



EICHER, EICHER 551 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 - 2015 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



Condition of seals for stub axles and king pins : Normal

Clearance between centre pin and bushes, (mm) : 0.10 to 0.23

Against the discard limit of 0.60 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 : None
Condition of bearings and other components : Normal

16. ADJUSTMENTS, DEFECTS, BREAKDOWNS AND REPAIRS

Sl. No	Adjustment/Defects/Breakdowns and Repairs	Category of breakdown	Tractor run hours
- Nil -			

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: 12207-2014	Values declared by the applicant (D)/ Requirement (R)	As observed	Whether meets the requirements (Yes/No.)
1	2	3	4	5	6	7
17.1.1	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	31.6 (D)	31.3	Yes
b)	Power at rated engine speed, (kW)	Non Evaluative	-do-	31.6 (D)	31.3	Yes
c)	Specific fuel consumption corresponding to maximum power, (g/kWh)	Non Evaluative	+ 5%	258(D)	242	Yes
d)	Maximum equivalent crankshaft torque, (Nm)	Non Evaluative	± 8%	175(D)	184.8	Yes

T-1103/1629/2017

EICHER, EICHER 551 TRACTOR - Commercial (Initial)



1	2	3	4	5	6	7
e)	Back-up torque, percent	Non Evaluative	10 percent, min.	10 percent, min(R)	23.31	Yes
f)	Maximum operating temperature, ($^{\circ}\text{C}$)					
	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.	135(D)	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.	120 (D)	93	Yes
g)	Engine oil consumption, (g/kWh)	Evaluative	Not exceeding 1% of SFC at max. power under High ambient conditions	Maximum 2.43(R)	0.50	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 CMVR)	3.25 per meter (R)	0.22	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	18.0 (D) 18.01 (R) Minimum	22.51	Yes
b)	Max. drawbar pull without ballast corresponding to 15 percent wheel slip, (kN)	Evaluative	Minimum 65% of static mass of tractor without ballast	13.9 (D) 13.96 (R) Minimum	17.42	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.	25.3 (D) 25.0 (R) Minimum	28.4	Yes
d)	Max. transmission oil temperature ($^{\circ}\text{C}$)	Non Evaluative	The declared value should not exceed the maximum value specified by oil company	115 (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%]	17.3 (D)	17.5	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	11.8 (D) 7.37 (R) Minimum	12.7	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	Observed value should not exceed 50 mm.	50 (D)	05	Yes

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 Unballast* (m):					
1)	Cold brake	Evaluative	10	10 (R)	7.95	Yes
2)	Hot brake	Evaluative	10	10 (R)	7.78	Yes
b)	Maximum force exerted on the brake pedal to achieve a deceleration of 2.5 m/s ² (N)	Evaluative	600	600 (R)	224 to 304	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
*The manufacturer has not recommended ballasting for road test. Therefore, the brake test was conducted under unballasted condition only.						

17.1.5 Noise measurement :

a)	Maximum ambient noise emitted by the tractor, dB(A)	Evaluative	As per CMVR	88 (R)	81	Yes
b)	Maximum noise at operator's ear level dB(A)	Evaluative	As per CMVR	96 (R)	95	Yes

17.1.6 Amplitude of mechanical vibrations at :

1)	Left foot rest	Non Evaluative	100 microns (max)	100 (R)	160	No
2)	Right foot rest			100 (R)	160	No



1	2	3	4	5	6	7
	3) Seat (with driver seated)	Non Evaluative		100 (R)	60	Yes
	4) Steering wheel			100 (R)	120	No
17.1.7	Air cleaner pull over:	Non Evaluative	0.25% (Max)	0.25%	0.09%	Yes
17.1.8	Haulage requirements :					
a)	Gross mass of the trailers, (tones):					
	1) Two wheel	Non	--	4.0 (D)	4.0	Yes
	2) Four wheel	Evaluative	--	5.0 (D)	5.0	Yes
b)	Distance travelled / liter of fuel consumption, (km/l):					
	1) Two wheel	Non	--	4.0 to 6.0 (D)	5.27 to 5.37	Yes
	2) Four wheel	Evaluative	--	4.0 to 6.0 (D)	5.04 to 5.17	Yes
c)	Fuel consumption (ml/km/tonne):					
	1) Two wheel	Non	--	32 to 42 (D)	46.5 to 47.4	No
	2) Four wheel	Evaluative	--	40 to 45 (D)	38.7 to 39.7	No

17.1.9	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.	There should be no ingress of water and/or mud	No ingress of water and/or mud was observed	Yes
	1) Clutch assembly	-do-				
	2) Brake housings	-do-				
	3) Front axle hubs	-do-				
	4) Engine oil	-do-				
	5) Transmission oil	-do-				
17.1.10	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



1	2	3	4	5	6	7
d)	Technical requirements for PTO shaft	Non Evaluative	Should meet the requirements of IS 4931 (as amended from time to time)	--do--	Meets the requirement	Yes
e)	Dimension of three point linkage	Non Evaluative	Should meet the requirements of IS 4468 (part 1) (as amended from time to time)	Requirements as per clause no.4 of table no. 1	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.

17.1.11 Labeling of tractors (Provision of labeling plate):

1)	Make	Evaluative	Should conform to the requirements of CMVR along-with declared value of PTO HP	--	Eicher	Yes
2)	Model	Evaluative		--	Eicher 551	Yes
3)	Year of manufacture	Evaluative		--	2015	Yes
4)	Engine serial number	Evaluative		--	523026414272	Yes
5)	Chassis number	Evaluative		--	923615447289	Yes
6)	Declaration of PTO power, (kW)	Evaluative		--	31.6	Yes

17.1.12 Discard limit for:

(a)	Cylinder bore diameter, (mm)	Evaluative	To be specified by the manufacturer	108.25	108.00 to 108.06	Yes
(b)	Clearance between piston & cylinder liner at skirt, (mm)	Non Evaluative		0.60	0.125 to 0.169	Yes
(c)	Ring end gap (mm):					
	- Top comp. ring.	Evaluative	-do-	4.0	0.50	Yes
	- 2 nd comp. ring.		-do-	4.0	0.80 to 0.90	Yes
	- Oil ring.		-do-	4.0	0.50 to 0.60	Yes
(d)	Ring groove clearance (mm):					
	- Top comp. ring.	Evaluative	-do-	0.25	0.127 to 0.135	Yes
	- 2 nd comp. ring.		-do-	0.25	0.076 to 0.080	Yes
	- Oil ring.		-do-	0.25	0.075 to 0.076	Yes
(e)	Clearance of main bearings (mm):					
	- Diametrical clearance	Evaluative	-do-	0.60	0.122 to 0.237	Yes
	- Crankshaft end float	Evaluative	-do-	0.80	0.30	Yes



1	2	3	4	5	6	7
(f)	Clearance of big end bearings, (mm):					
	- Diametrical	Evaluative	-do-	0.60	0.078 to 0.127	Yes
	- Axial	Evaluative	-do-	0.80	0.40 to 0.50	Yes
(g)	Clearance between king pin and bush, (mm)	Non Evaluative	-do-	0.60	0.007 to 0.112	Yes
(h)	Clearance between centre pin and bush, (mm)	Non Evaluative	-do-	0.60	0.104 to 0.230	Yes

17.1.13 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

17.1.14 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	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	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 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)] : **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 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]] : **Conforms**
- 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**

17.4 Salient Observations:**17.4.1 Laboratory tests:****17.4.1.1 PTO Performance:**

- i) The maximum PTO power was recorded as **31.3 kW** against the declaration of **31.6 kW** which meets the requirement of IS: 12207-2014 with regard to tolerance limit.
- ii) The specific fuel consumption corresponding to maximum power was measured as **242 g/kWh** against the declaration of **258 g/kWh**, which is within the tolerance limit of IS: 12207-2014.
- iii) The backup torque is **23.31%**.



- 17.4.1.2 Drawbar performance test:**
During 10 hour drawbar test, the creeping of LHS & RHS rear tyre over the rims was observed as 55 mm & 50 mm respectively, which was considered on higher side. This may be looked into for necessary corrective action.
- 17.4.1.3 Hydraulic performance test:**
The moment about the rear axle was computed as 23.69 kN-m at standard frame, which is considered on higher side as compared to the moment from front axle i.e. 20.43 kN-m. It is therefore, recommended that the lifting capacity of the hydraulic system may reduced suitably or standard ballast mass at front axle may be provided to avoid front lifting of the tractor.
- 17.4.1.4 Mechanical Vibration:**
The amplitude of mechanical vibration on various assemblies marked as (*) in Chapter-9 of this test report are on higher side especially at left and right foot rest and steering control wheel. This calls for dampening down of vibrations to improve the operational comfort and service life of components.
- 17.4.1.5 Three point linkage:**
The lateral distance from lower hitch point to centre line of tractor does not meets the requirement of IS: 4468 (Part-1)-1997. This should be looked into for necessary corrective action.
- 17.4.1.6 Operator's Seat**
The width of seat does not meet the requirement of IS: 12343-1998 (Re-affirmed in March, 2009) and calls for necessary corrective action.
- 17.4.1.7 Location and movement of operator's controls:**
Location and movement of operator's controls meets the requirements of IS: 8133-1993, **except the following:**
- Provision of differential lock. This should be looked into.
- 17.4.1.8 Operator's controls and displays:**
Operator's controls and displays meets the requirements of IS: 6283 (Part I & II)-1998, **except the following:**
i) Differential lock
- 17.4.1.9 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.
- 17.4.1.10 Constructional requirement with regard to safety:**
The working clearance between Position control and fender has not been provided as per IS: 12239(Part-II) 1999. This should be looked into for corrective action.
- 17.4.1.11 PTO Master shield:**
PTO master shield not provided on tractor as per the requirements of IS: 4931-1995. This should be looked into.



- 17.4.1.12 The discard limit regarding Max. Permissible ring end gap given by applicant is very higher side. This should be looked into for corrective action.
- 17.4.2 **Field performance test:**
- 17.4.2.1 **Haulage performance:**
- i) The fuel consumption (ml/km/tonne) with two wheel trailer was observed as 46.5 to 47.4 ml/km/tonne against the declaration of 32 to 42 ml/km/tonne. This does not meet the requirement of IS: 12207-2014 and therefore, should be looked into for necessary corrective action.
- 17.4.2.2 **Wet land cultivation (Puddling operation):**
No ingress of mud/or water was noticed during puddling operation of the tractor. Hence, it meets the requirements of IS: 11082-1984 (Technical requirements of agricultural tractors for wetland operation). The tractor is found suitable for wetland operation (Puddling).
- 17.5 **Maintenance / Service Problems:**
No noticeable maintenance/ service problem was observed during the test.
- 17.6 **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 exhaust system.
 - ii) Provision of differential lock.
 - iii) Provision of PTO shaft master shield.
 - iv) The working clearance between the position control lever & fender should be provided as per the requirement of relevant Indian Standard.
 - v) Provision of differential lock.
 - vi) The rear tyres should be guarded so that operator's feet may not come in contact with the wheels.
 - vii) The lateral distance from lower hitch point to center line of tractor should be provided as per the requirement of relevant Indian Standard.
- 17.7 **Adequacy of Literature supplied with machine:**
- 17.7.1 The following literature was supplied with the tractor for reference during the test.
- i) Operator's Manual in respect of Eicher, Eicher 551 tractor.
 - ii) Tractor Parts Catalogue in respect of Eicher, Eicher 551 tractor.
 - iii) Service Manual in respect of Eicher, Eicher 551 tractor.
- 17.7.2 The supplied literature was found adequate.
- 17.7.3 The literatures should also be brought out in national as well as other regional languages for the guidance of users and service personnel.



T-1103/1629/2017	EICHER, EICHER 551 TRACTOR - Commercial (Initial)
------------------	---

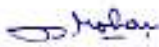
18. CITIZEN CHARTER


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	11 Months (August, 2016 to July, 2017)	No	Seasonal constraint

TESTING AUTHORITY:


C. V. CHIMOTE
TEST ENGINEER


Y.K. RAO
SENIOR AGRICULTURAL
ENGINEER


R.M. TIWARI
SENIOR AGRICULTURAL
ENGINEER


J. J. R. NARWARE
DIRECTOR

This test report is compiled by Shri. Shwetabh Singh, Senior Tech. Assistant

19. APPLICANT'S COMMENTS

Para No.	Our Reference	Applicant's comments
19.1	17.4.1.2	Have taken up with tyre manufacturer for the improvement.
19.2	17.4.1.4	NVH project taken.
19.3	17.4.1.3,17.4.1.5,17.4.1.6,17.4.1.7,17.4.1.8, 17.4.1.9,17.4.1.10,17.4.1.11 & 17.4.1.12	These are being looked into and will be incorporate accordingly.
19.4	17.6	Recommendations are being looked into w.r.t design, development & implementation.