

व्यावसायिक परीक्षण रिपोर्ट (प्रथम बैच)
COMMERCIAL TEST REPORT (1st Batch)

संख्या/No. : T- 1618/2149/2022
माह/Month : January, 2022

[ONLINE TESTING]

(यह परीक्षण रिपोर्ट 31/01/2027 तक वैध है/THIS TEST REPORT IS VALID UPTO 31/01/2027)



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.)-466 445

CENTRAL FARM MACHINERY TRAINING & TESTING INSTITUTE

(An ISO 9001: 2015 Certified Institute)

TRACTOR NAGAR, BUDNI (M.P.) - 466 445

E-mail: fmti-mp@nic.in, Web site: fmttibudni.gov.in, Telephone: 07564-234729

T- 1618/2149/2022	EICHER 551 TRACTOR – Commercial (1st Batch)
	THIS TEST REPORT IS VALID UPTO: 31/01/2027

3. SPECIFICATIONS

- 3.1 Tractor:**
- Make : Eicher
 Model : Eicher 551
 Type : Rear Wheel Drive, Standard Agricultural Tractor.
- Month & Year of manufacture : 07/21
 Chassis number : 930715473350
 Country of Origin : India
- 3.2 Engine:**
- Manufacturer's address : Eicher Tractors, Engine Division (A unit of TAFE Motors & Tractors Ltd.) Itrana Road, ALWAR – 301 001, Rajasthan.
- Make : Eicher
 Model : 320D49
 Type : Four stroke, naturally aspirated, liquid cooled, direct injection, diesel engine.
- Serial number : 530626754210
- Engine speed (Manufacturer's recommended production setting, (rpm)) :**
- Maximum speed at no load,(rpm) : 2150 to 2250
 - Low idle speed, (rpm) : 600 to 800
 - Speed at maximum torque, (rpm) : 1000 to 1400
- Rated speed, (rpm):**
- For PTO use : 2000
 - For drawbar use : 2000
- 3.3 Cylinder & Cylinder Head:**
- Number : Three
 Disposition : Vertical, inline
 Bore/stroke, (mm) : 108/120 (apa)
 Capacity as specified by the applicant, (cc) : 3298
 Compression ratio, (apa) : 18.5 (± 0.5) : 1
 Type of cylinder head : Monoblock
 Type of cylinder liner : Wet, replaceable
 Type of combustion chamber : Re-entrant cavity on piston crown
 Arrangement of valves : Over head, Inline
- Valve clearance (cold):**
- Inlet valve, (mm) : 0.35
 - Exhaust valve, (mm) : 0.35
- 3.4 Fuel System:**
- Type of fuel system : Gravity and force feed
- 3.4.1 Fuel tank:**
- Capacity, (l) : 47.5
 Location : Above clutch housing
 Provision for draining of sediments /water : **Not Provided**
 Type of fuel tank : Metallic
- 3.4.2 Water separator:**
- Make : Alerts (apa)
 Type : Inverted funnel, gravity separation
 Location : In between fuel tank & filters on LHS of engine.
 Capacity (l) : 0.50

T- 1618/2149/2022	EICHER 551 TRACTOR – Commercial (1st Batch)
	THIS TEST REPORT IS VALID UPTO: 31/01/2027

Previous Sample

Present Sample

15.4.1.2 Drawbar Performance Test:

- i) During 10 hours drawbar performance test, creeping of LHS & RHS rear tyre over the rims was observed as 55 mm & 50 mm respectively. This should be looked into for necessary corrective action.

- i) During ten hours drawbar test creeping of rear LHS tyre over the rims was recorded as 10 mm. This should be looked into for necessary corrective action.

15.4.1.3 Hydraulic Performance Test:

- i) The maximum lifting capacity throughout the range of lift at hitch point and standard frame was recorded as 17.50 kN & 12.68 kN against the declaration of 17.3 kN & 11.8 kN respectively which meets the requirement of IS:12207-2014 with regards to tolerance limit.
- ii) The moment about rear axle was computed as 19.78 kN-m at standard frame, which is considered on higher as compared to the moment from front axle i.e., 16.89 kN-m. It is, therefore, recommended that the lifting capacity of the hydraulic system may be reduced suitably or standard ballast recommendation may be reviewed to avoid the front lifting of the tractor.

- i) The maximum lifting capacity throughout the range of lift at hitch point and standard frame was recorded as 17.68 kN & 13.86 kN against the declaration of 17.3 kN & 11.8 kN respectively which meets the requirement of IS:12207-2019 with regards to tolerance limit.
- ii) The moment about rear axle at standard frame was calculated 20.03 kN-m whereas, the moment about front axle was calculated 16.89 kN-m under unballast condition. The moment about rear axle is on higher side as compared to the moment about front axle. It is, therefore, recommended that the lifting capacity of the hydraulic system may be reduced suitably or standard ballast recommendation may be reviewed to avoid the front lifting of the tractor.

15.5 Adequacy of literature:

Following literatures has been supplied with the tractor for reference during the test.

- | | |
|----------------------|----------------------|
| a) Operator's manual | a) Operator's manual |
| b) Parts catalogue | b) Parts catalogue |
| c) Workshop manual | c) Workshop manual |

16. SUMMARY OF OBSERVATIONS, COMMENTS & RECOMMENDATIONS

16.1 On the basis of tests conducted the performance results have been summarized as evaluative (mandatory) and non-evaluative (not-mandatory) parameter applicable for qualifying Minimum Performance Criteria as per Clause-4 (Table-1) of IS: 12207-2019 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: 12207-2019	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% for PTO power or engine power >26 kW, ± 10% for PTO power or Engine power ≤ 26 kW.	31.6 (D)	32.8	Yes
b)	Power at rated engine speed, (kW)	Non Evaluative	-do-	31.6 (D)	32.5	Yes

T- 1618/2149/2022	EICHER 551 TRACTOR – Commercial (1st Batch)
	THIS TEST REPORT IS VALID UPTO: 31/01/2027

1	2	3	4	5	6	7
c)	Specific fuel consumption corresponding to maximum power, (g/kWh)	Evaluative	+ 10% max.	258 (D)	245	Yes
d)	Maximum equivalent crankshaft torque, (Nm)	Non Evaluative	± 8%	175 (D)	189.5	No
e)	Back-up torque, percent	Evaluative	12 %, min.	12 %, (R) minimum	23.9	Yes
f)	Maximum operating temperature, (°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.	135 (D)	106	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.	120 (D)	96	Yes
g)	Engine oil consumption, (g/kWh)	Evaluative	Not exceeding 1% of SFC at max. power under High ambient conditions	2.45 (R) maximum 2.58 (D)	0.18	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 (As per CMVR)	3.25 per meter max.	0.43	Yes
16.1.2	Drawbar performance:					
a)	Max. drawbar pull with ballast corresponding to 15 percent wheel slip, (kN)	Non Evaluative	Minimum 70% of static mass with ballast	19.36 (D) 19.22 (R) minimum	23.19	Yes
b)	Maximum drawbar pull without ballast corresponding to 15 percent wheel slip, (kN)	Evaluative	Minimum 70% of static mass of tractor without ballast	15.04 (D) 14.90 (R) minimum	18.57	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) 26.2 (R) minimum	28.5	Yes
d)	Max. transmission oil temperature, (°C)	Evaluative	The declared value should not exceed the maximum value specified by oil company	115 (D)	75	Yes

T- 1618/2149/2022	EICHER 551 TRACTOR – Commercial (1st Batch)
	THIS TEST REPORT IS VALID UPTO: 31/01/2027

1	2	3	4	5	6	7	
16.1.3	Power lift and hydraulic pump performance :						
a)	Maximum lifting capacity throughout the range of lift, (kN):						
	1)	At hitch points	Evaluative	±10%	17.30 (D)	17.68	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	11.80 (D) 7.72 (R) minimum	13.86	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	Observed value should not exceed 50 mm.	50 (D) 50 maximum	25	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 road ballast, (m):						
	1)	Cold brake	Evaluative	10	10	7.81	Yes
	2)	Hot brake	Evaluative	10	10	8.08	Yes
b)	Maximum force exerted on the brake pedal to achieve a deceleration of 2.5 m/s ² (N)		Evaluative	600	600 maximum	224 to 300	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 (R)	Yes	Yes
16.1.5	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)	88 maximum	80	Yes
b)	Maximum noise at operator's ear level, dB(A)		Evaluative	96 (as per CMVR)	96 maximum	93	Yes
16.1.6	Amplitude of mechanical vibrations at:						
	1)	Left foot rest	Non Evaluative	100 microns (max.)	100 (max.)	103	No
	2)	Right foot rest				89	Yes
	3)	Seat (with driver seated)				108	No
	4)	Steering Wheel				123	No

1	2	3	4	5	6	7
16.1.7	Air Cleaner:					
	Max. oil pull over, (%)	Evaluative	0.25% (max.)	0.25% (max.)	0.21	Yes
16.1.8	Haulage requirements:					
a)	Gross mass of the trailers, (tones):					
	1) Two wheel	Non Evaluative	As specified by the manufacturer	4.0 (D)	4.0	Yes
	2) Four wheel	Evaluative		5.0 (D)	5.0	Yes
b)	Distance travelled / litre of fuel consumption, (km/l):					
	1) Two wheel	Non Evaluative	As specified by the manufacturer	4.0 to 6.0 (D)	5.74 to 5.83	Yes
	2) Four wheel			4.0 to 6.0 (D)	5.37 to 5.51	Yes
c)	Fuel consumption (cc/km/tonne):					
	1) Two wheel	Non Evaluative	As specified by the manufacturer	32 to 42 (D)	42.92 to 43.52	No
	2) Four wheel			40 to 45 (D)	36.27 to 37.23	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.	There should be no ingress of water and/or mud	No ingress of water and/or mud was observed during ICT vide report no. T-1103/16 29/2017	Yes
	1) Clutch assembly	-do-				
	2) Brake housings	-do-				
	3) Front axle hubs	-do-				
	4) Engine oil	-do-				
	5) Transmission oil	-do-				
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)	--	Meets the requirement	Yes
b)	Lighting arrangement	Evaluative	As per CMVR	--	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)	--	Meets the requirement	Yes
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)	Dimension of three point linkage	Non-Evaluative	Should meet the requirements of IS 4468 (part 1) (as amended from time to time)	--	Does not meet the requirement	No
f)	Specification of linkage drawbar	Evaluative	Should meet the requirements of IS 12953 and IS 12362 (part 3) (as amended from time to time)	--	Meets the requirement	Yes

T- 1618/2149/2022	EICHER 551 TRACTOR – Commercial (1st Batch)
	THIS TEST REPORT IS VALID UPTO: 31/01/2027

1	2	3	4	5	6	7
g)	Specifications of 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 travelling speed at rated engine speed in reverse gears, (kmph)	Evaluative	Should not exceed 20 Kmph	--	12.62 (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 shall be activated. Not applicable	--	Not applicable	Not applicable
16.1.11	Labelling of tractors (Provision of labelling plate):					
	1) Make	Evaluative	Should conform to the requirements of CMVR along-with declared value of PTO in kW and year of manufacture in numerical MM YY Digit 01-12 in box No.1 for MM will represent the month and next two digit in the box No.2 for YY will represent the year of manufacturing	Eicher	Yes	
	2) Model	Evaluative		Eicher 551	Yes	
	3) Month & Year of manufacture	Evaluative		07/21	Yes	
	4) Engine number	Evaluative		530626754210	Yes	
	5) Chassis number	Evaluative		930715473350	Yes	
	6) Declaration of maximum PTO power, (kW)	Evaluative		31.6	Yes	
	7) Specific fuel consumption (g/kWh)	Evaluative		258	Yes	
16.1.12	Discard limit for:					
(a)	Cylinder bore diameter, (mm)	Evaluative	To be specified by the manufacturer	108.25 (D)	108.000 to 108.016	Yes
(b)	Clearance between piston & cylinder liner at skirt, (mm)	Non Evaluative		0.60	0.117 to 0.126	Yes
(c)	Piston diameter at skirt, (mm)	Non Evaluative		107.68	107.888 to 107.895	Yes
(d)	Ring end gap (mm):					
	- Top comp. ring	Evaluative	-do-	4.0	0.40	Yes
	- 2 nd comp. ring		-do-	4.0	0.75 to 0.80	Yes
	- Oil ring		-do-	4.0	0.45	Yes
(e)	Ring groove clearance (mm):					
	- Top comp. ring	Evaluative	-do-	0.25	0.117 to 0.124	Yes
	- 2 nd comp. ring		-do-	0.25	0.056 to 0.063	Yes
	- Oil ring		-do-	0.25	0.052 to 0.058	Yes
(f)	Clearance of main bearings (mm):					
	- Diametrical clearance	Evaluative	-do-	0.60	0.082 to 0.299	Yes
	- Crankshaft end float	Evaluative	-do-	0.80	0.20	Yes
(g)	Clearance of big end bearings, (mm):					
	- Diametrical	Evaluative	-do-	0.60	0.088 to 0.144	Yes
	- Axial	Evaluative	-do-	0.80	0.30	Yes

T- 1618/2149/2022	EICHER 551 TRACTOR – Commercial (1st Batch)
	THIS TEST REPORT IS VALID UPTO: 31/01/2027

1	2	3	4	5	6	7
(h)	Clearance between king pin and bush, (mm)	Non Evaluative	-do-	0.60	0.09 to 0.11	Yes
(i)	Clearance between centre pin and bush, (mm)	Non Evaluative	-do-	0.60	0.10 to 0.11	Yes
16.1.13	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
16.1.14	Fitment of Roll Over Protective Structure (ROPS): for tractors 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 Provided	Not fitted	Not applicable
16.1.15	Standard accessories	Evaluative	Trailer hitch, front tow hook, linkage drawbar should be provided with tractor	Provided	Provided	Yes
16.1.16	Accessories (Optional)	Non Evaluative	Ballast weights if fitted should meet the requirement of CMVR.	Provided	Provided	Yes
16.2	CATEGORY OF BREAKDOWNS / DEFECTS:					
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	There is no 'critical breakdown' during the course of testing	None	Yes	
2.	Major	Evaluative	There are not more than 1 major breakdowns and neither of them is of repetitive nature	None	Yes	
3.	Minor	Evaluative	There are not more than 3 minor defects during the test and the frequency of each is not be more than two	None	Yes	
4.	Total breakdowns	Evaluative	In no case, the total number of breakdowns should exceed four that is, (1 major + 3 minor) or 4 minor breakdowns	None	Yes	

T- 1618/2149/2022	EICHER 551 TRACTOR – Commercial (1st Batch)
	THIS TEST REPORT IS VALID UPTO: 31/01/2027

16.3 Salient Observations:

16.3.1 Laboratory tests:

16.3.1.1 PTO Performance:

The maximum equivalent crankshaft torque was recorded as 189.5 Nm against the declaration of 175 Nm which does not meet the requirement of IS: 12207- 2019 with regard to tolerance. This should look into for necessary corrective action.

16.3.1.2 Drawbar performance test:

During ten hours drawbar test, creeping of rear LHS tyre over the rim was recorded as 10 mm. This should be looked into for necessary corrective action.

16.3.1.3 Hydraulic Performance:

The moment about rear axle at standard frame was calculated 20.03 kN-m whereas, the moment about front axle was calculated 16.89 kN-m under unballast condition. The moment about rear axle is on higher side as compared to the moment about front axle. This should look into for necessary corrective action.

The above observation was also made in the previous test report No. T-1103/1629/2017 (August, 2017) and no improvement have been made so far.

16.3.1.4 Mechanical Vibration:

The amplitude of mechanical vibration on various assemblies marked as (*) in Chapter – 10 of this test report is on higher side. This calls for dampening down of vibrations especially on left foot rest, steering wheel and operator’s seat to improve the operational comfort and service life of components.

The above observations were also made in the previous test report No. T-1103/1629/2017 (August, 2017) and no improvement have been made as regards to its conformity so far.

16.3.1.5 Haulage test:

i) The fuel consumption with two wheel trailer was recorded as 42.92 to 43.52 ml/km/tonne against the declaration of 32 to 42 ml/km/tonne. This should be looked into for necessary corrective action.

ii) The fuel consumption with four wheel trailer was recorded as 36.27 to 37.23 ml/km/tonne against the declaration of 40 to 45 ml/km/tonne. This should be looked into for necessary corrective action.

The above observation were also made in the previous test report No. T-1103/1629/2017 (August, 2017) and no improvement have been made as regards to its conformity so far.

16.3.1.6 Three point linkage:

i) The lateral distance from lower hitch point to centre line of tractor was observed 364 mm against the requirement of 435 mm, which not meet the requirement of IS: 4468 -1997 (Part-1). This should be looked into for necessary corrective action.

ii) Transport height was observed 885 mm against the minimum requirement of 950 mm, which does not meet the requirement of IS: 4468 (Part-1) - 1997 (Reaffirmed in Oct., 2017) Category II. This should be looked into for necessary corrective action.

iii) Some of the parameters conform to Cat. I and some of them conform to Cat. II. Keeping in view the spirit of standardization, necessary improvements may be incorporated.

The above observations were also made in the previous test report No. T-1103/1629/2017 (August, 2017) and no improvement have been made as regards to its conformity so far.

16.4 Maintenance / Service Problems:

No noticeable maintenance or service problem was observed during the test.

16.5 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 as per the requirement of IS: 12239 (Part-1)-2018.
- ii) Differential lock as per IS: 8133-1983 (Reaffirmed in January, 2019).
- iii) The working clearance between the position and draft control lever should be provided as per IS: 12239 (Part-2) – 1999 (Reaffirmed in January, 2019).
- iv) PTO master shield should be provided on tractor as per IS:4931-1995 (Reaffirmed in January, 2019).

All these observations were also made in the previous test report No. T-1103/1629/2017 (August, 2017) and no improvement have been made as regards to its conformity so far.

16.6 Adequacy of Literature supplied with machine:


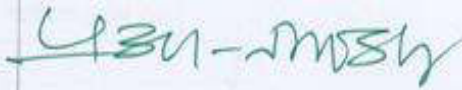
16.6.1 The following literature was supplied with test sample for reference during the test.

- a) Operator's manual for Eicher 551 tractor model
- b) Service manual for Eicher 551 tractor model
- c) Spare part's catalogue for Eicher 551 tractor model

16.6.2 The operator manual may be brought out for the guidance of users and service personnel as per IS:8132-1999 incorporating, inter alia, the following:

- a) The "content list" in Operator's manual.

TESTING AUTHORITY:

C.V. CHIMOTE TEST ENGINEER	
P.K. PANDEY DIRECTOR	

Test report is compiled by: Vithato Keyho, Senior Technical Assistant

T- 1618/2149/2022	EICHER 551 TRACTOR – Commercial (1st Batch)
	THIS TEST REPORT IS VALID UPTO: 31/01/2027

17. APPLICANT'S COMMENTS

Para No.	Our Reference	Applicant's comments
17.1	16.3.1.1, 16.3.1.2, 16.3.1.4 & 16.6.2	Observations will be studied and necessary action will be initiated.

ANNEXURE - I

TRACTOR RUN HOURS DURING TEST

A.	LABORATORY AND TRACK TESTS:	HOURS
1.	Running-in	53
2.	PTO performance test	13.0
3.	Power lift and hydraulic pump performance test	1.5
4.	Drawbar performance test	15.1
5.	Brake test	1.8
6.	Noise measurement	2.0
7.	Mechanical vibration test	0.8
8.	Nominal speed test	0.8
9.	Air cleaner oil pull over test	3.5
B.	HAULAGE TEST:	4.7
C.	Miscellaneous test and other run hours including idle run, transportation, trials and preparation for test	6.6
TOTAL:		102.8