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व्यावसायिक परीक्षण रिपोर्ट  
COMMERCIAL TEST REPORT (Initial)

संख्या / No. : T-1054/1579/2016  
माह / Month : December, 2016



**JOHN DEERE 5310 V5 TRACTOR**

  
 सत्यमेव जयते  
 भारत सरकार  
 कृषि एवं किसान कल्याण मंत्रालय  
 (कृषि, सहकारिता एवं किसान कल्याण विभाग)  
 GOVERNMENT OF INDIA  
 MINISTRY OF AGRICULTURE AND FARMERS WELFARE  
 (DEPARTMENT OF AGRICULTURE, CO-OPERATION AND FARMERS WELFARE)  
 केन्द्रीय कृषि मशीनरी प्रशिक्षण एवं परीक्षण संस्थान  
 ट्रैक्टर नगर, बुदनी (म.प्र.) ४६६ ४४५  
**CENTRAL FARM MACHINERY TRAINING & TESTING INSTITUTE**  
 (An ISO : 9001 - 2008 Certified Institute)  
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**Manufacturer** : M/s. John Deere India Pvt. Ltd.  
Gat No. 166 - 167 & 271 - 291,  
Off Pune - Nagar Road, Sanaswadi,  
Pune– 412 208 (M.S.)

**Location of plant** : M/s. John Deere India Pvt. Ltd.  
Survey No. 501, Village – Khatamba  
Jamgod, Dewas Bhopal Highway, Dewas  
(Madhya Pradesh) 455115

Test requested by (applicant) : The manufacturer

Selected for test by : The applicant

Place of running-in : At manufacturer’s works

Duration of said running-in (h):

- Engine : 20

- Transmission : 12

**Method of Selection** : The tractor was submitted directly by the applicant for test. Hence method of selection is not known.

## 1. SPECIFICATIONS

**1.1 Tractor:**

Make : John Deere

Model : 5310 V5

Variants, if any

S. No.	Variant models (*)	Variant features
1.	5310 V4	Change in B range selection speeds.
<b>*The variant models have not been tested at this Institute yet.</b>		

Type : Four wheeled, Rear wheel driven, General purpose, Agricultural Tractor.

Year of manufacture : BL-F (November, 2015)

Chassis number : 1PY5310EJFA006908

Country of Origin : India

**1.2 Engine:**

Make : John Deere

Model : 3029 HPY 60

Type : Four stroke, turbo charged, liquid cooled, direct injection, diesel engine.

Serial number : PY3029H058305

**Engine speed (Manufacturer’s recommended production setting), (rpm):**

- Maximum speed at no load, : 2550 to 2650

- Low idle speed : 800 to 900

- Speed at maximum torque : 1300 to 1500

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Condition of seals for stub axles and king pins : Normal  
 Clearance between centre pin and bush, (mm) : 0.18 to 0.26 | Against the discard limit of 0.80 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**

Sl. No.	Adjustments/Defects/Breakdowns and Repairs	Categories of Breakdowns	Tractor run hours
1.	During PTO maximum power search, the engine oil leakage was observed from turbocharger lubrication inlet pipe (Pt no. DZ100085) and it was replaced with new one.	Mn6	1.2

**16. SUMMARY OF OBSERVATIONS, COMMENTS & 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
<b>16.1.1</b>	<b>PTO Performance :</b>					
<b>a)</b>	Maximum power under 2 h test, (kW) (Natural ambient condition)	Evaluative	Declared value to be achieved with a tolerance of: -5 / +10% for PTO power >26 kW. -7.5/+10% for PTO power ≤ 26 kW or -5 / +10% for Engine power >26 kW. -7.5/+10% for Engine power ≤ 26 kW	36.4 (D)	36.7	Yes
<b>b)</b>	Power at rated engine speed, (kW)	Non Evaluative	-do-	36.4 (D)	35.8	Yes
<b>c)</b>	Specific fuel consumption corresponding to maximum power, (g/kWh)	Non Evaluative	+ 5%	325 (D)	315	Yes

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1	2	3	4	5	6	7	
<b>d)</b>	Maximum equivalent crankshaft torque, (Nm)	Non Evaluative	± 8%	229 (D)	204.93	<b>No</b>	
<b>e)</b>	Back-up torque, percent	Non Evaluative	10 percent, min.	10 (D)	34.51	Yes	
<b>f)</b>	<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	123	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	96	Yes
<b>g)</b>	Engine oil consumption, (g/kWh)	Evaluative	Not exceeding 1% of SFC at max. power under High ambient conditions	3.18 (R)	0.37	Yes	
<b>h)</b>	Smoke level	Evaluative	Maximum light absorption coefficient of 3.25 per meter or equivalent BOSCH No. 5.2 or 75 Hatridge value ( <b>As per CMVR</b> )	3.25 per metre	0.59 per metre	Yes	

<b>16.1.2 Drawbar performance :</b>						
<b>a)</b>	Max. drawbar pull with ballast corresponding to 15 percent wheel slip, (kN)	Non Evaluative	Minimum 65% of static mass with ballast	21.92 (D)	22.50	Yes
				19.10 (R)		
<b>b)</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)	17.79	Yes
				13.49 (R)		
<b>c)</b>	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. i) a) of engine performance in case of tractors which do not have a PTO shaft.	29.1 (D)	29.7	Yes
				29.4(R)		

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1	2	3	4	5	6	7
<b>d)</b>	Max. transmission oil temperature (°C)	Non Evaluative	The declared value should not exceed the maximum value specified by oil company	110 (D)	83	Yes

<b>16.1.3 Power lift and hydraulic pump performance :</b>							
<b>a)</b>	Maximum lifting capacity throughout the range of lift, (kN):						
	1)	At hitch points	Non Evaluative	[Tolerance of minus 10%]	17.5 (D)	19.33	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) 8.64 (R)	16.15	Yes
<b>b)</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)	08	Yes

<b>16.1.4 Brake performance at 25 kmph:</b>							
<b>a)</b>	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	8.29	Yes
	2)	Hot brake	Evaluative	10	10	8.25	Yes
<b>b)</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)	250 to 272	Yes
<b>c)</b>	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

<b>16.1.5 Noise measurement :</b>							
<b>a)</b>	Maximum ambient noise emitted by the tractor dB(A)		Evaluative	As per CMVR	88 (R)	82	Yes
<b>b)</b>	Maximum noise at operator's ear level dB(A)		Evaluative	As per CMVR	96 (R)	95	Yes

<b>16.1.6 Amplitude of mechanical vibrations at :</b>							
	1)	Left foot rest	Non Evaluative	100 microns (max)	100 (R)	110	<b>No</b>
	2)	Right foot rest				150	<b>No</b>
	3)	Seat (with driver seated)	Non Evaluative	100 microns (max)	100 (R)	110	<b>No</b>

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1	2	3	4	5	6	7
	4) Steering Wheel	Non Evaluative	100 microns (max)	100 (R)	140	<b>No</b>
<b>16.1.7</b>	<b>Air Cleaner:</b>					
	Air cleaner oil pull over (%)	Non Evaluative	0.25 % (Maximum)	Dry type air cleaner is provided	NA	--

16.1.8	<b>Haulage requirements :</b>					
<b>a)</b>	Gross mass of the trailers, (tones):					
	1) Two wheel	Non Evaluative	--	5.0 (D)	5.0	Yes
	2) Four wheel		--	7.0 (D)	7.0	Yes
<b>b)</b>	Distance travelled / litre of fuel consumption, (km/l):					
	1) Two wheel	Non Evaluative	--	4 to 6 (D)	4.40 to 4.52	Yes
	2) Four wheel		--	4 to 6 (D)	3.48 to 3.73	<b>No</b>
<b>c)</b>	Fuel consumption (cc/km/tonne):					
	1) Two wheel	Non Evaluative	--	30 to 40 (D)	44 to 45	<b>No</b>
	2) Four wheel		--	30 to 40 (D)	38 to 41	<b>No</b>

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-				

16.1.10	<b>Safety features :</b>					
<b>a)</b>	Guards against moving and hot parts	Evaluative	Belt drives, pulley, silencer, hydraulic pipes (As per IS 12239 part 2)	--	Conforms	Yes
<b>b)</b>	Lighting arrangement	Evaluative	As per CMVR	--	Conforms	Yes
<b>c)</b>	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
<b>d)</b>	Technical requirements for PTO shaft	Non-Evaluative	Should meet the requirements of IS 4931 (as amended from time to time)	--	Conforms	Yes
<b>e)</b>	Dimension of three point linkage	Non-Evaluative	Should meet the requirements of IS 4468 (part 1) (as amended from time to time)	--	Conforms	Yes

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1	2	3	4	5	6	7
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

16.1.11	Labelling of tractors (Provision of labelling plate):					
	1)	Make	Evaluative	Should conform to the requirements of CMVR along-with declared value of PTO HP	JOHN DEERE	Yes
	2)	Model	Evaluative		5310 V5	Yes
	3)	Year of manufacture	Evaluative		BL-F((November, 2015)	Yes
	4)	Engine number	Evaluative		PY3029H058305	Yes
	5)	Chassis number	Evaluative		1PY5310EJFA006908	Yes
	6)	Declaration of PTO power, (kW)	Evaluative		36.4	Yes
	7)	Specific fuel consumption,(g/kwh)	Evaluative		325	Yes

16.1.12	Discard limit for:					
(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	0.11	Yes
(c)	<b>Ring end gap (mm):</b>					
	- Top comp. ring	Evaluative	-do-	0.75	0.50 to 0.55	Yes
	- 2 <sup>nd</sup> comp. ring		-do-	2.00	0.80	Yes
	- Oil ring		-do-	0.75	0.35 to 0.45	Yes
(d)	<b>Ring groove clearance (mm):</b>					
	- Top comp. ring	Evaluative	-do-	Tapped	Tapped	Yes
	- 2 <sup>nd</sup> comp. ring		-do-	0.25	0.055 to 0.068	Yes
	- Oil ring		-do-	0.92	0.054 to 0.061	Yes
(e)	<b>Clearance of main bearings (mm):</b>					
	- Diametrical clearance	Evaluative	-do-	0.65	0.035 to 0.069	Yes
	- Crankshaft end float	Evaluative	-do-	0.85	0.15	Yes
(f)	<b>Clearance of big end bearings, (mm):</b>					
	- Diametrical	Evaluative	-do-	0.65	0.089 to 0.122	Yes
	- Axial	Evaluative	-do-	0.85	0.25 to 0.40	Yes
(g)	Clearance between king pin and bush, (mm)	Non Evaluative	-do-	0.80	0.17 to 0.25	Yes
(h)	Clearance between centre pin and bush, (mm)	Non Evaluative	-do-	0.80	0.18 to 0.26	Yes

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<b>16.1.13 Literature (Submission to test agency)</b>						
<b>(a)</b>	Operator manual	Evaluative	Provided/Not Provided	Provided	Provided	Yes
<b>(b)</b>	Parts Catalogue	Evaluative	Provided/Not Provided	Provided	Provided	Yes
<b>(c)</b>	Workshop/ Service manual	Evaluative	Provided/Not Provided	Provided	Provided	Yes

<b>16.1.14 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.	One(Mn6)	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.	One(Mn6)	Yes

<b>16.2 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. If ROPS fitted it should meet the requirement of IS: 11821-1992	Not provided ROPS not fitted	<b>No</b> Not applicable
2.	Accessories	Trailer hitch, linkage drawbar may be provided. Front tow hook	Provided Not provided	Yes <b>No</b>

**16.3 Conformity with following IS:**

- i) Guide lines for declaration of power and specific fuel : Conforms consumption and labelling of agricultural tractors (First revision) [IS10273: 1987 (Reaffirmed 2009)]
- ii) Agricultural tractors - Rear mounted power take-off - Types 1, 2 and 3 (third revision) [IS:4931-1995 (Reaffirmed 2009)]
- iii) Agricultural wheeled tractors - Three-point linkage: Part 2 : Conforms Category 1N (Narrow Hitch) (Third Revision) [IS 4468 (Part-2):1993/ ISO 730-2:1979 (Reaffirmed 2009)]
- iv) Drawbar for agricultural tractors – Link type [IS 12953:1990 : Conforms (Reaffirmed 2007)]



- v) Agricultural tractors - Operator's seat technical requirement [IS 12343 –1998 (First revision) (Reaffirmed 2009)] : Conforms
- vi) Guide for safety & comfort of operator of agricultural tractors: Part 1 General requirements (first revision): [IS 12239 (PT-1) 1996/ISO 4254-1:1989 (Reaffirmed 2009)] : **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 2009)] : **Does not conform**
- viii) Guide lines for location and operation of operator controls on agricultural tractors and machinery (first revision) IS: 8133-1983 (Reaffirmed 2009)] : 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 2009)] : Conforms
- x) Agricultural Tractors and Machinery - Lighting device for travel on public roads (IS: 14683-1999) (Reaffirmed 2009)] : Conforms

#### 16.4 Salient Observations:

##### 16.4.1 Laboratory tests:

##### 16.4.1.1 PTO performance:

- i) The maximum power was observed **36.7 kW** against the declaration of **36.4 kW**. Which is within the tolerance limit of IS: 12207-2014.
- ii) The specific fuel consumption corresponding to maximum power was measured as **315 g/kWh** against the declaration of **325 g/kWh**, which is within the tolerance limit of IS: 12207-2014.
- iii) The backup torque was observed as **34.51 %**.

##### 16.4.1.2 Hydraulic Performance :

- i) The moment of tractor about rear axle with standard frame is calculated as **25.68 kN-m** which is on higher side when compared to the moment of tractor about front axle i.e. **15.86 kN-m**. In view of the above, it is recommended that necessary improvement may be incorporated to avoid the front lifting of the tractor.
- ii) The maximum tilt angle of mast from vertical was recorded as 8.6 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 PTO master shield

The dimension "m" of PTO master shield does not meets the requirements of IS: 4931-1995. This should be looked into for necessary corrective action.

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

The working clearance around the position control lever was observed as 40 mm against the minimum requirement of 70 mm as per IS: 12239 (Part 2)-1999. This should be looked into for necessary corrective action.

**16.4.2 Field performance test:****16.4.2.1 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:**

During PTO maximum power search, the engine oil leakage was observed from turbocharger lubrication inlet pipe (Pt no. DZ100085) and it was replaced with new one. This defects has been categorized as minor breakdowns "Mn6" and call for strict quality control at production line.

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

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

- i) The working clearance around position control lever should be provided as per the requirement of relevant Indian Standard.
- ii) The dimension "m" of PTO master shield should be provide as per requirement of IS: 4931:1995.
- 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.

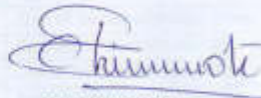
- i) Operator's Manual in respect of John Deere 5310 V5 tractor.
- ii) Tractor Parts Catalogue in respect of John Deere 5310 V5 tractor.
- iii) Service Manual in respect of John Deere 5310 V5 tractor.

**16.7.2** The printed literature supplied with the test sample is in English. The literature may be brought out as per IS: 8132 – 1999 (reaffirmed March, 2009) for the guidance of users and service personnel in national as well as other regional language.

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## 17. Citizen charter

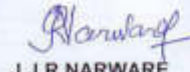
Time frame for Testing & Evaluation as per Citizen Charter	Duration of Test	Whether the Test Report is released within the time frame given in Citizen Charter	Remarks
10 Months	09 Months (March, 2015 to November, 2016)	Yes	-

TESTING AUTHORITY:


**C.V.CHIMOTE**  
**TEST ENGINEER**



**Y.K.RAO**  
**SENIOR AGRICULTURAL ENGINEER**



**J.J.R.NARWARE**  
**DIRECTOR**

This test report is compiled by Shri. Shwetabh Singh, Senior Tech. Assistant

## 18. APPLICANT'S COMMENTS

Para No.	Our Reference	Applicant's comments
18.1	16.4.1.2 (i)	We will certainly look into your recommendation and secondly we would like to state that the tractor is recommended with certain front weight as dealer fit option, which will take care of the front lift during transport and haulage applications.
18.2	16.4.1.3 & 16.4.1.5	Shall be taken up with operator station changes.
18.3	14.4.1.4	We will take necessary action.
18.4	16.5	We have initiated the necessary process check on assembly line to control this sort of issue.
18.5	16.6 (iii)	Front tow hook is part of quick attach weight and available at dealer end.

**ANNEXURE- I****BRIEF SPECIFICATION OF IMPLEMENTS USED DURING FIELD TEST**

S.No	Parameters	Disc Plough	Rotavator
1.	Make	M&M	Shaktiman
2.	Type	Mounted	Mounted
3.	No. of Disc/blades	03	36 in 7 flange
4.	Type of Disc/blades	Plane, Concave	Hatchet
5.	Size of bottoms/blades, (mm)	610	250 x 65 x 8
6.	Spacing of bottoms/flanges, (mm)	520	250
7.	Lower hitch point span, (mm)	855	620
8.	Mast height, (mm)	440	650
9.	<b>Overall dimensions, (mm):</b>		
	- Length	1890	1630
	- Width	1080	630
	- Height	1070	1170
10.	Gross mass, (kg)	365	495

**ANNEXURE – II****BRIEF SPECIFICATION OF FULL CAGE WHEEL**

S. No.	Parameters	Specifications
1.	Type	Full cage wheel
2.	Dia, (mm)	1280
3.	Width, (mm)	850
4.	No. and types of lugs	24, Straight lugs made of M.S. angle section welded to angle iron frame
5.	Size of angle section, (mm)	50 x 50 x 6
6.	Length of lugs, (mm)	425
7.	Spacing of lugs, (mm)	160
8.	Weight of each cage wheels (kg)	145

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

<b>A.</b>	<b>LABORATORY AND TRACK TESTS:</b>	<b>HOURS</b>
1.	Running-in	--
2.	PTO performance test	14.66
3.	Power lift and hydraulic pump performance test	2.98
4.	Drawbar performance test	22.74
5.	Turning ability	0.50
6.	Location of centre of gravity	-
7.	Operator's field of vision	0.10
8.	Brake test	1.83
9.	Noise measurement	1.83
10.	Mechanical vibration test	1.0
11.	Nominal speed test	0.83
<b>B.</b>	<b>FIELD TEST:</b>	
1.	Disc ploughing	10.25
2.	Rotavation	10.42
3.	Puddling (including 5 hrs water proof test)	15.16
<b>C.</b>	<b>HAULAGE TEST:</b>	5.27
<b>D.</b>	Miscellaneous test and other run hours including idle run, transportation, trials and preparation for test	4.73
	<b>TOTAL:</b>	<b>92.30</b>