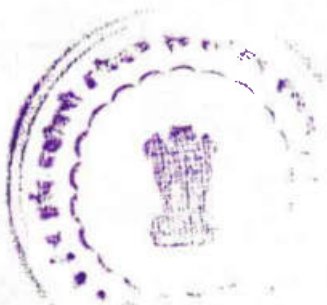




JOHN DEERE, 5050D TRACTOR



भारत सरकार
कृषि मंत्रालय
(कृषि एवं सहकारिता विभाग)

GOVERNMENT OF INDIA
MINISTRY OF AGRICULTURE
(DEPARTMENT OF AGRICULTURE & CO-OPERATION)

केन्द्रीय कृषि मशीनरी प्रशिक्षण एवं परीक्षण संस्थान
ट्रैक्टर नगर, बुदनी (म.प्र.) ४६६ ४४५

CENTRAL FARM MACHINERY TRAINING & TESTING INSTITUTE
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Type : Four wheeled, Rear-wheel drive, standard, Agricultural Tractor
 Year of manufacture : BC-B (March, 2011)
 Chassis number : 1PY 5050DEBA000004
 Country of Origin : India

1.2 Engine:

Make : John Deere
 Model : 3029DPY26
 Type : Four stroke, naturally aspirated, liquid cooled, direct injection, diesel engine.
 Serial number : PY3029D259842

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

- Maximum speed at no load : 2475 to 2550
 - Low idle speed : 800 to 875
 - Speed at maximum torque : 1200 to 1600

Rated speed, (rpm):

- For PTO use : 2300
 - For drawbar use : 2300

1.3 Cylinder & Cylinder Head:

Number : Three
 Disposition : Vertical, inline
 Bore/stroke, (mm) : 106.5 / 110
 Capacity as specified by the applicant, (cc) : 2940
 Compression ratio : 18.5 : 1
 Type of cylinder head : Monoblock, cross-flow
 Type of cylinder liners : Wet, replaceable
 Type of combustion chamber : Direct injection
 Arrangement of valves : Inline, Overhead
Valve clearance (cold):
 - Inlet valve, (mm) : 0.35
 - Exhaust valve, (mm) : 0.45

1.4 Fuel System:

Type of fuel feed system : Gravity and force feed

1.4.1 Fuel tank:

Capacity, (l) : 61.3
 Location : Behind Operator's seat
 Provision for draining of sediments/water : Not provided, however water separator is provided
 Material of fuel tank : Borialis (apa)

1.4.2 Water separator

Make : Engine Tech (apa)
 Type : Inverted funnel gravity separation.
 Location : On RHS of engine in between fuel tank and filter.



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16. SUMMARY OF OBSERVATIONS, COMMENTS & RECOMMENDATIONS

16.1 Evaluative (mandatory) / Non-evaluative (Non-mandatory) parameter applicable for qualifying Minimum Performance criteria as per Clause-4 (Table-1) of IS: 12207-2008 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: 12207-2008	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 / +10% for PTO power >35 hp (26.1kW). -7.5/+10% for PTO power ≤ 35 hp (26.1kW).	31.3 (D)	30.6	Yes
b)	Power at rated engine speed, (kW)	Non Evaluative	-do-	31.0 (D)	30.6	Yes
c)	Specific fuel consumption corresponding to maximum power, (g/kWh)	Non Evaluative	± 5%	270 (D)	287	No
d)	Maximum equivalent crankshaft torque, (Nm)	Non Evaluative	± 8%	170 (D)	161.3	Yes
e)	Back-up torque, percent	Non Evaluative	7 percent, min.	10 (D)	27.2	Yes
f)	Maximum operating temperature (°C)					
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	121	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.	118	108	Yes
g)	Engine oil consumption, (g/kWh)	Evaluative	Not exceeding 1% of SFC at max. power under High ambient conditions	2.96	0.68	Yes
h)	Smoke level	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 per metre	0.34 per metre	Yes

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1	2	3	4	5	6	7	
16.1.2	Drawbar performance :						
a)	Max. drawbar pull with ballast corresponding to 15 percent wheel slip, (kN)	Non Evaluative	Minimum 65% of static mass with ballast	20.0 (D)	24.31	Yes	
				17.85 (R)			
b)	Max. drawbar pull without ballast corresponding to 15 percent wheel slip, (kN)	Evaluative	Minimum 65% of static mass of tractor without ballast/ with standard ballast	13.50 (D)	15.94	Yes	
				12.24 (R)			
c)	Maximum drawbar power without ballast, (kW).	Evaluative	Minimum 80% of PTO power as referred in column No.6 of 11.1.1(a).	25.04 (D)	27.2	Yes	
				24.5 (R)			
d)	Max. transmission oil temperature (°C)	Non Evaluative	The declared value should not exceed the maximum value specified by oil company	110 (D)	83	Yes	
16.1.3	Power lift and hydraulic pump performance :						
a)	Maximum lifting capacity throughout the range of lift, (kN):						
	1)	At hitch points	Non Evaluative	[Tolerance of minus 10%]	13.50 (D)	12.84	Yes
	2)	With the standard frame	Evaluative	The lift capacity should at least be 18 kg/PTO hp. and it should be 16 kg/engine hp where the tractor is not provided with a PTO shaft	12.20 (D) 7.24 (R)	11.75	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)	05	Yes	

1	2	3	4	5	6	7	
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 road ballast, (m):						
	1)	Cold brake	Evaluative	10	10	8.11	Yes
	2)	Hot brake	Evaluative	10	10	8.18	Yes
b)	Maximum force exerted on the brake pedal to achieve a deceleration of 2.5 m/s ² (N)	Evaluative	600	600	225 to 233	Yes	
c)	Whether parking brake is effective at a force of 800 N at foot pedal(s) or 400 N at hand lever	Evaluative	Yes / No	Yes	Yes	Yes	



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1	2	3	4	5	6	7
16.1.5	Noise measurement :					
a)	Maximum ambient noise emitted by the tractor dB(A)	Evaluative	As per CMVR	88	83	Yes
b)	Maximum noise at operator's ear level dB(A)	Evaluative	As per CMVR	98	96	Yes
16.1.6	Amplitude of mechanical vibrations at :					
1)	Left foot rest	Non Evaluative	100 microns (max)	100 microns (max)	100	Yes
	Right foot rest				90	Yes
2)	Seat (with driver seated)				70	Yes
3)	Steering wheel				100	Yes
16.1.7	Haulage requirements :					
a)	Gross mass of the trailers, (tones):		--			
1)	Two wheel	Non Evaluative	--	5.0	5.0	Yes
2)	Four wheel	Evaluative	--	7.0	7.0	Yes
b)	Distance travelled per litre of fuel consumption, (km):					
1)	Two wheel	Non Evaluative	--	4.0 to 6.0	5.05 to 5.34	Yes
2)	Four wheel	Evaluative	--	4.0 to 6.0	4.41 to 4.91	Yes
c)	Fuel consumption (ml/km/tonne):					
1)	Two wheel	Non Evaluative	--	40.0 to 45.0	37.5 to 39.6	Yes
2)	Four wheel	Evaluative	--	40.0 to 45.0	29.1 to 32.4	Yes
16.1.8	Wetland Cultivation (Puddling Operation):					
	Sealing for the following assemblies:	Evaluative	The identified assemblies should essentially meet the requirement of IS: 11062. 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 was observed during water proof test	Yes
1)	Clutch assembly	-do-				
2)	Brake housings	-do-				
3)	Front axle hubs	-do-				
16.1.9	Safety features :					
a)	Guards against moving and hot parts	Evaluative	As per CMVR	At present no requirements	--	--
b)	Lighting arrangement	Evaluative	As per CMVR		Provided	Yes
16.1.10	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			5050 D	Yes
3)	Year of manufacture	Evaluative			BC-B, (February, 2011)	Yes
4)	Engine serial number	Evaluative			PY 3029 D 259842	Yes
5)	Chassis serial number	Evaluative			1PY5050D EBA000004	Yes
6)	Declaration of PTO power, kW(hp)	Evaluative			--	31.3 (42.6)

1	2
16.1.11	(a)
	(b)
	(c)
	(d)
	(e)
	(f)
	(g)
	(h)
16.1.12	CA
S. No.	Ch
1.	Cr
2.	Ma
3.	Min
4.	Tot
	bre
16.2	Opt
S. No.	
1	
1	Air c
	max
2.	Seat
3.	Fitm
4.	Techn
	for PT
5.	Dime
	point

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1	2	3	4	5	6	7
16.1.11	Discard limit for:					
(a)	Cylinder bore diameter, (mm)	Evaluative	To be declared by the manufacturer	106.62	106.50 to 106.52	Yes
(b)	Clearance between piston & cylinder liner at skirt, (mm)	Non Evaluative		0.32	0.135 to 0.140	Yes
(c)	Ring end gap (mm):					
	- 1 st comp. ring.	Evaluative	-do-	0.75	0.40 to 0.50	Yes
	- 2 nd comp. ring.		-do-	2.00	1.40 to 1.50	Yes
	- Oil ring.		-do-	0.75	0.50	Yes
(d)	Ring groove clearance (mm):					
	- 1 st comp. ring.	Evaluative	-do-	0.25	Taper rings	—
	- 2 nd comp. ring.		-do-	0.25	0.065 to 0.072	Yes
	- Oil ring.		-do-	0.92	0.055 to 0.065	Yes
(e)	Clearance of main bearings (mm):					
	- Diametrical clearance	Evaluative	-do-	0.32	0.083 to 0.104	Yes
	- Crankshaft end float	Evaluative		0.38	0.19	Yes
(f)	Clearance of big end bearings, (mm):					
	- Diametrical	Evaluative	-do-	0.32	0.102 to 0.123	Yes
	- Axial	Evaluative	-do-	0.38	0.35	Yes
(g)	Clearance between king pin and bush, (mm)	Non Evaluative	-do-	0.80	0.07 to 0.16	Yes
(h)	Clearance between center pin and bush, (mm)	Non Evaluative	-do-	0.80	0.06 to 0.20	Yes

16.1.12 CATEGORY OF BREAKDOWNS / DEFECTS :					
S. No.	Characteristic	Category (Evaluative / Non Evaluative)	Requirements as per IS: 12207-2008	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

16.2 Optional requirements as per Clause-4 (Table-2) of IS:12207-2008:				
S. No.	Characteristic	Requirements as per IS: 12207-2008	AS observed	Whether meets the requirements (Yes/No.)
1	2	3	4	5
1	Air cleaner oil pull over, max. oil pull over (%)	0.25% (max.)	Dry type air cleaner	Not applicable
2.	Seating requirements	Should meet the requirements of IS: 12343-1998	Does not meet the requirements	No
3.	Fitment of ROPS	With a provision for fitment of ROPS. If ROPS fitted it should meet the requirement of IS: 11821-1992	ROPS not fitted	Not applicable
4.	Technical requirements for PTO shaft	Should meet the requirements of IS: 4931 -1995	Does not meet the requirements	No
5.	Dimensions of three point linkage	Should meet the requirements of IS: 4468 (Part-I)-1997	Meets the requirements	Yes



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1	2	3	4	5
6.	Specifications of linkage drawbar	Should meet the requirements of IS: 12953-1990.	Meets the requirements	Yes
7.	Specifications of swinging drawbar	Should meet the requirements of IS: 12362 Part 3-1994.	Not provided	Not applicable
8.	Accessories	Trailer hitch, front tow hook, linkage drawbar may be provided.	Front towing hitch not provided	No

16.3 Conformity with following IS:

- i) Guide lines for declaration of power and specific fuel consumption and labelling 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-1):1997/ISO 730-1:1994 (Reaffirmed in March, 2009)] : **Does not conform**
- iv) Drawbar for agricultural tractors – Link type [IS 12953:1990 (Reaffirmed in March, 2007)] : **Conforms**
- v) 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 in March, 2007)] : **Does not conform**
- vi) Tractors and machinery for agriculture and forestry, powered lawn and garden equipment – Symbols for operator controls and other displays [IS: 6283 (Part-1)-2006 (Reaffirmed in March, 2009) and IS: 6283 (Part 2)-2007 (Reaffirmed in March, 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 in March, 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 in March, 2009)] : **Conforms**
- ix) 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 backup torque is 27.2 %.
- ii) The maximum power was observed as 30.6 kW against the declaration of 31.0 kW, which meet the requirement of IS: 12207-2008 with regard to tolerance.



- iii) The specific fuel consumption corresponding to maximum power was measured as **287g/kWh** against the declaration of **270 g/kWh**, which does not meet the requirement of IS:12207-2008 with regard to tolerance. This should be looked into.
- iv) The power drop of 7.2 % was recorded in high ambient condition as compared to natural ambient condition. It is considered on higher side and calls for necessary corrective action.

16.4.1.2 Drawbar performance:

During drawbar performance the tyre creeping over rim of LHS & RHS tyre were observed 30 & 18 mm respectively, it is on higher side and should be looked into.

16.4.1.3 Hydraulic performance:

The lifting capacity at standard frame was recorded as 11.75 kN and the moment about rear axle was computed as 18.21 kN-m, which is on higher side in compare to the moment about front axle i.e. 13.64 kN-m. Therefore, it is recommended that the lifting capacity should be reduced suitably or standard mass at front axle may be provided to avoid front lifting of tractor.

16.4.1.4 Mechanical Vibration:

The amplitude of mechanical vibration on various assemblies marked as (*) in chapter- 8 of this test report is on higher side. This calls for dampening down of vibrations to improve the operational comfort and service life of components.

16.4.1.5 Three Point Linkage:

- i) Dia of hole for upper hitch point meets the requirements of Cat-II whereas the width of ball has been provided as per Cat-I. This should be looked into for necessary corrective action.
- ii) Dia of hole for lower hitch point meets the requirements of Cat-II whereas the width of ball has been provided as per Cat-I. This should be looked into for necessary corrective action.
- iii) 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.

16.4.1.6 Linkage Drawbar:

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

16.4.1.7 Operator's seat:

- i) Width and length of seat does not meet the requirement of IS: 12343-1988. This should be looked into for necessary corrective action.
Vertical distance from seat index point to the centre of brake and clutch pedals does not meet the requirement of IS: 12343-1988. This should be looked into for necessary corrective action.
- ii) Longitudinal distance from seat index point to the centre of steering control wheel & differential lock pedal does not meet the requirement of IS: 12343-1988. This should be looked into for necessary corrective action.



- 16.4.1.8 Symbols of operator's controls and other displays:**
- All controls are identifiable with the symbols as per IS: 6283 (Part 1&2)-1998 except the color zones for the engine revolution gauge & coolant temperature gauge was not provided. This needs to be looked into for necessary corrective action.
 - The oil lubricant type & frequency, grease lubricant frequency & cautionary notice are not identifiable with the symbols as per IS: 6283 (Part-1&2)-1998. This needs to be looked into.
- 16.4.1.9 Location and operation of operator's control:**
The working clearance around the position control lever was observed as 45 mm against the minimum requirement of 70 mm as per per IS: 12239 (Part 2)-1996 This should be looked into for necessary corrective action.
- 16.4.2 Field performance:**
- 16.4.2.1 Dry land operation:**
The average area covered during disc ploughing operation with recommended size of plough was recorded in the range of 0.169 to 0.196 ha/h. Keeping in view the PTO power of the tractor, the area coverage is considered less, hence the recommended size of the plough may be reviewed.
- 16.4.2.2 Wetland cultivation (Puddling operation):**
No ingress of mud/or water was noticed during puddling operation of the tractor. Hence, It meets the requirements of IS: 11082-1984 (Technical requirements of agricultural tractors for wetland operation). The tractor is suitable for wetland operation (Puddling).
- 16.5 Maintenance / Service problems:**
No noticeable maintenance and service problems 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 as per relevant Indian Standards:
- Provision for spark arresting device in exhaust system.
 - The working clearance around hydraulic position control lever does not meet the requirement of IS: 12239 (part-2)-1999.
 - Provision of front towing hook
 - Provision of "Minimum cautionary notice" as per clause 11.2 of IS:12239 (part-2)-1999
 - Provision of suitable guard at exhaust silencer.
- 16.7 Adequacy of Literature:**
- 16.7.1** The following literatures were supplied with the test tractor for reference during the test.
- Operator's manual (For 5038 D, 5042D, 5045D, 5050D models tractor)
 - Technical manual (For 5038 D, 5042D, 5045D, 5050D models tractor)
 - Parts Catalogue (For 5038 D, 5042D, 5045D, 5050D models tractor)



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- 16.7.2 The literature was found adequate. However, the lubricants produced/marketed by various Indian manufacturers, if deemed suitable, may be recommended for their use in the tractor. should also be included in the operator's manual.
- 16.7.3 This literature should be brought out in national as well as other regional languages of India for guidance of users.

TESTING AUTHORITY;

J.J.R. NARWARE
SENIOR AGRICULTURAL ENGINEER

V. N. KALE
DIRECTOR

Report is compiled by Shri. Chanchlesh Singh Raghuwanshi, Senior Technical Assistant

17. APPLICANT'S COMMENTS

Para No.	Our Reference	Applicant's comments
17.1	16.4.1.1(iii)	We will take necessary action to identify the root cause.
17.2	16.4.1.1(iv)	We will take necessary action to identify the root cause.
17.3	16.4.1.3	We will certainly look into your recommendation and secondly we would like to state that the tractor is recommended with certain front weight which will take care of the front lifting during transport and haulage applications.
17.4	16.4.1.5 & 16.4.1.6	Most of the Indian customers use implements fitted with pins of bigger size. Hence, we have to provide with balls suiting the pins (Cat-II) though the other parameters call for conformity with Cat-I.
17.5	16.4.1.7	Shall be taken up with operator station changes.
17.6	16.4.1.8	We have taken corrective action and will be implemented on production tractors.
17.7	16.7.2	All lubricants & coolant used in our models are specially developed for our tractors. They are available with our dealers at Competitive prices. Customers are advised not to purchase from local markets.



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ANNEXURE-IBRIEF SPECIFICATION OF IMPLEMENTS USED DURING FIELD TEST

S. No.	Item	Disc Plough	Rotavator
1.	Make	Mahindra & Mahindra	Howard
2.	Type	Mounted	Mounted
3.	No. of discs / blades	Two	36, in 7 flange
4.	Type of discs / blades	Plain concave	Hatchet
5.	Size of discs / blades, (mm)	635	225x 50 x 10
6.	Spacing of discs / flanges, (mm)	510	250
7.	Lower hitch point span, (mm)	635	720
8.	Mast height, (mm)	470	481
9.	Overall dimensions, (mm):		
	- Length	1520	1750
	- Width	1190	1000
	- Height	1005	980
10.	Gross mass, (kg)	310	345

ANNEXURE-IIBRIEF SPECIFICATION OF FULL CAGE WHEEL

S No.	Items	Specification
1.	Type	Full cage wheel
2.	Outer 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 lug, (mm)	425
7.	Spacing of lug, (mm)	160
8.	Weight of each cage wheels, (kg)	145

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

A.	LABORATORY AND TRACK TESTS:	HOURS
1.	Running-in	--
2.	PTO performance test	12.3
3.	Drawbar performance test	14.7
4.	Power lift and hydraulic pump performance test	2.8
5.	Turning ability	0.3
6.	Location of centre of gravity	0.5
7.	Operator's field of vision	Nil
8.	Brake test	1.6
9.	Noise measurement	1.0
10.	Mechanical vibration test	1.0
11.	Nominal speed test	0.7
B.	FIELD TEST:	
1.	Disc Ploughing	10.2
2.	Rotavation	10.2
3.	Puddling (Including five hours water proof test)	15.0
C.	HAULAGE TEST	10.5
D.	Miscellaneous test and other run hours including idle run, transportation, preparation for test and trial runs.	4.5
	TOTAL:	85.3