

व्यावसायिक परीक्षण रिपोर्ट (प्रारंभिक)
COMMERCIAL TEST REPORT (Initial)

संख्या/No. : T- 1606/2137/2021
माह/Month : November, 2021

[ONLINE TESTING]

(यह परीक्षण रिपोर्ट 30/11/2024 तक वैध है | /THIS TEST REPORT IS VALID UPTO: 30/11/2024)



NEW HOLLAND, 5510 E1 TRACTOR



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 & Farmers Welfare)

केन्द्रीय कृषि मशीनरी प्रशिक्षण एवं परीक्षण संस्थान

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

Location of manufacturing plant : M/s. CNH Industrial (India) Pvt. Limited,
Plot No.-3, Udyog Kendra,
Greater Noida – 201 306,
Distt. Gautam Budh Nagar, Uttar Pradesh.

Test requested by (applicant) : The manufacturer
Selected for test by : The manufacturer
Place of running-in : At manufacturer's work place
Duration of said running-in, (h):
- Engine : 50
- Transmission : 50

Method of Selection : Due to Covid-19 pandemic, it was not possible to conduct the random selection. Nor it was possible for applicant to facilitate the random selection. As a last resort, applicant requested to allow the direct submission of test sample which was allowed.

1. SPECIFICATIONS

- 1.1 Tractor:**
- Make : New Holland
Model : 5510 E1
Variants, if any : None
Type : Four wheeled, Rear wheel driven, Unit Construction, General purpose, Agricultural tractor
- Month & Year of manufacture : 11 / 2020
Chassis number : NHN55100ZLL526863
Country of origin : India
- 1.2 Engine:**
- Make : FPT Industrial
Model : 8035.05D.941
Type : Four stroke, liquid cooled, naturally aspirated, direct injection, diesel engine.
Serial number : 301644DX
- 1.2.1 Engine speed(Manufacturer's recommended production setting), (rpm):**
- Maximum speed at no load : 2380 to 2520
- Low idle speed : 700 to 800
- Speed at maximum torque : 1100 to 1500
- Rated speed, (rpm):**
- For PTO use : 2100
- For drawbar use : 2100
- 1.3 Cylinder & Cylinder Head:**
- Number : Three
Disposition : Vertical, inline
Bore/stroke, (mm) : 104/115 (apa)
Capacity as specified by the applicant, (cc) : 2931 (apa)

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Any marked wear of king pin bushes : None
Clearance between king pin and bushes, (mm) : 0.15 to 0.18 | Against the discard limit of 0.40 mm.
Condition of thrust bearing : Normal
Condition of bearings for stub axles : Normal
Condition of seals for stub axles and king pins : Normal
Clearance between centre pin and bush, (mm) : 0.14 to 0.16 | Against the discard limit of 0.50 mm.

14.6 Steering system:

Visual condition of the components of complete steering assembly : Normal

14.7 Starter motor & Alternator:

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

15. ADJUSTMENTS, DEFECTS, BREAKDOWNS AND REPAIRS

--None--

16. SUMMARY OF OBSERVATIONS, COMMENTS & RECOMMENDATIONS

16.1 On the basis of tests conducted the performance results have been summarized as evaluative (mandatory) and non-evaluative (not-mandatory) parameter applicable for qualifying Minimum Performance Criteria as per Clause-4 (Table-1) of **IS: 12207-2019** for acceptance of the tractor for the purpose of subsidies/NABARD financing are summarized as under:-

S. No.	Characteristic	Category (Evaluative / Non Evaluative)	Requirements as per IS: 12207-2019	Values declared by the applicant (D) / Requirement (R)	As observed	Whether meets the requirements (Yes/No)
1	2	3	4	5	6	7
16.1.1	PTO Performance :					
a)	Max. power under 2 h test, (kW) (Natural ambient condition)	Evaluative	Declared value to be achieved with a tolerance of: ± 5% for PTO power or engine power >26 kW, ± 10% for PTO power or Engine power ≤ 26 kW.	33.6 (D)	32.7	Yes
b)	Power at rated engine speed, (kW)	Non Evaluative	-do-	33.6 (D)	32.7	Yes
c)	Specific fuel consumption corresponding to maximum power, (g/kWh)	Evaluative	+ 10% Max.	255 (D)	273	Yes
1	2	3	4	5	6	7
d)	Maximum equivalent	Non Evaluative	± 8%	195 (D)	187.2	Yes

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	crankshaft torque, (Nm)						
e)	Back-up torque, percent	Evaluative	12 percent, min.	20 % (D)	25.7	Yes	
				12 % (R)			
f)	Maximum operating temperature(°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.	134 (D)	121	Yes
	2)	Coolant (liquid)	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.	124 (D)	103	Yes
g)	Engine oil consumption, (g/kWh)	Evaluative	Not exceeding 1% of SFC at max. power under High ambient conditions	2.73 (Maximum) (R)	0.21	Yes	
h)	Smoke level, (m ⁻¹)	Evaluative	Maximum light absorption coefficient of 3.25 per metre or equivalent BOSCH No. 5.2 or 75 Hatridge value (As per CMVR)	3.25 (Maximum) (R)	0.32	Yes	
16.1.2	Drawbar performance:						
a)	Maximum drawbar pull with ballast corresponding to 15 percent wheel slip, (kN)	Non Evaluative	Minimum 70% of static mass with ballast	24.2 (D)	28.56	Yes	
				24.37 (Minimum) (R)			
b)	Maximum drawbar pull with standard ballast corresponding to 15 percent wheel slip, (kN)	Evaluative	Minimum 70% of static mass of tractor without / standard ballast	17.65 (D)	20.90	Yes	
				17.50 (Minimum) (R)			
c)	Maximum drawbar power without ballast, or with standard ballast as the 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.	26.9 (D)	26.9	Yes	
				26.2 (Minimum) (R)			
1	2	3	4	5	6	7	

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d)	Maximum transmission oil temperature (°C)	Evaluative	The declared value should not exceed the maximum value specified by oil company	132 (D)	81	Yes	
16.1.3	Power lift and hydraulic pump performance :						
a)	Maximum lifting capacity throughout the range of lift, (kN):						
	1)	At hitch points	Evaluative	±10 percent	24.50 (D)	25.41	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	18.10 (D) 7.70 Minimum (R)	22.11	Yes
b)	Maximum drop in the height of the point of application of the force after each 5 minutes interval for a total duration of 30 minute, (mm)		Non Evaluative	The observed value should not exceed 50 mm	50 (D) 50 Maximum (R)	30	Yes
16.1.4	Brake performance at 25 kmph:						
a)	Maximum stopping distance at a force, equal to or less than 600 N on brake pedal with ballast, (m):						
	1)	Cold brake	Evaluative	10	10 (R)	7.59	Yes
	2)	Hot brake	Evaluative	10	10 (R)	7.65	Yes
b)	Maximum force exerted on the brake pedal to achieve a deceleration of 2.5 m/s ² (N)		Evaluative	600	600 (R)	143 to 173	Yes
c)	Whether parking brake is effective at a force of 600 N at foot pedal(s) or 400 N at hand lever, N		Evaluative	Yes / No	Yes	Yes	Yes
16.1.5	Noise measurement :						
a)	Maximum ambient noise emitted by the tractor dB(A)		Evaluative	As per CMVR	88 (R)	81.0	Yes
b)	Maximum noise at operator's ear level dB(A)		Evaluative	As per CMVR	96 (R)	92.0	Yes
16.1.6	Amplitude of mechanical vibrations at :						
	1)	Left foot rest	Non Evaluative	100 microns (max)	100(R)	90	Yes
	2)	Right foot rest		-do-		80	Yes
	3)	Seat (with driver seated)		-do-		42	Yes
	4)	Steering wheel		do-		94	Yes

1	2	3	4	5	6	7
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16.1.7	Air cleaner oil pull over:					
	Maximum air cleaner oil pull over	Evaluative	0.25 % (max.)	--	Dry type air cleaner is fitted	Not applicable
16.1.8	Haulage requirements:					
a)	Gross mass of the trailers, (tones):					
	1) Two wheel	Non	--	5.0 (D)	5.0	Yes
	2) Four wheel	Evaluative		8.0 (D)	8.0	Yes
b)	Distance travelled / litre of fuel consumption, (km/l):					
	1) Two wheel	Non	--	4.0 to 6.0 (D)	4.65 to 4.75	Yes
	2) Four wheel	Evaluative		3.0 to 5.0 (D)	4.38 to 4.50	Yes
c)	Fuel consumption (ml/km/tonne):					
	1) Two wheel	Non	--	40 to 50 (D)	42.07 to 43.04	Yes
	2) Four wheel	Evaluative		30 to 40 (D)	27.81 to 28.56	No
16.1.9	Wetland cultivation :					
	Sealing for the following assemblies:	Evaluative	The identified assemblies should essentially meet the requirement of IS: 11082. No water ingress in the identified assembly given in column-2. If tractor does not meet the requirements of wetland cultivation, it may be recommended for dry land operation only.		Manufacturer has recommended that the tractor is not suitable for wetland (puddling) operation. Hence wetland (puddling) test was not conducted	Not applicable
	1) Clutch assembly	-do-		There should be no ingress of water and / or mud (R)		
	2) Brake housings	-do-				
	3) Front axle hubs	-do-				
	4) Engine Oil	-do-				
	5) Transmission Oil	-do-				
16.1.10	Safety features :					
a)	Guards against moving and hot parts	Evaluative	Belt drives, pullies, silencer, hydraulics 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
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

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1	2	3	4	5	6	7
g)	Specifications of 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 travelling speed at rated engine speed in reverse gears, kmph	Evaluative	Should not exceed 20 kmph		34.74 kmph (Meet the requirements)	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 shall be activated.		Audible warning signal is activated when reverse gear speed reaches to 20 kmph in HR3 & HR4 gears	Yes
16.1.11	Labelling of tractors (Provision of labelling plate):					
	1) Make	Evaluative	Should conform to the requirements of CMVR along with maximum declared value of PTO power in kW and for month & year of manufacture in numerical MM YY Digit 01-12 in box No.1 for MM will represent the month and next two digit in the box No.2 for YY will represent the year of manufacturing		NEW HOLLAND	Yes
	2) Model	Evaluative			5510 E1	Yes
	3) Month & Year of manufacture	Evaluative			11 / 2020	Yes
	4) Engine number	Evaluative			301644DX	Yes
	5) Chassis number	Evaluative			NHN55100ZLL5 26863	Yes
	6) Declaration of PTO power, kW	Evaluative			33.6	Yes
16.1.12	Discard limit for:					
(a)	Cylinder bore diameter, (mm)	Evaluative	To be specified by Manufacturer	104.204 (D)	104.009 to 104.032	Yes
(b)	Clearance between piston & cylinder liner at skirt, (mm)	Non Evaluative		0.50 (D)	0.172 to 0.181	Yes
(c)	Piston diameter at skirt, (mm)	Non Evaluative		Piston is discarded when ring groove clearance exceeds 0.25 mm with new rings	103.849 to 103.854	Yes
(d)	Ring end gap, (mm):					
	- Top comp. ring.	Evaluative	-do-	1.50 (D)	0.50 to 0.60	Yes
	- 2 nd comp. ring.		-do-	1.50 (D)	0.55 to 0.60	Yes
	- Oil ring.		-do-	1.80 (D)	0.45 to 0.50	Yes
(e)	Ring groove clearance, (mm):					
	- Top comp. ring.	Evaluative	-do-	0.25 (D)	0.051 to 0.106	Yes
	- 2 nd comp. ring.		-do-	0.25 (D)	0.055 to 0.099	Yes
	- Oil ring.		-do-	0.25 (D)	0.056 to 0.098	Yes

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1	2	3	4	5	6	7	
(f)	Diametrical clearance of main bearings, (mm):	Evaluative	-do-	0.50 (D)	0.108 to 0.134	Yes	
(g)	Clearance of big end bearings, (mm):						
	-	Diametrical	Evaluative	-do-	0.50 (D)	0.070 to 0.090	Yes
	-	Axial	Evaluative	-do-	0.75 (D)	0.35	Yes
(h)	Crankshaft end float, (mm)	Evaluative	-do-	0.50 (D)	0.22	Yes	
(i)	Clearance between king pin and bush,(mm)	Non Evaluative	-do-	0.40 (D)	0.15 to 0.18	Yes	
(j)	Clearance between center pin and bush,(mm)	Non Evaluative	-do-	0.50 (D)	0.14 to 0.16	Yes	
16.1.13	Literature (Submission to test agency)						
(a)	Operator manual	Evaluative	The printed literature in booklet form should be provided as per IS 8132 and 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	
16.1.14	Fitment of Roll Over Protective Structure (ROPS): for tractors 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 Provided (D)	Not fitted	Not Applicable	
16.1.15	Standard accessories	Evaluative	Trailer hitch, front tow hook, linkage drawbar should be provided with tractor	Provided	Provided	Yes	
16.1.16	Accessories (Optional)	Non Evaluative	Ballast weights if fitted should meet the requirement of CMVR.	Provided	Meets the requirement	Yes	

16.2 CATEGORY OF BREAKDOWNS / DEFECTS (As per clause 5.0 of IS:12207-2019):					
S. No.	Category of Breakdown	Category (Evaluative / Non Evaluative)	Requirements as per IS: 12207-2019	As observed	Whether meets the requirement (Yes/No.)
1.	Critical breakdown	Evaluative	There is no 'critical breakdown' during the course of testing	None	Yes
2.	Major breakdowns	Evaluative	There are not more than 1 major breakdowns and neither of them is of repetitive nature	None	Yes
3.	Minor breakdowns	Evaluative	There are not more than 3 minor defects during the test and the frequency of each is 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

16.3 Conformity with following IS:

- i) Guide lines for declaration of power and specific fuel consumption and labelling of agricultural tractors (First revision) [IS10273: 1987 (Reaffirmed in January, 2019)] : Conforms
- ii) Agricultural tractors - Rear mounted power take-off - Types 1, 2 and 3 (third revision) [IS:4931-1995 (Reaffirmed in January, 2019)] : Conforms
- 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 2017)] : Conforms
- iv) Drawbar for agricultural tractors – Link type [IS 12953:1990 (Reaffirmed in 2017)] : Conforms
- v) Agricultural tractors - Operator's seat technical requirement [IS 12343 –1998 (First revision) (Reaffirmed in January, 2019)] : Conforms
- vi) Guide for safety & comfort of operator of agricultural tractors: Part 1 General requirements (first revision): [IS 12239 (PT-1) 1996/ISO 4254-1:2018] : Conforms
- 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 January, 2019)] : **Does not conform**
- viii) Guide lines for location and operation of operator controls on agricultural tractors and machinery (first revision) IS: 8133-1983 (Reaffirmed in January, 2019)] : Conforms
- ix) Tractors and machinery for agriculture and forestry, powered lawn and garden equipment - Symbols for operator controls and other displays Part 2 Symbols for agricultural tractors and machinery [IS:6283 (Part-1)-2006 and IS: 6283 (Part-2)-2007 (Reaffirmed in January, 2019)] : Conforms

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- x) Agricultural Tractors and Machinery - Lighting device for : Conforms
travel on public roads (IS: 14683-1999) (Reaffirmed in
January, 2019)]

16.4 Salient Observations:

16.4.1 Laboratory tests:

16.4.1.1 Mechanical Vibration:

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

16.4.1.2 Three-point linkage:

All the dimensions of three point hitch do not conform to the requirement of a particular category (Cat I or Cat II), in toto, of IS: 4468-1997 (Part1). This should be looked into for corrective action.

16.5 Recommendation with regard to safety on tractor:

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

- i) Longitudinal distance from seat index point to centre of differential lock pedal has been measured as 300 mm against the requirement of 355 to 770 mm as per IS: 12343-1998 (Re-affirmed in January, 2019).
- ii) There shall be provision of spark arrester in the exhaust system of tractor's engine as per IS: 12239 (Part-2)-1999 (Re-affirmed in January, 2019).
- iii) Working clearance around the position and draft control lever has been measured as 25 mm in between PTO clutch lever and LHS fender against the minimum requirement of 70 mm as per IS: 12239 (Part-2) – 1999 (Reaffirmed in January, 2019).
- iv) There shall be provision of master shield around the PTO shaft as per IS: 4931-1995 (Reaffirmed in January, 2019).

16.6 Adequacy of Literature:

16.6.1 Following literature of following tractor models were supplied with the test sample for reference during the test.



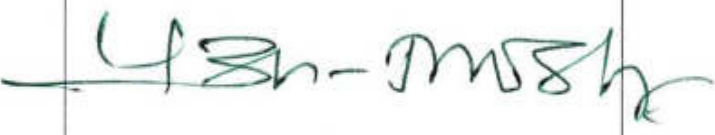
- i) Operator's NEW HOLLAND 5510E, NEW HOLLAND 5510E1, NEW HOLLAND 5510E2 and NEW HOLLAND 5510E3 tractor models.
- ii) Service Parts Catalogue (Part-I and Part-II) of NEW HOLLAND 5510E, NEW HOLLAND 5510E1, NEW HOLLAND 5510E2 and NEW HOLLAND 5510E3 tractor models.
- iii) Service Manual (Part-I, II, III and IV) NEW HOLLAND 5510E, NEW HOLLAND 5510E1, NEW HOLLAND 5510E2 and NEW HOLLAND 5510E3 tractor models.

The supplied literature was found adequate as per IS: 8132-1999 (Reaffirmed in 2019)

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16.6.2 The manufacturer has recommended that the tractor is not suitable for wetland cultivation (puddling operation). It is therefore recommended that this fact should be mentioned clearly and boldly in all literature of tractor.

TESTING AUTHORITY:

C.V. CHIMOTE TEST ENGINEER	
Y. K. RAO SENIOR AGRICULTURAL ENGINEER	
P. K. PANDEY DIRECTOR	

Draft Test Report is compiled by: **Partha Lodh**, Senior Technical Assistant.

17. APPLICANT'S COMMENTS

Para no.	Our reference	Applicant comments
17.1	16.4.1.2, 16.5 & 16.6.2	Your valuable comments & suggestions for improvements are well taken. Under our policy of continuous product improvement these aspects are further being looked into & will take appropriate actions to eliminate these deviation soon wherever necessary.

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ANNEXURE – I

BRIEF SPECIFICATION OF IMPLEMENTS USED DURING FIELD TEST

S.No.	I t e m	Disc Plough	Rotavator
1.	Make	Basundhra	Shaktiman
2.	Type	Mounted	Mounted
3.	No. of bottom/blades	Three	42 (in 7 flanges)
4.	Type of bottom/blades	Plain concave	Hatchet shape
5.	Size of bottom/blades, (mm)	660	170 x 70 x 5
6.	Spacing of bottom/flanges, (mm)	505	240
7.	Lower hitch point span, (mm)	775	845
8.	Mast height, (mm)	550	560
9.	Overall dimensions, (mm):		
	- Length	1925	1100
	- Width	1040	2060
	- Height	1135	1060
10.	Gross mass, (kg)	300	495

ANNEXURE –II

TRACTOR RUN HOURS DURING TEST

A.	LABORATORY AND TRACK TESTS:	HOURS
1.	PTO performance test	11.13
2.	Drawbar performance test	23.66
3.	Power lift and hydraulic pump performance test	1.50
4.	Turning ability & Location of centre of gravity	0.25
5.	Operator's field of vision	0.50
6.	Brake test	0.50
7.	Noise measurement	1.75
8.	Mechanical vibration test	1.00
9.	Theoretical speed test	1.77
B.	FIELD TEST:	
1.	Disc Plough	21.49
2.	Rotavation	16.67
C.	HAULAGE TEST:	5.63
D.	Miscellaneous test and other run hours including idle run, transportation, trials and preparation for test	8.70
TOTAL:		94.55