

T-681/1187/2009	DEUTZ-FAHR, AGROLUX-40E TRACTOR - Commercial (Initial)	1
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Manufacturer : M/s. SAME DEUTZ-FAHR INDIA (P) LTD
72, SIPCOT, Industrial Complex,
Ranipet – 632 403 (Tamil Nadu)

Month: July	Test Report No. T-681/1187/ 2009	Year : 2009
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Type of Test : **COMMERCIAL (INITIAL)**

Test code/Procedure : IS: 5994-1998, (Reaffirmed in 2003)
IS: 9253-2001 and IS: 12207:2008

Period of Test : January to May, 2009

Test Report No. : **T-681/1187/2009**

Month/Year : July, 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 pertain to the particular machine submitted by the applicant for test.
- iii) The results presented in this report do not in any way attribute to the durability of the machine.
- iv) This report should not be reproduced in part or full without prior permission of the Director, Central Farm Machinery Training and Testing Institute, Budni (M.P.).

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

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16. SUMMARY OF OBSERVATIONS, COMMENTS & RECOMMENDATIONS

16.1 Evaluative (mandatory) / Non-evaluation (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/ Require- ment	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 >35hp. -7.5/+10% for PTO power ≤ 35 hp	26.47	27.3	Yes
b)	Power at rated engine speed, (kW)	Non Evaluative	-do-	26.47	27.3	Yes
c)	Specific fuel consumption corresponding to maximum power, (g/kWh)	Non Evaluative	± 5%	280	266	Yes

1	2	3	4	5	6	7
d)	Maximum equivalent crankshaft torque, (Nm)	Non Evaluative	± 8%	143	145.1	Yes
e)	Back-up torque, percent	Non Evaluative	7 percent, min.	--	22.5	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.	150	128	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.	110	85	Yes
g)	Engine oil consumption, (g/kWh)	Evaluative	Not exceeding 1% of SFC at max. power under High ambient conditions	2.70	0.89	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)	--	0.37	Yes

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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	19.89	22.30	Yes
b)	Max. drawbar pull without ballast corresponding to 15 percent wheel slip, (kN)	Evaluative	Minimum 65% of static mass of tractor without ballast	12.75	15.39	Yes
c)	Maximum drawbar power without ballast (kW).	Evaluative	Min. 80% of PTO power as referred in 16.1.1 (a) of PTO performance	21.8	23.4	Yes
d)	Max. transmission oil temperature (°C)	Non Evaluative	The declared value should not exceed the maximum value specified by oil company	120	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%]	Not specified	17.33	Unascertainable
	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	6.55	15.76	Yes

1	2	3	4	5	6	7
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]	25	02	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	10.0	5.90	Yes
	2)	Hot brake	Evaluative	10	10.0	5.40	Yes
b)	Maximum force exerted on the brake pedal to achieve a deceleration of 2.5 m/s ² (N)	Evaluative	600	600	62 to 140	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	Yes	Yes	Yes	

16.1.5 Noise measurement :

a)	Maximum ambient noise emitted by the tractor dB(A)	Evaluative	As per CMVR	88	86	Yes
b)	Maximum noise at operator's ear level dB(A)	Evaluative	As per CMVR	98	96	Yes

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16.1.6	Amplitude of mechanical vibrations at :						
	1)	Left foot rest	Non Evaluative	100 microns (max)	100	160	No
		Right food rest			100	200	No
	2)	Seat (with driver seated)			100	100	Yes
3)	Steering wheel	100			90	Yes	
16.1.7	Haulage requirements :						
a)	Gross mass of the trailers, (tones):						
	1)	Two wheel	Non	--	4.0	4.0	Yes
	2)	Four wheel	Evaluative	--	5.0	5.0	Yes
b)	Distance travelled / litre of fuel consumption, (km):						
	1)	Two wheel	Non Evaluative	--	4.5 to 6.3	5.61 to 5.66	Yes
	2)	Four wheel		--	4.5 to 6.3	5.51 to 5.47	Yes
c)	Fuel consumption (ml/km/tonne):						
	1)	Two wheel	Non Evaluative	--	30 to 50	44.2 to 44.6	Yes
	2)	Four wheel		--	30 to 50	36.3 to 36.6	Yes

1	2	3	4	5	6	7
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.	Yes	No ingress of mud and/or water 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	--	Yes	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		DEUTZ-FAHR	Yes
	2) Model	Evaluative			AGROLU X 40E	Yes
	3) Year of manufacture	Evaluative			2008	Yes
	4) Engine number	Evaluative			3B17137 A08	Yes

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	5)	Chassis number	Evaluative			D10S403 WX1E100 1A08	Yes
	6)	Declaration of PTO power, (kW)	Evaluative			26.47	Yes
16.1.11	Discard limit for:						
(a)	Cylinder bore diameter, (mm)		Evaluative	To be specified by the manufacturer	105.10	105.00 to 105.01	Yes
(b)	Clearance between piston & cylinder liner at skirt, (mm)		Non Evaluative		0.42	0.115 to 0.124	Yes
(c)	Ring end gap (mm):						
	-	Top comp. ring.	Evaluative	-do-	1.5	0.35 to 0.45	Yes
	-	2 nd comp. ring.		-do-	1.5	0.55	Yes
	-	Oil ring.		-do-	1.5	0.45	Yes
(d)	Ring groove clearance (mm):						
	-	Top comp. ring.	Evaluative	-do-	0.25	0.112 to 0.124	Yes
	-	2 nd comp. ring.		-do-	0.25	0.041 to 0.055	Yes
	-	Oil ring.		-do-	0.15	0.014 to 0.018	Yes
(e)	Clearance of main bearings (mm):						
	-	Diametrical clearance	Evaluative	-do-	0.40	0.074 to 0.098	Yes
1	2	3	4	5	6	7	
	-	Crankshaft end float	Evaluative	-do-	0.50	0.11	Yes
(g)	Clearance of big end bearings, (mm):						
(h)	-	Diametrical	Evaluative	-do-	0.40	0.061 to 0.084	Yes
	-	Axial	Evaluative	-do-	0.50	0.20 to 0.40	Yes
(i)	Clearance between king pin and bush, (mm)		Non Evaluative	-do-	0.85	0.27 to 0.31	Yes
(j)	Clearance between center pin and bush, (mm)		Non Evaluative	-- do--	0.85	0.24 to 0.32	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.)

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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.)	Not applicable	--
2.	Seating requirements	Should meet the requirements of IS: 12343-1998	Does not meet the requirement	No
3.	Fitment of ROPS	With a provision for fitment of ROPS.	Provision exist	Yes
		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 meet the requirement	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 and IS:12362 Part 3-1994.	Conforms	Yes
	Specifications of swinging drawbar		Not provided	--
7.	Accessories	Trailer hitch, front tow hook, linkage drawbar may be provided.	Provided	Yes

16.3 Conformity with following IS:

- i) Guide lines for declaration of power and specific fuel consumption and labeling of agricultural tractors (First revision) [IS 10273:1987 (Reaffirmed in Oct. 2004)] : Conforms
- ii) Agricultural tractors – Rear mounted power take-off - Types 1, 2 and 3(third revision)[IS: 4931-1995 (Reaffirmed in Oct. 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(Reaffirmed in March, 2007)/ISO730-1:1994] : Conforms
- iv) Drawbar for agricultural tractors – Link type [IS 12953:1990 (Reaffirmed in March, 2007)] : Conforms

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- v) Agricultural tractors - Operator's seat technical requirement [IS 12343 –1998 (First revision) (Re-affirmed in Dec, 2004)] : **Does not conform**
- vi) Guide for safety & comfort of operator of agricultural tractors: Part 1 General requirements (first revision): [IS 12239 (PT-1) 1996 (Reaffirmed in March, 2007)/ISO 4254-1:1989] : Conforms
- vii) Tractors and machinery for agriculture and forestry, powered lawn and garden equipment – Symbols for operator controls and other displays [IS: 6283 (Part-1 & Part-2) –1998(Re-affirmed in Dec, 2003)/ISO 3767-2:1991]] : Conforms
- viii) Tractors and machinery for agriculture and forestry – Technical means for ensuring safety Part 2: Tractors (first revision) [(IS 12239 (PT-2) 1999) (Re-affirmed in Oct. 2004)] : **Does not conform**
- ix) Guide lines for location and operation of operator controls on agricultural tractors and machinery (first revision) (IS: 8133 – 1983) (Re-affirmed in Oct. 2004) : Conforms
- x) Agricultural Tractor & Machinery Lighting device for travel on public roads (IS: 14683-1999) (Re-affirmed in Oct. 2004) : Conforms

16.4 Salient Observations:

16.4.1 Laboratory tests:

16.4.1.1 PTO Performance:

- i) The backup torque is 22.5%.
- ii) The specific fuel consumption corresponding to maximum power was recorded as **266** g/kWh, against the declaration of 280 g/kWh.

16.4.1.2 Drawbar performance:

The LHS & RHS rear tyres creeping over rim was recorded as 40 & 16 mm respectively, which is considered on higher side and calls for necessary corrective action.

16.4.1.3 Hydraulic performance :

- i) The moment about the rear axle was computed as 23.56 kN-m at standard frame, which is considered on higher side as compared to the moment from front axle i.e. 15.94 kN-m. It is therefore, recommended that the lifting capacity of the hydraulic system may be reduced suitably or standard ballast mass at front axle may be provided to avoid front lifting of the tractor.
- ii) The linkage lock for transport is not provided. It should be provided for the safety during transport.

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. Especially at the foot rest and operator's seat. This calls for dampening down of vibrations to improve the operational comfort and service life of components.

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16.4.1.5 Three point linkage:

Distance from the end of power take-off to centre of lower hitch point (lower links in horizontal position) conforms to 'Cat-I' whereas other parameters conforms to 'Cat-II'. Keeping in the view the sprit of standardization, necessary improvements may be incorporated.

16.4.1.6 Specifications of Power Take-off Shaft:

Dimension "AØ" (Refer Fig.2) of PTO shaft does not meet the requirement of IS: 4931:1995. This should be looked into for compliance.

16.4.1.7 Operator's Seat:

The length of seat does not meet the requirements of IS: 12343-1999. It should be looked into for compliance.

16.4.1.8 Labelling Plate:

The labelling plate meets the requirements of IS:10273-1987

16.4.2 Field Performance:

16.4.2.1 Wet land cultivation (Puddling Operation):

The tractor meets the requirements of IS:11082-1984 and is found suitable for wet land cultivation (puddling operation).

16.5 Recommendation with regard to safety on tractor:

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

- i) Provision for spark arresting device in exhaust silencer
- ii) The working clearance around the PTO engaging lever & mudguard may be provided as per IS: 12239 (Part-2) – 1999.
- iii) Transport lock for hydraulic lift.

16.6 Maintenance / Service Problems:

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

16.7 Adequacy of Literature supplied with machine:

The following literature was supplied with the tractor for reference during the test.

- i) Use & Maintenance Manual for Agrolux-40 E, 50 E, 60 E & 70 E tractors.
- ii) Spare parts catalogue for Agrolux-40E tractor
- iii) Workshop Manual for Agrolux-40 E, 50 E, 60 E & 70 E tractors.

The supplied literature was found adequate. However, the literature may also be brought out in national as well as other regional languages.

TESTING AUTHORITY:

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R. K. NEMA AGRICULTURAL ENGINEER	
J.J.R. NARWARE SENIOR AGRICULTURAL ENGINEER	
V.N. KALE DIRECTOR	

USA-2009/Final drive/AGROLUX 40E ICT TRACTOR

17. APPLICANT'S COMMENTS

Para No.	Our reference	Applicant's comments
17.1	16.3 (v) & (viii)	Will be reviewed.

APPENDIX – I

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BRIEF SPECIFICATION OF IMPLEMENTS USED DURING FIELD TEST

S. No.	Item	Disc Plough	Rotavator
1.	Make	NA	Haward
2.	Type	Mounted	Mounted
3.	No. of disc blades	Two	30 in 6 flanges
4.	Type of disc blades	Plain concave	Hatchet
5.	Size of disc blades, (mm)	660	215 x 75 x 5
6.	Spacing of disc /flanges, (mm)	485	250
7.	Lower hitch point span, (mm)	795	690
8.	Mast height, (mm)	520	465
9.	Overall dimensions, (mm):		
	- Length	1400	1035
	- Width	950	1790
	- Height	1155	960
10.	Gross mass, (kg)	245	325

ANNEXURE - II

BRIEF SPECIFICATION OF FULL CAGE WHEEL

S. No.	Items	Specification
1.	Type	Full cage wheel
2.	Dia. (mm)	1210
3.	Width (mm)	900
4.	No. and type of lugs	24, straight lugs made up of MS angle section welded to angle iron frame.
5.	Size of angle section, (mm)	40 x 40 x 5
6.	Length of lugs, (mm)	444
7.	Spacing lugs, (mm)	290
8.	Weight of cage wheels (kg)	120

APPENDIX – III

TRACTOR RUN HOURS DURING TEST

A.	LABORATORY AND TRACK TESTS:	HOURS
1.	Running-in	--
2.	PTO performance test	13.6
3.	Power lift and hydraulic pump performance test	3.2

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4.	Drawbar performance test	14.5
5.	Turning ability	0.3
6.	Location of centre of gravity	0.2
7.	Operator's field of vision	0.1
8.	Brake test	3.0
9.	Noise measurement	1.8
10.	Mechanical vibration test	1.0
11.	Theoretical speed test	0.9
B.	FIELD TEST:	
1.	Disc ploughing	10.8
2.	Rotavation	10.9
3.	Puddling (Including water proof test for 5.0 hrs.)	15.3
C.	HAULAGE TEST:	9.1
D.	Miscellaneous test and other run hours including idle run, transportation, trials and preparation for test	20.0
	TOTAL:	89.4