व्यावसायिक परीक्षण रिपोर्ट
COMMERCIAL TEST REPORT (Batch)

संख्या / No. : T-1102/1628/2017
माह / Month : August, 2017

NEW HOLLAND 3510 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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Type of Test	:	**COMMERCIAL (Batch)**
Test code/Procedure	:	IS: 5994-1998 (Reaffirmed in 2009) and IS: 12207-2014.
Period of Test	:	January ,2017 to July ,2017
Test Report No.	:	**T- 1102/1628/2017**
Month/Year	:	**August, 2017**

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

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

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

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 i.e. "**New Holland 3510**" tractor bearing report No. **T-662/1168/2009** and the supplementary report, **New Holland 3510** bearing report no. T- **1099/1625/2017**, released in August 2017.

SELECTED CONVERSIONS

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
SIP	Seat Index Point

CONTENTS

The **"New Holland 3510"** tractor had undergone "Initial Commercial Test" at this Institute and a test report No. **T-662/1168/2009** was released in April, 2009. 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-1099/1625/2017**, released in **August, 2017**. Now the applicant has submitted an application vide letter No. PD-L116726 dated 26.10.2016 for Batch testing of **"New Holland 3510"**.

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	:	3510
Brand name	:	New Holland
Type	:	Four wheeled, Rear-wheel driven, General Purpose Agricultural Tractor.
Year of manufacture	:	2016
Chassis number	:	NHN35100ZGL372672
Country of origin	:	India

1.2 **Engine:**

Make	:	Simpsons
Model	:	T III A S324/NHF1.2
Type	:	Four stroke, water cooled, naturally aspirated, direct injection, diesel engine.
Serial number	:	S324D97875
Year of manufacture	:	2016
Country of origin	:	India

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

- Maximum speed at no load	:	2130 to 2200
- Low idle speed	:	600 to 800
- Speed at maximum torque	:	1200 to 1600
Rated speed, (rpm):		
- For PTO use	:	2000
- For drawbar use	:	2000

1.3 Cylinder & Cylinder Head:

Number	:	Three
Disposition	:	Vertical, Inline
Bore/stroke, (mm)	:	88.9 / 127 (apa)
Capacity as specified by the applicant, (cc)	:	2365
Compression ratio	:	18.5:1±0.3
Type of cylinder head	:	Monoblock
Type of cylinder liners	:	Dry, replaceable
Type of combustion chamber	:	Torroidal cavity on piston head
Arrangement of valves	:	Overhead
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)	:	63.7
Location	:	Above clutch housing
Provision for draining of sediments/ water	:	Not Provided
Material of fuel tank	:	HDPE (Plastic)

1.4.2 Water separator: Not provided

1.4.3 Fuel feed pump:

Make	:	Bosch, India
Type	:	Plunger
Model/Group combination No.	:	9440 030 030 (apa)
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 H20 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 AOZ 771
Type	:	Inline Plunger
Serial number	:	55648649
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	:	13+0/-2 °BTDC
Firing order	:	1 - 2 - 3

1.4.7 **Governor:**

Make	:	Bosch,India
Model/Group combination No.	:	RSC375...1000A4C1410R
Type	:	Mechanical, centrifugal variable speed
Governed range of engine speed, (rpm)	:	600 to 2200

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	:	Sietz
Type	:	Oil Bath
Location	:	In front of radiator, under the bonnet
Range of suction pressure at maximum power, (kPa)	:	2.4 to 2.5
Maintenance schedule	:	Whenever dusty or after every 50 hours of operation

1.6 **Exhaust System:**

Make	:	New Holland (apa)
Type of silencer	:	Updraft (elliptical), having Muffler assembly under the bonnet.

Position of silencer outlet with respect to SIP, (mm):

- Vertical	:	950
- Longitudinal	:	1345
- Lateral	:	490 (on LHS)
Range of exhaust gas pressure at maximum power (kPa)	:	9.1 to 10.8
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)	:	7.95
Total lub oil capacity, (l)	:	8.65
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)	:	343.2 to 448.2 (apa)
Minimum permissible pressure, (kPa)	:	39.0(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, semi open impeller of 69.7 mm diameter having Six vanes, and driven through crankshaft pulley by a cogged 'V'-belt & separate 'V' belt for the drive of alternator.

1.8.2 **Details of fan** : Suction type, having Six metallic blades of 376 mm diameter and mounted on water pump shaft.

Means of temperature control	:	Thermostat
Bare radiator capacity, (l)	:	1.65
Coolant expansion tank capacity,(l)	:	0.75
Total coolant capacity, (l)	:	6.90
Radiator cap pressure, (kPa)	:	88

1.9 **Starting System:**

Type	:	Electrical,12 V, DC
Aid for cold starting	:	Not Provided
Any other device provided for easy starting	:	None

1.10 **Electrical System:**

1.10.1 **Battery:**

Make and model	:	Standard Farukuwa & SFN 88L /TR
Number	:	One
Type	:	Lead Acid
Capacity and rating	:	12V, 88 Ah at 20 hour discharge rating
Location	:	In front of radiator, under the bonnet.

1.10.2 **Starter:**

Make	:	PANALFA
Model	:	013-2855
Type	:	Pre-engaging, solenoid operated
Power rating	:	12V, 2.7 kW
Serial number	:	Not available

1.10.3 **Generator:**

Make	:	PMP
Model	:	7030
Type	:	Alternator
Serial number	:	016F 3454
Output rating	:	14V, 35 amp @ 6000 rpm
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)
Supplementary Model:				
Front Lights:				
- Head lights	2,12V,35/35W	1145	90 x 140	715
- Parking lights	2, 12V, 5W	1290	75 x 77	270
- Turn Indicators-cum-hazard lights	2, 12V,21W	1290	77 x 110	185
Rear lights:				
-Tail-cum-brake light	2, 12V, 21/5W	1305	75 x 77	275
- Turn Indicators-cum-hazard lights	2,12V, 21W	1305	77 x 110	190
Plough light (on RHS mudguard)	1, 12V, 55W	1390	105 x 135	375
Reflectors (Red)	2	1305	20 x 62	255
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) Parking 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 6 number of fuses of following capacity:

Capacity	15 A	10 A
No. of fuse	4	2

1.10.10 **Details of other electrical accessories:**

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

1.10.10.2 **Flasher Unit:**

Make	:	Interface
Capacity:		
- Turn signal	:	12V, 21W x 2 +2W x 1
- Hazard signal	:	12V, 21W x 4 + 2Wx1
Flashes/min.	:	85

1.10.10.3 **Seven pin trailer socket** : Provided

1.11 **Instrument panel details:**

i) Engine speed-cum- cumulative digital run hour meter (0 – 28 x 100 rpm)
ii) Water temperature gauge (with colour zone)
iii) Lubricating oil pressure indicator light
iv) Fuel level gauge (with colour zones).
v) Battery charging warning indicator light
vi) Main switch key turn type
vii) Light switch rotary type
viii) Turn indicator light switch (Two way)
ix) Hazard light switch
x) Parking light 'ON' indicator light
xi) Head light long beam "ON" indicator light
xii) Turn indicator-cum-hazard indicator light tell-tale
xiii) Hand accelerator lever
xiv) Rear view mirror
xv) Steering control wheel
xvi) Horn push button
xvii) Work light switch
xviii) Engine stop by key turn off
xix) Forward and Reverse gear shift lever

1.12 **Transmission System:**

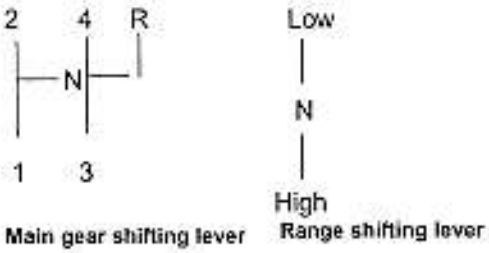
1.12.1 **Clutch:**

Make	:	Luk, India
Type	:	Single , Dry friction plates with diaphragm
No. of friction plate(s)	:	One
Size, (mm):		279.7/165.3
Method of operation:		By pressing the foot pedal provided on LHS of operator's seat.

1.12.2 **Gear box:**

Make	:	CNH (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 Range shifting lever

Oil capacity (l) : 24.0 (Common with differential, final drive, hydraulic and brake system)

Oil changing period : Change after every 1200 hours of operation.

1.12.3 Nominal Speed:

Movement	Gear No.	No. of engine revolutions for one revolution of driving wheel	Nominal speed at rated engine speed when fitted with 13.6-28 size tyres of 610 mm rolling index(kmph)
Forward	L1	181.30	2.53
	L2	120.26	3.82
	L3	81.39	5.64
	L4	59.21	7.77
	H1	49.93	9.20
	H2	33.10	13.88
	H3	22.42	20.49
	H4	16.30	28.25
Reverse	LR	147.67	3.12
	HR	40.66	11.30

1.12.4 Differential :

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

Reduction through crown wheel & bevel pinion : 3.909: 1 (43/11 T)

Oil capacity (l) : 24.0 (Common with gearbox, rear axle, brakes, final drive and hydraulic system)

Oil changing period : Change after every 1200 hours of operation

Differential lock: Not Provided

1.12.5 Rear axle & final drive:

Make : CNH (apa)

Model : Not specified

Type : Epicyclic Reduction unit accommodated inside the portal housing on both sides after brake system.

Reduction through final drive : 6.545 : 1 (Sun gear-11T, Planet gear-24T, and ring gear- 61T)

Oil capacity of final drive, (l) : 24.0 (Common with gearbox, differential brakes, and hydraulic system)

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 valve in its fully closed position acts as transport lock.

1.13.1 Hydraulic pump:

- Make & Model : Dynamatics (apa)
- Type : Gear (Tandem)
- Location & drive : On RHS of engine & driven through timing gears.

No. & Type of filter : One, spin on throw away type

Hydraulic oil capacity, (l) : 24.0 (Common with gearbox, rear axle, brakes, final drive and hydraulic 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.	Sensitivity control knob	For adjusting the sensitivity of hydraulic system when working in draft control.
5.	Response control knob	Varies the speed of drop of lower links.

Method of draft sensing : Through top link

Provision of trailer Brake Valve assembly : Not Provided

1.13.2 Three point linkage:

Sl. No.	Observations		As per IS:4468-1997(Part-I) (Cat.I / Cat.II), (mm)	As measured (mm)	Remarks
1	2		3	4	5
I.	**Upper hitch points:**				
	a)	Dia of hitch pin hole	19.30 to 19.50 / 25.70 to 25.90	25.86	Conforms to cat -II
	b)	Width of ball	44.0 (max.)/ 51.0 (max)	44.0	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	28.85	Conforms to cat -II
	b)	Width of ball	34.8 to 35.0 / 44.8 to 45.0	34.88	Conforms to cat -I

	2	3	4	5
[illegible]	Lateral distance from lower hitch point to centre line of tractor	359 / 435	359	Conforms to cat -I
[illegible]	Lateral movement of lower hitch points	100 (min) / 125 (min)	200	Conforms to cat – I&II
[illegible]	Distance from end of power take-off to centre of lower hitch point (lower links in horizontal position)	450 to 575 / 550 to 625	565	Conforms to cat –I & II
[illegible]	Transport height	820 (min)/ 950 (min)	950	Conforms to cat I & II
[illegible]	Power range (Without force)	560 (min)/ 650 (min)	610	Conforms to cat I
[illegible]	Leveling adjustment	100 (min)/ 100 (min)	300	Conforms to cat I & II
[illegible]	Lower hitch point tyre clearance	100 (min)/ 100 (min)	200	--do--
[illegible]	Lower hitch point height	200 (max) / 200 (max)	200	--do--

[illegible] **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.	Length of lower link	A	870	870
2.	Length of lift arm	B	230	230
3.	Length of lift rods	C	445 to 560	515
4.	Length of top link	D	720 to 980	720
5.	Distance of lift rod connection point from pivot point of lower link.	E	350	350
6.	Distance of lower link pivot point from rear wheel axis:			
	-Horizontally	F	130, behind	130, behind
	-Vertically	G	250, below	250, below
7.	Distance of upper link pivot point from rear wheel axis:			
	-Horizontally	H	180,190,210 behind	180, behind
	-Vertically	J	275, 300, 355 above	300, above
8.	Distance of lift arm pivot point from rear wheel axis:			
	-Horizontally	K	35,behind	35,behind
	-Vertically	L	280, above	280, above
9.	Height of lower hitch points relative to the rear wheel axis:			
	- In high position	M	105 to 340	200, above
	- In low position	N	- 545 to -210	410, below
10.	Height of lower link hitch points when locked in transport position	--	Any height within the power range	200, above

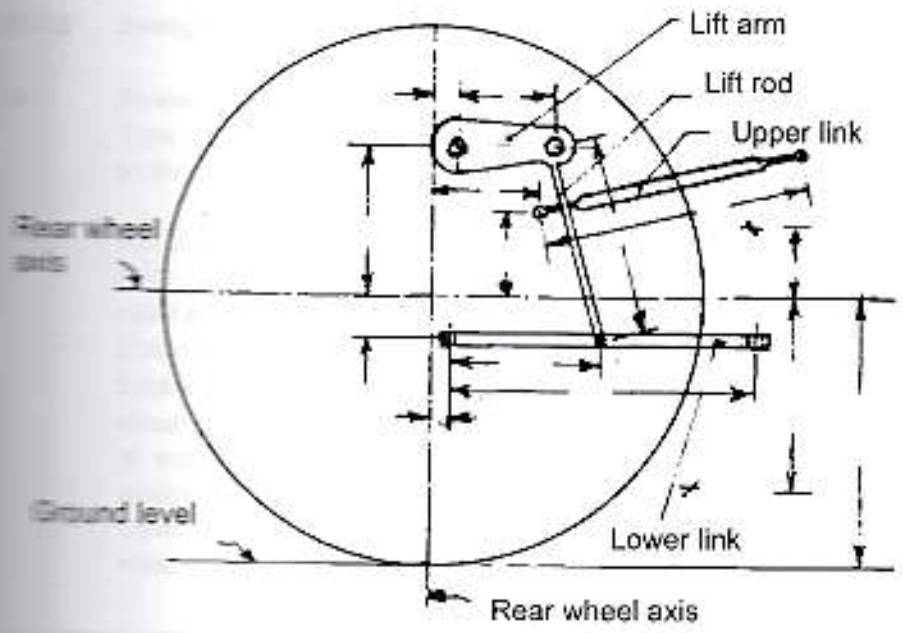


Fig. 1 (A): DIMENSIONAL NOTATIONS FOR TABLE OF LINKAGE GEOMETRY

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

Notation	As per IS: 12953-1995 (Cat. I)/(Cat.II) (mm)	As measured, (mm)	Remarks
A	683 ± 1.5 / 825 ± 1.5	684	Conforms to cat-I
B	75 (min) / 75 (min)	75.0	Conforms to Cat-I & Cat II
C	30 (min) / 30 (min)	30.0	--do--
[illegible]	21.79 to 22.00 / 27.79 to 28.00	27.9	Conforms to cat-II
E	39.0 (min) / 49.0 (min)	53.3	Conforms to Cat-I & Cat II
F	12.0 (min) / 12.0 (min)	12.1	--do--
G	15.0 (min) /15.0 (min)	18.0	--do--
H	25 ± 1 / 25 ± 1	25.0	--do--
J	80 ± 1.5 / 80 ± 1.5	80.0	--do--
No. of holes	7 / 9	07	Conforms to cat-I

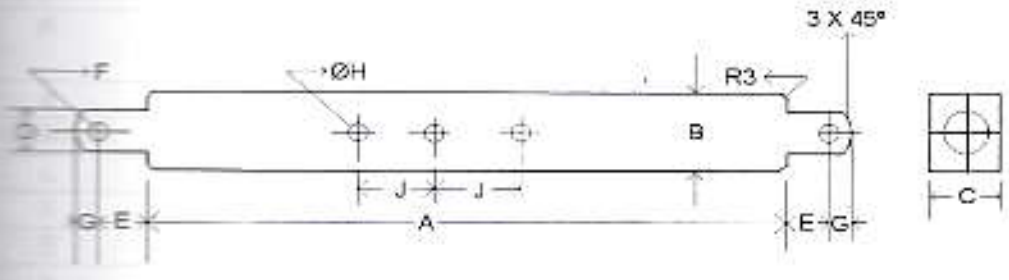


Fig. 1 (B): DIMENSIONAL NOTATIONS FOR LINKAGE DRAWBAR

1.12.4.2	Swinging drawbar	:	Not provided
1.13	Power take-off shaft:		
	Type	:	Type-I, Not Independent
	Method of engaging	:	By a hand lever provided on LHS of operator seat
	No. of shaft(s)	:	One
	PTO speed corresponding to rated engine speed of 2000 (rpm)	:	536
	Distance behind rear axle, (mm)	:	335
	Engine to PTO speed ratio	:	3.73 & 2.94 for (540E)
	Whether the PTO shaft is capable of transmitting the full power of engine	:	Yes
	Other speeds corresponding to rated engine speed	:	**Not applicable in Base Model** | 175, 262, 389, 215 (R)

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

Specification	As per IS:4931-1995 (Type-I)	As observed	Remarks
Nominal speed (rpm)	540 ± 10	540 rpm of PTO corresponds to 2014 rpm of engine.	Conforms
No. of splines	6	6	-do-
Direction of rotation	Clockwise	Clockwise	-do-
Location	The position of the centre of the end of PTO shaft shall be within 50mm to right or left of the centre line of the tractor	Centrally located	-do-
Dimensions (mm) (See Fig. 2):			
D2	34.79 ± 0.06	34.79	Conforms
d2	28.91 ± 0.05	28.81	-do-
B2	29.4 ± 0.1	29.4	-do-
A2 (Optional)	8.3 ± 0.5	NA	--
W	8.69 – 0.09 - 0.16	8.53	Conforms
a	7	7	-do-
a1 (Optional)	25 ± 0.5	NA	--
c	38	38	Conforms
X	30°	30°	--do--
B	76 (min)	79	--do--
h	450 to 675	590	--do--

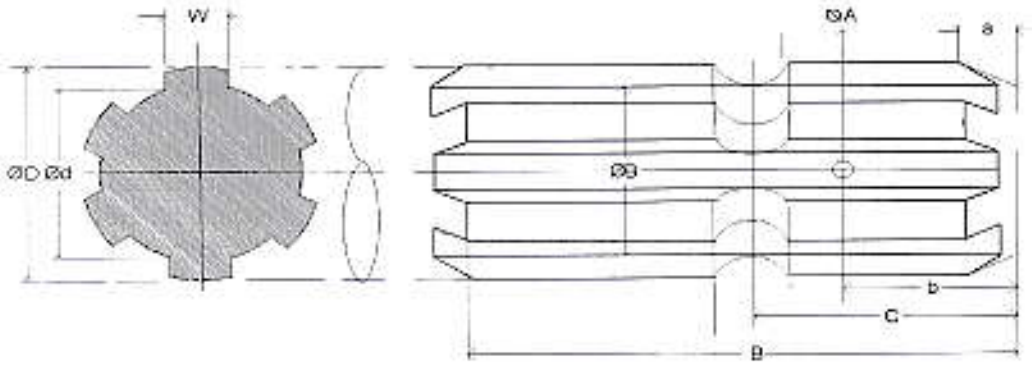


Fig. 2: DIMENSIONAL NOTATIONS FOR TYPE-I POWER TAKE-OFF SHAFT

1.14.3 Master Shield of Power Take-Off Shaft : **Not provided**

1.15 Towing hitch:

1.15.1 Front:

Type	:	Clevis
Location	:	At front ballast weight bolted on front axle mounting bracket.
Height above ground level,(mm)	:	680 (fixed)
Type of adjustment	:	None
Width of clevis, (mm)	:	100
Dia of pin hole, (mm)	:	30.0

1.15.2 Rear:

Type	:	Clevis
Location	:	At rear of transmission housing
Height above ground level, (mm):		
- Maximum	:	765
- Minimum	:	465
No. of position	:	6
- Type of adjustment	:	By changing the position of hitch on its mounting bracket and by reversing the hitch.
Distance of hitch point,(mm):		
- From rear axle centre	:	425
- From power take-off shaft end	:	90
Dia of pin hole, (mm)	:	29.5
Width of clevis, (mm)	:	72.0

1.16 Steering:

Make	:	Danfoss (apa)
Type	:	Open centre, Hydrostatic
Location	:	Above clutch housing
Diameter of steering control wheel,(mm)	:	375
Make & type of Steering drive pump	:	Dynamatics & tandem gear
Location	:	Mounted 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, on LHS
Oil capacity of steering system, (l)	:	1.4 (separate reservoir).
Oil change period	:	Change after every 1200 hours of operation.

1.17 Brakes:

1.17.1 Service Brake:

Make	:	New Holland (apa)
Type	:	Mechanical, oil immersed multidisc
Location	:	On half rear axle shaft on both side of final drive
No. of discs	:	Three (on each wheel side)
Area of liners. (cm^2)	:	692.7 (on each wheel side)
Material of liners	:	Organic (apa)
Method of operation	:	Individual /combine RHS foot pedal operation.

1.17.2 Parking Brake:

Type	:	Pawl & ratchet arrangement for locking service brake discs.
Method of operation	:	By locking the service brake discs through a separate hand lever provided on RHS of operator's seat.

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 250 kPa pressure, (kgf)	:	450 (as on tyre)
Recommended inflation pressure, kPa :		
- for field work	:	230
- for transport	:	230
Track width, (mm)	:	1255 (Std.),1385
Method of changing track width	:	By reversing the wheel disc.
Make & size of rim	:	SSWL, 4.50E x 16

1.18.2 **Driving wheel:**

Make	:	GOOD YEAR
Number	:	Two
Type of tyre	:	Pneumatic, traction
Size	:	13.6 -28
Ply rating	:	12
Maximum permissible loading capacity of each tyre at 230 kPa pressure, (kgf)	:	1800
Recommended inflation pressure, (kPa)		
- for field work	:	110
- for transport	:	140
Track width, (mm)	:	1235,1320 **(Std)**, 1505,1565,1635 & 1745
Method of changing track width	:	By reversing the wheel disc and changing position of wheel disc on offset rim lugs.
Make & size of rim	:	SSWL, W 12 x 28

1.18.3 **Wheel base, (mm)** : 1910
Method of changing wheel base, if any : None

1.19 **Operator's seat:**

Make	:	New Holland (apa)
Type	:	Cushioned
Type of suspension	:	Two Helical coil springs
Type of damping	:	Hydraulic shock absorber
Range of adjustment,(mm):		
- Vertical	:	Nil
- Lateral	:	Nil
- Longitudinal	:	± 105

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

1.20.1 **Conformity with IS: 12343-1998: (Re-affirmed in March, 2009).**
Operator's seat meets the requirements, except following:

i) Width of seat is less than the requirement.

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 meets the requirements.

1.20.3 **Conformity with IS:8133-1983 (Re-affirmed in March, 2009):**
Location and movement of various controls meets the requirement.

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 arrester is not provided in the exhaust system.

1.20.5 **Conformity with IS:12239 (Part-2)-1999 (Re-affirmed in March, 2009):**
Meets the requirements of IS:12239 (Part-2)-1999, **except the following:**

i) Power take off master shield is not provided.
ii) The working clearance between the position & draft control levers is 40 mm, which does not meet as per the requirement.

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

Location of labeling :- The labelling plate riveted on inner side of LHS mudguard, provides the following information.

Name of Manufacturer	**CNH Industrial (India) Private Limited**
Make	New Holland
Model	3510
Engine Number	S324D97875
Chassis Number	NHN35100ZGL372672
Maximum P.T.O Power, kW (hp)	24.3 (33)
Specific fuel consumption,(g/hph)	198

1.22 **Ballast Mass (kg):**

Particular		As used during drawbar test	As used during field test	As used during haulage test
			Dry land	
Front	C.I. weight	60	Nil	60
	Water	Nil	Nil	Nil
Rear	C.I. weight	400	80	80
	Water	205	205	205
	Additional weight, if any	Nil	Nil	Nil

1.22.1 **Standard ballast if any:**

Particulars	Front	Rear
C.I. Weights, (kg)	50	80
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
a)	With standard ballast	720	1105	1825
b)	With ballast as used during drawbar performance test	810	1695	2495
c)	With ballast as used during haulage test (including trailer hitch, canopy & linkage drawbar)	810	1400	2210

1.24 Overall dimensions:

Condition	Length, (mm)	Width, (mm)	Height, (mm)		Ground Clearance, (mm)
			With exhaust pipe	Without exhaust pipe	
With standard ballast	3410	1690	2250	1625 (at steering wheel)	385 (Below tie rod)

1.25 **Number of external lubricating points:**

- Oiling : Nil
- Grease nipples : 20
- Grease cups : 02

1.26 **Colour of tractor:**

Chassis : Black

Sheet metal:

Bonnet & Mudguard : Blue

Rim & Disc : White

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	2	3	4
1.	Engine	SAE 20W40	As recommended
2.	Transmission, differential, final drive ,brake , and hydraulic oil	SAE -80	Oil originally filled in the tractor was not changed
3.	Steering system		
	with Std. fitment hydraulic	SAE 80	
	with optional mechanical	SAE 140	--
4.	Grease	NLG1-2	MP Grease

3. PTO PERFORMANCE TEST

[redacted] : 08.02.2017 & 09.02.2017
[redacted] : 7.3
[redacted] : SAJ AG 250 Eddy Current

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:						
[redacted]	536	1999	7.35	6.15	0.267	3.14
[redacted]	536	1999	7.07	5.91	0.273	3.07*
b) Power at rated engine speed (2000 rpm):						
[redacted]	536	1999	7.35	6.15	0.267	3.14
[redacted]	536	1999	7.07	5.91	0.273	3.07*
c) Power at standard power take-off speed (540 ± 10 rpm):						
[redacted]	540	2014	7.20	6.02	0.271	3.09
[redacted]	540	2014	6.41	5.36	0.276	3.03*
d) Running loads at rated engine speed:						
i) Torque corresponding to maximum power available at rated engine speed:						
[redacted]	536	1999	7.35	6.15	0.267	3.14
ii) 85% of the torque obtained in (i):						
[redacted]	542	2022	6.45	5.39	0.272	3.07
iii) 75% of the torque obtained in (ii) :						
[redacted]	546	2037	5.20	4.35	0.291	2.87
iv) 50% of the torque obtained in (ii) :						
[redacted]	551	2055	4.08	3.41	0.338	2.48
v) 25% of the torque obtained in (ii) :						
[redacted]	576	2148	3.22	2.69	0.512	1.63
vi) Unloaded:						
[redacted]	586	2186	2.28	1.91	15.500	0.05
e) Carrying loads at Standard PTO Speed:						
The maximum PTO power was observed at 536 rpm of PTO speed, which lies in the range of standard PTO speed of 540 ± 10 rpm. Hence this test was not conducted.						

*Under high ambient conditions.

		Natural ambient	High ambient
-No load maximum engine speed (rpm)	:	2186	2171
-Equivalent crankshaft torque at maximum power, (Nm)	:	109.8	103.7
-Maximum equivalent crankshaft torque (Nm)	:	130.4	123.6
-Engine speed at maximum equivalent crankshaft torque (rpm)	:	1250	1201
- Backup torque, (%)	:	18.76	--
Smoke level, maximum light absorption coefficient, (per meter)	:	0.18	--
- Range of atmospheric conditions:			
Temperature (°C)	:	27 to 28	41 to 44
Pressure, (kPa)	:	99.2 to 99.4	100.0 to 100.5
Relative humidity (%)	:	41 to 43	21 to 27
-Maximum temperatures, (°C):			
Engine oil	:	111	124
Coolant	:	83	97
Fuel	:	53	68
Air intake	:	28	46
Exhaust gas	:	488	504
-Pressure at maximum power:			
Intake air, (kPa)	:	2.4 to 2.5	2.5 to 2.6
Exhaust gas, (kPa)	:	9.1 to 10.8	9.5 to 10.8
-Consumptions :			
Lub oil, (g/kWh)	:	--	0.73
Coolant (% of total coolant capacity)	:	--	Nil

4. DRAWBAR PERFORMANCE TEST

Date(s) of test	:	25.06.2017, 27.06.2017, 28.06.2017 & 29.06.2017
Tractor run at the Institute prior to start of drawbar performance test, (h)	:	37.5
Type of track	:	Concrete
Height of drawbar, (mm):		
- With standard ballast	:	650
- With ballast	:	575

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.**

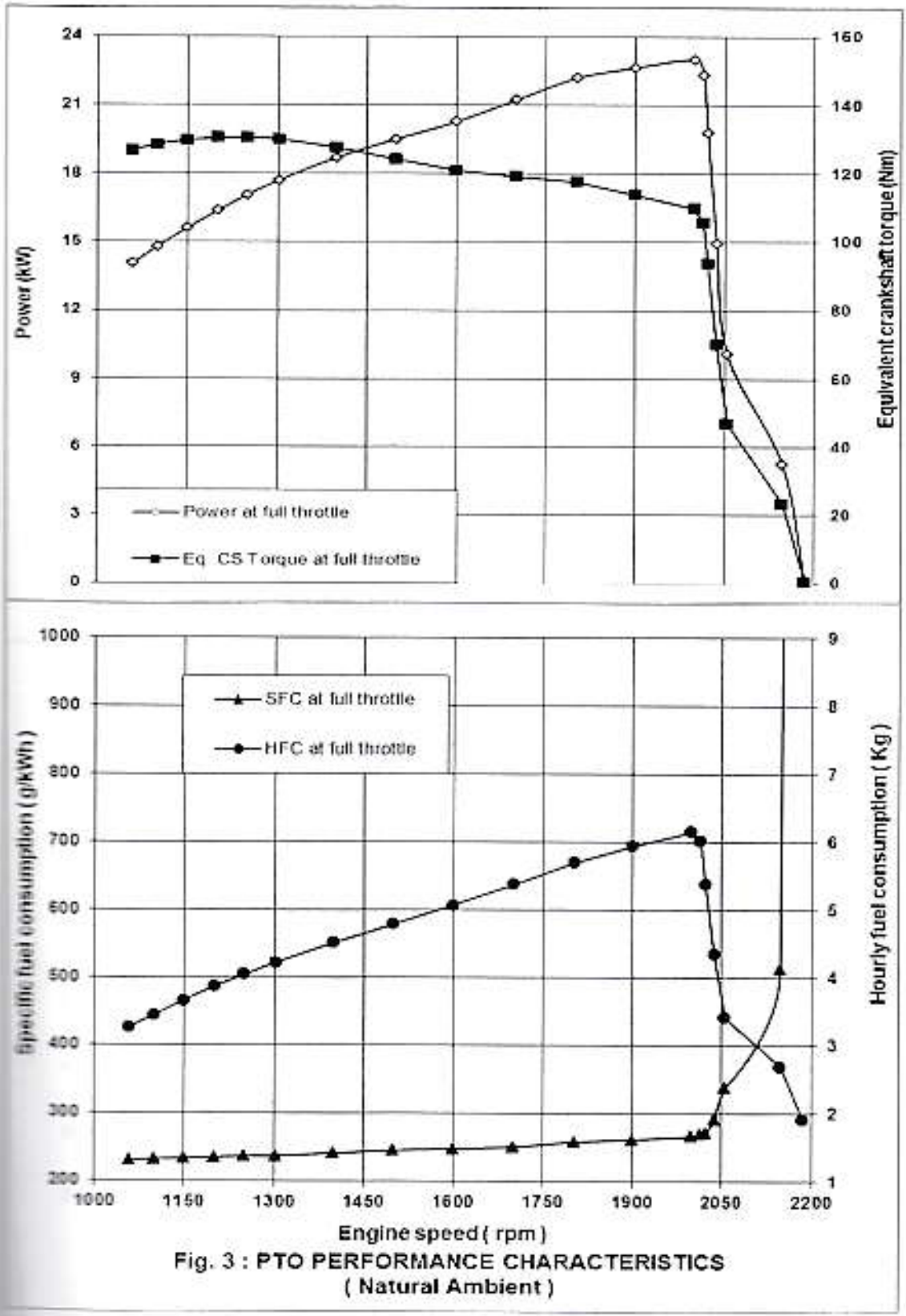


Fig. 3 : **PTO PERFORMANCE CHARACTERISTICS**
(Natural Ambient)

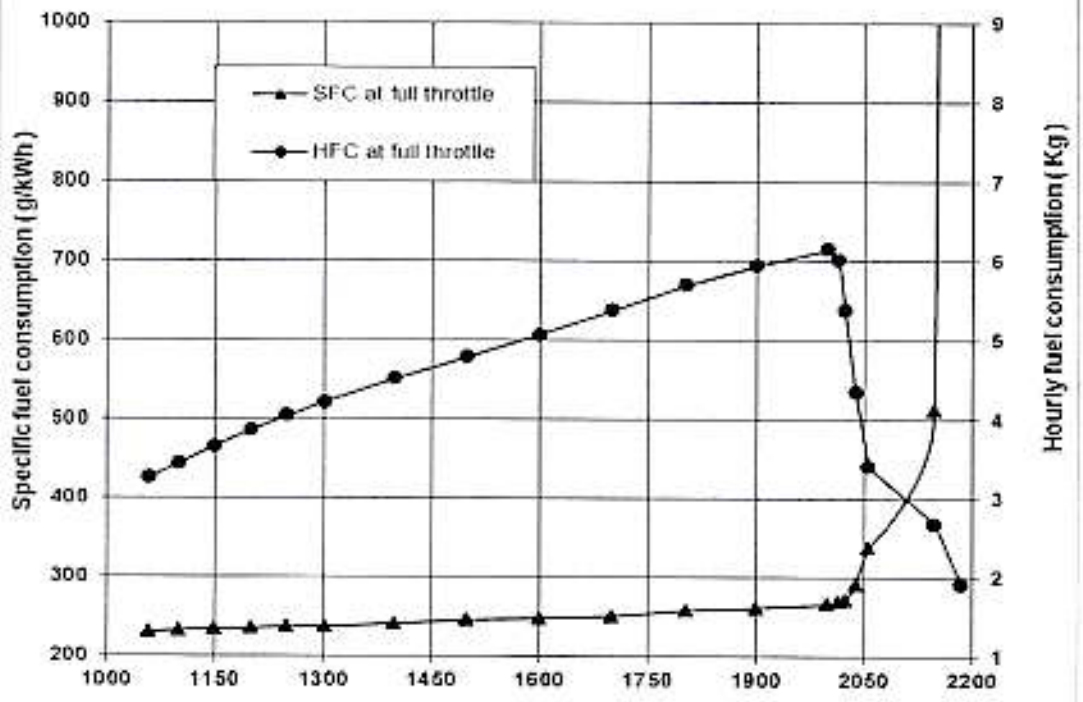


Fig. 3 : PTO PERFORMANCE CHARACTERISTICS
(Natural Ambient)

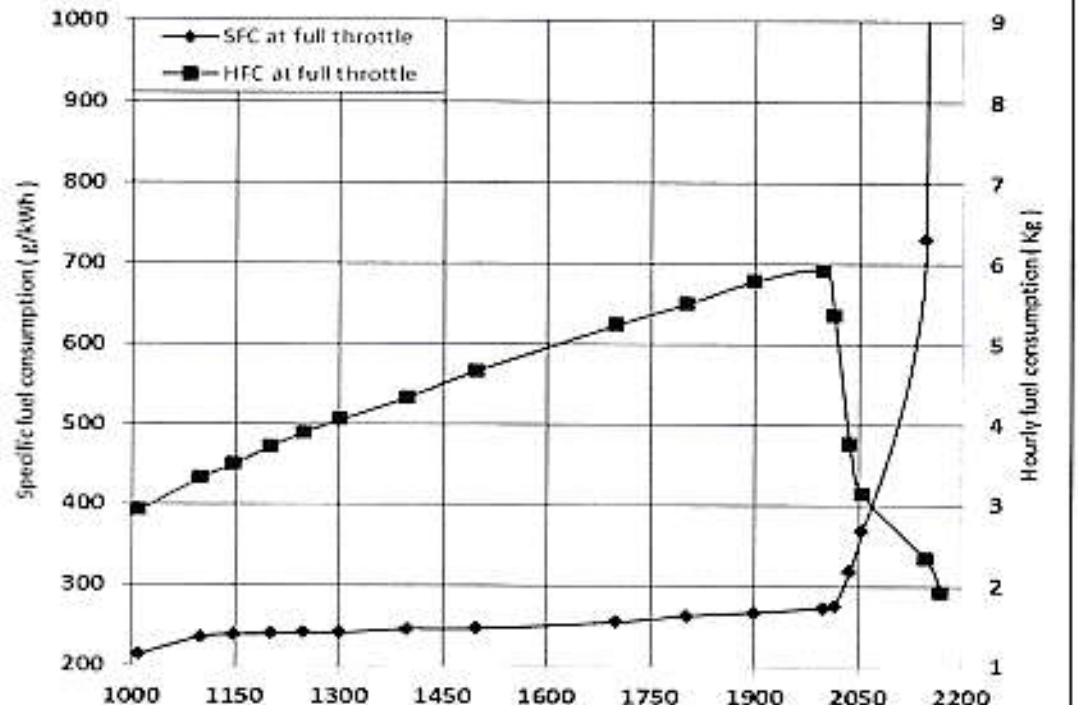


Fig. 4 : PTO PERFORMANCE CHARACTERISTICS
(High Ambient)

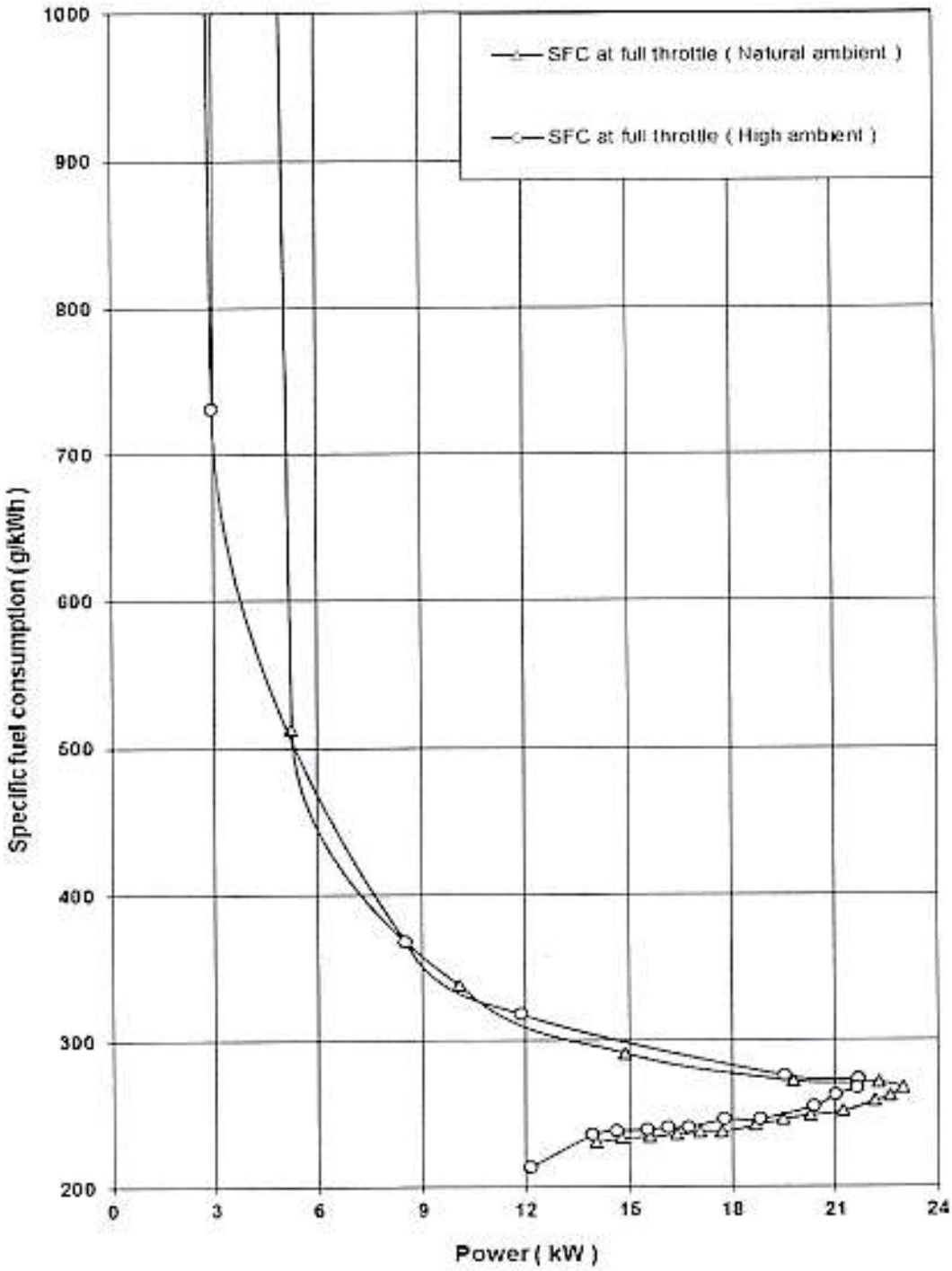


Fig. 5 : PTO PERFORMANCE CHARACTERISTICS

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	Tran s 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	2.35	10.1	15.43	2049	14.7	0.395	4.77	2.12	32	97.6	65	38	77	80	104	15.63
L2	3.51	14.7	15.04	2032	14.8	0.351	6.17	2.38	30	97.6	65	36	77	81	106	15.15
L3	5.46	18.5	12.22	1999	8.8	0.334	7.39	2.50	28	97.7	68	34	63	81	103	14.82
L4	7.77	20.9	9.69	2004	6.0	0.296	7.40	2.82	27	97.7	64	33	59	83	102	11.12
H1	9.30	21.1	8.16	2004	5.0	0.297	7.49	2.82	26	97.6	67	33	55	82	99	10.08
ii) Maximum power test (Tractor ballasted):																
L1	2.28	13.4	21.13	2030	14.8	0.367	5.88	2.28	28	97.5	66	35	78	80	104	22.53
L2	3.61	18.6	18.52	2000	9.3	0.327	7.28	2.56	28	97.4	73	34	64	86	105	20.96
L3	5.57	18.6	11.99	1999	5.2	0.328	7.30	2.55	28	97.5	73	34	61	83	103	14.93
L4	7.79	20.5	9.47	1995	3.6	0.301	7.38	2.78	28	97.5	79	34	58	83	102	10.97
H1	9.31	20.8	8.04	1998	2.8	0.295	7.34	2.83	27	97.5	72	33	53	84	98	9.84

Table-2 Contd..

Contd..Table-2

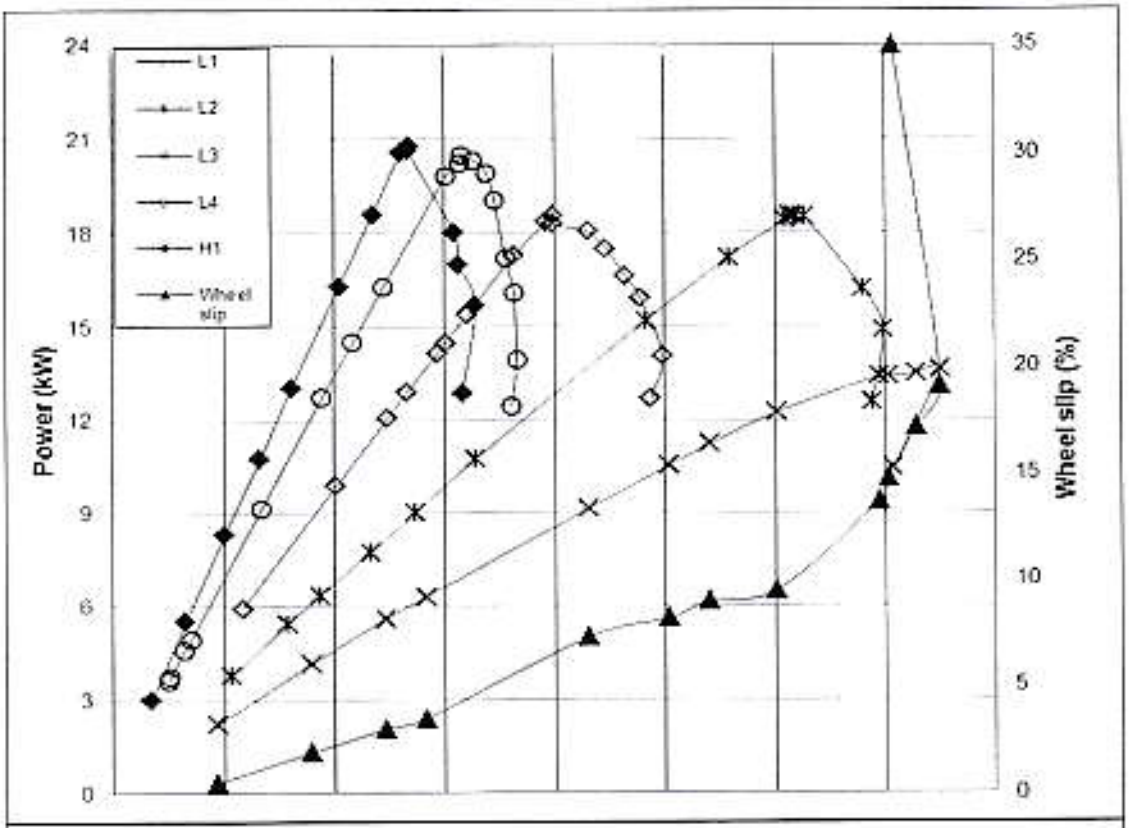
Gear	Travel Speed, (km/h)	Draw-bar power, (kW)	Draw-bar pull, (kN)	Engine Speed (rpm)	Wheel Slip, (%)	Fuel consumption		Specific Energy, (kWh/l)	Atmospheric conditions			Temperature (°C)				Max. sust-ained pull, (kN)
						(kg/ kWh)	(l/h)		Temp (°C)	Pre-ssure (kPa)	R.H. (%)	Fuel	Trans. oil	Coolant (water)	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	3.74	14.4	13.90	2030	8.2	0.336	5.93	2.43	27 to 32	97.7 to 98.0	65 to 76	34 to 49	50 to 80	79 to 83	91 to 107	--
iv) Five hours test at pull corresponding to 15 percent wheel slip (ballasted wheeled tractor):																
L1	2.31	13.5	21.15	2032	--	0.363	6.01	2.26	29 to 33	97.4 to 97.9	55 to 73	39 to 49	53 to 81	78 to 82	98 to 105	--

I) The coolant (water) and lub oil consumption during 10 hours test were observed as 5.0 ml/h and Nil respectively.

ii) Tyre Creeping, (mm):
- LHS : 45
- RHS : 45

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

Engine oil	:	108
Coolant (water)	:	88
Transmission oil	:	81
Fuel	:	49



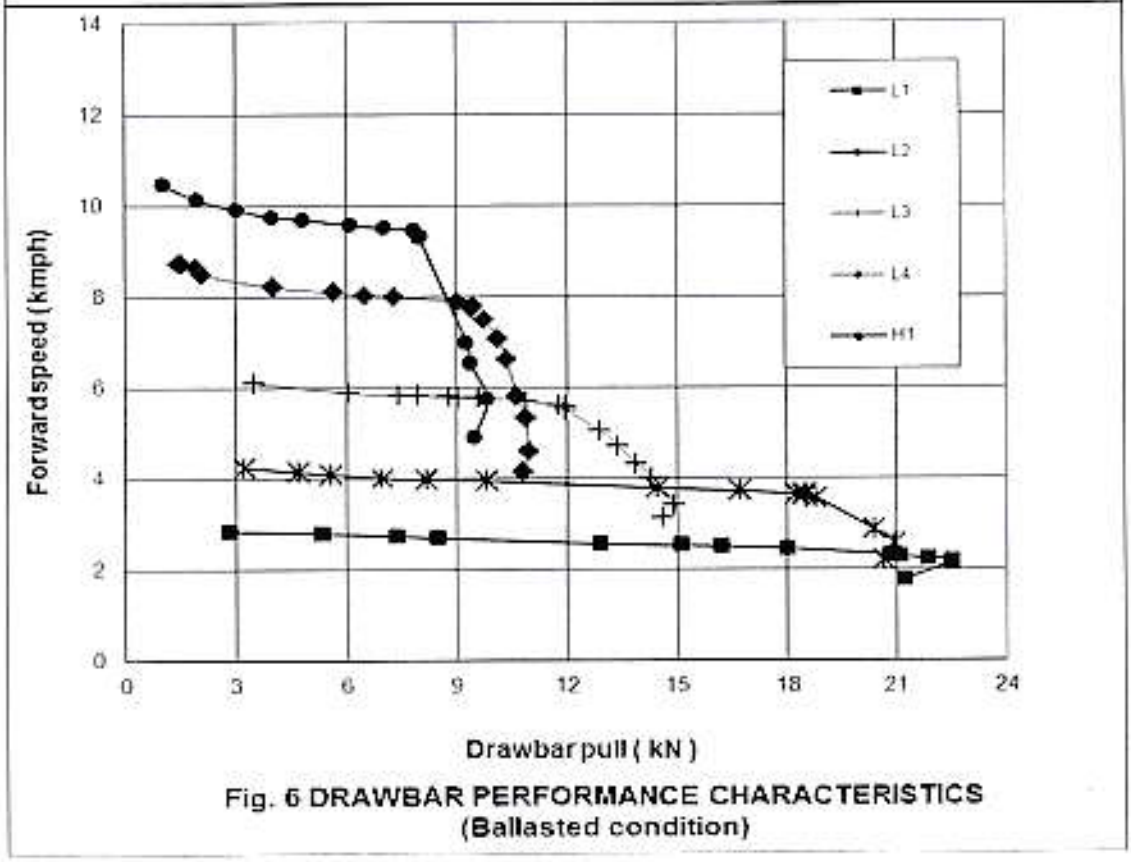


Fig. 6 DRAWBAR PERFORMANCE CHARACTERISTICS
(Ballasted condition)

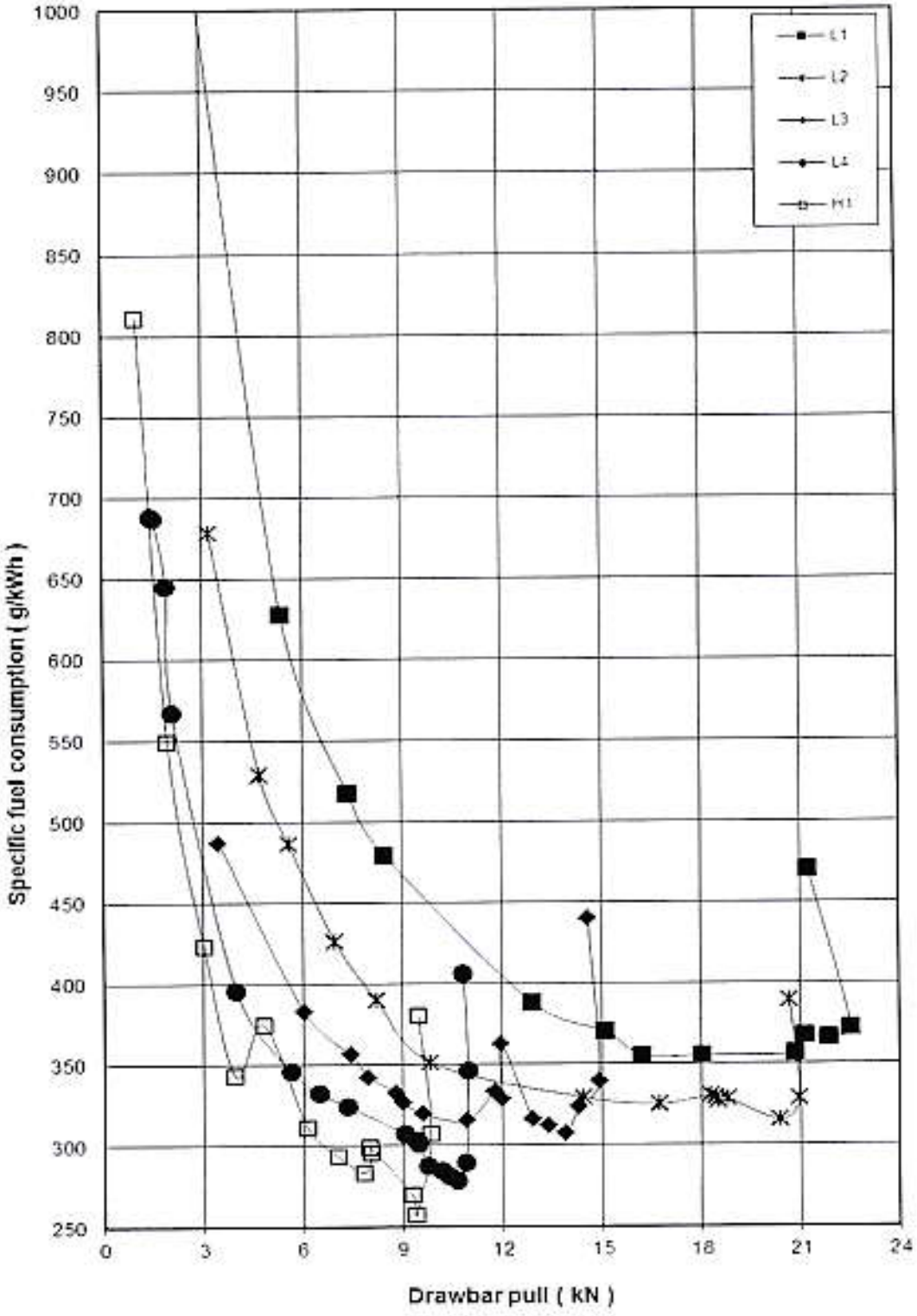


Fig.7 DRAWBAR PERFORMANCE CHARACTERISTICS
(Ballasted condition)

5. POWER LIFT & HYDRULIC PUMP PERFORMANCE TEST

Date(s) of test : 20.04.2017 & 21.04.2017
Tractor run at the Institute prior to start of hydraulic test, (h) : 22.0
Pump speed at rated engine speed (rpm) : 1860(apa)

5.1 Hydraulic power test:

Pump delivery rate at minimum pressure and rated engine speed, (l/min) : 28.5
Maximum hydraulic power,(kW) : 6.5
Pump delivery rate at maximum hydraulic power, (l/min) : 25.9
Pressure at maximum hydraulic power, (MPa) : 15.0
Sustained pressure of the open relief valve, (MPa) : 17.4
Tapping point:
a) Relief valve test : External circuit
b) Pump performance test : Pump outlet
Temperature of hydraulic fluid, (°C) : 60 to 69

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	595	8.97	15.7	8.97	--
On the standard frame	200	590	7.59	15.7	12.22	13.0

5.3 Maintenance of lift load:

Force applied at the frame, (kN) : 6.83
Temperature of hydraulic fluid at the start of test, (°C) : 60

Test data:

Elapsed time (minute)	5	10	15	20	25	30
Cumulative drop in height of lift, (mm)	00	00	05	10	15	15

6. BRAKE TEST

6.1 Service brake:

6.1.1 Cold brake test:

Date of test(s) : 31.01.2017
Type of Track : Concrete
Maximum attainable speed (kmph):
- With standard Ballast : 30.8
- With Ballasted (Road work) : 30.8

		At maximum attainable speed			
Standard ballasted tractor	Braking device control, force (N)	544	430	315	201
	Mean deceleration, (m/sec^2)	3.53	3.29	3.15	2.50
	Stopping distance, (m)	10.37	11.11	11.61	14.64
Ballasted Tractor (Road work)	Braking device control force(N)	478	394	310	225
	Mean deceleration, (m/sec^2,)	3.42	3.28	2.75	2.50
	Stopping distance, (m)	10.55	11.15	13.31	14.64
		At 25 kmph travel speed			
Standard ballasted tractor	Braking device control, force(N)	498	400	302	204
	Mean deceleration, ($m/sec.^2$)	3.48	3.19	2.91	2.50
	Stopping distance, (m)	7.15	7.56	8.28	9.65
Ballasted Tractor (Road work)	Braking device control force,(N)	510	412	314	216
	Mean deceleration, ($m/sec.^2$)	3.35	3.16	2.90	2.50
	Stopping distance, (m)	7.37	7.64	8.32	9.65

6.1.2 Brake fade test:

		At maximum attainable speed			
Ballasted Tractor (Road work)	Braking device control force(N)	506	434	363	291
	Mean deceleration, ($m/sec.^2$)	3.40	3.36	2.79	2.50
	Stopping distance, (m)	10.63	10.89	13.14	14.64
		At 25 kmph travel speed			
Ballasted Tractor (Road work)	Braking device control force,(N)	540	443	346	249
	Mean deceleration, ($m/sec.^2$)	3.27	3.07	2.88	2.50
	Stopping distance, (m)	7.57	7.85	8.37	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)	264	336	221	271
Efficacy of parking brake	----------Effective ----------			

7. NOISE MEASUREMENT

7.1 Noise at bystander's position:

Date of test	:	31.01.2017
Type of track	:	Concrete
Background noise level, dB (A)	:	54.5
Atmospheric conditions:		
Temperature, (°C)	:	31
Pressure, (kPa)	:	97.6
Relative humidity, (%)	:	40
Wind velocity, (m/s)	:	1.1

TEST DATA:-

S. No.	Gear	Travelling speed before acceleration, (kmph)	Noise level, dB (A)
1.	L1	2.16	81
2.	L2	3.26	81
3.	L3	4.83	81
4.	L4	6.59	81
5.	H1	7.86	81
6.	H2	11.85	80
7.	H3	17.05	80
8.	H4	22.86	80

7.2 Noise at operator's ear level:

Date of test	:	25.06.2017
Type of track	:	Concrete
Background noise level, dB(A)	:	57.6
Atmospheric conditions:		
Temperature, (°C)	:	30
Pressure, (kPa)	:	97.6
Relative humidity, (%)	:	55
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	2.91 to 15.45	2.85 to 2.32	91
L2	3.04 to 15.04	4.27 to 3.51	91
L3	3.48	6.17	92
L4*	0.76 to 9.69	8.84 to 7.77	91
H1	0.75 to 8.10	10.58 to 9.28	91

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

8. AIR CLEANER OIL PULL-OVER TEST

Date of test : 18.01.2017
Tractor run at the Institute prior to start of air cleaner oil pull-over test, (h) : 0.2
Atmospheric conditions:
Temperature, (°C) : 20 to 35
Pressure, (kPa) : 97.8
Relative humidity, (%) : 32 to 62
Mass of oil before test, (g) : 471.5

Sl. No	Position of tractor	Loss of oil (g)	Oil pull-over (%)	Engine oil pressure
i)	Tractor parked on level ground	0.1	0.02	Normal
ii)	Tractor tilted 15° laterally on RHS*	Nil	Nil	Normal
iii)	Tractor tilted 15° laterally on LHS*	Nil	Nil	Normal
iv)	Tractor tilted 15° longitudinally with front end up	0.1	0.02	Normal
v)	Tractor tilted 15° longitudinally with rear end up	Nil	Nil	Normal

9. MECHANICAL VIBRATION MEASUREMENT

Date of test : 14.02.2017
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	60	40	20	20
		Right	20	80	30	30
ii)	Steering control wheel		140*	110*	100	110*
iii)	Seat	Bottom	10	10	10	30
		Back	10	30	70	150*
iv)	Mudguard	Left	90	90	70	40
		Right	130*	70	40	30
v)	Head light	Left	40	30	40	40
		Right	30	30	40	30
vi)	Battery base, centre		60	40	30	30
vii)	Tail light	Left	150*	190*	70	120*
		Right	140*	100	60	60
viii)	Plough light		130*	110*	130*	70
ix)	Gear shifting lever		30	10	10	20
x)	Accelerator lever	Hand	70	60	90	120*
		Foot	70	140*	30	20
xi)	Brake pedal	Left	230*	230*	40	60
		Right	150*	90	40	40
xii)	Clutch pedal		90	60	40	90
xiii)	Main hydraulic control lever		40	30	10	20
xiv)	PTO engaging lever		20	10	20	30

*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-662/1168/2009**, released in April 2009. 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.

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)	:	610	615
Gear used during the test for negotiating slopes up to 8%	:	H-4	H-4
Average travel speed,(kmph)	:	27.57 to 28.32	27.21 to 27.57
Average fuel consumption:			
- (l/h)	:	5.0 to 5.13	5.1 to 5.4
- (ml/km/tonne)	:	44 to 47	34 to 36
Average distance traveled per liter of fuel consumption, (km)	:	5.37 to 5.66	5.1 to 5.3
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 48.8 hours of tractor operation at this Institute.

12.1 Engine:

12.1.1 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.	88.93	88.92	88.93	88.92	88.93	88.92	89.2
2.	88.93	88.92	88.93	88.92	88.93	88.93	
3.	88.93	88.92	88.93	88.92	88.93	88.92	

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.	88.387	88.238	88.808	88.520	0.122	0.50
2.	88.345	88.230	88.806	88.521	0.124	
3.	88.370	88.237	88.806	88.517	0.124	

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	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	1.50
2nd comp. ring	0.35	0.35	0.35	0.35	0.35	0.35	0.30	0.30	0.30	1.50
Oil ring	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	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	0.093	0.097	0.096	0.40
2nd Compression ring	0.062	0.070	0.068	0.40
Oil ring	0.054	0.050	0.042	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.	0.090 to 0.099	0.28	0.50	0.50
2.	0.085 to 0.138			
3	0.104 to 0.116			
4.	0.089 to 0.138			

12.1.6 Big end bearings:

Bearing No.	Clearance, (mm)		Maximum permissible limit,(mm)	
	Diametrical	Axial	Diametrical	Axial
1.	0.073	0.20	0.60	0.75
2.	0.073 to 0.140	0.25		
3.	0.089to 0.094	0.25		

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 : : 13.73 to 14.22
- Exhaust valve spring: : 13.24 to 13.73

Against discard limit of 9.8 N/mm

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

- Intake valve : 0.074 to 0.080
- Exhaust valve : 0.066 to 0.087

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):	:	10.43 to10.96	Discard limit wear upto 0.2 mm above rivet head.
Height of lining over rivet head, (mm):		2.73 to 3.17	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)	:	0.24	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	4.75 to 4.90	4.80 to 4.82	0.53 to 0.76	0.20
Right	4.75 to 4.90	4.76 to 4.82	0.43 to 0.79	

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)	:	0.18 to 0.24	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)	:	0.15 to 0.22	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 (TEST REPORT No. T-662/1168/2009) AND PRESENT SAMPLE

			Previous sample	Present sample
14.1	**Specification:**			
14.1.1	**Tractor:**			
	Make	:	New Holland	New Holland
	Model	:	3510	3510
14.1.2	**Engine:**			
	Make	:	Simpsons	Simpsons
	Model	:	T IIIA S 324/NH	T III A S324/NHF1.2
	Bore/Stroke, (mm)	:	88.9/127	88.9/127
	Specified cubic capacity, (cu.cm)	:	2365	2365
	Rated engine speed (rpm)	:	2000	2000
14.1.2.1	**Fuel system:**			
	Make & model of fuel feed pump	:	Bosch India, FP/KSG 22AD 45/2	Bosch 9440 030 030 (apa)
	Make & model of fuel filters	:	Mico LIC Bosch F002 H20 133	New Holland F002 H20 136 (apa)
	Make and model of fuel injection pump	:	Bosch ,India 9 400 030 651	Bosch, India, F002 A0Z 771
	Make & model of fuel injectors	:	Bosch ,India F002 C70 009	Bosch ,India F002 C70 018
	Type of injector	:	Multiholes (5)	Multiholes (5)
	Manufacturer's production pressure setting, (MPa)	:	23.0+0.8	25.0 +0.8
	Injection timing	:	15±1 BTDC	13+0/-2 °BTDC
	Make & model of governor	:	Bosch ,India RSV350...1100A2C21 23 4R	Bosch ,India RSV375...1000A4C1410R
14.1.2.2	**Lubricating system:**			
	Total lubricating oil capacity.(l)	:	8.0	8.65
14.1.3	**Transmission:**			
14.1.3.1	**Clutch:**			
	Type of clutch plate	:	Dry ,friction plate	Dry ,friction plate
	Size, OD/ID,(mm):		239.8/160.3	279.7/165.3
14.1.3.2	**Gear Box:**			
	No. of speeds:			
	- Forward	:	08	08
	- Reverse	:	02	02
	Range of speed, (kmph) :			
	- Forward	:	2.74 to 31.15	2.53 to 28.25
	- Reverse	:	3.38 to 12.38	3.12 to 11.30
14.1.4	**Service Brake:**			
	Make	:	NA	NA
	Type	:	Mechanical oil immersed discs	
	No. of friction disc	:	02 (Each side)	03 (Each side)
	Area of liners, (cm^2)	:	472.7(Each side)	692.7
14.1.5	**Wheel equipment:**			
	Make & Size of tyres	:		
	- Front	:	MRF	GOOD YEAR
	- Rear	:	MRF	GOOD YEAR
	Standard Track width, (mm):			
	- Front	:	1330	1255
	- Rear	:	1340	1320
14.1.5.1	**Wheel base, (mm)**	:	1920	1910

			Previous sample	Present sample
14.1.6	**Overall dimensions, (mm):**			
	- Length	:	3410	3410
	- Width	:	1690	1690
	- Height (at steering wheel)	:	2300	2250
	- Ground clearance, (mm)	:	366	385
14.1.7	**Operational mass of Std. Ballasted tractor(kg):**			
	- Front	:	730	720
	- Rear	:	1040	1105
	- Total	:	1770	1825

	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 March, 2009)]	:	Confirmed	Confirms
ii)	Agricultural tractors – Rear mounted power take-off - Types 1, 2 and 3 (third revision)[IS: 4931-1995 (Reaffirmed in March, 2009)]	:	Confirmed	Confirms
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, 2007)	:	**Didn't Confirm**	Confirms
iv)	Drawbar for agricultural tractors – Link type [IS 12953:1990 (Reaffirmed in March, 2007)]	:	Confirmed	Confirms
v)	Agricultural tractors - Operator's seat technical requirement [IS 12343 –1998 (First revision) (Reaffirmed in March, 2009)]	:	Confirmed	**Doesn't Confirm**
vi)	Guide for safety & comfort of operator of agricultural tractor Part 1 general requirement (first revision) [IS: 12239 (Part-1) 1996/ISO 4254-I: 1989. (Re-affirmed in March, 2007)]	:	Confirmed	Doesn't Confirm
vii)	Tractors and machinery for agriculture and forestry – Technical means for ensuring safety Part 2: Tractors (first revision) (IS 12239 (PT-2) 1999) (Re-affirmed in March, 2009.)	:	**Didn't Confirm**	**Doesn't Confirm**
viii)	Guide lines for location and operation of operator controls on agricultural tractors and machinery (first revision) (IS: 8133-1983) (Re-affirmed in March, 2009)	:	**Didn't Confirm**	Confirms
ix)	Tractors and machinery for agriculture and forestry, powered lawn and garden equipment – symbols for operator controls and other displays. Part – 2: Symbols for agriculture tractors and machinery [IS :6283 (Part-I&II)-1998 (Reaffirmed in March, 2009) /ISO3767-2: 1991]	:	**Didn't Confirm**	Confirms
x)	Agricultural tractor and machinery lighting device for travel on public roads (IS: 14683-1999) (Reaffirmed in March, 2009)	:	Confirmed	Confirms

14.2	**Performance Characteristics:**			
14.2.1	**PTO Performance:**			
	Maximum Power, (kW)	:	24.6	23.0
	Power at Rated engine speed,(kW)	:	24.6	23.0
	Specific fuel consumption corresponding to maximum power, (g/kWh)	:	272	267

			Previous sample	Present sample
	Maximum equivalent crankshaft torque,(Nm)	:	140.0	130.4
	Back up torque, (%)	:	19.1	18.76
	Maximum temperatures (degree):			
	Engine oil	:	109	124
	Coolant	:	91	97
	Lub oil consumption, (g/kWh)	:	2.57	0.73
14.2.2	**Drawbar performance :**			
	Maximum power with standard ballasted tractor, (kW)	:	20.2	21.1
	Maximum pull with std. ballasted Tractor, (kN)	:	14.15	15.43
	Maximum transmission oil temperature (deg. C)	:	64	81
14.2.3	**Hydraulic performance:**			
	Hydraulic pump discharge at minimum pressure and rated engine speed (l/min.)	:	20.7	28.5
	Maximum hydraulic power, (kW)	:	5.6	6.5
	Sustained pressure of the open relief valve, (MPa)	:	18.0	17.4
	Maximum lifting capacity, (kN):			
	- At the hitch point	:	9.02	8.97
	- At the standard frame	:	8.47	7.59
	Total drop in height of lift during load maintenance test, (mm)	:	13	15

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

Parameter	Previous Sample		Present Sample	
	Cold	Hot	Cold	Hot
Maximum Stopping distance, (m)	6.23 to 6.40	7.60	7.17 to 7.37	7.57

Maximum force exerted on the brake Pedal effort required to achieve deceleration of 2.5 m/sq sec, (N)	:	270 to 390	204 to 249
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:			
- Maximum noise at bystanders position, dB(A)	:	82	81
- Maximum noise at operator's ear level dB(A)	:	96	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 Previous /Present	Two wheel trailer Previous /Present
-Gross mass of trailer, (tonnes)	:	4.0	5.5
- Average speed, (kmph)	:	30.36 to 30.78/ 27.57 to 28.32	30.36 to 30.50/ 27.21 to 27.57
- Distance traveled per litre of fuel consumed, (km)	:	6.13/5. 37 to 5.66	5.38 to 5.42/ 5.1 to 5.3
- Average fuel consumption (cc/km/tonne)	:	40.8/ 44 to 47	33.52 to 33.79/ 34 to 36

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 require-ment (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	19.28	21.13	No
b)	Maximum drawbar pull without ballast corresponding to 15 percent wheel slip, (Kn)	Minimum 65% of static mass of tractor without ballast		14.15	15.43	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 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.		20.2	21.1	Yes
d)	Maximum transmission oil temperature (°C)	The declared value should not exceed the maximum value specified by oil company		64	81	Yes
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	9.02	8.97	Yes
	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		8.47	7.59	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		13	15	No

14.4 Salient Observations:

14.4.1 Laboratory test:

	Previous Sample	Present Sample
14.4.1.2	**Drawbar Performance:**	
i)	During ten hours drawbar test, creeping of LHS & RHS rear tyre over the rims was observed as 18 & 21 mm respectively. This should be looked into for necessary corrective action.	i) During ten hours drawbar test, creeping of LHS & RHS rear tyre over the rims was recorded as 45 mm for each. This should be looked into for necessary corrective action.
14.4.1.3	**Hydraulic Performance:**	
i)	The lifting capacity at hitch point observed as **9.02 kN** against the specified value of **10.78 kN**, which is on lower side and does not meet the requirement if IS: 12207 – 2008 with regard to tolerance. This should be looked into.	i) The lifting capacity at hitch point observed as **8.97 kN** against the specified value of **10.78 kN**, which is on lower side and does not meet the requirement if IS: 12207 – 2014 with regard to tolerance. This should be looked into.
ii)	The angle of mast of hydraulic lift was observed as 9.7 degrees against the requirement of minimum 10 degrees of IS: 12224 – 1987 (reaffirmed in 2004). This should be looked into for necessary corrective action.	
iii)	During lift load maintenance test, the hydraulic lift completely dropped to its lowermost position within 10 minutes due to heavy internal leakage of hydraulic oil. To rectify the internal leakage of the system, three attempts were made, but the exact location of oil leakage in the system could not be traced out, necessitating replacement of major assemblies like hydraulic lift cover assembly and hydraulic distributor assembly. This is considered as pre-mature failure of the system. It is strongly recommended that the strict quality control measures should be carried out at production level.	

14.5 Adequacy of literature:

Previous Sample	Present Sample
Following combined literature of New Holland 3500 / 4000 / 4500 & 5000 models were supplied with the test sample for reference during the test. a) Operator's manual b) Spare parts catalogue	Following combined literature of New Holland 3510, 4010, 4510 & 4710 models were supplied with the test sample for reference during the test. a) Operator's manual b) Parts catalogue c) Service /Repair Catalogue

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	24.3 (D)	23.0	Yes
b)	Power at rated engine speed, (kW)	Non Evaluative	-do-	24.3 (D)	23.0	Yes
c)	Specific fuel consumption corresponding to maximum power, (g/kWh)	Non Evaluative	+ 5%	265 (D)	267	Yes
d)	Maximum equivalent crankshaft torque, (Nm)	Non Evaluative	± 8%	140 (D)	130.4	Yes
e)	Back-up torque, percent	Non Evaluative	10 percent, min.	10 (D)	18.76	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.	132(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.	119 (D)	97	Yes
g)	Engine oil consumption, (g/kWh)	Evaluative	Not exceeding 1% of SFC at max. power under High ambient conditions	2.73 Maximum (R)	0.73	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)	0.18	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	15.52 (D) 15.89 (R) Minimum	21.13	Yes
b)	Max. drawbar pull with standard ballast corresponding to 15 percent wheel slip, (kN)	Evaluative	Minimum 65% of static mass of tractor without ballast or with standard ballast, as the case may be	11.28 (D) 11.63 (R) Minimum	15.43	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.	19.7 (D) 18.4 (R) Minimum	21.1	Yes
d)	Maximum transmission oil temperature (°C)	Non Evaluative	The declared value should not exceed the maximum value specified by oil company	130 (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)	8.97	No
	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) 5.41 (R) Minimum	7.59	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	15	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)	7.37	Yes
	2) Hot brake	Evaluative	10	10 (R)	7.57	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	204 to 249	Yes

1	2	3	4	5	6	7
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
15.1.5	**Noise measurement :**					
a)	Maximum ambient noise emitted by the tractor dB(A)	Evaluative	As per CMVR	88(R)	81	Yes
b)	Maximum noise at operator's ear level dB(A)	Evaluative	As per CMVR	98(R)	92	Yes
15.1.6	**Amplitude of mechanical vibrations at:**					
	1) Left foot rest	Non Evaluative	100 microns (max)	100(R)	60	Yes
	2) Right foot rest				80	Yes
	3) Seat (with driver seated)				150	No
	4) Steering wheel				140	No
15.1.7	**Air cleaner:**					
	Air cleaner oil pull over, (%)	Non Evaluative	0.25 % (maximum)	0.25 % (maximum)	0.02	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)	5.37 to 5.66	Yes
	2) Four wheel		--	4.0 to 6.0(D)	5.10 to 5.30	Yes
c)	Fuel consumption (ml/km/tonne):					
	1) Two wheel	Non Evaluative	--	25 to 50(D)	44 to 47	Yes
	2) Four wheel		--	25 to 50(D)	34 to 36	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)	The major breakdowns were not observed in the field test during initial commercial testing of the tractor model having test report No. T-662/1168/2009,	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
15.1.9	**Safety features :**					
a)	Guards against moving and hot parts	Evaluative	Belt drives, pullies, silencer, hydraulic pipes (As per IS 12239 (Part2)	--	Provided	Yes
b)	Lighting arrangement	Evaluative	As per CMVR	--	Provided	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)	--	Meets the requirements	Yes
d)	Technical requirements for PTO shaft	Non Evaluative	Should meet the requirements of IS: 4931 (As amended from time to time)	--	Meet the requirements	Yes
e)	Dimensions of three point linkage	Non Evaluative	Should meet the requirements of IS: 4468 (Part-I) (As amended from time to time)	--	Meet the requirements	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)	--	Meet the requirements	Yes
	Swinging drawbar			--	Not Provided	--
15.1.10	**Labelling of tractors (Provision of labelling plate):**					
	1) Make	Evaluative	Should conform to the requirements of CMVR	--	New Holland	Yes
	2) Model	Evaluative		--	3510	Yes
	3) Engine number	Evaluative		--	S324D97875	Yes
	4) Chassis number	Evaluative		--	NHN35100ZGL372672	Yes
	5) Declaration of PTO power (kW)	Evaluative		--	24.3	Yes Yes
15.1.11	**Discard limit for:**					
(a)	Cylinder bore diameter, (mm)	Evaluative	To be specified by the manufacturer and supported by the printed literature	89.2 (D)	88.92 to 88.93	Yes
(b)	Clearance between piston & cylinder liner at skirt, (mm)	Non Evaluative		0.50 (D)	0.122 to 0.124	Yes
(c)	**Ring end gap (mm):**					
	- Top comp. ring.	Evaluative	-do-	1.50(D)	0.30	Yes
	- 2nd comp. ring.		-do-	1.50(D)	0.30 to 0.35	Yes
	- Oil ring.		-do-	1.50(D)	0.35	Yes
(d)	**Ring groove clearance (mm):**					
	- Top comp. ring.	Evaluative	-do-	0.40 (D)	0.093 to 0.097	--
	- 2nd comp. ring.		-do-	0.40 (D)	0.062 to 0.070	Yes
	- Oil ring.		-do-	0.40 (D)	0.042 to 0.054	Yes
(e)	**Clearance of main bearings (mm):**					
	- Diametrical clearance	Evaluative	-do-	0.50 (D)	0.085 to 0.138	Yes
	- Crankshaft end float	Evaluative		0.50 (D)	0.28	Yes

1	2	3	4	5	6	7
(f)	**Clearance of big end bearings, (mm):**					
	- Diametrical	Evaluative	-do-	0.60 (D)	0.073 to 0.140	Yes
	- Axial	Evaluative	-do-	0.75 (D)	0.20 to 0.25	Yes
(g)	Clearance between king pin and bush, (mm)	Non Evaluative	-do-	0.50 (D)	0.18 to 0.24	Yes
(h)	Clearance between centre pin and bush, (mm)	Non Evaluative	-do-	0.50 (D)	0.15 to 0.22	Yes
17.1.12	**Literature (Submission to test agency)**					
(a)	Operator manual	Evaluative	Provided / Not Provided	Provided	Provided	Yes
(b)	Parts Catalogue	Evaluative	Provided / Not Provided	Provided	Provided	Yes
(c)	Workshop/ Service manual	Evaluative	Provided / Not Provided	Provided	Provided	Yes

15.1.13 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 Salient Observations:

15.3.1 Laboratory tests:

15.3.1.1 PTO Performance:

i) The max. PTO power at rated engine speed is **23.0 kW** against the declaration of **24.3 kW**, which is within the tolerance limit of IS: 12207-2014.

ii) The specific fuel consumption corresponding to maximum power was measured as **267g/kWh** against the declaration of **265 g/kWh**, which is within the tolerance limit of IS: 12207-2014.

iii) The backup torque is 18.76%.

15.3.1.2 Drawbar performance test:

i) During ten hours drawbar test, creeping of LHS & RHS rear tyre over the rims was observed as 45 mm for each. This should be looked into for necessary corrective action.

15.3.1.3 Hydraulic performance test:

The lifting capacity at hitch point observed as **8.97 kN** against the specified value of **10.78 kN**, which is on lower side and does not meet the requirement if IS: 12207 – 2014 with regard to tolerance. This should be looked into.

15.3.1.4 Mechanical Vibration:

The amplitude of mechanical vibration on various assemblies marked as (*) in Chapter – 8 of this test report is on higher side. This calls for dampening down of vibrations to improve the operational comfort and service life of components.

15.3.1.4 Location and operation of operator's control:

Working clearance between draft & position lever does not meet the requirement of the IS: 12279 (Part-2)-1999. This should be looked into for necessary corrective action.

15.4 Maintenance / Service Problems:

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

Component assembly inspection

15.5 Recommendation with regard to safety on tractor:

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

i) Provision for spark arresting device in exhaust system.
ii) Provision of PTO shaft master shield as per IS: 4931-1995.

15.6 Adequacy of Literature:

15.6.1 Following combined literature of New Holland 3510, 4010, 4510 &, 4710 models were supplied with the test sample for reference during the test.

a) Operator's manual
b) Parts catalogue
c) Service /Repair Catalogue

15.6.2 The literature should be brought out in national as well as other regional languages of India for guidance of users.

16. Citizen charter

Duration of Test	Test duration under citizen charter	Whether the report released within time frame given in the citizen charter	Remark
7 Months (January, 2017 to July ,2017)	10 Months	Yes	None

TESTING AUTHORITY:

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17. APPLICANT'S COMMENTS

Para No.	Our Reference	Applicant's comments
17.1	15.4.1.2 (i), 15.4.1.3, 15.4.1.4, 15.6 (i), (ii) & 15.7.3	Your valuable comments & suggestions for improvement are well taken, under our policy of continuous product improvement these aspects are further being looked into & will take appropriate actions 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	12.6
3.	Power lift and hydraulic pump performance test	2.3
4.	Drawbar performance test	14.7
5.	Brake test	2.6
6.	Noise measurement	1.5
7.	Mechanical vibration test	0.6
8.	Nominal speed test	1.0
9.	Air cleaner oil pull overt test	3.5
B	HAULAGE TEST	6.0
C.	Miscellaneous test and other run hours including idle run, transportation, trials and preparation for test	4.0
	TOTAL:	48.8