAGHUVANSHI
AGRICULTURAL ENGINEER



C.V. CHIMOTE
TEST ENGINEER

Y.K.RAO
SENIOR AGRICULTURAL ENGINEER



J.J.R. NARWARE
DIRECTOR

Test report compiled by Sh. Dev Vart Kumar, Senior Technical Assistant

17.0 APPLICANT COMMENT'S

Para No.	Our Reference	Applicant's comments
17.1	15.4.1.1 (iii),15.4.1.2,15.4.1.3,15.4.1.4 (i),15.4.1.5,15.6. & 15.7	Your valuable comments & suggestions for improvements are well taken. Under our policy of continuous product improvement these aspects are further being looked into and will try to eliminate these deviations soon wherever necessary

Annexure- I

TRACTOR RUN HOURS DURING TEST

A.	LABORATORY AND TRACK TESTS	HOURS
1.	Running-in	--
2.	PTO performance test	11.2
3.	Power lift and hydraulic pump performance test	2.3
4.	Drawbar performance test	21.2
5.	Brake test	2.5
6.	Noise measurement	1.4
7.	Mechanical vibration test	1.0
8.	Nominal speed test	1.1
9.	Air cleaner oil pull overt test	3.5
B	**HAULAGE TEST**	5.6
C.	Miscellaneous test and other run hours including idle run, transportation, trials and preparation for test	2.7
	TOTAL:	**52.5**