



OMAX ENERGY PVT. LTD., PRAMUKH TRACTOR



सत्यमेव जयते

भारत सरकार

GOVERNMENT OF INDIA

कृषि मंत्रालय (कृषि एवं सहकारिता विभाग, मशीनीकरण एवं प्रौद्योगिकी प्रभाग)
Ministry of Agriculture (Deptt. of Agri. & Co-op, Mechanization & Technology Division)

CENTRAL FARM MACHINERY TRAINING & TESTING INSTITUTE

(An ISO : 9001 - 2008 Certified Institute)

ट्रैक्टर नगर, बुदनी (म.प्र.) ४६६ ४४५ **Tractor Nagar, Budni (M.P.) 466 445**

Phone : 07564-234729 Fax : 07564 - 234743 E-mail fmti-mp@nic.in Website : <http://cfmtti.dacnet.nic.in>

Manufacturer : M/s. OMAX ENERGY PVT. LTD.
Survey No. 239, Plot No. 3,
B/H Gram Swaraj Mandar,
Nr. Arrow Techno Cast,
VERAVAL (SHAPAR) Rajkot-360024

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 : 18
- Transmission : 8
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 : OMAX ENERGY PVT. LTD.
Model : PRAMUKH TRACTOR
Variants, if any : None
***The variant models have not been tested at this Institute yet.**
Type : 4 wheeled, rear two wheel driven, agricultural tractor
Year of manufacture : 2012
Chassis number : 0712000 1
Country of Origin : India
- 1.2 Engine:**
Make : GREAVES COTTON LTD.
Model : G 600 W II
Type : 4 Stroke, water cooled, direct injection diesel engine
Serial number : A2C0613462
Engine speed (Manufacturer's recommended production setting), (rpm):
- Maximum speed at no load, : 3350 to 3550
- Low idle speed : 1100 to 1300
- Speed at maximum torque : 1600 to 1800
Rated speed, (rpm):
- For PTO use : 3000
- For drawbar use : 3000
- 1.3 Cylinder & Cylinder Head:**
Number : One
Disposition : Vertical
Bore/stroke, (mm) : 92/92
Capacity as specified by the applicant, (cc) : 611
Compression ratio : 18±0.5:1
Type of cylinder head : Vertical wet type
Type of cylinder liners : Wet, replaceable
Type of combustion chamber : Re-entrant
Arrangement of valves : Over Head Valves

17. SUMMARY OF OBSERVATIONS, COMMENTS & RECOMMENDATIONS

17.1 Evaluative (mandatory)/Non-evaluative (Non-mandatory) parameter 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:

Sl.No.	Characteristic	Category (Evaluative / Non Evaluative)	Requirements as per IS: 12207-2008	Values declare d by the applica nt (D)/ Require ment (R)	As observ ed	Whether meets the requirem ents (Yes/No.)
1	2	3	4	5	6	7
17.1.1	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 > 26 kW -7.5/+10% for PTO power ≤ 26 kW.	7 (D)	7.1	Yes
b)	Power at rated engine speed, (kW)	Non Evaluative	-do-	7 (D)	7.1	Yes
c)	Specific fuel consumption corresponding to maximum power, (g/kWh)	Non Evaluative	+ 5%	284 (D)	340.18	No
d)	Maximum equivalent crankshaft torque, (Nm)	Non Evaluative	± 8%	31 (D)	31.2	Yes
e)	Back-up torque, percent	Non Evaluative	10, percent, min.	10 % (R)	28.93	Yes

1	2	3	4	5	6	7	
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.	140(D)	113	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.	110(D)	78	Yes

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g)	Engine oil consumption, (g/kWh)	Evaluative	Not exceeding 1% of SFC at max. power under High ambient conditions	1% of SFC 3.40 (R)	1.105	Yes
17.1.2 Drawbar performance:						
a)	Max. drawbar pull with ballast corresponding to 15 percent wheel slip, (kN)	Non Evaluative	Minimum 65% of static mass with ballast	65% of static mass (D) 5.68 (R)	5.88	Yes
b)	Max. drawbar pull without ballast corresponding to 15 percent wheel slip, (kN)	Evaluative	Minimum 65% of static mass of tractor without ballast or with standard ballast, as the case may be	65% of static mass (D) 5.36 (R)	5.46	Yes
c)	Maximum drawbar power without ballast, (kW).	Evaluative	Min. 80% of PTO power as referred in SL No. i) a) of PTO performance in case of tractors having total static mass > 1500 kg Minimum 75% of PTO power as referred in SL No. i) a) of PTO performance in case of light weight tractors having 1500 kg total static mass of tractor. Minimum 75% of engine power as referred in SL No. i) a) of engine performance in case of tractors which do not have a PTO shaft.	80 % of PTO power (D) 5.3 (R)	6.3	Yes
d)	Max. transmission oil temperature (°C)	Non Evaluative	The declared value should not exceed the maximum value specified by oil company	120 (D)	77	Yes
1	2	3	4	5	6	7
17.1.3 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%]	5 (D)	11.18	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	1.68 (D) 2.24 (R)	5.54	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]	20 (D)	03	Yes

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17.1.4	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(D)	4.5	Yes
	2)	Hot brake	Evaluative	10	10(D)	5.8	Yes
b)	Maximum force exerted on the brake pedal to achieve a deceleration of 2.5 m/s ² (N)		Evaluative	600	600 (R)	385 to 410	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
17.1.5	Noise measurement :						
a)	Maximum ambient noise emitted by the tractor dB(A)		Evaluative	As per CMVR	88(R)	84	Yes
b)	Maximum noise at operator's ear level dB(A)		Evaluative	As per CMVR	98(R)	98	Yes
17.1.6	Amplitude of mechanical vibrations at :						
	1)	Left foot rest	Non Evaluative	100 microns (max)	100 (R) microns	190	No
		Right foot rest				150	No
	2)	Seat (with driver seated)				250	No
	3)	Steering wheel				310	No
17.1.7	Haulage requirements :						
a)	Gross mass of the trailers, (tones):						
	1)	Two wheel	Non Evaluative	-	1.5 (D)	1.5	Yes
b)	Distance travelled per liter of fuel consumption, (km) :						
	1)	Two wheel	Non Evaluative	--	10 to 12 (D)	9.45 to 10.03	Yes
c)	Fuel consumption (ml/km/tonne):						
	1)	Two wheel	Non Evaluative	--	60 to 65 (D)	66.49 to 70.51	No

1	2	3	4	5	6	7
17.1.8	Safety Features:					
a)	Guards against moving and hot parts	Evaluative	Belt drives, pulley, silencer, hydraulic pipes (As per IS 12239 (part 2) 1999	-	Meets the requirement	Yes
b)	Lighting arrangement	Evaluative	As per CMVR	--	Provided	Yes
c)	Seating requirement	Non-Evaluative	Should meet the requirements of IS 12343 – 1998 as amended from time to time)	--	Does not meet the requirement	No
d)	Technical requirements for PTO shaft	Non-Evaluative	Should meet the requirements of IS 4931- 1995 (as amended from time to time)	--	Does not meet the requirement	No
e)	Dimension of three point linkage	Non-Evaluative	Should meet the requirements of IS 4468- 1997 (part 1)	--	Does not meet the	Yes

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			(as amended from time to time)		requirement	
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)	--	Meets the requirement	Yes

17.1.9	Labelling of tractors (Provision of labeling plate):					
	1)	Make	Evaluative	Should conform to the requirements of CMVR along-with declared value of PTO HP	M/s OMAX ENERGY PVT. LTD	Yes
	2)	Model	Evaluative		PRAMUKH TRACTOR	Yes
	3)	Year of manufacture	Evaluative		2012	Yes
	4)	Engine serial number	Evaluative		A2C0613462	Yes
	5)	Chassis serial number	Evaluative		07120001	Yes
	6)	Declaration of PTO power, kW(hp)	Evaluative		7.0 (9.4)	Yes

17.1.10	Discard limit for:					
(a)	Cylinder bore diameter, (mm)	Evaluative	To be declared by the manufacturer	92.10	92.02 to 92.04	Yes
(b)	Clearance between piston & cylinder liner at skirt, (mm)	Non Evaluative		0.150	0.129	Yes
(c)	Ring end gap (mm):	Evaluative	To be declared by the manufacturer	-		
	1 st comp. ring.			0.75	0.55 to 0.60	Yes
	2 nd comp. ring.			0.75	0.50 to 0.55	Yes
	Oil ring			0.75	0.60	Yes

(d)	Ring groove clearance (mm):					
	1 st comp. ring.	Evaluative	do	0.20 for all	0.08	Yes
	2 nd comp. ring.		-do-		0.06	Yes
	Oil ring.		-do-		0.04	Yes
(e)	Clearance of main bearings (mm):					
	Diametrical clearance	Evaluative	-do-	0.250	0.78 to 0.081	Yes
	Crankshaft end float	Evaluative	-do-	0.5	0.25	Yes
(f)	Clearance of big end bearings, (mm):					
	Diametrical	Evaluative	-do-	1.0	0.057 to 0.058	Yes
	Axial	Evaluative	-do-	0.150	0.10	Yes
(g)	Clearance between king pin and bush, (mm)	Non Evaluative	-do-	0.80	Not measured as per design future	Yes
(h)	Clearance between center pin and bush, (mm)	Non Evaluative	-do-	0.150	0.402 to 0.508	No
17.1.11	Literature (Submission to test agency)					

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(a)	Operator manual	Evaluative	Provided/Not Provided	As per relevant IS Code (IS 8132)	Provided	Yes
(b)	Parts Catalogue	Evaluative	Provided/Not Provided	As per relevant IS Code (IS 8132)	Provided	Yes
(c)	Workshop/Service manual	Evaluative	Provided/Not Provided	As per relevant IS Code (IS 8132)	Provided	Yes

17.1.12 CATEGORY OF BREAKDOWNS / DEFECTS :					
Sr.No.	Characteristic	Category (Evaluative / Non Evaluative)	Requirements as per IS: 12207-2014	As observed	Whether meets the requirements (Yes/No.)
1.	Critical	Evaluative	No critical breakdown	-	Yes
2.	Major	Evaluative	Not more than two and neither of them should be repetitive in nature	02	Yes
3.	Minor	Evaluative	Not more than five and frequency of each should not be more than two.	01	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	03	Yes

17.2 Optional requirements as per Clause-4 (Table-2) of IS:12207-2014:				
Sr.No.	Characteristic	Requirements as per IS: 12207-2014	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.)	0.08	Yes
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. If ROPS fitted it should meet the requirement of IS: 11821-1992	ROPS not fitted	No

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

17.3 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)]	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 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)]	: Conforms
VIII.	Guide lines for location and operation of operator controls on agricultural tractors and machinery (first revision) [(IS: 8133 – 1983) (Reaffirmed in March, 2009)]	Does not conform
IX.	Agricultural Tractor & Machinery Lighting device for travel on public roads [(IS: 14683-1999) (Reaffirmed in March, 2009)]	conforms

17.4 Salient Observations:

17.4.1 Laboratory tests:

17.4.1.1 PTO Performance:

- i) The backup torque is 28.93 %.
- ii) The maximum power was observed as **7.1 kW** against the declaration of **7.0 kW**, which meet the requirement of IS: 12207-2014 with regard to tolerance.
- iii) The specific fuel consumption corresponding to maximum power was measured as **340.18 g/kWh** against the declaration of **284 g/kWh**, which is very higher side with regard to tolerance. This should be looked into for necessary corrective action.

17.4.1.2 Hydraulic performance:

The lifting capacity at standard frame was recorded as **5.54 kN** and the moment about rear axle was computed as 4.71 kN-m. & 4.55 kN-m for front axle. The moment about rear axle is higher side as compared to the moment about front axle that's why there is need for front ballasting.

17.4.1.3 Mechanical Vibration:

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

17.4.1.4 Three Point Linkage:

Some of the parameters of three point linkage does not meet the requirement.

17.4.1.5 Linkage Drawbar:

All the parameter meets the requirement.

17.4.1.6 Operator's seat:

Longitudinal adjustment forward & rearward from the mid position does not meet the requirement. Necessary improvements may be incorporated.

17.4.1.7 Symbols of operator's controls and other displays:

Some controls shall not be identifiable with symbol in accordance with IS: 6283-1998. This should be looked into for necessary corrective action.

17.4.1.8 Location and operation of operator's control:

The safety guards around the axial flow fans, pulleys, belts, gears & chain was not provided. This should be looked into for necessary corrective action.

17.5 Maintenance / Service problems:

Maintenance / Service problems observed during the test. So as per request of applicant all the defected parts observed during the inspection & allowed to replace by new one.

1.	The woodruff key and adopter plate of engine & clutch joining unit was found damage, so it was replace with new one.
2.	The FIP pump mounting bolt (Allen key) was replaced with new one
3.	The clutch plate, main drive gear shaft & clutch bearing replace with new one

17.6 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:

- i) Safety start of engine
- ii) The hand lever does not remain in stop position.
- iii) Provision of spark arresting device in exhaust system.

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17.7 Adequacy of Literature supplied with machine:

17.7.1

- i) Operator's Manual for Pramukh tractor
- ii) Part's catalogue for Pramukh tractor – Engine, Chassis and Seat metal, transmission and hydraulic.
- iii) Service Manual of Pramukh tractor

18. 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	October, 2013 to March, 2015	No	Delay in Noise level & field test due to maintenance problem.

TESTING AUTHORITY:

A.K.SINGH
SENIOR AGRICULTURAL ENGINEER

C.R. LOHI
DIRECTOR

Report is compiled by **Er. Shwetabh Singh** Senior Technical Assistant

19. APPLICANT'S COMMENTS

Para No.	Clause	Comments
19.1	17.4.1.1, 17.4.3, 17.4.1.2, 17.4.1.4, 17.5 & 17.6	These are being studied & corrective action will be taken in near future wherever required.
19.2	17.1.1, 17.2, 17.3, 17.5, 17.6, 17.8, 17.4.1.7, 17.4.1 & 17.4.1.9	Your valuable comments & suggestions for improvement are well taken. Under our policy of continuous product improvement these aspects are further being looked into & will try to eliminate these deviations soon wherever necessary.

Annexure- I

BRIEF SPECIFICATION OF IMPLEMENTS USED DURING FIELD TEST

Sl.No.	Item	M.B.Plough	Rotavater
1.	Make	Captain Tractors Pvt. Ltd.	Kranti
2.	Type	Mounted	Mounted
3.	No. of bottom / blades	02	30
4.	Type of bottom / blades	Mould board	C-blade
5.	Size of bottom / blades, (mm)	20	100X50X7
6.	Spacing of bottom / flanges, (mm)	230	170
7.	Lower hitch point span, (mm)	620	440
8.	Mast height, (mm)	450	470
9.	Overall dimensions, (mm):		
	- Length	1010	1110
	- Width	720	670
	- Height	855	840
10.	Gross mass, (kg)	75	190

Annexure- II

TRACTOR RUN HOURS DURING TEST

A.	LABORATORY AND TRACK TESTS:	<u>HOURS</u>
1.	Running-in	--
2.	PTO performance test	14.98
3.	Drawbar performance test	16.49
4.	Power lift and hydraulic pump performance test	4.04
5.	Turning ability	0.2
6.	Location of center of gravity	0.2
7.	Operator's field of vision	0.0
8.	Brake test	1.0
9.	Air cleaner oil pull over test	3.6
10.	Noise measurement	1.5
11.	Mechanical vibration test	1.10
12.	Nominal speed test	1.42
B.	FIELD TEST:	
1.	M.B. Ploughing	22.62
2.	Rotavation	15.82
C.	HAULAGE TEST	11.0
D.	Miscellaneous test and other run hours including idle run, transportation, preparation for test and trial runs.	11.45
	TOTAL:	105.42