

व्यावसायिक परीक्षण रिपोर्ट (प्रथम बैच परीक्षण )  
COMMERCIAL TEST REPORT (First Batch Test)

संख्या/No. : T-1611/2142/2021  
माह/Month : December, 2021

[ONLINE TESTING]

(यह परीक्षण रिपोर्ट 31/12/2026 तक वैध है।/ THIS TEST REPORT IS VALID UPTO 31/12/2026)



## EICHER 485 USJ TRACTOR



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, Cooperation & Farmers Welfare)

केन्द्रीय कृषि मशीनरी प्रशिक्षण एवं परीक्षण संस्थान

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(An ISO 9001: 2015 Certified Institute)

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<b>T-1611/2142/2021</b>	<b>EICHER 485 USJ TRACTOR - Commercial (First Batch Test)</b>
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The “**EICHER 485 USJ**” tractor had undergone “Initial Commercial Test at this Institute bearing test report no. **T-1031/1556/2016** released in July, 2016. & Administrative extension test report No. **T- 1374/1901/2020** released in March, 2020. Now, the applicant has submitted online application No.28/2020-21/62 dated 04/03/2021 for batch testing of “**EICHER 485 USJ**” tractor.

All necessary tests as per Table-1 of clause 6.0 of IS: 5994 – 1998 (Reaffirmed in 2019) were carried out and test report released as under: -

**Manufacturer** : **M/s. Eicher Tractors**  
**(A unit of TAFE Motors & Tractors Limited, a wholly owned subsidiary of TAFE), Plot No.1, Sector - D, Industrial Area, Mandideep – 462 046, Distt. Raisen (M.P)**

Test requested by (applicant) : The Manufacturer  
Selected for test by : Testing Authority  
Place of running-in : At institute premises

**Duration of said running-in (h):**  
- Engine : 21  
-Transmission : 32

**Method of Selection** : The test sample was selected randomly out of five tractors from the production line by the representative of testing authority through online.

**Details of tractors made available for random selection:**

<b>Sr.No.</b>	<b>Chassis Number</b>	<b>Engine Number</b>
i)	930611566291	530427254052
ii)	930611566297	530327253456
iii)	930611566295	530327252755
iv)	930611566288	530527255609
v)	930611566292	530427253676

**1. SPECIFICATION**

**1.1 Tractor:**  
Make : Eicher  
Model : Eicher 485 USJ  
Type : Four wheeled, rear wheel driven, Unit construction, Agricultural tractor.  
Variant: if any : None  
Month & Year of manufacture : 06 | 21  
Chassis number : 930611566291  
Country of origin : India

**1.2 Engine:**  
Make : Eicher  
Model : 398 ED  
Type : Air cooled, four stroke, direct injection, diesel engine.  
Serial number : 530427254052

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### 15. SUMMARY OF OBSERVATIONS, COMMENTS & RECOMMENDATIONS

**15.1** On the basis of test conducted the performance results have been summarized as evaluative (mandatory) / non-evaluative (non-mandatory) parameters 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:

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
<b>15.1.1</b>	<b>PTO Performance:</b>					
<b>a)</b>	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 $\leq 26$ kW.	29.5 (D)	29.4	Yes
<b>b)</b>	Power at rated engine speed, (kW)	Non-Evaluative	-do-	29.5 (D)	29.4	Yes
<b>c)</b>	Specific fuel consumption corresponding to maximum power, (g/kWh)	Evaluative	+ 10% max.	273 (D)	243	Yes
<b>d)</b>	Maximum equivalent crankshaft torque, (Nm)	Non-Evaluative	$\pm 8\%$	160(D)	162.9	Yes
<b>e)</b>	Back-up torque, percent	Evaluative	12 percent	12% (D) 12% (R) min.	24.9	Yes
<b>f)</b>	Maximum operating temperature, ( $^{\circ}\text{C}$ )					
	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.	132 (D)	126	Yes
	2) Liner wall	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.	240 (D)	182	Yes
<b>g)</b>	Engine oil consumption, (g/kWh)	Evaluative	Not exceeding 1% of SFC at max. power under High ambient conditions.	1% of SFC 2.48 (R)	1.11	Yes
<b>h)</b>	Smoke level, $\text{m}^{-1}$	Evaluative	Maximum light absorption coefficient of 3.25 per meter or equivalent BOSCH No. 5.2 or 75 Hatridge value ( <b>As per CMVR</b> ).	3.25 per meter max. (R)	0.17 per meter	Yes

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1	2	3	4	5	6	7	
<b>15.1.2</b>	<b>Drawbar performance:</b>						
<b>a)</b>	Max. drawbar pull with ballasted corresponding to 15 percent wheel slip, (kN)	Non-Evaluative	Minimum 70% of static mass of tractor with ballast.	19.01 (D) 18.57 (R) min.	22.77	Yes	
<b>b)</b>	Max. drawbar pull with unballasted as the case may be corresponding to 15 percent wheel slip, (kN)	Evaluative	Minimum 70% of static mass of tractor without ballast or with standard ballast, as the case may be.	14.69 (D) 14.21 (R) min.	17.27	Yes	
<b>c)</b>	Maximum drawbar power with unballast, (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.	23.6 (D) 23.5 (R) min.	25.8	Yes	
<b>d)</b>	For tractors fitted with air conditioned /heated cabin: Maximum drawbar power without ballast, or with standard ballast as the case may be, kW	Evaluative	Minimum 70 % of PTO power as referred in SI No. i) a) of PTO performance in case of tractors having total static mass > 1500 kg	Not fitted	Not applicable	Not applicable	
<b>e)</b>	Maximum transmission oil temperature (°C)	Evaluative	The declared value should not exceed the maximum value specified by oil company	115 (D)	81	Yes	
<b>15.1.3</b>	<b>Power lift and hydraulic pump performance:</b>						
<b>a)</b>	Maximum lifting capacity throughout the range of lift, (kN):						
	1)	At hitch points	Evaluative	Tolerance of ± 10%	11.8 (D)	12.58	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.	9.8 (D) 6.92 (R) min.	10.84	Yes
<b>b)</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) max.	40	Yes	

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1	2	3	4	5	6	7	
<b>15.1.4</b>	<b>Brake performance at 25 kmph:</b>						
<b>a)</b>	Maximum stopping distance at a force, equal to or less than 600 N on brake pedal with standard ballast, (m):						
	1)	Cold brake	Evaluative	10	10 (R)	7.19	Yes
	2)	Hot brake	Evaluative	10	10 (R)	7.59	Yes
<b>b)</b>	Maximum force exerted on the brake pedal to achieve a deceleration of 2.5 m/s <sup>2</sup> (N)		Evaluative	600	600 (R) max.	299 to 342	Yes
<b>c)</b>	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	346	Yes
<b>15.1.5</b>	<b>Noise measurement:</b>						
<b>a)</b>	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 (R)	84	Yes
<b>b)</b>	Maximum noise at operator's ear level dB(A)		Evaluative	96 (as per CMVR)	96 (R)	94	Yes
<b>15.1.6</b>	<b>Amplitude of mechanical vibrations at:</b>						
	1)	Left foot rest	Non Evaluative	100 microns (max.)	100 (R)	105	<b>No</b>
	2)	Right foot rest				494	<b>No</b>
	3)	Seat (with driver seated)				79	Yes
	4)	Steering wheel				112	<b>No</b>
<b>15.1.7</b>	<b>Air cleaner Oil Pull-Over:</b>						
	Maximum air cleaner oil pull over, (%)		Evaluative	0.25% (max.)	0.08		Yes
<b>15.1.8</b>	<b>Haulage requirements:</b>						
<b>a)</b>	Gross mass of the trailers, (tonnes):						
	Two wheel	Non-Evaluative	--	4.0 (D)	4.0		Yes
	Four wheel	Evaluative	--	5.0 (D)	5.0		Yes
<b>b)</b>	Distance travelled / liter of fuel consumption, (km/l):						
	Two wheel	Non-Evaluative	--	4 to 5.5(D)	5.41 to 5.63		<b>No</b>
	Four wheel	Evaluative	--	4 to 5.5 (D)	5.51 to 5.59		<b>No</b>
<b>c)</b>	Fuel consumption (ml/km/tonne):						
	Two wheel	Non-Evaluative	--	36 to 42 (D)	44.4 to 46.2		<b>No</b>
	Four wheel	Evaluative	--	36 to 42 (D)	35.8 to 36.3		<b>No</b>
<b>15.1.9</b>	<b>Wetland cultivation (Puddling Operation):</b>						
	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 (R)	No ingress of water and / or mud was observed during ICT test vide test report no. T-1031/1556 /2016 (July, 2016). So, as per clause 7.2 of IS: 12207-2019, test was not conducted.	--
	1)	Clutch assembly	-do-				
	2)	Brake housings	-do-				
	3)	Front axle hubs	-do-				
	4)	Engine oil	-do-				
	5)	Transmission oil	-do-				

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1	2	3	4	5	6	7
<b>15.1.10</b>	<b>Safety features:</b>					
<b>a)</b>	Guards against moving and hot parts	Evaluative	Belt drives, pulleys, silencer, hydraulic pipes (As per IS 12239 (Part-2))		Meets the requirement	Yes
<b>b)</b>	Lighting arrangement	Evaluative	As per CMVR		Meets the requirement	Yes
<b>c)</b>	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)		Meets the requirement	Yes
<b>d)</b>	Technical requirements for PTO shaft	Evaluative	Should meet the requirements of IS: 4931 (As amended from time to time)		Meets the requirement	Yes
<b>e)</b>	Dimensions of three-point linkage	Non-Evaluative	Should meet the requirements of IS: 4468 (Part-I) (As amended from time to time)		Meets the requirement	Yes
<b>f)</b>	Specifications of linkage drawbar	Evaluative	Should meet the requirements of IS: 12953 (As amended from time to time)		Meets the requirement	Yes
<b>g)</b>	Swinging drawbar (wherever fitted)	Evaluative	Should meet the requirement of IS: 12362 (Part-3) (As amended from time to time)		Not provided	Not applicable
<b>h)</b>	1) Maximum travelling speed at rated engine speed in reverse gears, Kmph	Evaluative	Should not exceed 20 Kmph		12.39 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 shall 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 provided	Not applicable
<b>15.1.11</b>	<b>Labeling of tractors (Provision of labeling plate):</b>					
	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 and next two digits in box No.2 for YY will represent the year of Manufacturing.		EICHER	Yes
	2) Model	Evaluative			Eicher 485 USJ	Yes
	3) Month & Year of manufacture	Evaluative			06 & 21	Yes
	4) Engine number	Evaluative			530427254052	Yes
	5) Chassis number	Evaluative			930611566291	Yes
	6) Maximum PTO power, (kW)	Evaluative			29.5	Yes
	7) Specific fuel consumption, (g/kwh)	Evaluative			273	Yes
<b>15.1.12</b>	<b>Discard limit for:</b>					
<b>(a)</b>	Cylinder bore diameter, (mm)	Evaluative	To be specified by the manufacturer and supported by the printed literature	100.25	100.010 to 100.014	Yes
<b>(b)</b>	Piston & cylinder liner clearance at skirt, (mm)	Non-Evaluative		0.72	0.135 to 0.137	Yes
<b>(c)</b>	Piston diameter at skirt, mm	Non-Evaluative		99.279	99.877 to 99.879	Yes

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1	2	3	4	5	6	7	
<b>(d)</b>	<b>Ring end gap (mm):</b>						
	-	Top comp. ring.	Evaluative	-do-	4.00	0.20 to 0.25	Yes
	-	2 <sup>nd</sup> comp. ring.		-do-	4.00	0.40 to 0.45	Yes
	-	Oil ring.		-do-	3.00	0.25 to 0.30	Yes
<b>(e)</b>	<b>Ring groove clearance (mm):</b>						
	-	Top comp. ring.	Evaluative	--Tapped rings --			--
	-	2 <sup>nd</sup> comp. ring.		-do-	0.30	0.066 to 0.067	Yes
	-	Oil ring.		-do-	0.30	0.065 to 0.067	Yes
<b>(f)</b>	<b>Clearance of main bearings (mm):</b>						
	-	Diametrical clearance	Evaluative	-do-	0.90	0.109 to 0.113	Yes
	-	Crankshaft end float	Evaluative		0.90	0.26	Yes
<b>(g)</b>	<b>Clearance of big end bearings, (mm):</b>						
	-	Diametrical	Evaluative	-do-	0.90	0.105 to 0.111	Yes
	-	Axial	Evaluative	-do-	0.90	0.30 to 0.40	Yes
<b>(h)</b>	Clearance between king pin and bush, (mm)		Non-Evaluative	-do-	0.80	0.08	Yes
<b>(i)</b>	Clearance between centre pin and bush, (mm)		Non-Evaluative	-do-	0.80	0.09 to 0.10	Yes
<b>15.1.13</b>	<b>Literature (Submission to test agency)</b>						
<b>(a)</b>	Operator manual	Evaluative	Provided / Not Provided	Provided	Provided	Yes	
<b>(b)</b>	Parts Catalogue	Evaluative		Provided	Provided	Yes	
<b>(c)</b>	Workshop/ Service manual	Evaluative		Provided	Provided	Yes	
<b>15.1.14</b>	<b>Fitment of Roll Over Protective Structures (ROPS):</b>						
	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	
<b>15.1.15</b>	Standard Accessories	Evaluative	Trailer hitch, front tow hook, linkage drawbar should be provided with tractor		Provided	Yes	
<b>15.1.16</b>	Accessories (optional)	Non Evaluative	Ballast weight, if fitted, should meet the requirement of CMVR		Provided	Yes	

<b>15.2 CATEGORY OF BREAKDOWNS / DEFECTS (As per clause 5.0 of IS:12207-2019):</b>					
Sl. 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 one and neither of them should be repetitive in nature	None	Yes
3.	Minor	Evaluative	Not more than three 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 four, that is, (1 major + 3 minor) or 4 minor breakdowns.	None	Yes

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**15.3 Salient Observations:**

**15.3.1 Laboratory tests:**

**15.3.1.1 Drawbar performance test:**

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

**15.3.1.2 Mechanical Vibration:**

The amplitude of mechanical vibration on various assemblies marked as (\*) in Chapter-8 of this test report are on higher side especially at left and right foot rest. This calls for dampening down of vibrations to improve the operational comfort and service life of components.

**15.3.1.3 Haulage test:**

- i) Distance travelled / liter of fuel consumption with two wheel & four wheel trailer was recorded 5.41 to 5.63 km/l & 5.51 to 5.59 km/l respectively against the declaration of 4.0 to 5.5 km/l. This should be looked into for necessary corrective action.
- ii) The fuel consumption in ml/km/tonne with two wheel & four wheel trailer was recorded 44.4 to 46.2 & 35.8 to 36.3 respectively against the declaration of 36 to 42 ml/km/tonne. This should be looked into for necessary corrective action.

**15.3.1.4 Components and assembly inspection:**

The overall thickness of brake disc after test were measured 4.91 to 4.98 mm against the Initial specified thickness of 4.75 to 4.90 mm. The observed overall thickness is more than its initial thickness. Hence, it is recommended to take necessary corrective measures.

**15.4 Maintenance / Service Problems:**

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

**15.5 Recommendation with regard to safety on tractor:**

The following requirements, inter alia, may be considered for incorporation on the tractor:

- i) Length of seat, longitudinal distance from SIP to centre of steering control wheel lock should be provided as IS: 12343-1998 (Reaffirmed in 2019).
- ii) Provision for spark arresting device should be provided as IS: 12239 (Part-I)-2018.
- iii) Provision of master shield has should be provided as IS: 12239 (Part-II) (Reaffirmed in 2019).
- iv) Working clearance in between position control and draft control lever is should be provided as per IS: 12239 (Part-II) (Reaffirmed in 2019).
- v) Fuel shut-off knob does not remain in "STOP" position as per the requirement of IS: 8133 -1983 (Reaffirmed in January, 2019).

**15.6 Adequacy of Literature supplied with machine:**

**15.6.1** The supplied literature was found adequate as per IS: 8132-1999 (Reaffirmed in 2019).

- a) Operator's manual for Eicher - 485 USJ tractor model
- b) Parts catalogue for Eicher - 485 USJ tractor model
- c) Service manual for Eicher - 485 USJ tractor model



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**TESTING AUTHORITY:**

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

Test Report is compiled by: **Pratyush Satya**, Senior Technical Assistant

**16. APPLICANT'S COMMENTS**

Para no.	Our reference	Applicant comments
16.1	15.3.1.1, 15.3.1.2, 15.3.1.3 & 15.3.1.4	Recommendations are being looked into with respect to design, development & implementation.
16.2	15.5 (i), (ii), (iii), (iv) & (v)	

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**ANNEXURE- I**

**TRACTOR RUN HOURS DURING TEST**

<b>A.</b>	<b>LABORATORY AND TRACK TESTS:</b>	<b>HOURS</b>
1.	Running-in	53.0
2.	PTO performance test	12.5
3.	Drawbar performance test	17.5
4.	Power lift and hydraulic pump performance test	5.0
5.	Brake test	1.3
6.	Noise measurement	1.5
7.	Mechanical vibration test	1.0
8.	Theoretical speed test	1.4
<b>B.</b>	Haulage Test	4.9
<b>C.</b>	Miscellaneous test and other run hours including idle run, transportation, trials and preparation for test	6.8
	<b>TOTAL:</b>	<b>104.9</b>