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PREET 4549 CHALLENGER 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)

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Manufacturer	:	M/s. Preet Tractors Pvt. Ltd. Post Box No. 28, Patiala Road, Nabha (Punjab) -147 201
Test requested by	:	The manufacturer
Duration of running-in, (h):	:	
- Engine	:	32
- Transmission	:	25
Method of Selection:	:	The test sample was selected by the applicant, hence method of selection is not known.

1. SPECIFICATIONS

(The manufacturer has not recommended this tractor for puddling operation. Hence this test was not conducted)

1.1 Tractor:		
Make	:	PREET
Model	:	4549 CHALLENGER
Variants	:	None
Brand name	:	PREET
Type	:	Four wheeled, rear-wheel drive, standard, agricultural tractor.
Year of manufacture	:	2014
Chassis number	:	NCK 4500396
Country of origin	:	India
1.2 Engine:		
Make	:	PREET
Model	:	4549
Type	:	Four stroke, water cooled, direct injection, naturally aspirated diesel engine.
Engine Serial number	:	P 345 03712
1.2.1 Engine speed (Manufacturer's recommended production setting), (rpm):		
- Maximum speed at no load	:	2350 to 2450
- Low idle speed	:	550 to 650
- Speed at max. torque	:	1200 to 1400
Rated speed, (rpm):		
- For PTO use	:	2200
- For drawbar use	:	2200
1.3 Cylinder & Cylinder Head:		
Number	:	Three
Disposition	:	Vertical, inline
Bore/stroke, (mm)	:	102/ 118
Capacity as specified by the applicant, (cc)	:	2892
Compression ratio	:	18.2 ± 1 : 1
Type of cylinder head	:	Individual
Type of cylinder liners	:	Wet, replaceable
Type of combustion chamber	:	Re-entrant cavity on piston crown
Arrangement of valves	:	Overhead, inline
Valve clearance (mm)	:	(Cold) (Hot):
- Inlet valve	:	0.30 0.30
- Exhaust valve	:	0.40 0.40



17. SUMMARY OF OBSERVATIONS, COMMENTS & RECOMMENDATIONS

17.1 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: 12207-2008	Values declared by the applicant/ requirement	As observed	Whether meets the require- ments (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 or -5 / +10% for Engine power >26 kW. -7.5/+10% for Engine power ≤ 26 kW	30.0	30.5	Yes
b)	Power at rated engine speed, (kW)	Non Evaluative	-do-	30.0	30.5	Yes
c)	Specific fuel consumption corresponding to maximum power, (g/kWh)	Non Evaluative	± 5%	285 (D)	289	Yes
d)	Maximum equivalent crankshaft torque, (Nm)	Non Evaluative	± 8%	180(D)	168.18	No
e)	Back-up torque, percent	Non Evaluative	10 percent, min.	16 (D)	26.8	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	111	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.	115	93	Yes
g)	Engine oil consumption, (g/kWh)	Evaluative	Not exceeding 1% of SFC at max. power under High ambient conditions	2.86 (R)	0.61	Yes
h)	Smoke level	Evaluative	Maximum light absorption coefficient of 3.25 per meter or equivalent BOSCH No. 5.2 or 75 Hatridge value (As per CMVR)	3.25 per meter (R)	0.36	Yes



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1	2	3	4	5	6	7
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	17.08 (R) 16.70 (D)	21.28	Yes
b)	Max. drawbar pull with un- ballasted corresponding to 15 percent wheel slip, (kN)	Evaluative	Minimum 65% of static mass of tractor without ballast/ with standard ballast	12.94 (R) 12.62 (D)	16.65	Yes
c)	Maximum drawbar power without ballast, (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.	24.4 (R) 24.0 (D)	29.8	Yes
d)	Maximum transmission oil temperature (°C)	Non Evaluative	The declared value should not exceed the maximum value specified by oil company	105 (D)	77	Yes
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 minus 10%] of	14.5 (D)	20.27	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	7.18(R) 7.10(D)	16.21	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	The observed value should not exceed 50 mm	50 (D)	60	No
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 ballast, (m):					
	1) Cold brake	Evaluative	10	10	8.56	Yes
	2) Hot brake	Evaluative	10	10	8.58	Yes
b)	Maximum force exerted on the brake pedal to achieve a deceleration of 2.5 m/s ² (N)	Evaluative	600	600	226 to 406	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

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7	1	2	3	4	5	6	7	
	17.1.5	Noise measurement :						
Yes	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	96	Yes	
Yes	17.1.6	Amplitude of mechanical vibrations at :						
	1)	Right foot rest	Non Evaluative	100 microns (max.)	100 micron (max)	70	Yes	
		left foot rest				130	No	
	2)	Seat (with driver seated)				100	Yes	
Yes	3)	Steering control wheel				170	No	
	17.1.7	Haulage requirements :						
	a)	Gross mass of the trailers, (tones):						
	1)	Two wheel	Non	--	5.0	5.0	Yes	
	2)	Four wheel	Evaluative	--	6.0	6.0	Yes	
	b)	Distance travelled / litre of fuel consumption, (km/l):						
	1)	Two wheel	Non Evaluative	--	5.0	5.00 to 5.04	Yes	
	2)	Four wheel		--	5.5	4.64	No	
	c)	Fuel consumption (ml/km/tonne):						
Yes	1)	Two wheel	Non Evaluative	--	36.0	39.65 to 39.99	No	
	2)	Four wheel		--	32.0	35.86	No	
	17.1.8	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.	The manufacturer has recommended that the tractor is not suitable for wetland cultivation	Manufacture has not recommended the tractor for puddling operation. Hence the puddling test was not conducted	Not applicable	
Yes	1)	Clutch assembly	-do-					
	2)	Brake housings	-do-					
Yes	3)	Front axle hubs	-do-					
	4)	Engine Oil	-do-					
	5)	Transmission Oil	-do-					
	17.1.9	Safety features :						
No	a)	Guards against moving and hot parts	Evaluative	Belt drives, pulley, silencer, hydraulic pipes (As per IS 12239 (part 2))	Conforms	Conforms	Yes	
	b)	Lighting arrangement	Evaluative	As per CMVR	--	Conforms	Yes	
allast,	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 requirements	No	
Yes	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 requirements	No	

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1	2	3	4	5	6	7
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 requirements	No
f)	Specifications of linkage	Non Evaluative	Should meet the requirements of IS 12953 and IS 12362 (Part 3) (As amended from time to time)	--	Meet the requirements	Yes
	Swinging drawbar				Not Provided	Not applicable
17.1.10	Labelling of tractors (Provision of labelling plate):					
1)	Make	Evaluative	Should conform to the requirements of CMVR along-with declared value of PTO HP	--	PREET	Yes
2)	Model	Evaluative		--	4549	Yes
3)	Year of manufacture	Evaluative		--	CHALLENGER	Yes
4)	Engine number	Evaluative		--	NCK (it means July 2014as [per code letter)	Yes
5)	Chassis number	Evaluative		--	P 345 03712	Yes
6)	Declaration of PTO power, (kW)	Evaluative		--	NCK 4500396	Yes
				--	30.0	Yes
17.1.11	Discard limit for:					
(a)	Cylinder bore diameter, (mm)	Evaluative	To be declared by the manufacturer	102.4	102.00 to 102.04	Yes
(b)	Clearance between piston & cylinder liner at skirt, (mm)	Non Evaluative	-do-	0.80	0.073 to 0.120	Yes
(c)	Ring end gap (mm):					
-	Top comp. ring.	Evaluative	-do-	2.0	0.50	Yes
-	2 nd comp. ring.		-do-	2.0	0.50 to 0.55	Yes
-	Oil ring.		-do-	2.0	0.30 to 0.35	Yes
(d)	Ring groove clearance (mm):					
-	Top comp. ring.	Evaluative	-do-	0.35	Tapered	--
-	2 nd comp. ring.		-do-	0.35	0.072 to 0.081	Yes
-	Oil ring.		-do-	0.35	0.042 to 0.048	Yes
(e)	Clearance of main bearings (mm):					
-	Diametrical clearance	Evaluative	-do-	0.90	0.061 to 0.122	Yes
-	Crankshaft end float	Evaluative	-do-	1.00	0.25	Yes
(f)	Clearance of big end bearings, (mm):					
-	Diametrical	Evaluative	To be declared by the manufacturer	0.90	0.062 to 0.085	Yes
-	Axial	Evaluative	-do-	1.00	0.35 to 0.40	Yes
(g)	Clearance between king pin and bush, (mm)	Non Evaluative	-do-	0.40	0.175 to 0.903	No
(h)	Clearance between center pin and bush, (mm)	Non Evaluative	-do-	0.40	0.075 to 0.126	Yes

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7
No

Yes

Not
applicable

Yes

Yes

Yes

Yes

Yes

Yes

Yes

Yes

Yes

Yes

Yes

Yes

Yes

Yes

Yes

Yes

Yes

No

Yes

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17.1.12	Literature (Submission to test agency)					
(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

17.1.13 CATEGORY OF BREAKDOWNS / DEFECTS :					
Sl. 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	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

17.2 Optional requirements as per Clause-4 (Table-2) of IS:12207-2014:				
S. No.	Characteristic	Requirements as per IS: 12207-2014	AS observed	Remarks (Yes/or Not)
1	2	3	4	5
1	Air cleaner oil pull over, max. Oil pull over (%)	0.25% (max.)	(0.39 to 1.6) Does not Meet the requirements	No
2.	Seating requirements	Should meet the requirements of IS: 12343-1998	Conforms	Yes
3.	Filment of ROPS	With a provision for fitment of ROPS. If ROPS fitted it should meet the requirement of IS: 11821-1992	Not provided	--
4.	Technical requirements for PTO shaft & its Master shield	Should meet the requirements of IS: 4931 -1995	Conforms	Yes
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	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.	Provided	Yes

17.3 Conformity with following Indian Standard:

- 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)] : Conforms
- 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)/ISO 730-1:1994] : **Does not conform**
- iv) Drawbar for agricultural tractors – Link type [IS 12953:1990 (Reaffirmed in March, 2007)]. : 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 (PT-1)-1996 (Reaffirmed in March, 2009)/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 (PT-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 [IS: 6283 (Part-1 & Part-2) –2006 & 2007(Reaffirmed in March, 2009)/ ISO 3767-2:1991)]. : **Does not conform**
- ix) 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**
- x) 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 26.8 %.

17.4.1.2 Drawbar Performance :

- i) During ten hours drawbar test, creeping of LHS & RHS rear tyre over the rim was observed as 45 mm & 35 mm respectively. This should be looked into for necessary corrective action.

17.4.1.3 Hydraulic Performance:

- i) Total cumulative drop in height of lift during lift load maintenance test was recorded as 60 mm against the declaration of 50 mm. This should be looked into.

17.4.1.4 Air Cleaner Oil Pull over Test

- i) The max. oil consumption of the air cleaner bowl during the test was noted 0.39 to 1.6 % which was on higher side against the requirement of 0.25 % as per IS 12207 -2014. This should be looked into for necessary corrective action.
- ii) The oil level on the bowl is not clearly marked besides during the test gasket "o" ring of air cleaner assembly was found broken . This all need stringent quality improvement.

17.4.1.5 Mechanical Vibration:

The amplitude of mechanical vibration marked as (*) in chapter-9 of this report is on higher side especially at LHS foot rest steering control wheel, & 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.

17.4.1.6 Three point linkage :

Lateral distance from lower hitch point to centre line of tractor, distance from end of power take-off shaft to centre of lower hitch point. Transport height and power range does not meet the requirement of relevant IS. This should be looked into.

17.4.1.7 PTO Master shield:

PTO master shield not provided on tractor as per the requirements of IS: 4931-1995. This should be looked into.

17.4.1.8 Location and movement of operator's controls:

Location and movement of operator's controls such as Safety against accidental start of the engine, fuel shut-off knob does not meet the requirement of **IS:8133-1983 (Re-affirmed in March, 2009)**. This should be looked into for corrective action.

17.4.2 Field performance:**17.4.2.1 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.

17.5 Components/assembly inspection & wear assessment :

- i) Measured depth of oil groove of the brake discs was found near to its discard value, so it needs to be reviewed for the quality point of view.
- ii) Clearance between king pin and bushes was reached beyond the discard limit which need stringent quality improvement.

17.6 Maintenance / Service Problems:

Noticeable maintenance or service problems, observed during the test. , have been tabled in chapter no.14. Therefore, it should be looked into for necessary quality improvement.

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) Safety against the accidental start of the engine.
- iii) The fuel shut-off lever does not remain in "STOP" position.
- iv) Hydraulic pipe lines should be fully protected.
- v) The working clearance between the draft control lever & mud guard may be provided as per **IS:12239 (Part-2)-1999**
- vi) Provision of differential lock.

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Adequacy of Literature supplied with machine:

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

- a) Operator's -cum- service Book (For Preet 6549, Preet 4549 Challenger, Preet 3549 Challenger, Preet 955 Challenger tractors)
- b) Spare parts catalogue For Preet 6549, Preet 955 Challenger, Preet 45 Challenger, & Preet 3549 Challenger, tractors)
- c) Service Manual (For Preet 6549, Preet 3549 Challenger, Preet 45 Challenger, & Preet 955 Challenger tractors)

17.7.1

The operator's manual may be revised as per IS: 8132-1999 (Reaffirmed Oct.2004) with inclusion of inter alia, the following;

- i) Fuel saving tips
- ii) Gross mass of trailer & safe hitch height, while using trailer.
- iii) Recommendation regarding matching implements.
- iv) Corrections with regard to recommended lubricants.

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	08 Months (March, 2015 to October, 2015)	Yes	--

TESTING AUTHORITY:


P.C. MESHARAM
SENIOR AGRICULTURAL ENGINEER



C. R. LOHI
DIRECTOR

Test Report compiled by: Sh. **Nitesh Kumar Verma**, Senior Technical Assistant.

19. APPLICANT'S COMMENTS

Para No.	Our Reference	Applicant's comments
19.1	17.1.9 (c)	We will take possible action for further improvement on given suggested points.
19.2	17.1.11 (g)	We will look into for the corrective action.
19.3	17.2 (1)	We will look into for the corrective action.

APPENDIX - I**BRIEF SPECIFICATION OF IMPLEMENTS USED DURING FIELD TEST**

S. No.	Item	Rotavator	Disc Plough
1.	Make	Sonalika	John Deere
2.	Type	Mounted	Mounted
3.	No. of blades/bottoms, (mm)	36, in 7 flanges	Three
4.	Type of blades/ bottoms, (mm)	L shape	Concave
5.	Size of blades/ bottoms, (mm)	240 X 80 X 7	610
6.	Spacing of blades / bottoms, (mm)	240	510
7.	Lower hitch point span, (mm)	725	715
8.	Mast height, (mm)	465	520
9.	Overall dimensions, (mm):		
	- Length	1890	1520
	- Width	960	1190
	- Height	1075	1005
10.	Gross mass, (kg)	400	310

APPENDIX - II**TRACTOR RUN HOURS DURING TEST**

A.	LABORATORY AND TRACK TESTS:	HOURS
1.	Running-in	--
2.	PTO performance test	10.53
3.	Power lift and hydraulic pump performance test	3.43
4.	Drawbar performance test	15.59
5.	Turning ability	0.3
6.	Location of centre of gravity	0.3
7.	Operator's field of vision	--
8.	Brake test	1.58
9.	Noise measurement	1.42
10.	Mechanical vibration test	1.0
11.	Nominal speed test	0.50
B.	FIELD TEST:	
1.	Rotavation	20.61
2.	Disc Ploughing	15.69
C.	HAULAGE TEST:	5.63
D.	Miscellaneous test and other run hours including idle run, transportation, trials and preparation for test	9.80
	TOTAL:	86.40