



PREET 955 CHALLENGER 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**

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- 15.5 Front axle:**
 Any marked wear of king pins : None
 Any marked wear of king pin bushes : None
 Clearance between king pin and bushes, (mm) : 0.044 to 0.057 | Against discard limit of 0.60 mm
 Condition of thrust bearing : Normal
 Condition of bearings for stub axles : Normal
 Condition of seals for stub axles and king pins : Normal
 Clearance between centre pin and bush, (mm) : 0.043 to 0.055 | Against discard limit of 0.80 mm
- 15.6 Steering system:**
 Visual condition of the components of complete steering assembly : Normal
- 15.7 Starter motor & Alternator:**
 Presence of soil/oil in housing : NA
 Condition of bearings and other components : Normal

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/ requirement	As observed	Whether meets the requirements (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 >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	31.0	31.8	Yes
b)	Power at rated engine speed, (kW)	Non Evaluative	-do-	31.0	32.1	Yes
c)	Specific fuel consumption corresponding to maximum power, (g/kWh)	Non Evaluative	± 5%	285	290	Yes
d)	Maximum equivalent crankshaft torque, (Nm)	Non Evaluative	± 8%	180	186.87	Yes
e)	Back-up torque, percent	Non Evaluative	10 percent, min.	16 (D)	35.46	Yes



1	2	3	4	5	6	7	
f)	Maximum operating temperature (^oC)						
	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	113	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	88	Yes
g)	Engine oil consumption, (g/kWh)	Evaluative	Not exceeding 1% of SFC at max. power under High ambient conditions	2.91 (R) 2.91 (D)	0.448	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)	0.17 (per meter)	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	17.59 (R)	22.94	Yes	
				17.65 (D)			
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	13.45 (R)	18.33	Yes	
				13.5 (D)			
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.	25.4 (R) 24.5 (D)	29.2	Yes	
d)	Maximum transmission oil temperature (^o C)	Non Evaluative	The declared value should not exceed the maximum value specified by oil company	105 (D)	84	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%]	14.5 (D)	17.83	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	7.48 (R) 12.0 (D)	15.80	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	The observed value should not exceed 50 mm	50 (D)	41	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	9.65	Yes
	2) Hot brake	Evaluative	10	10	9.65	Yes
b)	Maximum force exerted on the brake pedal to achieve a deceleration of 2.5 m/s ² (N)	Evaluative	600	600	139 to 324	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
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	95	Yes
16.1.6 Amplitude of mechanical vibrations at :						
1)	Right foot rest	Non Evaluative	100 microns (max.)	100 micron (max)	350	No
	left foot rest				120	No
2)	Seat (with driver seated)				60	Yes
3)	Steering control wheel				90	Yes
16.1.7 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 Evaluative	--	5.0	4.65 to 4.87	Yes
	2) Four wheel		--	5.0	4.18 to 4.35	Yes
c)	Fuel consumption (ml/km/tonne):					
	1) Two wheel	Non Evaluative	--	27.0	41.10 to 43.03	No
	2) Four wheel		--	36.0	32.81 to 34.19	Yes
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.	The manufacturer has recommended that the tractor is not suitable for wetland cultivation	Manufacturer has not recommended the tractor for puddling operation. Hence the puddling test was not conducted	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
16.1.9	Safety features :					
a)	Guards against moving and hot parts	Evaluative	Belt drives, pulley, silencer, hydraulic pipes (As per IS 12239 (part 2))	--	Meets the requirements	Yes
b)	Lighting arrangement	Evaluative	As per CMVR	--	Meets the requirements	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 requirements	No
d)	Technical requirements for PTO shaft	Non Evaluative	Should meet the requirements of IS: 4931 (As amended from time to time)	--	Does not meet the requirements	No
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)	--	Does not meet the requirements	No
	Swinging drawbar				Not Provided	Not applicable

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	--	PREET	Yes
	2) Model	Evaluative		--	955 CHALLENGER	Yes
	3) Year of manufacture	Evaluative		--	2014	Yes
	4) Engine number	Evaluative		--	P 350 - 00638	Yes
	5) Chassis number	Evaluative		--	NCK 5500630	Yes
	6) Declaration of PTO power, (kW)	Evaluative		--	31	Yes
16.1.11	Discard limit for:					
(a)	Cylinder bore diameter, (mm)	Evaluative	To be declared by the manufacturer	105.4	105.09 to 105.11	Yes
(b)	Clearance between piston & cylinder liner at skirt, (mm)	Non Evaluative	-do-	0.80	0.192 to 0.197	Yes
(c)	Ring end gap (mm):					
	- Top comp. ring.	Evaluative	-do-	2.0	0.45 to 0.60	Yes
	- 2 nd comp. ring.		-do-	2.0	0.60 to 0.75	Yes
	- Oil ring.		-do-	2.0	0.45 to 0.65	Yes
(d)	Ring groove clearance (mm):					
	- Top comp. ring.	Evaluative	-do-	0.35	0.127 to 0.135	Yes
	- 2 nd comp. ring.		-do-	0.35	0.086 to 0.091	Yes
	- Oil ring.		-do-	0.35	0.056 to 0.062	Yes



1	2	3	4	5	6	7
(e)	Clearance of main bearings (mm):					
-	Diametrical clearance	Evaluative	-do-	0.90	0.123 to 0.129	Yes
-	Crankshaft end float	Evaluative	-do-	1.00	0.22	Yes
(f)	Clearance of big end bearings, (mm):					
-	Diametrical	Evaluative	To be declared by the manufacturer	0.90	0.055 to 0.085	Yes
-	Axial	Evaluative	-do-	1.00	0.035 to 0.40	Yes
(g)	Clearance between king pin and bush, (mm)	Non Evaluative	-do-	0.60	0.044 to 0.057	Yes
(h)	Clearance between center pin and bush, (mm)	Non Evaluative	-do-	0.80	0.043 to 0.055	Yes
15.1.12	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

15.1.13 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

15.2 Optional requirements as per Clause-4 (Table-2) of IS:12207-2014:

S. No.	Characteristic	Requirements as per IS: 12207-2014	AS observed	Remarks
1	2	3	4	5
1	Air cleaner oil pull over, max. oil pull over (%)	0.25% (max.)	Dry type	..
2.	Fitment of ROPS	With a provision for fitment of ROPS. If ROPS fitted it should meet the requirement of IS: 11821-1992	Not provided	--
3.	Accessories	Trailer hitch, front tow hook, linkage drawbar may be provided.	Provided	Yes



- 16.3 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)] : **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)/ISO 730-1:1994] : **Does not conform**
 - iv) Drawbar for agricultural tractors – Link type [IS 12953:1990 (Reaffirmed in March, 2007)]. : **Does not conform**
 - 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**

16.4 Salient Observations:

16.4.1 Laboratory tests:

16.4.1.1 PTO Performance:

- i) The backup torque is 35.46 %.
- ii) Maximum power in natural ambient condition and high ambient condition are 31.8 kW and 30.9 kW respectively under the declaration 31.0 kW which is in lower side and also drop in power of 3.14% from natural to high ambient condition. This should be looked into for necessary correction.
- iii) The drop in torque of 5.41% from natural to high ambient condition. This should be looked into for necessary correction.

16.4.1.2 Mechanical Vibration:

The amplitude of mechanical vibration marked as (*) in chapter-9 of this report is on higher side especially at LHS & RHS foot rest, mudguard, accelerator lever, brake clutch pedals. This calls for reduction in amplitude of vibration in view of improving service life of the component(s) and the operator's comfort.



16.4.1.3 Three point Linkage :

- i) The lateral distance from lower hitch point to the centre line of tractor does not meet the requirement of As per IS: 4468-(Part-1) -1997. This should be looked into for corrective action.
- ii) Some of the parameters conform to Category-I and some of them conform to Category-II. Keeping in the view of the spirit of standardization necessary improvement may be incorporated.

16.4.1.4 Linkage drawbar:

The width of drawbar link (B) doesn't meet the requirement of As per IS: 12953-1995.

16.4.1.5 PTO Master shield:

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

16.4.1.6 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.

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:

There is no Noticeable maintenance or service problems was observed during the test.

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) Safety against the accidental start of the engine.
- iii) The fuel shut-off lever does not remain in "STOP" position.
- iv) Width of foot step.
- 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.
- vii) Inclination of back rest for comfort.

16.7 Adequacy of Literature supplied with machine:

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

- a) Operator's manual of tractor model 3549 challenger, 4549 challenger, 955 challenger & 6549 challenger.
- b) Spare parts catalogue of tractor model 3549 challenger, 4549 challenger, 955 challenger & 6549 challenger.
- c) Service Manual of tractor model 3549 challenger, 4549 challenger, 955 challenger & 6549 challenger.



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	9 Months (November, 2014 to July 2015)	Yes	---

TESTING AUTHORITY:

H.L. YADAV
SENIOR AGRICULTURAL ENGINEER

C. R. LOHI
DIRECTOR

Test Report compiled by: **Er. Rajneesh Patel**, Senior Technical Assistant.

18. APPLICANT'S COMMENTS

Sl. No.	Para No.	Our Reference	Applicant's comments	Remarks
1.	16.1	16.1.9 c)	Seating requirement meets the requirement of IS: 12343-1998.	This parameter was rechecked found same.
2.	16.1	16.1.9 d)	Master shield of PTO shaft as per IS 4931 - 1995 is using in export models. Same can be used in all domestic models.	---
3.	16.1	16.1.9 e)	Conform in Special implement as per IS : 4468, there is a variation of only 5 mm may be variation in dimension of parts. (To be take care in production tractors).	---
4.	16.1	16.1.9 f)	There is a variation of only 1 mm may be variation in dimension of parts. (To be take care in production tractors).	This parameter was rechecked found same.

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

S. No.	Item	Rotavator	Disc Plough
1	Make	PREET	Shaktimaan
2	Type	Mounted	Mounted
3	No. of blades/bottoms, (mm)	48, in 8 flanges	42 in 7 Flanges
4	Type of blades/ bottoms, (mm)	L shape	Hatchet
5	Size of blades/ bottoms, (mm)	240 X 80 X 7	170 x 140 x 5
6	Spacing of blades / bottoms, (mm)	240	240
7	Lower hitch point span, (mm)	780	845
8	Mast height, (mm)	575	560
9	Overall dimensions, (mm):		
	- Length	2275	1100
	- Width	1130	2060
	- Height	1032	1060
10	Gross mass, (kg)	460	425

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

A.	LABORATORY AND TRACK TESTS:	HOURS
1.	Running-in	--
2.	PTO performance test	11.3
3.	Power lift and hydraulic pump performance test	3.48
4.	Drawbar performance test	15.0
5.	Turning ability	0.42
6.	Location of centre of gravity	0.67
7.	Operator's field of vision	0.2
8.	Brake test	2.66
9.	Noise measurement	2.0
10.	Mechanical vibration test	1.0
11.	Nominal speed test	0.42
B.	FIELD TEST:	
1.	Rotavation	20.5
2.	Disc Ploughing	15.66
C.	HAULAGE TEST:	6.21
D.	Miscellaneous test and other run hours including idle run, transportation, trials and preparation for test	6.07
	TOTAL:	85.59