

व्यावसायिक परीक्षण रिपोर्ट
COMMERCIAL TEST REPORT (Initial)

संख्या / No. : T-789/1297/2011
माह / Month : August, 2011



EICHER, 242 XTRAC TRACTOR



भारत सरकार
कृषि मंत्रालय
(कृषि एवं सहकारिता विभाग)

GOVERNMENT OF INDIA
MINISTRY OF AGRICULTURE

(DEPARTMENT OF AGRICULTURE & CO-OPERATION)

केन्द्रीय कृषि मशीनरी प्रशिक्षण एवं परीक्षण संस्थान
ट्रैक्टर नगर, बुदनी (म.प्र.) ४६६ ४४५

CENTRAL FARM MACHINERY TRAINING & TESTING INSTITUTE
TRACTOR NAGAR, BUDNI (M.P.) - 466 445

E-mail : fmti-mp@nic.in

Web site : cfmtti.dacnet.nic.in

Telephone : 07564-234729

Fax : 07564-234743

T-789/1297/2011

EICHER, 242 XTRAC TRACTOR - Commercial (Initial)



16. ADJUSTMENTS, DEFECTS, BREAKDOWNS AND REPAIRS

Sl. No.	Items	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: 12207-2008 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 (D)/ Requirement (R)	As observed	Whether meets the requirem- ents (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 >35hp. -7.5/+10% for PTO power ≤ 35 hp	14.7 (D)	13.9	Yes
b)	Power at rated engine speed, (kW)	Non Evaluative	-do-	14.7 (D)	13.9	Yes
c)	Specific fuel consumption corresponding to maximum power, (g/kWh)	Non Evaluative	± 5%	265 (D)	263	Yes
d)	Maximum equivalent crankshaft torque, (Nm)	Non Evaluative	± 8%	105 (D)	98.7	Yes
e)	Back-up torque, percent	Non Evaluative	7 percent, min.	7 percent, min. (R)	22.6	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 (D)	99	Yes
2)	Cylinder 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.	225 (D)	140	Yes
g)	Engine oil consumption, (g/kWh)	Evaluative	Not exceeding 1% of SFC at max. power under High ambient conditions	2.64 (R)	1.22	Yes

T-789/1297/2011

EICHER, 242 XTRAC TRACTOR - Commercial (Initial)



1	2	3	4	5	6	7
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)	0.23	Yes
17.1.2 Drawbar performance :						
a)	Maximum drawbar pull with ballast corresponding to 15 percent wheel slip, (kN)	Non Evaluative	Minimum 65% of static mass with ballast	12.75 (D) 14.02 (R)	10.40	No
b)	Maximum drawbar pull without ballast corresponding to 15 percent wheel slip, (kN)	Evaluative	Minimum 65% of static mass of tractor without ballast/ with standard ballast	11.77 (D) 10.96 (R)	10.96	Yes
c)	Maximum drawbar power without ballast, (kW).	Evaluative	Min. 80% of PTO power as referred in AI (a) of PTO performance	13.0 (D) 11.1 (R)	11.2	Yes
d)	Maximum transmission oil temperature (°C)	Non Evaluative	The declared value should not exceed the maximum value specified by oil company	110 (D)	78	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 of minus 10%]	8.83 (D)	10.08	No
	2) With the standard frame	Evaluative	The lift capacity should at least be 18 kg/PTO hp, and it should be 16 kg/engine hp where the tractor is not provided with a PTO shaft	6.40 (D) 3.38 (R)	8.75	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	[Tolerance of plus 5 mm]	50 (R)	15	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 road ballast, (m):					
	1) Cold brake	Evaluative	10	10 (R)	6.80	Yes
	2) Hot brake	Evaluative	10	10 (R)	8.00	Yes
b)	Maximum force exerted on the brake pedal to achieve a deceleration of 2.5 m/s ² (N)	Evaluative	600	600 (R)	450 to 505	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



1	2	3	4	5	6	7
17.1.5	Noise measurement :					
a)	Maximum ambient noise emitted by the tractor dB(A)	Evaluative	As per CMVR	88 (R)	83	Yes
b)	Maximum noise at operator's ear level dB(A)	Evaluative	As per CMVR	98 (R)	95	Yes
17.1.6	Amplitude of mechanical vibrations at :					
1)	Left foot rest	Non Evaluative	100 microns (max)	100 (R)	90	Yes
2)	Right foot rest			100 (R)	100	Yes
3)	Seat (with driver seated)			100 (R)	100	Yes
4)	Steering wheel			100 (R)	100	Yes
17.1.7	Haulage requirements :					
a)	Gross mass of the trailers, (tonnes):					
1)	Two wheel	Non	--	3.0 (D)	3.0	Yes
2)	Four wheel	Evaluative	--	4.0 (D)	4.0	Yes
b)	Distance traveled / liter of fuel consumption, (km/l):					
1)	Two wheel	Non Evaluative	--	8.0 to 8.16	8.81 to 8.95	Yes
2)	Four wheel		--		8.28 to 8.37	Yes
c)	Fuel consumption (ml/km/tonne):					
1)	Two wheel	Non	--	40.8 to	37.3 to 37.8	Yes
2)	Four wheel	Evaluative	--	41.7	29.8 to 30.2	Yes
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.	There should be no ingress of water and/or mud	Manufacturer not recommended for puddling operation	Not applicable
1)	Clutch assembly	-do-				
2)	Brake housings	-do-				
3)	Front axle hubs	-do-				
17.1.9	Safety features :					
a)	Guards against moving and hot parts	Evaluative	As per CMVR	At present no requirements	Provided	Yes
b)	Lighting arrangement	Evaluative	As per CMVR	As per CMVR	Provided	Yes

T-789/1297/2011

EICHER, 242 XTRAC TRACTOR - Commercial (Initial)



1	2	3	4	5	6	7
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	--	Eicher	Yes
	2) Model			--	242 XTRAC	Yes
	3) Year of manufacture			--	2010	Yes
	4) Engine serial number			--	5179291502 14	Yes
	5) Chassis serial number			--	9178102055 20	Yes
	6) Declaration of PTO power, (kW)			--	14.7	Yes

17.1.11	Discard limit for:					
(a)	Cylinder bore diameter, (mm)	Evaluative	To be specified by the manufacturer	115.25	114.99	Yes
(b)	Clearance between piston & cylinder liner at skirt, (mm)	Evaluative		0.52	0.142	Yes
(c)	Ring end gap (mm):					
	- Top comp. ring.	Evaluative	To be specified by the manufacturer	4.00	0.65	Yes
	- 2 nd comp. ring.			4.00	0.50 to 0.55	Yes
	- Oil ring.			2.50	0.50	Yes
(d)	Ring groove clearance (mm):					
	- Top comp. ring.	Evaluative	-do-	0.20	0.114	Yes
	- 2 nd comp. ring.		-do-	0.20	0.095	Yes
	- Oil ring.		-do-	0.15	0.077	Yes
(e)	Clearance of main bearings (mm):					
	- Diametrical clearance	Evaluative	-do-	Cylindrical roller bearing provided	Not applicable	--
	- Crankshaft end float	Evaluative	-do-	0.50	0.18	Yes
(f)	Clearance of big end bearings, (mm):					
	- Diametrical	Evaluative	-do-	0.40	0.139 to 0.142	Yes
	- Axial	Evaluative	-do-	0.40	0.22	Yes
(g)	Clearance between king pin and bush, (mm)	Non Evaluative	-do-	0.40	0.13 to 0.18	Yes
(h)	Clearance between center pin and bush, (mm)	Non Evaluative	-do-	0.40	0.11 to 0.15	Yes

T-789/1297/2011

EICHER, 242 XTRAC TRACTOR - Commercial (Initial)



17.1.12 CATEGORY OF BREAKDOWNS / DEFECTS :

S. No.	Characteristic	Category (Evaluative / Non Evaluative)	Requirements as per IS: 12207-2008	As observed	Whether meets the require- ments (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:12207-2008:

S. No.	Characteristic	Requirements as per IS: 12207-2008	AS observed	Whether meets the requirements (Yes/No.)
1	Air cleaner oil pull over, max. oil pull over (%)	0.25% (max.)	0.12	Yes
2.	Seating requirements	Should meet the requirements of IS: 12343-1998	Meets the requirement	Yes
3.	Filment of ROPS	With a provision for filment of ROPS. If ROPS fitted it should meet the requirement of IS: 11821-1992	Not provided ROPS not fitted	No Not applicable
4.	Technical requirements for PTO shaft	Should meet the requirements of IS: 4931 -1995	Meets the requirement	Yes
5.	Dimensions of three point linkage	Should meet the requirements of IS: 4468 (Part-I)-1997	Does not meet the requirement	No
6.	Specifications of linkage drawbar	Should meet the requirements of IS: 12953-1990.	Meets the requirement	Yes
	Specifications of linkage swinging drawbar	Should meet the requirements of IS: 12362 Part 3-1994.	Not provided	Not applicable
7.	Accessories	Trailer hitch, front tow hook, linkage drawbar may be provided.	Provided	Yes

17.3 Conformity with following IS:

- Guide lines for declaration of power and specific : Conforms
fuel consumption and labeling of agricultural tractors (First revision) [IS 10273:1987 (Reaffirmed in March, 2009)]
- Agricultural tractors – Rear mounted power take-off - Types 1, 2 and 3(third revision)[IS: 4931-1995 (Reaffirmed in March, 2009)] : Conforms



T-789/1297/2011

EICHER, 242 XTRAC TRACTOR - Commercial (Initial)

- iii) Agricultural wheeled tractors - Rear mounted three-point linkage: Part 1 Categories 1, 2, 3 & 4 (fourth revision) [IS 4468(Part-I):1997/ISO 730-1:1994 (Reaffirmed in March, 2009)] : 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)] : Conforms
- vi) Guide for safety & comfort of operator of agricultural tractors: Part 1 General requirements (first revision) : [IS 12239 (PT-1) 1996/ISO 4254-1:1989 (Reaffirmed in March, 2007)] : Does not conform
- vii) 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] : Conforms
- viii) 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
- ix) Guide lines for location and operation of operator controls on agricultural tractors and machinery (first revision) (IS: 8133 - 1983) (Reaffirmed in March, 2009)] : Conforms
- 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 22.6 %.
- ii) The maximum power was measured as 13.9 kW against the declaration of 14.7 kW, which is within the tolerance limit as specified in the IS:12207-2008.
- iii) The specific fuel consumption corresponding to maximum power was measured as 263 g/kWh against the declaration of 265 g/kWh, which is within the tolerance limit as specified in the IS:12207-2008.

17.4.1.2 Drawbar performance:

- i) The unballasted drawbar performance test of the tractor was conducted in L1 to H1 gears and in all these gears, it was observed but the engine speed was dropping drastically below the rated engine speed before achieving the sufficient wheel slip.
- ii) The ballast condition of the tractor has not made any significant improvement on the drawbar performance of the tractor.
The above performance of the tractor may call for necessary corrective action.



17.4.1.3 Hydraulic performance :

- i) The lifting capacity at standard frame was recorded as 8.75 kN and the moment about the rear axle was computed as 12.86 kN-m. The moment about rear axle is on higher side in compare to the front axle i.e 11.49 kN-m. It is, therefore, recommended that the lifting capacity of the hydraulic system may be reduced suitably or standard ballast mass at front axle may be provided to avoid front lifting of the tractor.
- ii) The maximum tilt angle of mast from vertical is observed as 8.4 degree against the minimum requirement of 10 degree. This may looked into for necessary corrective action.

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. This calls for dampening down of vibrations to improve the operational comfort and service life of components.

17.4.1.5 Three point linkage:

- i) 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.
- ii) Some of the parameters of the three point linkage conform to Cat.I and some of them conform to Cat.II. Keeping in view of the spirit of standardization, the necessary improvements may be incorporated.

17.4.1.6 Linkage drawbar:

Some of the parameters of linkage drawbar conform to Cat.I and some of them conform to Cat.II. In view of the spirit of standardization, necessary improvements may be incorporated.

17.4.1.7 Location and operation of operator's control:

Operations of some of the operator's control such as safety against accidental start of engine & retaining the fuel shut-off lever in "STOP" position does not meet the requirements of IS: 8133-1983. This may be looked into.

17.5 Maintenance / Service Problems:

No noticeable maintenance or 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 of safety against accidental start of the engine.
- ii) Provision for spark arresting device in exhaust system.
- iii) Provision for retaining the fuel shut-off lever in "STOP" position.
- iv) Provision of PTO shaft master shield.
- v) Provision of differential lock lever and fuel gauge.
- vi) Provision of vertical retainers on both sides of clutch and brake pedals.
- vii) The minimum cautionary notice as per clause 11.2 of IS: 12239 (Part-2)-1999 should be provided.

T-789/1297/2011

EICHER, 242 XTRAC TRACTOR - Commercial (Initial)



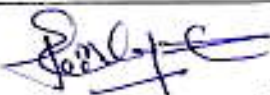
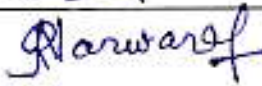
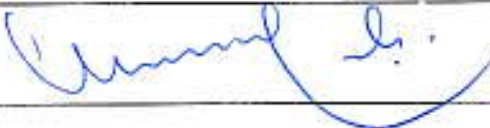
17.7 Adequacy of Literature supplied with machine:

17.7.1 The following literature has been supplied by the manufacturer for reference during the testing.

- i) Operator's manual for Eicher 241/242 XTRAC and 242 XTRAC premium tractor model
- ii) Spare parts catalogue (steering, tractor, electrical aggregate wise catalogue) for Eicher 241, Eicher 242 tractor models.
- iii) Service manual for Eicher 241/242 XTRAC and 242 XTRAC premium tractor model

17.7.2 The supplied literature was found adequate, however, these literatures should be brought out in national as well as other regional languages of India for guidance of users.

TESTING AUTHORITY:

P.C. MESHRAM AGRICULTURAL ENGINEER	
J.J.R. NARWARE SENIOR AGRICULTURAL ENGINEER	
V.N. KALE DIRECTOR	

18. APPLICANT'S COMMENTS

Para No.	Our Reference	Applicant's comments
18.1	17.4.1.2 (ii)	The problem will be analyzed.
18.2	17.6	Recommendations are being looked into w.r.t. Design, Development & Implementation