



**JOHN DEERE, 5310 V3 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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## 15. ADJUSTMENTS, DEFECTS, BREAKDOWNS AND REPAIRS

Sl. No.	Adjustments / Defects / Breakdowns and Repairs	Tractor run hours
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## 16. SUMMARY OF OBSERVATIONS, COMMENTS &amp; RECOMMENDATIONS

16.1 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:

S. 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
16.1.1	<b>PTO Performance :</b>					
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 >25 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	36.4 (D)	36.5	Yes
b)	Power at rated engine speed, (kW)	Non Evaluative	-do-	36.4 (D)	35.3	Yes
c)	Specific fuel consumption corresponding to maximum power, (g/kWh)	Non Evaluative	+ 5%	325 (D)	308	Yes
d)	Maximum equivalent crankshaft torque, (Nm)	Non Evaluative	± 8%	229 (D)	208.1	No
e)	Back-up torque, percent	Non Evaluative	10 percent, min.	10 percent, min (R)	34.3	Yes
f)	<b>Maximum operating temperature (°C) :</b>					
	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.	135	117	Yes
	2) Coolant (water)	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.	118	100	Yes
g)	Engine oil consumption, (g/kWh)	Evaluative	Not exceeding 1% of SFC at max. power under High ambient conditions	3.14 (R)	0.61	Yes



1	2	3	4	5	6	7
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 metre	0.54	Yes
<b>16.1.2 Drawbar performance :</b>						
a)	Max. drawbar pull with ballast corresponding to 15 percent wheel slip, (kN)	Non Evaluative	Minimum 65% of static mass with ballast	21.92 (D) 19.08 (R)	22.93	Yes
b)	Maximum drawbar pull without ballast corresponding to 15 percent wheel slip, (kN)	Evaluative	Minimum 65% of static mass of tractor without ballast	15.44 (D) 13.44 (R)	17.70	Yes
c)	Maximum drawbar power without ballast, (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. ii) a) of engine performance in case of tractors which do not have a PTO shaft.	29.1 (D) 29.2 (R)	30.7	Yes
d)	Max. transmission oil temperature (°C)	Non Evaluative	The declared value should not exceed the maximum value specified by oil company	110 (D)	77	Yes
<b>16.1.3 Power lift and hydraulic pump performance :</b>						
a)	Maximum lifting capacity throughout the range of lift, (kN):					
1)	At hitch points	Non Evaluative	[Tolerance of minus 10%]	17.50 (D)	17.96	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	12.9 (D) 8.59 (R)	15.53	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	[Tolerance of plus 5 mm]	50 (D)	02	Yes
<b>16.1.4 Brake performance at 25 kmph :</b>						
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	7.25	Yes
2)	Hot brake	Evaluative	10	10	7.57	Yes



1	2	3	4	5	6	7
b)	Maximum force exerted on the brake pedal to achieve a deceleration of 2.5 m/s <sup>2</sup> (N)	Evaluative	600	600 (R)	183 to 216	Yes
c)	Whether parking brake is effective at a force of 600 N at foot pedal(s) or 400 N at hand lever	Evaluative	Yes / No	Yes (R)	Yes	Yes
16.1.5	<b>Noise measurement :</b>					
a)	Maximum ambient noise emitted by the tractor dB(A)	Evaluative	As per CMVR	88 (R)	83	Yes
b)	Maximum noise at operator's ear level dB(A)	Evaluative	As per CMVR	96 (R)	95	Yes
16.1.6	<b>Amplitude of mechanical vibrations at :</b>					
	1) Left foot rest	Non Evaluative	100 microns (max)	100 (R)	380	No
	2) Right foot rest	Evaluative			360	No
	3) Seat (with driver seated)	Non Evaluative			100	Yes
	4) Steering Wheel	Non Evaluative			160	No
16.1.7	<b>Air Cleaner :</b>					
	Air cleaner oil pull over (%)	Non Evaluative	0.25 % (Maximum)	Dry type air cleaner is provided	Not applicable	--
16.1.8	<b>Haulage requirements :</b>					
a)	Gross mass of the trailers, (tones):					
	1) Two wheel	Non	--	5.0 (D)	5.0	Yes
	2) Four wheel	Evaluative	--	7.0 (D)	7.0	Yes
b)	Distance travelled / litre of fuel consumption, (km/l):					
	1) Two wheel	Non	--	4 to 6 (D)	4.50 to 4.52	Yes
	2) Four wheel	Evaluative	--	4 to 6 (D)	4.04	Yes
c)	Fuel consumption (cc/km/tonne):					
	1) Two wheel	Non	--	30 to 40 (D)	44.3 to 44.5	No
	2) Four wheel	Evaluative	--	30 to 40 (D)	35.40	Yes
16.1.9	<b>Wetland cultivation :</b>					
	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	No ingress of water and/or mud was observed	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
<b>16.1.10</b>	<b>Safety features :</b>					
a)	Guards against moving and hot parts	Evaluative	Belt drives, pulley, silencer, hydraulic pipes (As per IS 12239 part 2)	--	Conforms	Yes
b)	Lighting arrangement	Evaluative	As per CMVR	--	Conforms	Yes
c)	Seating requirement (Tractors having more than 1150 mm rear track width)	Non-Evaluative	Should meet the requirements of IS 12343 (as amended from time to time)	--	Conforms	Yes
d)	Technical requirements for PTO shaft	Non-Evaluative	Should meet the requirements of IS 4931 (as amended from time to time)	--	Conforms	Yes
e)	Dimension of three point linkage	Non-Evaluative	Should meet the requirements of IS 4468 (part 1) (as amended from time to time)	--	Conforms	Yes
f)	Specification of linkage and swinging drawbars	Non-Evaluative	Should meet the requirements of IS 12953 and IS 12362 (part 3) (as amended from time to time)	--	Conforms	Yes
<b>16.1.11</b>	<b>Labelling of tractors (Provision of labelling plate) :</b>					
	1) Make	Evaluative	Should conform to the requirements of CMVR along-with declared value of PTO HP		JOHN DEERE	Yes
	2) Model	Evaluative			5310 V3	Yes
	3) Year of manufacture	Evaluative			BL-F (November, 2015)	Yes
	4) Engine number	Evaluative			PY3029H058374	Yes
	5) Chassis number	Evaluative			1PY5310EKFA006924	Yes
	6) Declaration of PTO power, (kW)	Evaluative			36.4	Yes
	7) Specific fuel consumption, (g/kwh)	Evaluative			325	Yes
<b>16.1.12</b>	<b>Discard limit for:</b>					
(a)	Cylinder bore diameter, (mm)	Evaluative	To be specified by the manufacturer	106.77 (D)	106.48 to 106.50	Yes
(b)	Clearance between piston & cylinder liner at skirt, (mm)	Non-Evaluative		0.32	0.1 to 0.11	Yes
(c)	<b>Ring end gap (mm):</b>					
	- Top comp. ring	Evaluative	-do-	0.75	0.45	Yes
	- 2 <sup>nd</sup> comp. ring		-do-	2.00	0.65 to 0.74	Yes
	- Oil ring		-do-	0.75	0.40	Yes
(d)	<b>Ring groove clearance (mm):</b>					
	- Top comp. ring	Evaluative	-do-	Tapped	Tapped	---
	- 2 <sup>nd</sup> comp. ring		-do-	0.25	0.038 to 0.046	Yes
	- Oil ring		-do-	0.92	0.041 to 0.057	Yes
(e)	<b>Clearance of main bearings (mm):</b>					
	- Diametrical clearance	Evaluative	-do-	0.65	0.087 to 0.121	Yes
	- Crankshaft end float	Evaluative	-do-	0.85	0.20	Yes



1	2	3	4	5	6	7
(f)	<b>Clearance of big end bearings, (mm):</b>					
	- Diametrical	Evaluative	-do-	0.65	0.069 to 0.179	Yes
	- Axial	Evaluative	-do-	0.85	0.35	Yes
(g)	Clearance between king pin and bush, (mm)	Non Evaluative	-do-	0.80	0.06 to 0.16	Yes
(h)	Clearance between centre pin and bush, (mm)	Non Evaluative	-do-	0.80	0.01 to 0.07	Yes
<b>16.1.13</b>	<b>Literature (Submission to test agency)</b>					
(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
<b>16.1.14</b>	<b>CATEGORY OF BREAKDOWNS / DEFECTS:</b>					
S. 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	
<b>16.2</b>	<b>Optional requirements as per Clause-4 (Table-2) of IS:12207-2014:</b>					
S. No.	Characteristic	Requirements as per IS: 12207-2014	As observed	Whether meets the requirements (Yes/No.)		
1.	Fitment of ROPS	With a provision for fitment of ROPS.	Not provided	No		
		If ROPS fitted it should meet the requirement of IS: 11821-1992	ROPS not fitted	Not applicable		
2.	Accessories	Trailer hitch, linkage drawbar may be provided.	Provided	Yes		
		Front tow hook	Not provided	No		

**16.3 Conformity with following IS:**

- i) Guidelines for declaration of power and specific fuel consumption and labeling of agricultural tractors (First revision) [IS 10273:1987 (Reaffirmed in March, 2009)] : Conforms
- ii) Agricultural tractors – Rear mounted power take-off Types 1, 2 and 3 (third revision) [IS: 4931-1995 (Reaffirmed in March, 2009)] : Conforms



- iii) Agricultural wheeled tractors - Rear mounted three-point linkage: Part 1 Categories 1, 2, 3 & 4 (fourth revision) [IS 4468 (Part-I):1997 (Reaffirmed in February, 2012)] : Conforms
- iv) Drawbar for agricultural tractors – Link type [IS 12953:1990 (Reaffirmed in February, 2012)] : Conforms
- v) Agricultural tractors - Operator's seat technical requirement [IS 12343 –1998 (First revision) (Reaffirmed in March, 2009)] : **Does not conform**
- vi) Guide for safety & comfort of operator of agricultural tractors: Part 1 General requirements (first revision) : [IS 12239 (Part-1)-1996 (Reaffirmed in February, 2012) / ISO 4254-1:1989] : **Does not conform**
- vii) Tractors and machinery for agriculture and forestry – Technical means for ensuring safety Part 2: Tractors (first revision) IS 12239 (Part-2)-1999 (Reaffirmed in March, 2009)] : **Does not conform**
- viii) Tractors and machinery for agriculture and forestry, powered lawn and garden equipment – Symbols for operator controls and other displays – Symbols for Agricultural Tractors and Machinery [IS: 6283 (Part-2) – 2007(Reaffirmed in March, 2009) / ISO 3767-2:1991)] : Conforms
- ix) Guidelines for location and operation of operator controls on agricultural tractors and machinery (first revision) (IS: 8133 – 1983) (Reaffirmed in March, 2009) / ISO 3789: 1982] : Conforms
- x) Agricultural Tractor & Machinery Lighting device for travel on public roads [IS: 14683-1999 (Reaffirmed in March, 2009)] : Conforms

**16.4 Salient Observations:**
**16.4.1 Laboratory tests:**
**16.4.1.1 PTO performance:**

- i) The maximum PTO power was recorded as **36.5 kW** against the declaration of **36.4 kW** which meets the requirement of IS: 12207-2014 with regard to tolerance limit.
- ii) The specific fuel consumption corresponding to maximum power was measured as **308 g/kWh** against the declaration of **325g /kWh**, which is within the tolerance limit of IS: 12207-2014.
- iii) The maximum equivalent crankshaft torque was observed as **208.1 Nm** against the declaration of **229 Nm** and which does not meet the requirement of IS: 12207-2014 with regard to tolerance. This should be looked into for necessary corrective action.
- iv) The percentage drop in maximum power during natural ambient and high ambient condition was observed as 6.6 %, which was considered on higher side. This should be looked into for necessary corrective action.
- v) The backup torque is **34.3%**.

**16.4.1.2 Hydraulic Performance :**

- i) The moment about rear axle with standard frame was calculated as **24.85 kN-m**. Whereas, the moment about front axle was calculated as **14.72 kN-m** under unballasted condition and **21.32 kN-m** under ballasted condition. The moment about rear axle is on higher side as compared to the moment about front axle even under ballasted condition. It is, therefore, recommended that the lifting capacity of the hydraulic system may be reduced suitably or ballast recommendation may be reviewed to avoid the front lifting of the tractor.



- ii) The maximum tilt angle of mast from vertical was recorded as 7.5 degree only against the minimum requirement of 10.0 degree. This should be looked into for necessary corrective action.

**16.4.1.3 Mechanical vibration:**

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

**16.4.1.4 Three point linkage:**

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.

**16.4.1.5 Linkage drawbar:**

Some of the parameters of the drawbar linkage conform to Cat.-I and some of them conform to Cat.-II. Keeping in view of the spirit of standardization, the necessary improvements may be incorporated.

**16.4.1.6 Operator's Seat**

The Longitudinal distance from SIP to centre of differential lock pedal does not meet the requirement of IS: 12343-1998 (Re-affirmed in March, 2009) and calls for necessary corrective action.

**16.4.1.7 Location and movement of operator's controls:**

Working clearance between gear shift lever (in park position) and the mudguard does not meet the requirement of the IS: 12239 (Part-2)-1996. This should be looked into for necessary corrective action.

**16.4.1.8 Labelling Plate:**

The maximum PTO power has been specified as 36.4 kW (49.5 hp) vide labelling plate of the tractor. As per the conversion, the power of 36.4 kW is equals to 48.8 hp and not equals to 49.5 hp. This needs to be looked into for necessary corrective action.

**16.4.2 Field performance test:**

**16.4.2.1 Haulage performance:**

The fuel consumption (ml/km/tonne) with two wheel trailer was observed as 44.3 to 44.5 ml/km/tonne against the declaration of 30 to 40 ml/km/tonne for two wheel trailer. This does not meet the requirement of IS: 12207-2014 and therefore, should be looked into for necessary corrective action.

**16.4.2.2 Wetland cultivation (Puddling operation):**

No ingress of mud and / or water was noticed during puddling operation of the tractor and meet the requirements of IS: 11082-1984 (Technical requirements of agricultural tractors for wetland operation). Therefore, the tractor is found as suitable for wetland operation (Puddling).

**16.5 Maintenance / Service Problems:**

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



**16.6 Recommendation with regard to safety on tractor:**

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

- i) Provision of spark arresting device in exhaust system.
- ii) The working clearance around main gear shifting lever does not meet the requirement of IS: 12239 (part-2)-1999.
- iii) Front tow hook shall be provided.

**16.7 Adequacy of Literature supplied with machine:**

**16.7.1** The following literature was supplied with the tractor for reference during the testing.

- i) Operator's Manual (For 5310, 5310 V3, 5310 V5, 5050E, 5055E, 5060E, 5065E & 5075E tractor models).
- ii) Technical manual Part 1 & 2 (For 5310, 5310 V3, 5310 V5, 5050E, 5055E, 5060E, 5065E & 5075E tractor models).
- iii) Parts Catalogue (For 5310, 5310 V3 & 5310 V5 tractor models).

**16.7.2** The given literature supplied was found adequate. However, the following points needs to be incorporated in owners/operators manual.

- i) Details of all variants along with their features at a glance should be provided in the operator's manual.

**16.7.3** The literatures should also be brought out in national as well as other regional languages for the guidance of users and service personnel.

**17. 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	10, Months (May, 2016 to March, 2017)	Yes	-

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