



KUBOTA, B 2741 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

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16. SUMMARY OF OBSERVATIONS, COMMENTS & RECOMMENDATIONS

16.1 Evaluative (mandatory) / Non-evaluation (Non-mandatory) parameters 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)/ Require- ment (R)	As observed	Whether meets the require- ments (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 / +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	14,3 (D)	14.0	Yes
b)	Power at rated engine speed, (kW)	Non Evaluative	-do-	14,3 (D)	14.0	Yes
c)	Specific fuel consumption corresponding to maximum power, (g/kWh)	Non Evaluative	+ 5%	320 (D)	321	Yes
d)	Maximum equivalent crankshaft torque, (Nm)	Non Evaluative	± 8%	65.8 (D)	64.9	Yes
e)	Back-up torque, percent	Non Evaluative	10 percent, minimum.	25.3%	26.5	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.	140 (D)	124	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.	130 (D)	110	Yes
g)	Engine oil consumption, (g/kWh)	Evaluative	Not exceeding 1% of SFC at maximum power under High ambient conditions.	Maximum 0.95 (D)	0.47	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	0.22	Yes



1	2	3	4	5	6	
16.1.2	Drawbar performance :					
a)	Maximum drawbar pull with ballast corresponding to 15 percent wheel slip, (kN)	Non Evaluative	Minimum 65% of static mass with ballast	5.5 (D) 5.35 (R)	7.49	Yes
b)	Maximum drawbar pull without ballast corresponding to 15 percent wheel slip, (kN)	Evaluative	Minimum 65% of static mass of tractor without ballast or with standard ballast as the case may be.	5.0 (D) 4.37 (R)	6.12	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.	11.4 (D) 10.5 (R)	11.1	Yes
d)	Maximum transmission oil temperature (°C)	Non Evaluative	The declared value should not exceed the maximum value specified by oil company	120 (D)	89	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	To be declared by manufacturer [Tolerance of minus 10%]	5.6 (D)	5.61	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 and it should be 16 kg/engine hp where the tractor is not provided with a PTO shaft	3.4 (D) 3.3 (R)	4.03	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.	11 (D)	02	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 (R)	10 (D)	4.55	Yes
2)	Hot brake	Evaluative	10 (R)	10 (D)	4.82	
b)	Maximum force exerted on the brake pedal to achieve a deceleration of 2.5 m/s ² (N).	Evaluative	600 (R)	600 (D)	280 to 295	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	423	Yes



1	2	3	4	5	6	7
16.1.5	Noise measurement :					
a)	Maximum ambient noise emitted by the tractor dB(A)	Evaluative	As per CMVR	85 (R)	78	Yes
b)	Maximum noise at operator's ear level dB(A)	Evaluative	As per CMVR	96 (R)	92	Yes
16.1.6	Amplitude of mechanical vibrations at :					
	1) Left foot rest	Non Evaluative	100 microns (max)	100 (D)	50	Yes
	2) Right foot rest			100 (D)	70	Yes
	3) Seat (with driver sealed)		-do-	100 (D)	60	Yes
	4) Steering wheel		-do-	100 (D)	50	Yes
16.1.7	Air cleaner					
	Air cleaner oil pull over (%)	Non Evaluative	0.25% (maximum)	Not applicable	--	-
16.1.8	Haulage requirements :					
a)	Gross mass of the trailers, (tones):					
	1) Two wheel	Non Evaluative	--	1.5 (D)	1.5	Yes
b)	Distance travelled / litre of fuel consumption, (km/l):					
	1) Two wheel	Non Evaluative	--	7.8 ± 1 (D)	7.42 to 7.47	Yes
c)	Fuel consumption (ml/km/ton):					
	1) Two wheel	Non Evaluative	--	84 ± 5 (D)	89.30 to 89.80	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 (R)	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-				



1	2	3	4	5	6	
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 requirements (Tractor having more than 1150 mm rear track width)	Non Evaluative	Should meet the requirements of IS 12343 (as amended from time to time)	Not applicable	Not applicable	
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 requirement	No	
e)	Dimensions of three point linkage	Non Evaluative	Should meet the requirements of IS 4468 (part 1) (as amended from time to time)	Meets the requirement	Yes	
f)	Specifications of linkage drawbar	Non Evaluative	Should meet the requirements of IS 12953 and IS 12362 (part 3) (as amended from time to time)	Meets the requirement	Yes	
g)	Specifications of swinging drawbar	Non Evaluative		Not provided	NA	
16.1.11	Labeling of tractors (Provision of labeling plate):					
	1) Make	Evaluative	Should conform to the requirements of CMVR	-- KUBOTA	Yes	
	2) Model	Evaluative		-- B2741	Yes	
	3) Year of manufacture	Evaluative		-- KJ (i.e. October, 2016)	Yes	
	4) Engine serial number	Evaluative		-- IGN7929	Yes	
	5) Chassis serial number	Evaluative		-- KBTB30TNCJTKPC001	Yes	
	6) Declaration of PTO power, (kW)	Evaluative		-- 14.3	Yes	
16.1.12	Discard limit for:					
(a)	Cylinder bore diameter, (mm)	Evaluative	To be specified by the manufacturer and supported by printed literature	78.15	78.00 to 78.02	Yes
(b)	Clearance between piston & cylinder liner at skirt, (mm)	Non Evaluative		0.30	0.058 to 0.076	Yes
(c)	Ring end gap (mm):					
	- Top comp. ring.	Evaluative	To be specified by the manufacturer and supported by printed literature	1.25	0.30	Yes
	- 2 nd comp. ring.		-do-	1.25	0.50 to 0.55	Yes
	- Oil ring.		-do-	1.25	0.35	Yes
(d)	Ring groove clearance (mm):					
	- Top comp. ring.	Evaluative	-do-	--Tapped--		Yes
	- 2 nd comp. ring.		-do-	0.20	0.100 to 0.111	Yes
	- Oil ring.		-do-	0.15	0.023 to 0.035	Yes



1	2	3	4	5	6	7
(e)	Clearance of main bearings (mm):					
	- Diametrical clearance	Evaluative	-do-	0.40	0.090 to 0.118	Yes
	- Crankshaft end float	Evaluative	-do-	0.50	0.212	Yes
(f)	Clearance of big end bearings, (mm):					
	- Diametrical	Evaluative	-do-	0.40	0.083 to 0.097	Yes
	- Axial	Evaluative	-do-	0.50	0.28	Yes
(g)	Clearance between king pin and bush, (mm)	Non Evaluative	-do-	In place of king pin & bush bearing are provided.		Yes
(h)	Clearance between center pin and bush, (mm)	Non Evaluative	-do-	0.45	0.12 to 0.14	Yes
16.1.13	Literature as per IS:8132 (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 CATEGORY OF BREAKDOWNS / DEFECTS :					
S. No.	Characteristic	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

16.2 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	2	3	4	5
1.	Fitment of ROPS	With a provision for fitment of ROPS.	Provided	Yes
		If ROPS fitted it should meet the requirement of IS: 11821-1992.	ROPS not fitted	Not applicable
2.	Accessories	Trailer hitch, front tow hook, linkage drawbar may be provided.	Front tow hook is not provided	No



16.3 Conformity with following IS:

- i) Guide lines 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/ISO 730-1:1994 (Reaffirmed in March, 2009)] : **Conforms**
- 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) (Tractor having more than 1150 mm rear track width)] : **Not applicable**
- 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]] : **Does not conform**
- 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)] : **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 maximum PTO power was recorded as **14.0 kW** against the declaration of **14.3 kW**, which meets the requirement of IS: 12207-2014 with regard to tolerance limit.
- ii) The specific fuel consumption corresponding to maximum power was recorded as **321 g/kWh** against the declaration of **320 g/kWh**, which is within the tolerance limit of IS: 12207-2014.
- iii) The maximum equivalent crankshaft torque was recorded as **64.9 N-m** against the declaration of **65.8 N-m**, which is within the tolerance limit of IS: 12207-2014.
- iv) The backup torque is **26.5 %**.



16.4.1.2 Hydraulic Performance:

- i) The moment about rear axle with standard frame was calculated as **5.28 kN-m**. Whereas, the moment about front axle was calculated as **4.82 kN-m** under standard ballasted condition. The moment about rear axle is on higher side as compared to the moment about front axle under standard ballasted condition. It is, therefore, recommended that the lifting capacity of the hydraulic system may be reduced suitably or ballast recommendation may be reviewed to avoid the front lifting of the tractor.

16.4.1.3 Mechanical Vibration:

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

16.4.1.4 Three Point Linkage:

Some of the parameters of three point linkages conform to Cat I and some of them conform to Cat. 1N. Keeping in view the spirit of standardization, necessary improvements may be incorporated.

16.4.1.5 Linkage Drawbar:

The some of the parameters of linkage drawbar meet to the Cat.I and some of Cat. 1N of IS 12953 (Part-I): 1990. This should be looked into for necessary corrective action.

16.4.1.6 Specifications of Power Take-off Shaft:

The dimension "d ϕ " of PTO shaft Refer Fig.2 (a) of PTO shaft does not meet the requirement of IS: 4931:1995. This should be looked into for corrective action.

16.5 Field and haulage test:

16.5.1 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).

16.5.2. Haulage test:

Fuel consumption, (ml/km/ton) was recorded as **89.30 to 89.80 ml/km/ton** against the declaration of **84 \pm 5 ml/km/ton**, which does not meet the requirement of IS: 12207-2014. This should be looked into for necessary corrective action.

16.6 Maintenance / Service Problems:

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

16.7 Recommendation with regard to safety on tractor:

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

- i) Provision of spark arrester in the exhaust system.
- ii) Working clearance between the position and draft control lever of hydraulic is less than the minimum requirement.
- iii) Rear wheel are not covered fully.
- iv) Suspension system should be provided in the operator's seat.
- v) There should be provision of master shield.

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

- 16.8.1 The following literature has been supplied with the tractor for reference during the testing.
- i) Operator' of KUBOTA A211N, A211N-Optional, B2441 & B2741 tractors.
 - ii) Spare part's catalogue of KUBOTA A211N-Optional, A211N, B2441 & B2741 tractors.
 - iii) Service manual of KUBOTA A211N-Optional, A211N, B2441 & B2741 tractors.
- 16.8.2 The supplied literature was found adequate, **except the following:-**
- i) This oil change period should be examined as the present available lubricants require longer change periods.
- 16.8.3 These literatures may also be brought out in national & other regional languages for the guidance of user's and service personnel.

17. CITIZEN CHARTER

Duration of Test	Time frame for Testing & Evaluation as per Citizen Charter	Whether the Test Report is released within the time frame given in Citizen Charter	Remarks
07 Months (May, 2017 to November, 2017)	10 Months	Yes	--

TESTING AUTHORITY:

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Test report is compiled by: **Sh. Rajneesh Patel**, Agricultural Engineer.

18. APPLICANT'S COMMENTS

Para No.	Our Reference	Applicant's comments
		--None--