Manufacturer : **M/s John Deere Equipment Pvt. Ltd.**
Gat No.166 to 167 & 271 to 291
Sanaswadi, Pune (M.S.)
Pin – 412 208

Month: June	Test Report No. T- 673/1179/2009	Year: 2009

GOVERNMENT OF INDIA
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Type of Test	:	**Commercial (ICT)**
Test code/Procedure	:	IS: 5994-1998, IS: 9253-2001 and IS: 12207-2008
Period of Test	:	September, 2008 to April, 2009
Test Report No	:	T- 673/1179/2009
Month/Year	:	June, 2009

i) The results reported in this report are observed values and no corrections have been applied for atmospheric and site conditions.

ii) The data given in this report pertains to the particular machine submitted by the applicant for tests.

iii) The results presented in this report do not in any way attribute to the durability of the machine.

SELECTED CONVERSIONS

S. No	Units	Conversion Factor
1	**Force:**	
	1 kgf	9.80665 N
		2.20462 lbf
2	**Power:**	
	1 hp	1.01387 metric hp (Ps)
		745.7 W
	1 Ps	735.5 W
	1 kW	1.35962 Ps
3	**Pressure:**	
	1 psi	6.895 kPa
	1 kgf/cm^2	98.067 kPa = 735.56 mm of Hg
	1 bar	100 kPa = 10 N/cm^2
	1 mm of Hg	1.3332 m-bar

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/ requirement	As observed	Whether meets the require-ments (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).	25.8	24.1	Yes
b)	Power at rated engine speed, (kW)	Non Evaluative	-do-	25.5	23.8	Yes
c)	Specific fuel consumption corresponding to maximum power, (g/kWh)	Non Evaluative	± 5%	272	268	Yes
d)	Maximum equivalent crankshaft torque, (Nm)	Non Evaluative	± 8%	140.0	132.4	Yes
e)	Back-up torque, percent	Non Evaluative	7 percent, min.	7 percent, min.	38.2	Yes
f)	**Maximum operating temperature (^{O}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.	130	111	Yes

1	2	3	4	5	6	7
	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.	120	99	Yes
g)	Engine oil consumption, (g/kWh)	Evaluative	Not exceeding 1% of SFC at max. power under High ambient conditions	Not to exceed 2.76 g/kWh	0.88	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**)	--	0.16 per metre	Yes
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	16.64, Minimum	19.82	Yes
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	11.22, Minimum	14.23	Yes
c)	Maximum drawbar power without ballast/with standard ballast, (kW).	Evaluative	Minimum 80% of PTO power as referred in column No.6 of 16.1.1(a).	19.3 Minimum	19.3	Yes
d)	Max. transmission oil temperature (^{o}C)	Non Evaluative	The declared value should not exceed the maximum value specified by oil company	110	78	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	12.25	Yes

1	2	3	4	5	6	7
	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	5.70, Minimum	11.51	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	45	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	6.75	Yes
	2) Hot brake	Evaluative	10	10	6.10	Yes
b)	Maximum force exerted on the brake pedal to achieve a deceleration of 2.5 m/s^2 (N)	Evaluative	600	600	270 to 290	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	Yes	Yes
16.1.5	**Noise measurement :**					
a)	Maximum ambient noise emitted by the tractor dB(A)	Evaluative	As per CMVR	88	81	Yes
b)	Maximum noise at operator's ear level dB(A)	Evaluative	As per CMVR	98	95	Yes

16.1.6	**Amplitude of mechanical vibrations at :**						
	1)	Foot rest - Left	Non Evaluative	100 microns (max)	100 microns (max)	350	**No**
		Foot rest - Right		-do-		160	**No**
	2)	Seat (with driver seated)		-do-		80	Yes
	3)	Steering wheel		-do-		230	**No**

1	2		3	4	5	6	7
16.1.7	**Haulage requirements :**						
a)	Gross mass of the trailers, (tones):						
	1)	Two wheel	Non Evaluative	--	4.0	4.0	Yes
	2)	Four wheel		--	5.0	5.0	Yes
b)	Distance travelled per litre of fuel consumption, (km):						
	1)	Two wheel	Non Evaluative	--	4.0 to 6.0	5.91 to 5.96	Yes
	2)	Four wheel		--	4.0 to 6.0	5.93 to 5.96	Yes
c)	Fuel consumption (ml/km/tonne):						
	1)	Two wheel	Non Evaluative	--	25.0 to 45.0	41.9 to 42.3	Yes
	2)	Four wheel		--	25.0 to 45.0	33.6 to 33.7	Yes
16.1.8	**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.	There should be no ingress of water and/or mud	No ingress of mud and / or water was observed	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	--	JDEPL	Yes
	2)	Model	Evaluative		--	5038 D	Yes
	3)	Year of manufacture	Evaluative		--	G-AJ (2008)	Yes
	4)	Engine number	Evaluative		--	PY 3029 D 177697	Yes
	5)	Chassis number	Evaluative		--	PY 5038 X 000116	Yes
	6)	Declaration of PTO power, kW(hp)	Evaluative		--	25.8 (35)	Yes

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 106.54	Yes
(b)	Clearance between piston & cylinder liner at skirt, (mm)	Non Evaluative	-do-	0.32	0.153 to 0.170	Yes
(c)	**Ring end gap (mm):**					
	- 1st comp. ring.	Evaluative	-do-	0.75	0.30 to 0.40	Yes
	- 2nd comp. ring.		-do-	2.00	1.35 to 1.45	Yes
	- Oil ring.		-do-	0.75	0.35 to 0.40	Yes
(d)	**Ring groove clearance (mm):**					
	- 1st comp. ring.	Evaluative	-do-	--	Taper rings	--
	- 2nd comp. ring.		-do-	0.25	0.054 to 0.067	Yes
	- Oil ring.		-do-	0.92	0.048 to 0.049	Yes
(e)	**Clearance of main bearings (mm):**					
	- Diametrical clearance	Evaluative	-do-	0.32	0.105 to 0.117	Yes
	- Crankshaft end float	Evaluative	-do-	0.38	0.19	Yes
(g)	**Clearance of big end bearings, (mm):**					
(h)	- Diametrical	Evaluative	-do-	0.32	0.074 to 0.088	Yes
	- Axial	Evaluative	-do-	0.38	0.25 to 0.30	Yes
(i)	Clearance between king pin and bush, (mm)	Non Evaluative	-do-	0.80	0.112 to 0.123	Yes
(j)	Clearance between center pin and bush, (mm)	Non Evaluative	-do-	0.80	0.072 to 0.087	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 require-ments (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.	**Mn 6**	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**	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 require-ments (Yes/No.)
1	2	3	4	5
1	Air cleaner oil pull over, max. oil pull over (%)	0.25% (max.)	Not applicable	--
2.	Seating requirements	Should meet the requirements of IS: 12343-1998	Does not conform	**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	**--**
4.	Technical requirements for PTO shaft	Should meet the requirements of IS: 4931 -1995	Does not conform	**No**
5.	Dimensions of three point linkage	Should meet the requirements of IS: 4468 (Part-I)-1997	Conforms	Yes
6.	Specifications of linkage drawbar	Should meet the requirements of IS: 12953-1990.	Conforms	Yes
7.	Specifications of swinging drawbar	Should meet the requirements of IS: 12362 Part 3-1994.	Not provided	--
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) [IS10273: 1987 (Reaffirmed 2004)] : **Does not conform**

ii) Agricultural tractors - Rear mounted power take-off - Types 1, 2 and 3 (third revision) [IS:4931-1995 (Reaffirmed 2004)] : **Does not conform**

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 2007)] : **Does not conform**

iv) Drawbar for agricultural tractors – Link type [IS 12953:1990 (Reaffirmed 2007)] : Conforms

v) Agricultural tractors - Operator's seat technical requirement [IS 12343 –1998 (First revision) (Reaffirmed 2003)] : **Does not conform**

vi) Guide for safety & comport of operator of agricultural tractors: Part 1 General requirements (first revision): [IS 12239(PT-1) 1996/ISO 4254-1:1989 (Reaffirmed 2007)] : 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 2004)] : **Does not conform**

viii) Guide lines for location and operation of operator controls on agricultural tractors and machinery (first revision) IS: 8133-1983 (Reaffirmed 2004)] : **Does not conform**

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) (Reaffirmed 2004) and IS: 6283 (Part-2)-1998 (Reaffirmed 2003)] : **Does not conform**

x) Agricultural Tractors and Machinery - Lighting device for travel on public roads (IS: 14683-1999) (Reaffirmed 2004)] : Conforms

16.4 Salient Observations:

16.4.1 Laboratory tests:

16.4.1.1 PTO Performance:

i) The backup torque is 38.2 **%**

ii) The specific fuel consumption corresponding to maximum Power was measured as 268 g/kWh against the declaration of 272 g/kWh, which meet the requirement of IS:12207-1999 with regard to tolerance.

iii) Initially, the maximum power was observed as 23.8 kW against the declaration of 25.8 kW, which was 7.8% less than the declaration & did not met the requirement of IS:12207-2008. To rectify the root cause of power loss the following checking's / adjustments have been done.

a) On inspection, the tappet clearance was observed as 0.30 to 0.35 mm for intake valves and 0.45 to 0.60 mm for exhaust valves against the declaration of 0.35 mm for intake valves and 0.45 mm for exhaust valves respectively. So, the tappet clearance was adjusted to 0.35 mm for intake valves and 0.45 mm for exhaust valves respectively.

b) During the inspection of injectors, the washer (Part No. R60746) (compression sealing washer) of injector of cylinder No.3 was found missing. The washer was not fitted during the assembly at production line. So, the three numbers of washers (Part No. R60746) of all the injectors were replaced with new ones.

c) The applicant has requested for increasing the maximum high idling engine speed from 2490 rpm to 2540 rpm against the specified value of 2475 to 2550 rpm. So, the maximum high idling speed of the engine was adjusted to 2536 rpm by adjusting the high idle stopper screw provided on the fuel injection pump. Thereafter, the maximum power search was conducted and the maximum power was observed as 24.2 kW against the declaration of 25.8 kW.
This calls for introduction of stringent quality control mechanism at the production level.

iv) The power drop in maximum power during natural ambient and high ambient condition was observed as 7.5%, which is considered as very high. This should be looked into.

16.4.1.2 Mechanical Vibration:

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

16.4.1.3 Specifications of P.T.O Shaft:

The dimension "dϕ " of the PTO shaft (Ref. Fig-2 of this report) does not conform to IS: 4931-1995. This should be looked into for necessary corrective action.

16.4.1.4 Three Point Linkage:

i) The width of ball of lower hitch points does not meet the requirement of IS: 4468 (Part -1)-1997. This should be looked into for necessary corrective action.

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

16.4.1.6 Operator's seat:

i) The width of operator's seat and Longitudinal distance from SIP to centre of steering control wheel does not meet the requirement of IS: 12343-1988. This should be looked into for necessary corrective action.

ii) Longitudinal adjustment provided on operator's seat i.e. forward and rearward from the mid position was observed as ±75 mm against the minimum and optimum requirement of ±25 mm and ±100 mm respectively. In view of enhancing comfort level of operation, this may be looked into.

16.4.1.7 Symbols of operator's controls and other displays:

Some controls such as engine speed cum cumulative run hour meter, Differential lock pedal, Fuel shut-off lever, Grease lubricant frequency, oil lubricant type and frequency are not identifiable with the symbols as per IS: 6283 (Part 1&2)-1998. This needs to be looked into for necessary corrective action.

16.4.1.8 Location and operation of operator's control:

The fuel shut-off lever does not remain in "STOP" position and hence does not meet the requirement of IS: 8133-1983. This may be looked into for corrective action.

16.4.1.9 Labelling of Tractor:

i) As per IS:10273-1987, it is the "year of manufacture" that is required to be written/punched on the labelling plate for the purpose of guidance of the purchaser. "Code" for the year of manufacture, therefore, does not appear to serve the above purpose. This should be looked into for necessary corrective action.

ii) The make of tractor has been specified as "John Deere" vide specification sheet. However, the same has been observed as "JDEPL" vide labelling plate of the tractor. This should be looked into for corrective action.

iii) The maximum PTO power has been specified as 25.8 kW (35 hp) vide labeling plate. The conversion of power in "hp" should be looked into for necessary corrective action.

16.5 General Observation:

16.5.1 Height of the foot rest from ground level is 640 mm. For easy mounting and dismounting of the operator, foot step(s) at suitable height, may be provided as per requirement of relevant Indian standard.

16.6 Maintenance / Service problems:

No noticeable maintenance and service problems was observed during the test. However, provision for draining of sediments / water should be provided in the fuel supply system.

16.7 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:

i) Provision for spark arresting device in exhaust system.

ii) "Minimum cautionary notice" as per clause 11.2 of IS:12239 (part-2)-1999

iii) The working clearance around the position control lever does not meet the requirement of IS: 12239 (part-2)-1999.

16.8 Adequacy of Literature:

The following literatures were supplied with the test tractor for reference during the test.

a) Operator's manual (For 5038D, 5103E, 5103, 5103S, 5203, 5104 and 5204 model tractors)

b) Technical manual (For 5038D, 5103E, 5103, 5103S, 5203, 5104 and 5204 model tractors)

c) Parts Catalogue (For 5038D, 5103E, 5103, 5103S, 5203, 5104 and 5204 model tractors)

The following discrepancies in specifications were observed in the operator's manual

i) The maximum equivalent crankshaft torque has been specified as "140 Nm" vide selected performance characteristics sheet. However, the same has been specified as "147 Nm" vide P.No. 155-2 of operator's manual.

ii) The maximum high idling speed of the engine has been specified as "2500 – 25/+ 50 rpm" vide specification sheet. However, the same has been specified as "2485 ± 25" vide P.No. 155-2 of operator's manual.

iii) The low idling speed of the engine has been specified as "850 – 50/+ 25 rpm" vide specification sheet. However, the same has been specified as "850 ± 25" vide P.No. 155-2 of operator's manual.

iv) The injection pump timing has been specified as "13.5±1 degree before TDC" vide specification sheet. However, the same has been specified as "15.5 ± 1 degree before TDC" vide P.No. 155-2 of operator's manual.

It is, however suggested that the operator's manual may be revised as per IS: 8132-1999 with the inclusion of , inter alia, the following:

i) Lubricants produced/marketed by various Indian manufacturers, if deemed suitable, may be recommended for their use in the tractor.

ii) Fuel saving tips

iii) Safe hitch height while using trailer.

iv) Details regarding preparation of tractor for wet land cultivation (puddling).

TESTING AUTHORITY:

CHAKRADHAR V. CHIMOTE **ASSISTANT ENGINEER (Series Testing)**	
J.J.R. NARWARE **SENIOR TEST ENGINEER**	
V. N. KALE **DIRECTOR**	

17. APPLICANT'S COMMENTS

Para No.	Our Reference	Applicant's comments
17.1	**16.2 (8)**	Offered as an optional fitments.
17.2	**16.4.1.1 (iii)**	We will take necessary action at the production level.
17.3	**16.4.1.1 (iv)**	We will take necessary action to identify the root cause.
17.4	**16.4.1.2**	Vibration levels are under study and will be improved under continuous improvement program
17.5	**16.4.1.3**	Will be reviewed for conformance.
17.6	**16.4.1.4 & 16.4.1.5**	Most of the Indian customers use implements fitted with pins of bigger. Hence, we had to provide with balls suiting the pins. However the width of ball conformance to Cat II will be reviewed for necessary action.
17.7	**16.4.1.6, 16.4.1.7, 16.5.1 & 16.6**	Shall be taken up with operator station changes
17.8	**16.4.1.9 (ii)**	Necessary corrective action has been taken
17.9	**16.4.1.9 (iii)**	Will do the necessary changes on the labelling plate
17.10	**16.8**	Will be rectified in the subsequent editions

APPENDIX - I

BRIEF SPECIFICATION OF IMPLEMENTS USED DURING FIELD TEST

S. No.	I t e m	Disc Plough	Rotavator	Puddler
1.	Make	Mahindra & Mahindra	Shaktimaan	Not available
2.	Type	Mounted	Mounted	Mounted
3.	No. of discs / blades	Two	30	12 (6 in each gang)
4.	Type of discs / blades	Plain concave	Hatchet	Notched
5.	Size of discs / blades, (mm)	635	170 x 140 x 5	460
6.	Spacing of discs / flanges, (mm)	510	230	164
7.	Lower hitch point span, (mm)	635	870	680
8.	Mast height, (mm)	470	560	680
9.	**Overall dimensions, (mm):**			
	- Length	1520	1000	1190
	- Width	1190	1420	1810
	- Height	1005	1070	1330
10.	Gross mass, (kg)	310	420	240

APPENDIX - II

BRIEF SPECIFICATION OF CAGE WHEEL

Sl No.	Items	Specification
1.	Type	Half cage wheel
2.	Outer dia, (mm)	1085
3.	Width, (mm)	340
4.	No. and types of lugs	12, Straight lugs made of M.S. angle section welded to angle iron frame
5.	Size of angle section, (mm)	50 x 50 x 5
6.	Length of lug, (mm)	340
7.	Spacing of lug, (mm)	275
8.	Weight of each cage wheels, (kg)	60

APPENDIX - III

TRACTOR RUN HOURS DURING TEST

A.	**LABORATORY AND TRACK TESTS:**	**HOURS**
1.	Running-in	--
2.	PTO performance test	14.2
3.	Power lift and hydraulic pump performance test	3.0
4.	Drawbar performance test	15.2
5.	Turning ability	0.2
6.	Location of centre of gravity	--
7.	Operator's field of vision	--
8.	Brake test	3.3
9.	Noise measurement	1.8
10.	Mechanical vibration test	1.0
11.	Nominal speed test	0.8
B.	**FIELD TEST:**	
1.	Disc Ploughing	10.4
2.	Rotavation	10.2
3.	Puddling (Including five hours water proof test)	10.5
C.	**HAULAGE TEST**	8.6
D.	Miscellaneous test and other run hours including idle run, transportation, preparation for test and trial runs.	16.2
	TOTAL:	**95.4**