

T-10

व्यावसायिक परीक्षण रिपोर्ट
COMMERCIAL TEST REPORT (Initial)

संख्या / No. : T-1098/1624/2017
माह / Month : August, 2017



PREET 7549 AGRITRAC 4WD 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)

Tractor Nagar, Budni (M.P.) 466 445

E-mail fmti-mp@gov.in

Website : <http://www.fmttibudni.gov.in>

Telephone : 07564 - 234729

Fax : 07564 - 234743



5.	During 2 nd five hour at 15% wheel slip under ten hour drawbar performance test, forward & reverse gear shifting lever was disengaged itself 3 to 4 times on loading condition. Consequent upon the request received from the applicant for change of clutch assembly with new having same specification (Clutch cover/housing, Part No: P030403, PTO clutch plate, Part No: P0303404 & Clutch plate, Part No: 74801) were replaced.	Mj-8	48.11
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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: 12207-2014 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
16.1.1	PTO Performance :					
a)	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	50 (D)	51.1	Yes
b)	Power at rated engine speed, (kW)	Non Evaluative	-do-	50 (D)	49.4	Yes
c)	Specific fuel consumption corresponding to maximum power, (g/kWh)	Non Evaluative	± 5%	292 (D)	277	Yes
d)	Maximum equivalent crankshaft torque, (Nm)	Non Evaluative	± 8%	300(D)	280.7	Yes
e)	Back-up torque, percent	Non Evaluative	10 percent, min.	10 percent, min. (D)	16.25	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.	130 (D)	126	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.	118 (D)	113	Yes
g)	Engine oil consumption, (g/kWh)	Evaluative	Not exceeding 1% of SFC at max. power under High ambient conditions	Maximum 2.83 (R)	0.41	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 CNVR)	3.25 per meter (R)	2.53	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	24.34 (D) 24.07 (R) Minimum	31.65	Yes
b)	Max. drawbar pull with standard ballast corresponding to 15 percent wheel slip.(kN)	Evaluative	Minimum 65% of static mass of tractor without ballast	16.57 (D) 16.29 (R) Minimum	23.25	Yes
c)	Maximum drawbar power without ballast, (kW).	Evaluative	Minimum 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 the engine power as referred in Sl No. i) a) of engine performance in case of tractors which do not have a PTO shaft.	40.0 (D) 40.9 (R) Minimum	40.7	Yes
d)	Max. transmission oil temperature,(°C)	Non Evaluative	The declared value should not exceed the maximum value specified by oil company	130 (D)	114	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%]	23.53 (D)	24.64	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	14.0 (D) 12.03 (R) Minimum	18.70	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 Minutes. (mm)	Non Evaluative	Observed value should not exceed 50 mm.	50 (D)	15	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 Un ballast* (m):					
	1) Cold brake	Evaluative	10	10 (R)	7.97	Yes
	2) Hot brake	Evaluative	10	10 (R)	8.12	Yes
b)	Maximum force exerted on the brake pedal to achieve a deceleration of 2.5 m/s ² (N)	Evaluative	600	600 (R)	331 to 334	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
16.1.5 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	96 (R)	94	Yes
16.1.6 Amplitude of mechanical vibrations at :						
	1) Left foot rest	Non Evaluative	100 microns (max)	100 (R)	150	No
	2) Right foot rest			100 (R)	250	No
	3) Seat (with driver seated)			100 (R)	90	Yes
	4) Steering wheel			100 (R)	150	No
16.1.7	Air cleaner pull over (%)	Non Evaluative	0.25% (Max)	Dry type air cleaner is provided		-
16.1.8 Haulage requirements :						
a)	Gross mass of the trailers, (tones):					
	1) Two wheel	Non	--	5.0	5.0	Yes
	2) Four wheel	Evaluative	--	7.0	7.0	Yes
b)	Distance travelled / litre of fuel consumption, (km/l):					
	1) Two wheel	Non	--	8.0	3.04 to 3.13	No
	2) Four wheel	Evaluative	--	7.0	3.06 to 3.15	No
c)	Fuel consumption (ml/km/tonne):					
	1) Two wheel	Non	--	46.0	63.82 to 65.76	No
	2) Four wheel	Evaluative	--	39.0	45.24 to 46.62	No



16.1.9		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.	The manufacturer has recommended that the tractor is not suitable for wetland cultivation (puddling operation).	Not recommend	Not applicable
	1) Clutch assembly					
	2) Brake housing					
	3) Front axle hubs					
	4) Engine oil					
	5) Transmission oil					

16.1.10		Safety features :				
a)	Guards against moving and hot parts	Evaluative	Belt drives, pulley, silencer, hydraulic pipes As per IS 12239 (part 2)	Requirements as per clause no.4 of table no.1	Meets the requirement	Yes
b)	Lighting arrangement	Evaluative	As per CMVR	--do--	Meets the requirement	Yes
c)	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)	--do--	Does not meet the requirement	No
d)	Technical requirements for PTO shaft	Non Evaluative	Should meet the requirements of IS 4931 (as amended from time to time)	--do--	Does not meet the requirement	No
e)	Dimension of three point linkage	Non Evaluative	Should meet the requirements of IS 4468 (part 1) (as amended from time to time)	--do--	Does not meet the requirement	No
f)	Specification of linkage drawbar	Non Evaluative	Should meet the requirements of IS 12953 and IS 12362 (part 3) (as amended from time to time)	--do--	Meets the requirement	Yes
g)	Specification of swinging drawbar	Non Evaluative		--do--	Not provided	N.A.

16.1.1		Labelling of tractors (Provision of labelling plate):				
1)	Make	Evaluative	Should conform to the requirements of CMVR along-with declared value of PTO HP	-	PREET	Yes
2)	Model	Evaluative		-	7549 AGRITRAC 4WD	Yes
3)	Year of manufacture	Evaluative		-	December, 2015	Yes
4)	Engine number	Evaluative		-	P480 - 00003	Yes
5)	Chassis number	Evaluative		-	XCM75AG00001/B	Yes
6)	Declaration of PTO power, (kW)	Evaluative		-	50	Yes

16.1.11 Discard limit for:						
(a)	Cylinder bore diameter, (mm)	Evaluative	To be declared by the manufacturer	105.40	104.98 to 105.02	Yes
(b)	Clearance between piston & cylinder liner at skirt, (mm)	Non Evaluative	-do-	0.80	0.090 to 0.102	Yes
(c)	Ring end gap (mm):					
	- Top comp. ring.	Evaluative	-do-	2.0	0.45 to 0.50	Yes
	- 2 nd comp. ring.		-do-	2.0	0.60 to 0.70	Yes
- Oil ring.	-do-		2.0	0.50	Yes	
(d)	Ring groove clearance (mm):					
	- Top comp. ring.	Evaluative	-do-	0.35	Tapered	--
	- 2 nd comp. ring.		-do-	0.35	0.087 to 0.100	Yes
- Oil ring.	-do-		0.35	0.041 to 0.056	Yes	
(e)	Clearance of main bearings (mm):					
	- Diametrical clearance	Evaluative	-do-	0.90	0.025 to 0.059	Yes
	- Crankshaft end float	Evaluative	-do-	1.0	0.20	Yes
(f)	Clearance of big end bearings, (mm):					
	- Diametri-cal	Evaluative	To be declared by the manufacturer	0.90	0.057 to 0.079	Yes
	- Axial	Evaluative	-do-	1.0	0.25	Yes
(g)	Clearance between king pin and bush, (mm)	Non Evaluative	-do-	0.6	Not measured due to spherical design of bush.	-
(h)	Clearance between center pin and bush, (mm)	Non Evaluative	-do-	0.8	0.12 to 0.16	Yes

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

16.1.14 CATEGORY OF BREAKDOWNS / DEFECTS :					
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	01	Yes
3.	Minor	Evaluative	Not more than five and frequency of each should not be more than two.	03	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.	04	Yes

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16.2 Optional requirements as per Clause-4 (Table-2) of IS:12207-2014:				
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.	Not provided	No
		If ROPS fitted it should meet the requirement of IS: 11821-1992.	Not provided	Not applicable
2.	Accessories	Trailer hitch, front tow hook, linkage drawbar may be provided.	Provided	Yes

17.3 Conformity with following IS:

- i) Guidelines for declaration of power and specific fuel consumption and labeling 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-1):1997 (Reaffirmed in February, 2012)] : **Does not conform**
- iv) Drawbar for agricultural tractors – Link type [IS 12953:1990 (Reaffirmed in February, 2012)] : **Conforms**
- v) Agricultural tractors - Operator's seat technical requirement [IS 12343 –1998 (First revision) (Reaffirmed in March, 2009)] : **Does not conform**
- vi) Guide for safety & comfort of operator of agricultural tractors: Part 1 General requirements (first revision) : [IS 12239 (Part-1)-1996 (Reaffirmed in February, 2012) / ISO 4254-1:1989] : **Does not conform**
- vii) Tractors and machinery for agriculture and forestry – Technical means for ensuring safety Part 2: Tractors (first revision) IS 12239 (Part-2)-1999 (Reaffirmed in March, 2009)] : **Does not conform**
- viii) Tractors and machinery for agriculture and forestry, powered lawn and garden equipment – Symbols for operator controls and other displays – Symbols for Agricultural Tractors and Machinery [IS: 6283 (Part-2) – 2007(Reaffirmed in March, 2009) / ISO 3767-2:1991]] : **Does not conform**
- ix) Guidelines for location and operation of operator controls on agricultural tractors and machinery (first revision) (IS: 8133 – 1983) (Reaffirmed in March, 2009) / ISO 3789: 1982] : **Does not conform**
- x) 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) During PTO performance test under high ambient condition, leakage of coolant was observed from the upper tank of radiator. To rectify the problem, breezing of radiator upper tank was done.
- ii) During the max. power search test under high ambient condition, leakage of fuel was observed from high pressure pipe line to injector. The high pressure pipe line was replaced with new one having same specification (Part no. P0108133).



- iii) The maximum PTO power was recorded as 51.1 kW against the declaration of 50.0 kW, which meets the requirement of IS: 12207-2014 with regard to tolerance limit.
- iv) The specific fuel consumption corresponding to maximum power was recorded as 277 g/kWh, against the declaration of 292 g/kWh, which is within the tolerance limit of IS: 12207-2014.
- v) The backup torque is 16.25%.

16.4.1.2 Drawbar Performance :

- i) During preparation of tractor for drawbar performance test, again leakage of coolant was observed from the bottom tank of radiator. Consequent upon the request received from the applicant for change of radiator assembly with new having same specification (Part No. P0201027) under "Supplementary Test" as per clause 3.2.4 of IS 12207-2014, the radiator was changed & drawbar performance test was conducted.
- ii) During 2nd five hour at 15% wheel slip under ten hour drawbar performance test, forward & reverse gear shifting lever was disengaged itself 3 to 4 times on loading condition. Consequent upon the request received from the applicant for replacement of clutch assembly with new having same specification (Clutch cover/housing, Part No: P030403, PTO clutch plate, Part No: P0303404 & Clutch plate, Part No: 74801) replaced. This breakdown is categorized as "MJ-8" as per IS: 12207-2014.

16.4.1.3 Hydraulic Performance:

- i) The external circuit tapping point is not provided in the tractor's hydraulic system. This should be looked into.
- ii) During the pressure relief valve test, the oil temperature exceed the limit 75 °C against the limit of 65 ± 5 °C. This should be looked into for necessary corrective action.

16.4.1.4 Nominal speed test:

The nominal speed of the tractor recorded as 27.42 kmph in high reverse gear (RC-4). The speed recorded in reverse gear RC-4 is not safe as far as the reversing of tractor is concerned. This should be looked into for necessary corrective action.

16.4.1.5 Mechanical Vibration:

The amplitude of mechanical vibration marked as (*) in chapter-8 of this report is on higher side especially at LHS and RHS foot rest & steering control wheel. This calls for reduction in amplitude of vibration in view of improving service life of the component(s) and the operator's comfort.

16.4.1.6 Three point linkage :

The lateral distance from lower hitch point to center line of tractor does not meet the requirements of IS-4468-(Part I)-1997. This should be looked into for necessary corrective action.

16.4.1.7 Operator's Seat :

The Longitudinal distance from seat index point to centre of steering control wheel of operator's seat does not meet the minimum requirements of IS: 12343-1998 (Re-affirmed in March, 2009). This should be looked into for corrective action.

16.4.1.8 Symbols for operator's controls and displays:

Oil, grease lubrication type and its frequency are not identifiable with the symbols as per IS: 6283 (Part I & II)-1998. This should be looked into for corrective action.



- 16.4.1.9 Location and movement of operator's controls:**
The fuel shut-off knob for stop does not remain in stop position without application of sustains manual effort. This should be looked into for corrective action.
- 16.4.1.10 Operator's work place:**
Operator's work place meets the requirements of IS-12239(part-I)—1996,except the following:
i) Spark arresting device in the exhaust system is not provided.
ii) Width of foot step is not provided as per the above standard.
- 16.4.1.11 Constructional requirement with regard to safety:**
The working clearance between Position control and draft control lever has not been provided as per IS: 12239(Part-II) 1999. This should be looked into for corrective action.
- 16.4.1.12 Specification of Power Take Off Shaft:**
The dimensions "dø" of the PTO shaft does not meet the requirements of IS-4931-1995. This should be looked into for necessary corrective action.
- 16.4.1.13 PTO Master shield:**
PTO master shield not provided on tractor as per the requirements of IS: 4931-1995. This should be looked into.
- 16.4.2 Field performance:**
- 16.4.2.1 Wet land cultivation (Puddling Operation):**
The manufacturer has recommended that the tractor is not suitable for wetland cultivation (puddling operation) and therefore, the wetland cultivation (puddling operation) was not conducted. It is recommended that in all the literature this fact that the tractor is not suitable for wetland (puddling) operation should be mentioned clearly & boldly in all the relevant literature of the tractor & also a cautionary notice regarding non-suitability of tractor for puddling operation may be displayed on the bonnet of the tractor.
- 16.5 Maintenance / Service Problems:**
Noticeable maintenance or service problems, observed during the test. , have been tabled in chapter no.15. Therefore, it should be looked into for necessary quality improvement.
- 16.6 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 the exhaust system.
ii) PTO shaft master shield should be provided to avoid the accident.
iii) The fuel shut-off lever does not remain in "STOP" position.
iv) The working clearance between the draft control lever & position control lever should be provided as per the requirement of relevant Indian Standard.
v) The rear tyres should be guarded so that operator's feet may not come in contact with the wheels.
vi) The lateral distance from lower hitch point to center line of tractor should be provided as per the requirement of relevant Indian Standard.
vii) Longitudinal distance from seat index point to centre of steering control wheel should be within the limit for easy and comfortable controlling of tractor.



- 16.7 Adequacy of Literature supplied with machine:**
The following literature was supplied with the tractor for reference during the test.
- Operator's Manual in respect of PREET 7549 AGRITRAC 4WD tractor.
 - Tractor Parts Catalogue in respect of PREET 7549 AGRITRAC 4WD tractor.
 - Service Manual in respect of PREET 7549 AGRITRAC 4WD tractor.
- 16.7.1** The supplied literature was found adequate.
- 16.7.2** The literatures supplied by applicant should also in national as well as other regional languages for the guidance of users and service personnel.

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	16 Months (March, 2016 to July, 2017)	Yes	Due to frequent break down on the test sample.

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	16.1.6, (1), (2) & (4)	We will look into for corrective action
18.2	16.1.10 (c)	
18.3	16.1.10 (d)	
18.4	16.10.1 (e)	