



PREET, 3549 CHALLENGER TRACTOR



सत्यमेव जयते

भारत सरकार

कृषि एवं किसान कल्याण मंत्रालय
कृषि, सहकारिता एवं किसान कल्याण विभाग
मशीनीकरण एवं प्रौद्योगिकी प्रभाग

GOVERNMENT OF INDIA

MINISTRY OF AGRICULTURE AND FARMERS WELFARE

(Department of Agriculture, Cooperation & Farmers Welfare, Mechanization & Technology Division)

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

CENTRAL FARM MACHINERY TRAINING & TESTING INSTITUTE

(An ISO : 9001 - 2015 Certified Institute)

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Manufacturer : M/s. Preet Tractors Pvt. Ltd.
Post Box No. 28, Patiala Road,
Nabha (Punjab) - 147 201

Test requested by (Applicant) : The manufacturer

2. ESSENTIAL TESTS

2.1 SPECIFICATIONS

The following are the brief specifications of the tractor. However, for detail specifications of the tractor, the test report No. T- 1113/1639/2017 released in **October, 2017** should be referred.

2.1.1 Tractor:

Make : PREET
Model : 3549 CHALLENGER
Brand name : PREET
Type : Four wheeled, rear wheel driven, Unit construction, General purpose, Agricultural tractor

Month & Year of manufacture : 02 20
Chassis Serial number : 02203521763
Country of Origin : India

2.1.2 Engine:

Make : PREET
Model : 3549
Type : Four stroke, liquid cooled, naturally aspirated, direct injection, diesel engine

Serial number : P335-07777

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

- Maximum speed at no load : 2250 to 2350
- Low idle speed : 550 to 650
- Speed at maximum torque : 1200 to 1400

Rated speed, (rpm):

- For PTO use : 2100
- For drawbar use : 2100

2.1.3 Cylinder & Cylinder Head:

Number : Three
Disposition : Vertical, inline
Bore / stroke, (mm) : 100/118 (apa)
Capacity as specified by the applicant, (cc) : 2781

2.1.4 Fuel System:

Type of fuel feed system : Gravity and forced feed

2.1.4.1 Fuel feed pump:

Make : Bosch, India
Type : Plunger with hand primer
Model/Group combination No. : FP/KSG22AD105, F002 A50 040

2.1.4.2 Fuel Injection pump:

Make : Bosch, India
Model/Group combination No. : F002 A0Z 851, PES3A90D320RS 3500
Type : Inline, Plunger
Serial number : 95948356

2.1.4.3 Fuel injectors:

Make : Bosch, India
Model/Group combination No.: : F002 C70 552
Holder number : DSLA 148P 5566
Nozzle no. : Multi hole (five holes)
Type : 12° ± 1 degree before TDC
Injection timing



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5. SUMMARY OF OBSERVATIONS, COMMENTS & RECOMMENDATIONS

5.1 The performance results have been reproduced from Initial Commercial Test report No. T-1113/1639/2017 (October, 2017) / On the basis of test conducted the performance results have been summarized as evaluative (mandatory) and non – evaluative (not mandatory) parameters applicable for qualifying Minimum Performance Criteria as per clause-4 Table-1 of Indian Standard 12207: 2019 for acceptance of tractor for the purpose of subsidies/NABARD financing are summarized as under.

Sl. No.	Characteristic	Category (Evaluative / Non Evaluative)	Requirements as per IS: 12207-2019	Values declared by the applicant (D)/ Requirement (R)	As observed	Whether meets the requirements (Yes/No)
1	2	3	4	5	6	7
5.1.1 PTO Performance:						
a)	Maximum power under 2 h test, (kW) (Natural ambient condition)	Evaluative	Declared value to be achieved with a tolerance of: $\pm 5\%$ for PTO power and or Engine power >26 kW. $\pm 10\%$ for PTO power and or engine ≤ 26 kW	23.2 (D)	22.9	Yes
b)	Power at rated engine speed, (kW)	Non Evaluative	-do-	23.2 (D)	22.9	Yes
c)	Specific fuel consumption corresponding to maximum power, (g/kWh)	Evaluative	+ 10%	280 (D)	284	Yes
d)	Maximum equivalent crankshaft torque, (Nm)	Non Evaluative	$\pm 8\%$	135 (D)	145.3	Yes
e)	Back-up torque, percent	Evaluative	12 percent, min.	12% (D) 12% (R)	39.5	Yes
f)	Maximum operating temperature, ($^{\circ}$ C) (*)					
	1) Engine oil	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)	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.	118 (D)	96	Yes
g)	Engine oil consumption, (g/kWh)	Evaluative	Not exceeding 1% of SFC at max. power under High ambient conditions	Maximum 2.89 (R)	0.95	Yes
h)	Smoke level, m^{-1}	Evaluative	Maximum light absorption coefficient of 3.25 per meter or equivalent BOSCH No. 5.2 or 75 Hatridge value.	3.25 per meter (R)	0.09	Yes

1	2	3	4	5	6	7	
5.1.2 Drawbar performance : (*)							
a)	Max. drawbar pull with ballast corresponding to 15 percent wheel slip or 7 percent track slip, (kN)	Non Evaluative	Minimum 70% of static mass with ballast	17.68 (D)	18.97	Yes	
				17.68 (R) Minimum			
b)	Max. drawbar pull with unballast corresponding to 15 percent wheel slip or 7 percent track slip, (kN)	Evaluative	Minimum 70% of static mass of tractor without ballast or with standard ballast, as the case may be	13.22 (D)	14.37	Yes	
				13.22 (R) Minimum			
c)	Maximum drawbar power with unballast as in case may be, (kW)	Evaluative	Minimum 80 % of PTO power as referred in SI No. i) a) of PTO performance in case of tractors having total static mass > 1500 kg Minimum 75 % of PTO power as referred in SI 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 SI No. i) a) of engine performance in case of tractors which do not have a PTO shaft.	18.6 (D)	19.3	Yes	
				17.3 (R) Minimum			
d)	Maximum transmission oil temperature (°C)	Evaluative	To be declared by the manufacturer.	120 (D)	83	Yes	
5.1.3 Power lift and hydraulic pump performance : (*)							
a) Maximum lifting capacity throughout the range of lift, (kN):							
	1)	At hitch points	Evaluative	Tolerance of $\pm 10\%$	19.0 (D)	19.26	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	5.46 (D) 5.09 (R) Minimum	16.07	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 Minutes, (mm)	Non Evaluative	The observed value should not exceed 50 mm	50 (D)	17	Yes	
				50(R) Maximum			
5.1.4 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 m	10 (R)	7.83	Yes
	2)	Hot brake	Evaluative	10 m	10 (R)	8.04	Yes
b)	Maximum force exerted on the brake pedal to achieve a deceleration of 2.5 m/s ² (N)	Evaluative	600 N	600 (R) Maximum	252 to 346	Yes	
c)	Whether parking brake is effective at a force of 600 N at foot pedal (s) or 400 N at hand lever, N	Evaluative	Yes / No	Yes	344	Yes	



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1	2	3	4	5	6	7
5.1.5 Noise measurement : (*)						
a)	Maximum ambient noise emitted by the tractor dB(A)	Evaluative	88 dB (A) for >1.5 tonne GVW and 85 db (A) for <1.5 tonne GVW (as per CMVR)		82	Yes
b)	Maximum noise at operator's ear level dB(A)	Evaluative	96 (as per CMVR)		93	Yes
5.1.6 Amplitude of mechanical vibrations at: (*)						
	1) Left foot rest	Non Evaluative	100 microns (max)		150	No
	2) Right foot rest				200	No
	3) Seat (with driver seated)				130	No
	4) Steering wheel				100	Yes
5.1.7 Air cleaner oil pull over test :						
	Maximum air cleaner pull over, (%)	Evaluative	0.25% (Max)		Dry type air cleaner is provided	Not applicable
5.1.8 Haulage requirements : (*)						
a)	Gross mass of the trailers, (tones):					
	1) Two wheel	Non Evaluative	To be specified by manufacturer	4.0	4.0	Yes
	2) Four wheel	Non Evaluative	-do-	5.0	5.0	Yes
b)	Distance travelled / liter of fuel consumption, (km/l):					
	1) Two wheel	Non Evaluative	To be specified by manufacturer	3.0 to 7.0	5.56 to 5.91	Yes
	2) Four wheel	Non Evaluative	-do-	3.0 to 7.0	5.51 to 5.56	Yes
c)	Fuel consumption (ml/km/tonne):					
	1) Two wheel	Non Evaluative	To be specified by manufacturer	25.0 to 50.0	42.3 to 45.0	Yes
	2) Four wheel	Non Evaluative	-do-	25.0 to 50.0	35.8 to 36.3	Yes
5.1.9 Wetland cultivation (Puddling Operation): (*)						
	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	Not recommended	Not applicable
	1) Clutch assembly	-do-				
	2) Brake housings	-do-				
	3) Front axle hubs	-do-				
	4) Engine oil	-do-				
	5) Transmission oil	-do-				

1	2	3	4	5	6	7	
5.1.10	Safety features :						
a)	Guards against moving and hot parts	Evaluative	Belt drives, pulleys, silencer, hydraulic pipes (As per IS: 12239 (Part-2))		Meets the requirement	Yes	
b)	Lighting arrangement	Evaluative	As per CMVR		Meets the requirement	Yes	
c)	Seating requirements (Tractors having more than 1150 mm rear track width)	Non Evaluative	Should meet the requirements of IS: 12343 (As amended from time to time)		Does not meet the requirement	No	
d)	Technical requirements for PTO shaft	Evaluative	Should meet the requirements of IS: 4931 (As amended from time to time)		Meets the requirement	Yes	
e)	Dimensions of three point linkage	Non Evaluative	Should meet the requirements of IS: 4468 (Part-I) (As amended from time to time)		Does not meet the requirement	No	
f)	Specifications of linkage drawbar (*)	Evaluative	Should meet the requirements of IS 12953 (As amended from time to time)		Meets the requirement	Yes	
g)	Swinging drawbar (wherever fitted)	Evaluative	Should meet the requirements of IS 12362 (Part 3) (As amended from time to time)		Not fitted	Not applicable	
h)	1)	Maximum traveling speed at rated engine speed in reverse gear, kmph	Evaluative	Should not exceed 20 kmph	13.23 kmph (Meets the requirement)	Yes	
	2)	Audible warning signal on tractor	Evaluative	As soon as the travelling speed in reverse gear reaches to 20 kmph, an audible warning signal on tractor be activated, The safety aspects about the operation of shuttle technology shall be brought in operation and manufacturer /dealer shall ensure the training on this aspect to operator before the delivery of tractor.	Not applicable	Not applicable	
5.1.11	Labelling of tractors (Provision of labelling plate):						
	1)	Make	Evaluative	Should conform to the requirements of CMVR along-with maximum PTO power in kW and year of manufacture in numerical form MM YY Digit 01-12 in box No.1 for MM will represent the months & next two digits in box No.2 for YY will represent the year of manufacturing.	PREET	Yes	
	2)	Model	Evaluative		3549 CHALLENGER	Yes	
	3)	Month & Year of manufacture	Evaluative		02 / 20	Yes	
	4)	Engine number	Evaluative		P335-07777	Yes	
	5)	Chassis number	Evaluative		02203521763	Yes	
	6)	Declaration of PTO power, (kW)	Evaluative		23.2	Yes	



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1	2	3	4	5	6	7
5.1.12	Discard limit for, (mm) : (*)					
(a)	Cylinder bore diameter, (mm)	Evaluative	To be specified by the manufacturer and supported by the printed literature	100.40	99.99 to 100.01	Yes
(b)	Clearance between piston & cylinder liner at skirt, (mm)	Non Evaluative		0.80	0.134 to 0.142	Yes
(c)	Piston diameter at skirt, (mm)	Non Evaluative	-do-	99.60	99.866 to 99.873	Yes
(d)	Ring end gap (mm):					
	- Top comp. ring	Evaluative	--do--	2.0	0.35 to 0.40	Yes
	- 2 nd comp. ring			2.0	0.85 to 0.90	Yes
	- Oil ring.			2.0	0.40 to 0.45	Yes
(e)	Ring groove clearance (mm):					
	- Top comp. ring	Evaluative	-do-	--Tapered--		Not applicable
	- 2 nd comp. ring		-do-	0.50	0.042 to 0.047	Yes
	- Oil ring.		-do-	0.50	0.050 to 0.066	Yes
(f)	Clearance of main bearings (mm):					
	- Diametrical clearance	Evaluative	-do-	0.90	0.05 to 0.11	Yes
	- Crankshaft end float	Evaluative		1.0	0.18	Yes
(g)	Clearance of big or small end bearings, (mm):					
	- Diametrical	Evaluative	-do-	0.90	0.07 to 0.11	Yes
	- Axial	Evaluative	-do-	1.0	0.35	Yes
(h)	Clearance between king pin and bush, (mm)	Non Evaluative	-do-	0.6	0.08 to 0.10	Yes
(i)	Clearance between centre pin and bush, (mm)	Non Evaluative	-do-	1.0	0.14 to 0.16	Yes



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1	2	3	4	5	6	7
5.1.13	Literature (Submission to test agency) (*)					
(a)	Operator manual	Evaluative	The printed literature in booklet form should be provided as per IS 8132 & should submit along with the test sample	Provided	Yes	
(b)	Parts Catalogue	Evaluative		Provided	Yes	
(c)	Workshop / Service manual	Evaluative		Provided	Yes	
5.1.14	Fitment of Roll Over Protective Structures (ROPS); for tractor having more than 1150 mm rear track width	Evaluative	ROPS should meet the requirement of IS 11821 or OECD code or equivalent International standard	Not fitted	Not applicable	
5.1.15	Standard Accessories	Evaluative	Trailer hitch, front tow hook, linkage drawbar should be provided with the tractor.	Provided	Yes	
5.1.16	Accessories (optional)	Non Evaluative	Ballast weights, if fitted, should meet the requirement of CMVR	Provided	Yes	

5.2 CATEGORY OF BREAKDOWNS / DEFECTS (As per Clause 5.0 of IS:12207-2019) :					
S. No.	Category of breakdowns	Category (Evaluative / Non Evaluative)	Requirements as per IS: 12207-2019	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

Remark (*):- Data has been taken from Initial Commercial test report of Preet 3549 Challenger tractor model tested vide report No. T-1113/1639/2017 (October, 2017)

5.3 Salient Observations:

5.3.1 PTO performance test:

- i) The maximum PTO power was recorded as **22.9 kW** against the declaration of **23.2 kW**, which meets the requirement of IS: 12207-2019 with regard to tolerance limit.
- ii) The specific fuel consumption corresponding to maximum power was recorded as **284 g/kWh** against the declaration of **280 g/kWh**, which meets the requirement of IS: 12207-2019 with regard to tolerance limit.
- iii) The maximum equivalent crankshaft torque was recorded as **145.3 N-m** against the declaration of **135.0 N-m**, which meets the requirement of IS: 12207-2019 with regard to tolerance limit.
- iv) The backup torque is **39.5 %**, which meets the requirement of IS: 12207-2019 with regard to tolerance limit.

5.3.2 This tractor model meets the evaluative requirements of **IS: 12207-2019** only for dry land operation.



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6. 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	02, Months (April, 2020 to May, 2020)	Yes	None

TESTING AUTHORITY:

RAJNEESH PATEL
AGRICULTURAL ENGINEER

C.V. CHIMOTE
TEST ENGINEER

J.J.R. NARWARE
DIRECTOR

7. APPLICANT'S COMMENTS

Para No.	Our Reference	Applicant's comments
7.1	5.1.6 (1), (2), (3) & (4)	We will look into for corrective action
7.2	5.1.10 (c) & (e)	We will look into for corrective action

**ANNEXURE – I****TRACTOR RUN HOURS DURING TEST**

A.	LABORATORY AND TRACK TESTS:	HOURS
1.	Running-in	--
2.	Nominal speed test	1.10
3.	PTO performance test	4.60
4.	Turning ability test	0.30
5.	Brake test	2.00
B.	Miscellaneous test and other run hours, including idle run transportation, trial and preparation for test.	0.25
Total		8.25