



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

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2. ESSENTIAL TESTS

2.1. SPECIFICATIONS

The following are the brief specifications of the tractor. However, for detail specifications of the tractor, the test report No. T- 1102/1628/2017 released in August, 2017 should be referred.

- 2.1.1 Tractor:**
- Make : New Holland
 Model : 3510
 Brand name : New Holland
 Type : Four wheeled, Rear wheel driven, General Purpose, Unit Construction, Agricultural Tractor.
- Month & Year of manufacture : 01 20
 Chassis Serial number : NHN35100ZLA499068
 Country of Origin : India
- 2.1.2 Engine:**
- Make : Simpsons
 Model : T III A S324/NHF1.2
 Type : Four stroke, water cooled, naturally aspirated, direct injection, diesel engine.
 Serial number : S324F08450
- Engine speed (Manufacturer's recommended production setting)(rpm) :**
- 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
- 2.1.3 Cylinder & Cylinder Head:**
- Number : Three
 Disposition : Vertical, Inline
 Bore/stroke, (mm) : 88.9 / 127 (apa)
 Capacity as specified by the applicant, (cc) : 2365
- 2.1.4 Fuel System:**
- Type of fuel feed system : Gravity and forced feed
- 2.1.4.1 Fuel feed pump:**
- Make : Bosch, India
 Type : Plunger
 Model/Group combination No. : 9440 030 030 (apa)
- 2.1.4.2 Fuel Injection pump:**
- Make : Bosch, India
 Model/Group combination No. : F002 AOZ 771, PES3A 80D320RS 2000
 Type : Inline, Plunger
 Serial number : 95832014
- 2.1.4.3 Fuel injectors:**
- Make : Bosch, India
 Holder number : F002 C70 018
 Nozzle no. : DSLA 146P 5514
 Type : Multi hole (Five holes)
 Injection timing : 25.0 +0.8
- 2.1.4.4 Governor:**
- Make : Bosch, India
 Model/Group combination No. : RSV375... 1000A4C1410R
 Type : Mechanical, centrifugal, variable speed



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5. SUMMARY OF OBSERVATIONS, COMMENTS & RECOMMENDATIONS

5.1 The performance results have been reproduced from test report No. T- 1102/1628/2017, (August, 2017) / 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: 2019 for acceptance of tractor for the purpose of subsidies/NABARD financing are summarized as under.

Sl. No.	Characteristic	Category (Evaluative / Non Evaluative)	Requirements as per IS: 12207-2019	Values declared by the applicant (D)/ Requirement (R)	As observed	Whether meets the requirements (Yes/No)
1	2	3	4	5	6	7
5.1.1 PTO Performance :						
a)	Maximum power under 2 h test, (kW) (Natural ambient condition)	Evaluative	Declared value to be achieved with a tolerance of: $\pm 5\%$ for PTO power and or Engine power >26 kW. $\pm 10\%$ for PTO power and or engine ≤ 26 kW	24.3 (D)	22.1	Yes
b)	Power at rated engine speed, (kW)	Non Evaluative	-do-	24.3 (D)	22.0	Yes
c)	Specific fuel consumption corresponding to maximum power, (g/kWh)	Evaluative	+ 10%	265 (D)	278	Yes
d)	Maximum equivalent crankshaft torque, (Nm)	Non Evaluative	$\pm 8\%$	140 (D)	125.3	No
e)	Back-up torque, percent	Evaluative	12 percent, min.	15 % (D) 12 % (R) Minimum	20.4	Yes
f)	Maximum operating temperature, ($^{\circ}$ C)					
	1) Engine oil	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 (R) Maximum	0.73	Yes
h)	Smoke level, m^{-1}	Evaluative	Maximum light absorption coefficient of 3.25 per meter or equivalent BOSCH No. 5.2 or 75 Hatridge value.	3.25 per meter (R) Maximum	0.18 m^{-1}	Yes



1	2	3	4	5	6	7
5.1.2 Drawbar performance :						
a)	Max. drawbar pull with ballast corresponding to 15 percent wheel slip or 7 percent track slip, (kN)	Non Evaluative	Minimum 70% of static mass with ballast	15.52 (D) 17.13 (R) Minimum	21.13	Yes
b)	Max. drawbar pull with standard ballast corresponding to 15 percent wheel slip or 7 percent track slip, (kN)	Evaluative	Minimum 70% of static mass of tractor without ballast or with standard ballast, as the case may be	11.28 (D) 12.53 (R) Minimum	15.43	Yes
c)	Maximum drawbar power without ballast, or with standard ballast as in case may be, kW	Evaluative	Minimum 80 % of PTO power as referred in SI No. i) a) of PTO performance in case of tractors having total static mass > 1500 kg Minimum 75 % of PTO power as referred in SI 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 SI No. i) a) of engine performance in case of tractors which do not have a PTO shaft.	19.7 (D) 17.7 (R) Minimum	21.1	Yes
d)	Maximum transmission oil temperature (°C)	Evaluative	To be declared by the manufacturer.	130 (D)	81	Yes
5.1.3 Power lift and hydraulic pump performance :						
a) Maximum lifting capacity throughout the range of lift, (kN):						
	1) At hitch points	Evaluative	Tolerance of $\pm 10\%$	11.00 (D)	11.02	Yes
	2) With the standard frame	Evaluative	The lift capacity should at least be 24 kg/PTO kW, and it should be 21.5 kg/engine kW where the tractor is not provided with a PTO shaft	9.71 (D) 5.20 (R) Minimum	9.03	Yes
b)	Maximum drop in the height of the point of application of the force after each 5 minutes interval for a total duration of 30 Minutes, (mm)	Non Evaluative	The observed value should not exceed 50 mm	50 (D) Maximum	00	Yes
5.1.4 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 m	10 (R)	7.37	Yes
	2) Hot brake	Evaluative	10 m	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 N	600 (R) Maximum	204 to 249	Yes



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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, N	Evaluative	Yes / No	Yes	Yes	Yes
5.1.5	Noise measurement :					
a)	Maximum ambient noise emitted by the tractor dB(A)	Evaluative	88 dB (A) for >1.5 tonne GVW and 85 db (A) for <1.5 tonne GVW (as per CMVR)		81	Yes
b)	Maximum noise at operator's ear level dB(A)	Evaluative	96 (as per CMVR)		92	Yes
5.1.6	Amplitude of mechanical vibrations at:					
	1) Left foot rest	Non Evaluative	100 microns (max)		60	Yes
	2) Right foot rest				80	Yes
	3) Seat (with driver seated)				150	No
	4) Steering wheel				140	No
5.1.7	Air cleaner oil pull over test :					
	Maximum air cleaner pull over test, (%)	Evaluative	0.25% (Max)		0.02	Yes
5.1.8	Haulage requirements :					
a)	Gross mass of the trailers, (tonnes):					
	Two wheel	Non Evaluative	To be specified by manufacturer	4.0 (D)	4.0	Yes
	Four wheel		5.5 (D)	5.5	Yes	
b)	Distance travelled / liter of fuel consumption, (km/l):					
	Two wheel	Non Evaluative	-do-	4.0 to 6.0(D)	5.37 to 5.66	Yes
	Four wheel			4.0 to 6.0(D)	5.10 to 5.30	Yes
c)	Fuel consumption (ml/km/tonne):					
	Two wheel	Non Evaluative	-do-	25 to 50(D)	44 to 47	Yes
	Four wheel			25 to 50(D)	34 to 36	Yes
5.1.9	Wetland cultivation (Puddling Operation):					
	Sealing for the following assemblies:	Evaluative	The identified assemblies should essentially meet the requirement of IS: 11082. No water ingress in the identified assembly given in column-2. If tractor does not meet the requirements of wetland cultivation, it may be recommended for dry land operation only.	There should be no ingress of water and/or mud	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, April 2009.	Yes
	1) Clutch assembly	-do-				
	2) Brake housings	-do-				
	3) Front axle hubs	-do-				
	4) Engine oil	-do-				
	5) Transmission oil	-do-				
5.1.10	Safety features :					
a)	Guards against moving and hot parts	Evaluative	Belt drives, pulleys, silencer, hydraulic pipes (As per IS: 12239 (Part-2)		Meets the requirement	Yes
b)	Lighting arrangement	Evaluative	As per CMVR		Meets the requirement	Yes
c)	Seating requirements (Tractors having more than 1150 mm rear track width)	Non Evaluative	Should meet the requirements of IS: 12343 (As amended from time to time)		Meets the requirement	Yes



1	2	3	4	5	6	
d)	Technical requirements for PTO shaft	Evaluative	Should meet the requirements of IS: 4931 (As amended from time to time)	Meets the requirement	Yes	
e)	Dimensions of three point linkage	Non Evaluative	Should meet the requirements of IS: 4468 (Part-I) (As amended from time to time)	Meets the requirement	Yes	
f)	Specifications of linkage drawbar	Evaluative	Should meet the requirements of IS 12953 (As amended from time to time)	Meets the requirement	Yes	
g)	Swinging drawbar (wherever fitted)	Evaluative	Should meet the requirements of IS 12362 (Part 3) (As amended from time to time)	Not provided	Not applicable	
h)	1) Maximum traveling speed at rated engine speed in reverse gear, kmph	Evaluative	Should not exceed 20 kmph	11.30 kmph (Meets the requirement)	Yes	
	2) Audible warning signal on tractor	Evaluative	As soon as the travelling speed in reverse gear reaches to 20 kmph ,an audible warning signal on tractor be activated ,The safety aspects about the operation of shuttle technology shall be brought in operation and manufacturer /dealer shall ensure the training on this aspect to operator before the delivery of tractor.	Not applicable	Not applicable	
5.1.11	Labelling of tractors (Provision of labelling plate):					
	1) Make	Evaluative	Should conform to the requirements of CMVR along-with maximum PTO power in kW and year of manufacture in numerical form MM YY Digit 01-12 in box No.1 for MM will represent the months & next two digits in box No.2 for YY will represent the year of manufacturing.	New Holland	Yes	
	2) Model	Evaluative		3510	Yes	
	3) Month & Year of manufacture	Evaluative		01 20	Yes	
	4) Engine number	Evaluative		S324F08450	Yes	
	5) Chassis number	Evaluative		NHN35100ZLA4	Yes	
	6) Declaration of PTO power, (kW)	Evaluative		99068	Yes	
	7) Declaration Specific Fuel Consumption g/kWh	Evaluative		24.3	Yes	
			265	Yes		
5.1.12	Discard limit for, (mm) :					
(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)	Piston diameter at skirt (mm)	Non Evaluative		Not specified	88.806 to 88.808	--
(d)	Ring end gap, (mm):					
	- Top comp. ring.	Evaluative	-do-	1.50 (D)	0.30	Yes
	- 2 nd comp. ring.			1.50 (D)	0.30 to 0.35	Yes
	- Oil ring.			1.50 (D)	0.35	Yes
(e)	Ring groove clearance, (mm):					
	- Top comp. ring.	Evaluative	-do-	0.40 (D)	0.093 to 0.097	--
	- 2 nd comp. ring.			0.40 (D)	0.062 to 0.070	Yes
	- Oil ring.			0.40 (D)	0.042 to 0.054	Yes



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1	2	3	4	5	6	7	
(f)	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
(g)	Clearance of big or small 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
(h)	Clearance between king pin and bush, (mm)		Non Evaluative	-do-	0.50 (D)	0.18 to 0.24	Yes
(i)	Clearance between centre pin and bush, (mm)		Non Evaluative	-do-	0.50 (D)	0.15 to 0.22	Yes
5.1.13	Literature (Submission to test agency):						
(a)	Operator manual		Evaluative	The printed literature in booklet form should be provided as per IS 8132 & should submit along with the test sample	Provided	Provided	Yes
(b)	Parts Catalogue		Evaluative		Provided	Provided	Yes
(c)	Workshop / Service manual		Evaluative		Provided	Provided	Yes
5.1.14	Fitment of roll Over protective structures (ROPS): for tractor having more than 1150 mm rear track width		Evaluative	ROPS should meet the requirement of IS 11821 or OECD code or equivalent International standard		Not fitted	Not applicable
5.1.15	Standard Accessories		Evaluative	Trailer hitch, front tow hook, linkage drawbar should be provided with the tractor.		Provided	Yes
5.1.16	Accessories (optional)		Non Evaluative	Ballast weights, if fitted, should meet the requirement of CMVR		Provided	Yes

5.2 CATEGORY OF BREAKDOWNS / DEFECTS (As per Clause 5.0 of IS:12207-2019) :					
S. No.	Category of breakdowns	Category (Evaluative / Non Evaluative)	Requirements as per IS: 12207-2019	As observed	Whether meets the Requirements (Yes/No.)
1.	Critical	Evaluative	No critical breakdown	None	Yes
2.	Major	Evaluative	Not more than one and neither of them should be repetitive in nature	None	Yes
3.	Minor	Evaluative	Not more than three 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 four, that is, (1 major + 3 minor) or 4 minor breakdowns.	None	Yes

**5.3 Salient Observations:****5.3.1 PTO performance test:**

The maximum power was observed as **22.1 kW** against the declaration of **24.3 kW**, which meets the requirement of IS: 12207-2019 with regard to tolerance limit.

5.3.2 Hydraulic performance test:

i) Maximum lifting capacity throughout the range of lift at hitch point and standard frame was recorded as **11.02 kN & 9.03 kN** respectively against the re-declaration of **11.0 kN & 9.71 kN** respectively. Which meet the minimum requirement of IS: 12207-2019.

5.3.3 This tractor model meets the evaluative requirements of IS: 12207-2019.

6. 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	03 Month (March, 2020 to May, 2020)	Yes	--None--

TESTING AUTHORITY:

PRAMOD YADAV
AGRICULTURAL ENGINEER

C.V. CHIMOTE
TEST ENGINEER

J.J.R. NARWARE
DIRECTOR

The report compiled by Sh. Vithato Keyho, Senior Technical Assistant

7. APPLICANT'S COMMENTS

-Nil-

ANNEXURE - I**TRACTOR RUN HOURS DURING TEST**

A.	LABORATORY AND TRACK TESTS:	HOURS
1.	Running-in	--
2.	Nominal speed test	0.5
3.	Power Lift and hydraulic pump performance test	1.0
4.	PTO performance test	4.8
B.	Miscellaneous test and other run hours, including idle run transportation, trial and preparation for test.	6.0
	Total	12.3