

ब्यावसायिक परीक्षण रिपोर्ट (पूरक)

संख्या / No. : T-1260/1787/2019

COMMERCIAL TEST REPORT (Supplementary)

माह / Month : July, 2019



NEW HOLLAND, 3037 TRACTOR



संघीय प्रजासत्ताक

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½df"k] l gdkfjrk , oafdl ku dY; k.k foHkkx] e' khuhdj .k , oa i ks] kf xdh i Hkkx½

GOVERNMENT OF INDIA

MINISTRY OF AGRICULTURE AND FARMERS WELFARE

(Deptt. of Agricultural, Cooperation & Farmer's Welfare, Mechanization & Technology Division)

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(An ISO 9001: 2015 Certified Institute)

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T-1260/1787/ 2019	NEW HOLLAND, 3037 TRACTOR - Commercial (Supplementary)
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Manufacturer : M/s. CNH Industrial (India) Pvt. Ltd.,
Plot no.-3, Udyog Kendra, Greater Noida-
201306, Distt. Gautam Budh Nagar, Uttar
Pradesh

Month: July	Test Report No. T-1260/1787/2019	Year : 2019
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Type of Test : **COMMERCIAL (Supplementary)**

Test code/Procedure : IS: 5994-1998 (Reaffirmed in 2014) and IS: 12207-2014

Period of Test : August, 2018 to May, 2019

Test Report No. : **T-1260/1787/2019**

Month/Year : **July, 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 submitted by the applicant for test.
 - iii) The results presented in this report do not in any way attribute to the durability of the machine.
 - iv) This report should not be reproduced in part or full without prior permission of the Director, Central Farm Machinery Training and Testing Institute, Budni (M.P.).
 - v) This is a supplementary test report and, should be read in conjunction with the Test Report of base model i.e. **“NEW HOLLAND 3037 TRACTOR”** bearing No.**T-648/1154/2008** released on **November, 2008**.
-

Sl. No	Units	Conversion Factor
1.	Force:	
	1 kgf	9.80665 N 2.20462 lbf
	Power:	
2.	1 Mechanical power	1.01387metric horse power 745.7 W
	1 Metric horse power	735.5 W
	1 kW	1.35962 Metric horse power
	Pressure:	
3.	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

A B B R E V I A T I O N S	
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

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1. SCOPE OF TEST

The tractor model namely "New Holland 3037" had undergone Commercial (variant) test at this Institute vide Test Report No. T-648/1154/2008 (released in November, 2008) which was a variant derived from base model "New Holland 3130". The base model was tested under Initial Commercial Test vide Test Report No. T-574/1069 (released in February, 2007). During submission of application for batch testing of "New Holland 3037", the firm has informed that the base model "New Holland 3130" is not in production and the chassis number of last tractor produced was "NH6313787" in year 2015 vide letter dated 26.05.2017 and requested to consider "New Holland 3037" tractor as a base model for testing under supplementary and batch testing.

During the supplementary test also, the firm has submitted that the technical specifications of "New Holland 3037" have been changed and are not same as tested vide Test Report No. T-648/1154/2008. The firm has also informed that chassis number of last tractor produced was "NHN30370370ZHE415928" in year May, 2017.

In view of the above submission of the firm, the following test reports released earlier became obsolete. The firm, vide letter No. PD-L118168 dated 26.06.2019 & No. PD-L118170 dated 27.06.2019, has recommended to supersede the earlier test report of New Holland 3130 & New Holland 3037 tractor models. Accordingly, the following test reports stands superseded.

Sr. No.	Make & Model of tractor	Nature of test	Test report No.	Chassis no. of the last tractor produced
1.	New Holland India, New Holland 3130	Commercial (Initial)	T-574/1069 (February, 2007)	NH6313787 in year 2015
2.	New Holland India, New Holland 3037	Commercial (Variant)	T-648/1154/2008 (November, 2008)	NHN30370370ZHE415928 in year May, 2017

The major features of Base model and Supplementary model are listed below :-

S. No.	Parameters	Previous Sample (T-648/1154/2008, November, 2008)	Present Sample
1.	Tractor:		
	Make	New Holland India	New Holland
	Model	New Holland 3037	3037
2.	Engine:		
	-Make	Simpson & Co. Ltd.	Simpson & Co. Ltd.
	-Model	T III S 325 / NH.2	T III S 325 / NH.2 F1.4
	Speed at max. torque, rpm	1402	1251
	Compression ratio	18.5:1	18.5±0.3:1
	Model/Group combination No. of fuel injection pump	F002 AOZ 527, PES3A80D320	F002 AOZ 451
	Model/Group combination no. of injector	F002 C70009	F002 C70 009
	Suction pressure at max. power, (Mpa)	2.3 to 2.5	2.6
3.	Range of nominal speed, kmph		
	- Forward	2.82 to 32.00	2.43 to 29.66
	- Reverse	3.49 to 12.80	3.00 to 11.88
4.	Steering system:		
	Type	Mechanical, worm and single drop arm	Hydrostatic
5.	Drive wheel:		
	Tyre size and ply rating	12.4 x 28, 12 PR	13.6 x 28, 12 PR
6.	Speed reduction through rear final drive	5.385 : 1	6.00:1

Subsequent to the examination of the case in light of clause 3.2.4 (b), 6.1 & 6.2 of Indian Standard **IS: 12207-2014**, the following tests were considered to be carried out:-

- Specification checking
- Nominal speed
- Two-hour maximum PTO power performance test under natural ambient condition

Manufacturer : **M/s. CNH Industrial (India) Pvt. Ltd.,**
Plot no.-3, Udyog Kendra, Greater Noida-201306, Distt. Gautam Budh Nagar, Uttar Pradesh

Test requested by (applicant) : **M/s. CNH Industrial (India) Pvt. Ltd.,**
Plot no.-3, Udyog Kendra, Greater Noida-201306, Distt. Gautam Budh Nagar, Uttar Pradesh

Test requested by : The manufacturer
Selected for test by : The representative of testing authority
Place of running-in : At manufacturer's works

Duration of said running-in, (h):

- Engine : 50
- Transmission : 50

Method of Selection : The test sample was selected randomly out of five tractors from the production line by the representative of testing authority.

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 and air cleaner oil	20W40	As recommended
2.	Gear box, differential, brake system, hydraulic system and final drive	SAE 80	Oil originally filled in the tractor was not changed
3.	Steering system	SAE 120	--do--
4.	Grease	NL GI No 2 Li Base	As recommended

3. ESSENTIAL TESTS

3.1. SPECIFICATIONS

3.1.1 Tractor:	<u>Previous sample</u>	<u>Present sample</u>
Make :	New Holland	
Model :	3037	
Brand name :	New Holland	
Type :	Four wheeled, rear wheel driven, general purpose agricultural tractor.	
Year of manufacture :	2008	2018
Chassis Serial number :	094739	NHN 30370ZJB416095
Country of Origin :	India	

3.1.2	Engine:	<u>Previous sample</u>	<u>Present sample</u>
	Make	:	Simpson & Co. Ltd.
	Model	:	TIII S 325 / NH.2 T III A S 325/NH.2F1.4
	Type	:	Four stroke, naturally aspirated, water cooled, direct injection, diesel engine.
	Serial number	:	B48171 S325 J07177
	Engine speed (Manufacturer's recommended production setting)(rpm):		
	- Maximum speed at no load	:	2150 to 2200
	- Low idle speed	:	700 ± 100
	- Speed at maximum torque	:	1400 to 1500 1200 to 1500
	Rated speed, (rpm):		
	- For PTO use	:	2000
	- For drawbar use	:	2000
3.1.3	Cylinder & Cylinder Head:		
	Number	:	Three
	Disposition	:	Vertical, inline
	Bore/stroke, (mm)	:	91.4 / 127
	Capacity as specified by the applicant, (cc)	:	2500
	Compression ratio, (apa)	:	18.5 : 1 18.5±0.3:1
	Type of cylinder head	:	Monoblock
	Type of cylinder liners	:	Dry, replaceable
	Type of combustion chamber	:	Torroidal cavity on piston crown
	Arrangement of valves	:	Overhead, inline
	Valve clearance (cold/Hot):		
	- Inlet valve, (mm)	:	0.30 / 0.25
	- Exhaust valve, (mm)	:	0.30 / 0.25
3.1.4	Fuel System:		
	Type of fuel feed system	:	Gravity and force feed
3.1.4.1	Fuel tank:		
	Capacity, (l)	:	40.8 44.7
	Location	:	Above clutch housing
	Provision for draining of sediments/ water	:	Not provided
	Material of fuel tank	:	Crossed link poly ethylene
3.1.4.2	Fuel feed pump:		
	Make	:	Bosch, India
	Type	:	Plunger
	Model/Group combination no.	:	9 440 030 030 Not visible
	Provision of sediment bowl	:	Provided
	Method of drive	:	Through cam shaft of FIP
3.1.4.3	Fuel filters:		
	Make	:	Bosch, India
	Model/Group combination no.	:	F002 H20 116 F002 H20 138
	Number	:	Two Two
	Type of elements:		
	-Primary	:	Paper, spin-on
	-Secondary	:	Paper, spin-on
	Capacity of final stage filter, (l)	:	0.45

3.1.4.4	Fuel Injection pump:	<u>Previous sample</u>	<u>Present sample</u>
	Make	:	Bosch, India
	Model/Group combination No.	:	F002 AOZ 527, PES3A80D320RS2000
	Type	:	Inline plunger
	Serial number	:	88392019
	Method of drive	:	Through timing gear
3.1.4.5	Fuel injectors:		
	Make	:	Bosch, India
	Model/Group combination No.	:	F002 C70009
	Holder no.	:	Not available
	Nozzle no.	:	Not available
	Type	:	Multi hole (five holes)
	Manufacturer's production pressure setting, (MPa)	:	25.6 +0.8
	Injection timing	:	17 ± 2 ⁰ before TDC
	Firing order	:	1 – 2 – 3
3.1.4.6	Governor:		
	Make	:	Bosch, India
	Model/Group combination No.	:	RSV375...1000 A4C 1410R
	Type	:	Mechanical, centrifugal, variable speed
	Rated engine speed, (rpm)	:	2000
	Governed range of engine speed (rpm)	:	600 to 2200
3.1.5	Air Intake system:		
3.1.5.1	Pre-cleaner:		
	Make	:	Lumax
	Type	:	Centrifugal with transparent dust collector.
	Location	:	Above air cleaner inlet tube.
3.1.5.2	Air cleaner:		
	Make	:	Lumax
	Type	:	Oil bath
	Location	:	In-front of radiator under bonnet.
	Range of suction pressure at maximum power, (kPa)	:	2.3 to 2.5
	Oil capacity, (l)	:	0.50
	Oil change period	:	After every 50 hours of operation or earlier in extreme dusty condition.
3.1.6	Exhaust System:		
	Type of silencer	:	Updraft (cylindrical)
	Position of silencer outlet with respect to SIP, (mm):		
	- Vertical	:	1070
	- Longitudinal	:	1380
	- Lateral	:	170 (on LHS)
	Range of exhaust gas pressure at maximum power, (kPa)	:	3.2 to 3.3
	Provision of spark arrestor	:	None
	Provision against entry of rain water	:	A bend is provided at the top of outlet.

3.1.7	Lubricating system:	Previous sample	Present sample
	Type	Force feed and splash	
	Oil sump capacity, (l)	6.00	7.35
	Total lub oil capacity, (l)	6.50	7.65
	Oil change period	First change after 50 hours and subsequently after every 300 hours of operation.	
	Cooling device, (if any)	None	
	Filters:		
	Type	Full flow replaceable paper element.	Full flow replaceable paper element.
	Number	One	One
	Pump:		
	Type	Rotary, Lobe	
	Method of drive	Through timing gears	
	Pressure release setting, (kPa)	343 to 448	
	Minimum permissible pressure, (kPa)	176	39 (apa)
3.1.8	Cooling system:		
	Type	Forced circulation of water	
	Coolant as recommended	Not available	Zero R anticorrosive additive, having coolant water ratio 1.25:1.
	Details of pump	Centrifugal, semi-open impeller of 70 mm diameter, having six numbers of vanes and driven through crankshaft pulley by a cogged V-belt.	
	Details of fan	Suction type having six polypropylene blades of 379 mm diameter and mounted on water pump shaft.	
	Means of temperature control	Thermostat	
	Bare radiator capacity, (l)	1.50	1.60
	Capacity of expansion flask, (l)	0.80	0.60
	Total coolant capacity, (l)	6.60	7.40
	Radiator cap pressure, (kPa)	88	88
3.1.9	Starting System:		
	Type	12V, DC, Electrical	
	Aid for cold starting	None	
	Any other device provided for easy starting.	None	
3.1.10	Electrical System:		
3.1.10.1	Battery:		
	Make & Model	Standard furukawa	
	Type	Lead acid	
	Capacity and rating	12V, 75 Ah at 20 hours discharge rate	
	Location	In front of radiator under bonnet.	

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3.1.10.2 Starter:		Previous sample	Present sample
Make	:	Mico Lic Bosch	Spark minda
Model	:	F002 G20 311	H - series
Type	:	Pre-engaging, solenoid operated	
Capacity and rating	:	12V, 1.9 kW	12V, 2.7 kW
Serial Number	:	Not available	0230D1021

3.1.10.3 Generator:			
Make	:	MICO LIC Bosch	PMP
Model	:	F002 G-10 360 K-1	ISJ
Type	:	Alternator	
Serial number	:	Not available	017K137210
Output rating	:	14V, 23A at speed of 6000 rpm	
Method of drive	:	Through crank shaft pulley by a coggled "V" belt, in common with fan pulley.	

3.1.10.4 Voltage regulator : In built in alternator

3.1.10.5 Detail of lights:

Description	No. & capacity of bulbs	Height of the centre of beam above ground level,(mm)	Size of beam, (mm)	Distance between centre of the beam and outside edge of tractor at standard rear track setting, (mm)
Previous model:				
Front Lights:				
- Head lights	2, 12V, 30/35W	980	136 x 105	465
- Parking lights	2, 12V, 5W	1280	78 x 75	183
- Turn-cum-Hazard Indicators	2, 12V, 21W	1280	78 x 45112	90
Rear lights:				
- Parking-cum-Brake lights	2, 12V, 21/5W	1310	78 x 75	185
- Turn-cum-Hazard Indicators	2, 12V, 21W	1310	78 x 112	92
-Plough light (on RHS mudguard)	1, 12V, 55W	1405	137 x 114	360
-Reflectors (Red)	2	-Part of tail lamp assembly-		
-Registration plate Light		-Part of tail lamp-		
Present Model:				
Front Lights:				
- Head lights	2, 12V, 35/35W	970	140 x 110	495
- Parking lights	2, 12V, 5W	1305	70 x 75	175
-Turn cum hazard light	2, 12V, 21W	1305	110 x 75	85
Rear lights:				
-Stop/Tail light	2, 12V, 21/5W	1315	75 x 75	170
-Turn-cum-hazard indicators	2, 12V, 21W	1315	110 x 75	80
- Reflectors(R)	2 Nos.	1315	20 x 55	150
-Registration plate light		-Part of rear light assembly-		
- Plough light	1, 12V, 55 W	1435	140 x 110	340

- 3.1.10.6 Main switch** : **Previous sample** : Key turn type, having four positions viz: **OFF, circuit ON, brake light, turn signal and START** | **Present sample** : Key turn type, having three positions viz: **OFF, circuit ON and START**
- 3.1.10.7 Light switch** : **Previous sample:** Rotary type having four positions viz.
i) Off
ii) Parking lights + dashboard lights 'ON'
iii) Head lights(short beam) + (ii)
iv) Head light (long beam) + (ii)
Present sample: Rotary type having five positions viz.
i) Off
ii) Parking lights + dashboard lights 'ON'
iii) Head lights(short beam) + (ii)
iv) Head light (long beam) + (ii)
- 3.1.10.8 Horn:**
Make : Nikko auto
Type : 12V, 2B, electromagnetically vibrated diaphragm
Location : In-front of radiator, under the bonnet
- 3.1.10.9 Fuse box** : Contains 6 numbers of fuses of following capacities :-

	Previous sample		Present sample	
Capacity	10A	15A	10A	15A
Number	06	02	02	04

3.1.10.10 Details of other electrical accessories:**3.1.10.10.1 Flasher Unit:**

- | | | |
|-----------------|---|--------------------|
| Make | : | Interface |
| Capacity | : | 12 V |
| - Turn signal | : | 21W x 2 + 1.4W x 1 |
| - Hazard signal | : | 21W x 4 + 1.4W x 2 |
| Flashes/Min. | : | 85 |

- 3.1.10.10.2** Seven pin socket for trailer lights : Not available | Provided

- 3.1.10.10.3** Safety against accidental start : Not available | Safety switch provided in high-low gear shifting lever to prevent operation of the starting motor unless the High – low gear lever is in the neutral position.

3.1.11 Instrument panel details:-

- | | Previous sample | Present sample |
|---|------------------------|-----------------------|
| i) Engine rpm meter (0 to 25 x100) | Provided | Provided |
| ii) Cumulative digital run hour meter | Provided | Provided |
| iii) Coolant temperature gauge with color zones | Provided | Provided |
| iv) Fuel level gauge (with color zones) | Provided | Provided |
| v) Engine oil pressure gauge with color zone | Provided | Provided |

	<u>Previous sample</u>	<u>Present sample</u>
vi) Hazard light switch	Provided	Provided
vii) Turn-cum-hazard indicator lights tell-tale	Provided	Provided
viii) Battery charging warning indicator	Provided	Provided
ix) Head light long beam 'ON' indicator light	Provided	Provided
x) Parking brake light indicator	Provided	Provided
xi) Turn indicator switch	Provided	Provided
xii) Horn push button	Provided	Provided
xiii) Hand accelerator lever	Provided	Provided
xiv) Fuel shut-off control knob	Provided	Provided
xv) Rear view mirror	Provided	Provided
xvi) Steering control wheel	Provided	Provided

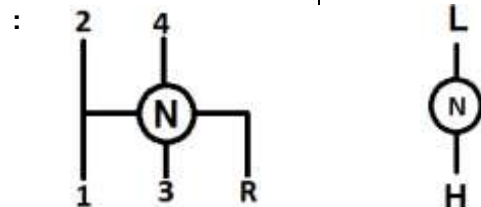
3.1.12 Transmission System:Previous samplePresent sample**3.1.12.1 Clutch:**

Make	:	Luk
Type	:	Dry, friction plates
No. of friction plate, (s)	:	One
Size, OD/ID, (mm)	:	240/Not available 280.4/165.4
Method of operation	:	By pressing a pedal on LHS halfway.
Material of lining	:	Not available Organic

3.1.12.2 Gear box:

Make	:	Carraro
Type	:	Constant mesh
No. of speeds:		
- Forward	:	08
- Reverse	:	02
Location of gear shifting levers	:	Not available Side shifting, main gear shifting lever at RHS and speed range selector at LHS of operator's seat

Gear shifting pattern of previous and present sample



Oil capacity, (l)	:	18.0 (Common with differential, hydraulic & brake systems).	18.0 (Common with differential, hydraulic, rear axle & brake system).
Oil changing period	:	After every 1200 hours of operation.	

3.1.12.3	Nominal Speed:		<u>Previous sample</u>	<u>Present sample</u>
	- Forward	:	2.82 to 32.00	2.43 to 29.66
	- Reverse	:	3.49 to 12.80	3.00 to 11.88
3.1.12.4	Differential unit:			
	Type	:	Crown wheel and bevel pinion, with differential unit accommodated inside the differential housing.	
	Reduction through crown wheel and bevel pinion	:	4.09 : 1 (45/11T)	
	Oil capacity, (l)	:	18.0 (Common with gear box, hydraulic & brake systems).	
	Oil changing period	:	After every 1200 hours of operation.	
	Differential lock:			
	Type	:	Pin type	
	Location	:	RHS of operator's seat	
	Method of operation	:	By pressing a foot pedal provided on RHS of operator seat.	
3.1.12.5	Rear axle & final drive:			
	Type	:	Spur gear type accommodated inside the portal housing.	
	Reduction through final drive	:	5.385:1	6.00:1 (12/72T)
	Oil capacity of final drive, (l)	:	2.6 (each side)	2.2 (each side)
	Oil change period	:	After every 1200 hours of operation.	
3.1.13	Power lift (hydraulic system):			
	Make	:	MITA	MIPL
	Type	:	Open centre, Live, ADDC	
	No. and type of cylinder	:	One, single acting	
	Type of linkage lock for transport	:	Provided	
3.1.13.1	Hydraulic pump:			
	- Make	:	Bosch, India	Dowty
	- Type	:	Gear type	
	- Location & drive	:	At front on RHS of engine, driven through timing gear.	
	No. & type of filters	:	One, replaceable paper filter	
	Hydraulic oil capacity, (l)	:	18.0 (Common with transmission, differential & brake system)	
	Oil change period	:	After every 1200 hours of operation	
	Provision for external tapping	:	Provided	
	Details of control levers:	i)	Position control lever	
		ii)	Draft control lever	
		iii)	Transport lock knob cum response control knob	
		iv)	Lift-O-matic device	
		v)	Isolating valve for external circuit	
	Method of draft sensing	:	Through top link	

3.1.13.2 Three point linkage:

S. No	Observations		As per IS: 4468- (Part-1) -1997, (Cat.I / Cat.II), (mm)	As measured, (mm)		Remarks in case of <u>Present sample</u>
				<u>Previous sample</u>	<u>Present sample</u>	
I.	Upper hitch points:					
	a)	Dia of hitch pin hole	19.30 to 19.50 / 25.70 to 25.90	25.84	25.80	Conforms to cat -II
	b)	Width of ball	44.0 (max.) / 51.0 (max.)	43.8	44.0	Conforms
II.	Lower hitch points:					
	a)	Dia of hitch pin hole	22.40 to 22.65 / 28.70 to 29.00	28.89	28.90	Conforms to cat -II
	b)	Width of ball	34.8 to 35.0 / 44.8 to 45.0	35.0	35.0	Conforms to cat -I
III.	Lateral distance from lower hitch point to centre line of tractor.		359 / 435	429	359	Conforms to cat -I
IV.	Lateral movement of lower hitch points		100 (min) / 125 (min)	140	181	Conforms
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	570	595	Conforms to cat -II
VI.	Transport height		820 (min)/ 950 (min)	900	820	Conforms to cat -I
VII.	Power range (without force)		560(min)/ 650 (min)	650	620	Conforms to cat -I
VIII.	Leveling adjustment		100 (min)/ 100 (min)	365	225	Conforms
IX.	Lower hitch point clearance		100 (min)/ 100 (min)	125	260	Conforms
X.	Lower hitch point height		200 (max)/ 200 (max)	200	200	Conforms

3.1.13.3 Drawbar:**3.1.13.3.1 Linkage Drawbar [Refer Fig.1]:**

Notation	As per IS: 12953-1990, (Cat.I) / (Cat.II), (mm)	As measured, (mm)		Remarks in case of <u>Present model</u>
		<u>Previous sample</u>	<u>Present sample</u>	
A	683 ± 1.5/825 ± 1.5	824	683	Conform to cat -I
B	75 (min)/75 (min)	78	74	Does not conform
C	30 (min) / 30 (min)	30	30	Conforms
D∅	21.79 to 22.0/27.79 to 28.0	27.95	27.80	Conform to cat -II
E	39.0 (min)/49.0 (min)	47.5	55.2	Conforms
F∅	12.0 (min)/12.0 (min)	12.2	12.1	Conforms
G	15.0 (min)/15.0 (min)	20.0	16.0	Conforms
H∅	25 ± 1/25 ± 1	25	25	Conforms
J	80 ± 1.5/80 ± 1.5	80.0	80.0	Conforms
No. of holes	7/9	09	07	Conform to cat -I

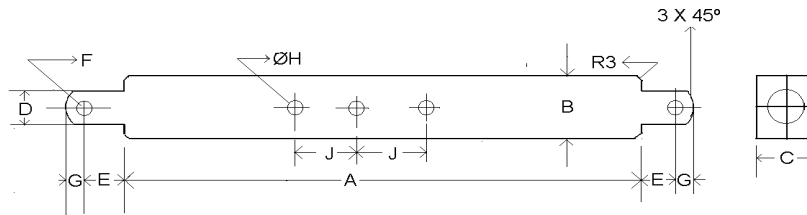


Fig. 1: DIMENSIONAL NOTATIONS FOR LINKAGE TYPE DRAWBAR

		<u>Previous sample</u>	<u>Present sample</u>
3.1.13.3.2	Swinging drawbar	:	Not provided
3.1.14	Power take-off shaft:		
	Type	:	Type-I, Not independent
	Method of engaging	:	By hand lever provided at LHS of operator's seat.
	No. of shaft,(s)	:	One
	PTO speed corresponding to rated engine speed, (rpm):	:	625
	Distance behind rear axle, (mm)	:	195 200
	Engine to PTO speed ratio	:	3.20 : 1
	Whether the PTO shaft is capable of transmitting the full power of engine	:	Yes

3.1.14.1 Specifications of Power Take-Off Shaft:

Specification	As per IS: 4931-1995 (Type-I)	As observed		Remarks in case of <u>Present sample</u>
		<u>Previous sample</u>	<u>Present sample</u>	
Nominal speed, (rpm)	540 ± 10	540 rpm of PTO shaft corresponds to 1728 rpm of engine.	1728 rpm of engine.	Conforms
No. of splines	6	6	6	Conforms
Direction of rotation	Clockwise	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	Centrally located	Conforms
Dimensions, (mm) [See Fig.2]:				
DØ	34.79 ± 0.06	34.73	34.77	Conforms
dØ	28.91 ± 0.05	28.00	28.05	Conforms
BØ	29.4 ± 0.1	29.6	29.5	Conforms
AØ (optional)	8.3 ± 0.1	8.3	8.4	Conforms
W	8.69 - 0.09 - 0.16	8.57	8.60	Conforms
a	7	7	7	Conforms
b (optional)	25 ± 0.5	25.5	25.2	Conforms
c	38	38	38	Conforms
X	30°	30 ⁰	30 ⁰	Conforms
B	76 (min)	85	82	Conforms
h	450 to 675	590	610	Conforms

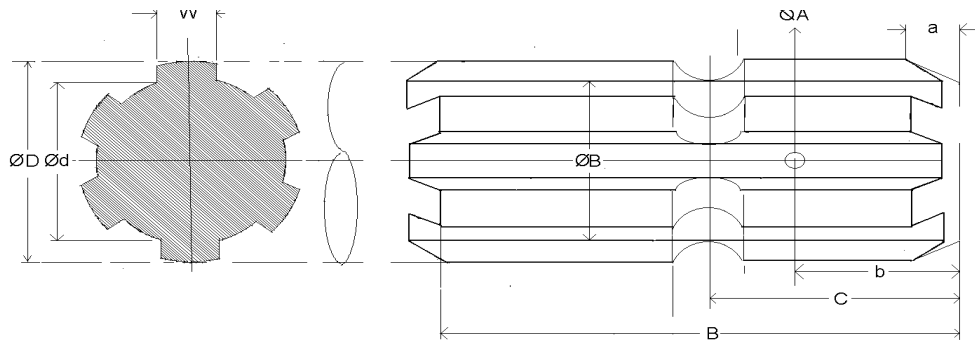


Fig. 2 : DIMENSIONAL NOTATIONS FOR TYPE-I POWER TAKE-OFF SHAFT

3.1.14.2	Power Take-off Master Shield:	:	Not provided	
3.1.15	Towing hitch:		<u>Previous sample</u>	<u>Present sample</u>
3.1.15.1	Front:			
	Type	:	Clevis	
	Location	:	At font of engine support bracket.	
	Height above ground level, (mm)	:	600 (Fixed)	595 (Fixed)
	Type of adjustment	:	None	None
	Dia of pin hole, (mm)	:	26.8	29.7
	Width of clevis, (mm)	:	117.0	176.6
3.1.15.2	Rear			
	Type	:	Clevis	
	Location	:	At rear of differential housing.	
	Height above ground level, (mm):			
	- Maximum	:	770	785
	- Minimum	:	400	485
	- No. of positions	:	Not available	06
	- Type of adjustment	:	By changing the position of hitch and reversing it on its mounting bracket.	
	Distance of hitch point, (mm):			
	-From rear wheel centre	:	338	323
	-From power take-off shaft end	:	138	123
	Dia of pin hole, (mm)	:	29.0	32.0
	Width of clevis, (mm)	:	80.0	71.3
3.1.16	Steering:			
	Make	:	ZF	Ognibene, India
	Type	:	Mechanical, worm & roller	Hydrostatic
	Location of control wheel	:	Above clutch housing	
	Method of operation	:	Manually by a steering control wheel.	
	Diameter of steering control wheel, (mm)	:	455	380
	Type & make of pump	:	--	Gear type, dowty
	Location of pump	:	On RHS of engine	
	Method of drive	:	--	Through timing gear
	No., type & make of hydraulic ram cylinder	:	--	One, double acting single connecting, ognibene
	Steering oil capacity, (l)	:	0.60	0.60
	Lubricant change period	:	After every 1200 hours of operation	

3.1.17 Brakes:		<u>Previous sample</u>	<u>Present sample</u>
3.1.17.1 Service Brake:			
Make	:	Not specified	JMI
Type	:	Oil immersed disc brake	
Location	:	Inside differential housing on rear axle shaft.	
No. of disc(s)	:	Three (on each wheel side)	
Area of liners, (cm ²)	:	471.2 (on each wheel side)	692.78 (on each wheel side)
Material of liners	:	Not specified	Non asbestos
Method of operation	:	Independent / combined pedal operation by right foot.	
3.1.17.2 Parking Brake:			
Type	:	Pawl and ratchet arrangement for locking service brakes	
Location & method of operation	:	Hand operated lever provided on RHS of operator seat.	
3.1.18 Wheel Equipment:			
3.1.18.1 Steering Wheel(s):			
Make	:	Not available	Good year
Number(s)	:	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)	:	660	675
Recommended inflation pressure, (kPa) :			
- for field work	:	230	
- for transport	:	230	
Track width, (mm)	:	1260 (std) and 1365	1250 (std) and 1350, 1450, 1570, 1630 and 1770
Method of changing track width	:	By extending the wheel.	By extending axle & reversing the wheel.
Make & size of rims	:	WIL, 5E x 16	
3.1.18.2 Drive wheel (s):			
Make	:	MRF	Good year
Number	:	Two	
Type of tyre	:	Pneumatic, traction	
Size	:	12.4 - 28	13.6 - 28
Ply rating	:	12	
Maximum permissible loading capacity of each tyre pressure	:	1650 at 250 kPa pressure	1005 at 110 kPa pressure
Recommended inflation pressure, (kPa):			
- For field work	:	95	
- For transport	:	110	
Track width, (mm)	:	1330 (std), 1435, 1535, 1635 & 1735	1330 (std), 1450, 1550, 1630 & 1740.
Method of changing track width	:	By reversing the wheel disc & changing the position of wheel disc on offset rim lugs.	
Make & size of wheel rim	:	Not available	WIL, W12 x 28

3.1.18.3	Wheel base, (mm)	:	<u>Previous sample</u>		<u>Present sample</u>
	Method of changing wheel base, if any, and range	:	1970		1965
					None
3.1.19	Operator's seat:				
	Make	:			Harita Seating System Ltd.
	Type	:			Cushioned with back rest
	Type of Suspension	:			Two helical coil springs
	Type of Damping	:			Hydraulic shock absorber
	Range of adjustment, (mm):				
	Vertical	:	Nil		±23
	Lateral	:	Nil		Nil
	Longitudinal	:	± 30		± 100
3.1.20	Provision for safety and comfort of operator:				
3.1.20.1	Operator's Seat:				
	Meet the minimum requirements of IS: 12343-1998, (Re-affirmed in 2014): except the following:				
			<u>Previous sample</u>		<u>Present sample</u>
	i) Width of seat				i) Inclination of seat towards rear direction.
	ii) Vertical distance from seat index point to center of clutch pedals				ii) Longitudinal distance from SIP to center line of differential lock pedal.
3.1.20.2	Conformity with IS: 6283 (Part-1)-2006, (Re-affirmed in 2014):				
	Meet the requirements of IS: 6283 (Part-1)-2006, except the following:				
			<u>Previous sample</u>		<u>Present sample</u>
	i) Speed range (slow-fast)				--
	ii) Grease lubrication points				--
3.1.20.3	Conformity with IS: 6283 (Part-2)-2006, (Re-affirmed in 2014):				
	Meet the requirements of IS: 6283 (Part-2)-2007 except the following:				
			<u>Previous sample</u>		<u>Present sample</u>
			--		i) Colour codes for fuel level gauge.
3.1.20.4	Conformity with IS : 8133-1983 (Re-affirmed in 2014):				
	Location and movement of various controls meets the requirement of IS: 8133-1983, except the following:				
			<u>Previous sample</u>		<u>Present sample</u>
	i) Fuel-shut-off knob did not remain in 'STOP' position.				i) Fuel-shut-off knob does not remain in 'STOP' position.
3.1.20.5	Conformity with IS:12239 (Part-1)-1996 (Re-affirmed in October, 2017):				
	Meet the requirements of IS: 12239 (Part-1) – 1996, except the following:				
			<u>Previous sample</u>		<u>Present sample</u>
	i) Towing hitch				i) The spark arrester is not provided in the exhaust system.
	ii) The spark arrester was not provided in the exhaust system.				--
3.1.20.6	Conformity with IS:12239 (Part-2)-1999 (Re-affirmed in 2014):				
	Meet the requirements of IS:12239 (Part-2)-1999, except the following:				
			<u>Previous sample</u>		<u>Present sample</u>
	i) Cautionary notice was not provided as per above referred standard.				i) Master shield for PTO shaft is not provided.
			--		ii) Working clearance between draft control lever and position control lever is 25 mm.

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

All lighting arrangements meet the requirements of IS: 14683-1999 in both previous & present samples.

3.1.20.8 Rear view mirror:

Rear view mirror is provided in both previous & present samples.

3.1.20.9 Slow moving emblem:

Slow moving emblem is provided in both previous & present samples.

	<u>Previous sample</u>	<u>Present sample</u>
3.1.21 Mass of standard ballast tractor, (kg):		
- Front	: 695	715
- Rear	: 1065	1085
- Total	: 1760	1800

3.1.22 Over all dimensions, (mm):

- Length	: 3290	3363
- Width	: 1660	1720
- Height (with exhaust pipe)	: 2285	2280
Minimum ground clearance	: 390, (below tie rod of steering system)	

3.1.23 Labelling of tractor as per IS: 10273-1987 (Reaffirmed in 2014):

Locations of labelling plate:- The labelling plate is riveted on LHS of fender and provides the following information:

Name of Manufacturer	:	M/s. CNH INDUSTRIAL INDIA PVT. LTD.
Make	:	NEW HOLLAND
Model	:	3037
Year of manufacture	:	February, 2018
Engine Serial Number	:	S325J07177
Chassis Serial Number	:	NHN 30370ZJB416095
Maximum PTO Power, kW (hp)	:	26(35)
Specific fuel consumption, g/kWh	:	191 (g/hph)

3.1.24 Number of external lubricating points:

- Oiling	: Nil	Nil
- Grease cups	: 02	02
- Grease nipples	: 11	13

3.1.25 Colour of tractor:

Chassis & engine	: Dark grey	Black
Sheet metal:		
Mudguard	: White	White
Bonnet	: Blue	Blue
Rim & disc	: White	White

3.2 NOMINAL SPEED TEST

Movement	Gear No.	No. of engine revolutions for one revolution of driving wheel		Nominal speed at rated engine speed when fitted with 12.4-28 size tyres 590 mm radius index, (kmph).	Nominal speed at rated engine speed when fitted with 13.6-28 size tyres 610 mm radius index, (kmph).	Variation in nominal speed (%) in Present sample and Previous sample
		<u>Previous sample</u>	<u>Present sample</u>	<u>Previous sample</u>	<u>Present sample</u>	
Forward	L1	157.7	189.7	2.82	2.43	13.83
	L2	108.0	129.6	4.12	3.55	13.83
	L3	73.5	80.1	6.06	5.75	5.12
	L4	51.1	61.4	8.71	7.49	14.01
	H1	43.0	47.9	10.34	9.61	7.06
	H2	29.3	32.7	15.16	14.05	7.32
	H3	20.0	20.2	22.21	22.73	2.34
	H4	13.9	15.5	32.00	29.66	7.31
Reverse	LR	127.6	153.4	3.49	3.00	14.04
	HR	34.7	38.7	12.80	11.88	7.19

3.3 PTO PERFORMANCE TEST

S. No.	Particulars	<u>Previous sample</u>	<u>Present sample</u>
1	Date(s) of test	18.10.2005 & 20.10.2005	24.09.2019
2	Tractor run at this Institute prior to start of PTO test, (h)	6.5	3.6
3	Dynamometer test bench used	Fuchino ESF 1000 S	SAJ- AG 250

Maximum power two hours test under natural ambient condition was conducted. The results of Power take-off performance test under natural ambient of Previous & Present sample are tabulated in **Table-2**.

Table-2

	Power, (kW)	Speed, (rpm)		Fuel Consumption			Specific energy, (kWh/ l)
		PTO	Engine	(l/h)	(kg/h)	(kg/kWh)	
a) Maximum power – 2 hours test (under natural ambient condition):							
Previous sample	27.2	625	2000	8.44	7.02	0.258	3.22
Present sample	25.9	625	2000	8.33	6.96	0.269	3.11

S. No.	Parameters	Previous sample		Present sample
		Natural Ambient	High Ambient	Natural Ambient (Max. power Two Hours)
	-No load maximum engine speed, (rpm)	2170	2160	2189
	-Equivalent crankshaft torque at maximum power, (Nm)	129.8	125.1	123.7
	-Maximum equivalent crankshaft torque, (Nm)	--	143.4	--
	-Engine speed at maximum equivalent crankshaft torque, (rpm)	--	1402	--
	- Back up torque, (%)	--	14.6	--
	-Smoke level, maximum light absorption coefficient, (per meter)	Not available	--	--
	- Range of atmospheric conditions:			
	Temperature, (°C)	29	41 to 43	26 to 27
	Pressure, (kPa)	98.6 to 98.8	98.3 to 98.5	99.6 to 99.7
	Relative humidity, (%)	27 to 32	11 to 39	63 to 68
	- Maximum temperatures, (°C):			
	Engine oil	97	108	112
	Coolant	78	93	79
	Fuel	42	56	49
	Air intake	32	50	27
	Exhaust gas	562	548	657
	- Pressure at maximum power:			
	Intake air, (kPa)	2.3 to 2.5	1.9 to 2.0	2.6
	Exhaust gas, (kPa)	3.2 to 3.3	2.7 to 2.9	1.5 to 1.9
	- Consumptions:			
	Lub oil, (g/kwh)	--	0.55	--
	Coolant (% of total coolant capacity)	--	2.27	--

4. OTHER APPLICABLE TESTS

4.1	-None-
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5. ADJUSTMENTS, DEFECTS, BREAKDOWNS AND REPAIRS

S. No.	Adjustment/Defect/Breakdown and Repairs	Tractor run hours
	-None-	

6. SUMMARY OF OBSERVATIONS, COMMENTS & RECOMMENDATIONS

6.1 On the basis of test conducted the performance results have been summarized as evaluative (mandatory) and non – evaluative (not mandatory) parameters applicable for qualifying Minimum Performance Criteria as per clause-4 table-1 of Indian Standard **12207: 2014** for acceptance of tractor for the purpose of subsidies/NABARD financing for the applicable features for this tractor model.

Sl. No.	Characteristic	Category (Evaluative / Non Evaluative)	Requirements as per IS: 12207- 2014	Values declared by the applicant/ requirement		As observed		Whether present model meets the requirem ents (Yes/No.)
				Previous sample	Present sample	Previous sample	Present sample	
6.1.1	PTO Performance :							
a)	- Max. 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	26.0 (R)	26.0 (D)	27.2	25.9	Yes
b)	Specific fuel consumption corresponding to maximum power, (g/kWh)	Non Evaluative	+ 5%	265 (R)	265 (D)	258	269	Yes
6.1.2	Labeling of tractors (Provision of labeling plate):							
	1) Make	Evaluative	Should conform to the require ments of CMVR along- with declared value of PTO HP	--	NEW HOLLAND		Yes	
	2) Model	Evaluative		--	3037		Yes	
	3) Year of manufacture	Evaluative		--	February, 2018		Yes	
	4) Engine number	Evaluative		--	S325J07177		Yes	
	5) Chassis number	Evaluative		--	NHN30370ZJB416095		Yes	
	6) Declaration of PTO power, kW	Evaluative		--	26 (35)		Yes	
	7) Specific fuel consumption, g/kWh	Evaluative		--	191 g/hph		Yes	
6.1.3	Literature (Submission to test agency)							
(a)	Operator manual	Evaluative	Provided/ Not Provided	Provided	Provided	Provided	Yes	
(b)	Parts Catalogue	Evaluative	Provided/Not Provided	Provided	Provided	Provided	Yes	
(c)	Workshop/ Service manual	Evaluative	Provided/Not Provided	Provided	Provided	Provided	Yes	

6.2 Conformity with following IS:	<u>Previous sample</u>	<u>Present sample</u>
i) Guidelines for declaration of power and specific fuel consumption and labeling of agricultural tractors (First revision) [IS 10273:1987 (Reaffirmed in 2014)]	: Conformed	Conforms
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-2):1993 (Reaffirmed in October, 2017)/ISO 730-1:1994]	: Did not conform	Conforms
iv) Drawbar for agricultural tractors – Link type [IS 12953:1990 (Reaffirmed in October, 2017)]	: Conformed	Does not conform
v) Agricultural tractors - Operator's seat technical requirement [IS 12343 –1998 (First revision) (Reaffirmed in 2014)] Tractors having more than 1150 mm rear track width.	: Did not conform	Does not conform
vi) Guide for safety & comfort of operator of agricultural tractors: Part 1 General requirements (first revision) : [IS 12239 (PT-1)-1996 (Reaffirmed in October, 2017)/ISO 4254-1:1989]	: Did not conform	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
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 March, 2014)/ ISO 3767-2:1991]]	: Did not conform	Conforms
ix) Guide lines for location and operation of operator controls on agricultural tractors and machinery (first revision) (IS: 8133 – 1983) (Reaffirmed in 2014)]	: Did not conform	Does not conform
x) Agricultural Tractor & Machinery Lighting device for travel on public roads (IS: 14683-1999) (Reaffirmed in March, 2014)]	: Conformed	Conforms

6.3 Salient Observations:**6.3.1 Laboratory tests:****6.3.1.1 PTO Performance:**

- i) The maximum power was recorded as **27.2 & 25.9 kW** in case of previous & present sample respectively against the declaration of **26.0 kW**, which meets the requirement of IS: 12207-2014 with regard to tolerance.
- ii) The specific fuel consumption corresponding to maximum power in case of previous and present sample was measured as **258 & 269 g/kWh** respectively against the declaration of **265 g/kWh**, which meets the requirement of IS: 12207-2014 with regard to tolerance.

6.3.1.2 Power take-off:

- i) The dimension “d \emptyset ” of PTO does not meet the requirement of IS: 4931-1995 (re-affirmed in 2014). This should be looked into for necessary corrective action.

6.3.1.3 Three point linkage:

- i) Some of the parameters conform to Cat. I and some of them conform to Cat. II. Keeping in view the spirit of standardization, necessary improvement may be incorporated. Same had been observed in the base report of this tractor but the manufacturer did not take any corrective action in this supplementary model.

6.3.1.4 Linkage drawbar:

- i) The dimension “B” of drawbar does not meet the requirement of IS: 12953-1990 (Re-affirmed in Oct. 2017). This should be looked into for necessary corrective action.
- ii) Some of the parameters of linkage drawbar conform to Cat. I and some of them conform to Cat. II In view of the spirit of standardization, necessary improvements may be incorporated.

6.3.1.5 Seating requirement:

- i) Inclination of seat towards rear direction does not meet the requirement of IS: 12343-1998 (Re-affirmed in 2014). This should be looked into for necessary corrective action.
- ii) Longitudinal distance from SIP to center line of differential lock pedal does not meet the requirement of IS: 12343-1998 (Re-affirmed in 2014). This should be looked into for necessary corrective action.

6.3.1.6 Operator's work place:

- i) Width of foot step does not meet the requirement of IS: 12239 (Part-I)-1996 (re-affirmed in Oct. 2017). This should be looked into for necessary corrective action.
- ii) Provision for spark arresting device is not provided. This should be looked into for necessary corrective action.

6.3.1.7 Guards:

- i) Provision for power take-off shield is not provided. This should be looked into for necessary corrective action.
- ii) Working clearance for hand control between position control lever and draft control lever & main gear shifting lever and mud guard does not meet the requirement of IS: 12239 (Part-II)-1999 (Re-affirmed in 2014). This should be looked into for necessary corrective action.

6.3.1.8 Operator's control:

Colour zone for fuel level is not provided as per IS: 6283(Part II)-1998 (Re-affirmed in 2014). This should be looked into for necessary corrective action.

6.4 Maintenance / Service problems:

No noticeable maintenance or service problems, observed during the test.

6.5 Labeling of tractor:

- i) Make of tractor is not as per the application submitted by the applicant. This should be looked into for necessary corrective action.
- ii) Unit of specific fuel consumption given in the labeling plate is not as per the requirement of IS: 10273-1987 (Re-affirmed in 2014). This should be looked into for necessary corrective action.

6.6 Recommendation with regard to safety on tractor:

The following requirements, inter alia, may be considered for incorporation on the tractor as per relevant Indian Standards:

- i) Dimension "B" (width) of drawbar.
- ii) Inclination towards rear direction of operator's seat.
- iii) Vertical distance from SIP to center line of differential lock pedal.
- iv) Width of foot step.
- v) Provision of spark arresting device in exhaust system.
- vi) Provision of master shield in power take-off.
- vii) Colour zone for fuel level gauge.
- viii) Working clearance around the position control & draft control lever and main gear shifting lever & mud guard.

6.7 Adequacy of Literature supplied with machine:

6.7.1 The following literatures were supplied with the test tractor for reference during the test:-

- a) Operator's manual for New Holland 3037 & 3032 tractor.
- b) Service manual for NH 3030, NH 3032, NH 3037 & NH 3230 tractor models.
- c) Parts Catalogue for NH 3032, NH 3037NX, NH 3230NX tractor.

6.7.2 The supplied literature was found adequate. Except the following:

- a) Transmission oil, rear axle oil and steering oil scheduling maintenance given in operator's manual does not match with specification submitted by the applicant.
- b) Schedule maintenance given in the operator's manual for engine oil is not as per the application submitted by the applicant.
- c) Engine radiator coolant is not specified in the operator's manual.
- d) Liquid capacity of engine oil, air cleaner oil, rear axle oil and engine radiator coolant is not as per the application submitted by the applicant.
- e) The lubricants produced/ marketed by various Indian manufacturers, if deemed suitable, may be recommended for their use in the tractor, shall also be included in the Operator Instruction Book.
- f) These literatures may be brought out in national & other regional languages for the guidance of user's and service personnel.

T-1260/1787/ 2019	NEW HOLLAND, 3037 TRACTOR - Commercial (Supplementary)
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7. CITIZEN CHARTER

Time frame for Testing & Evaluation as per Citizen Charter	Duration of Test	Whether the Test Report is released within the time frame given in Citizen Charter	Remarks
10 Months	09 Months (August, 2018 to May, 2019)	Yes	None

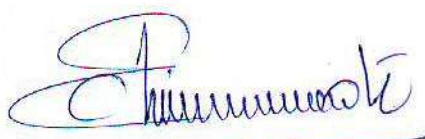
8. APPLICANT'S COMMENTS

Para No.	Our reference	Applicant's comments
19.1	6.3.1.2, 6.3.1.3, 6.3.1.4, 6.3.1.5, 6.3.1.6, 6.3.1.7, 6.3.1.8, 6.5 & 6.6.2	Your valuable comments and suggestions for improvement are well taken. Under our policy of continuous product improvement, these aspect are further being looked into and will take appropriate action to eliminate these deviation soon wherever necessary.

TESTING AUTHORITY:



C.K. TIJARE
AGRICULTURAL
ENGINEER



C.V. CHIMOTE
TEST ENGINEER



Y.K. RAO
SENIOR AGRICULTURAL
ENGINEER



J.J.R. NARWARE
DIRECTOR

Test report compiled by **Shri Shivkumar Sharma**, Senior Technical Assistant.

ANNEXURE - I

TRACTOR RUN HOURS DURING TEST

A.	LABORATORY AND TRACK TESTS:	HOURS
1.	Running-in	--
2.	PTO performance test	6.18
3.	Nominal speed test	1.13
B.	Miscellaneous test and other run hours including idle run, transportation, preparation for test and trial runs.	0.50
	TOTAL:	7.81