

संख्या / No. : T-1490/2017/2020

माह / Month : November, 2020

गोपनीय परीक्षण रिपोर्ट
CONFIDENTIAL TEST REPORT

व्यावसायिक परीक्षण रिपोर्ट में परिवर्तित
CONVERTED TO COMMERCIAL TEST REPORT

(यह परीक्षण रिपोर्ट 30/11/2023 तक वैध है। / THIS TEST REPORT IS VALID UP TO : 30/11/2023)



KUBOTA, B 2741S TRACTOR



सत्यमेव जयते

भारत सरकार

कृषि एवं किसान कल्याण मंत्रालय
कृषि, सहकारिता एवं किसान कल्याण विभाग
मशीनीकरण एवं प्रौद्योगिकी प्रभाग

GOVERNMENT OF INDIA

MINISTRY OF AGRICULTURE AND FARMERS WELFARE

(Department of Agriculture, Cooperation & Farmers Welfare, Mechanization & Technology Division)

केन्द्रीय कृषि मशीनरी प्रशिक्षण एवं परीक्षण संस्थान

ट्रैक्टर नगर, बुदनी (म.प्र.) ४६६ ४४५

CENTRAL FARM MACHINERY TRAINING & TESTING INSTITUTE

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Initially the applicant had submitted the application of “KUBOTA, B2741S” tractor for confidential test vide letter no. nil dated 23.12.2019. After releasing the draft test report, applicant had submitted a letter vide no. Nil dated 28.10.2020 for conversion of nature of test from confidential test to commercial test. The request of the applicant has been examined and accepted for conversion of nature of test as per relevant commercial test procedures. Hence, this confidential test report is released under commercial test.

Manufacturer : M/s. KUBOTA Corporation,
700/867 Moo 3, Amata Nakorn
Industrial Estate, Tambon Nonggakka,
Amphur Panthong, Chonburi, 20160-
Thailand.

Test requested by (applicant) : M/s. Kubota Agricultural Machinery
India Pvt. Ltd., Block No.94, Tower-1, 8th
Floor, TVH Belicia Towers, MRC Nagar,
Chennai-600 028 , Tamil Nadu , INDIA.

1. SPECIFICATIONS

- 1.1 Tractor:**
- Make : Kubota
 Model : B 2741S
 Variants, if any : None
 Brand name : None
 Type : Four wheeled, four wheel driven (4WD),
 General Purpose, Unit construction,
 Agricultural Tractor
- Year of manufacture : 10 | 18
 Chassis number : KBTB30TNHLTKPC001
 Country of Origin : Thailand
- 1.2 Engine:**
- Make : Kubota, Japan
 Model : D1305
 Type : Four strokes, liquid cooled, naturally
 aspirated, Indirect injection, diesel engine.
- Serial number : 1JN7228
- Engine speed (Manufacturer’s recommended production setting), rpm :**
- Maximum speed at no load : 2820
 - Low idle speed : 1050 to 1150
 - Speed at maximum torque : 1500 to 1900
- Rated speed, (rpm):**
- For PTO use : 2600
 - For drawbar use : 2600
- 1.3 Cylinder & Cylinder Head:**
- Number : Three
 Disposition : Vertical, Inline
 Bore/stroke, (mm) : 78 / 88
 Capacity as specified by the applicant, (cc) : 1261
 Compression ratio, (apa) : 24 : 1
 Type of cylinder head : Monoblock
 Type of cylinder liners : Wet, non replaceable
 Type of combustion chamber : Indirect combustion, Swirl chamber
 Arrangement of valves : Overhead, Inline

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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 / +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)	13.6	Yes
b)	Power at rated engine speed, (kW)	Non Evaluative	-do-	14.3 (D)	13.6	Yes
c)	Specific fuel consumption corresponding to maximum power, (g/kWh)	Non Evaluative	+ 10%	320 (D)	319	Yes
d)	Maximum equivalent crankshaft torque, (Nm)	Non Evaluative	± 8%	65.8 (D)	64.3	Yes
e)	Back-up torque, percent	Non Evaluative	12 percent, minimum.	25.3% (D) 12 % (R)	28.6	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.	140 (D)	118	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)	124	Yes
g)	Engine oil consumption, (g/kWh)	Evaluative	Not exceeding 1% of SFC at maximum power under High ambient conditions.	0.95 (D) 3.33 (R)	0.41	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 (R)	0.22 per meter	Yes

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1	2	3	4	5	6	7	
16.1.2	Drawbar performance :						
a)	Maximum drawbar pull with ballast corresponding to 15 percent wheel slip, (kN)	Non Evaluative	Minimum 70% of static mass of tractor with ballast.	5.5 (D) 5.70 (R) Minimum	7.79	Yes	
b)	Maximum drawbar pull without ballast 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.	5.0 (D) 4.56 (R) Minimum	6.16	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) 10.2 (R) Minimum	11.9	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	Evaluative	Tolerance of ± 10%	5.6 (D)	6.02	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.	3.4 (D) 3.2 (R) Minimum	4.40	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) Maximum	00	Yes	
16.1.4	Brake performance at 25 kmph/Max. attainable speed:						
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)	5.56	Yes
	2)	Hot brake	Evaluative	10 (R)	10 (D)	5.72	Yes
b)	Maximum force exerted on the brake pedal to achieve a deceleration of 2.5 m/s ² (N).	Evaluative	600 (R)	600 (D)	337 to 408	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	397	Yes	

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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)	77	Yes
b)	Maximum noise at operator's ear level dB(A)	Evaluative	As per CMVR	96 (R)	93	Yes
16.1.6	Amplitude of mechanical vibrations at :					
	1) Left foot rest	Non Evaluative	100 microns (max)	100 (D)	55	Yes
	2) Right foot rest			100 (D)	97	Yes
	3) Seat (with driver seated)			100 (D)	31	Yes
	4) Steering wheel			100 (D)	112	No
16.1.7	Air cleaner :					
	Max Air cleaner oil pull over (%)	Evaluative	0.25% (max)	Dry type air cleaner fitted	Not applicable	
16.1.8	Haulage requirements :					
a)	Gross mass of the trailers, (tonne):					
	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)	7.52 to 7.66	Yes
c)	Fuel consumption (ml/km/tonne):					
	1) Two wheel	Non Evaluative	--	84 ± 5 (D)	87.04 to 88.65	Yes
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)	Ingress of mud and or water was not observed in the identified assemblies.	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 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 as the rear track width is less than 1150 mm		Not applicable
d)	Technical requirements for PTO shaft	Evaluative	Should meet the requirements of IS 4931 (as amended from time to time)	Meets the requirement		Yes

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1	2	3	4	5	6	7
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	Evaluative	Should meet the requirements of IS 12953 (As amended from time to time)		Meets the requirement	Yes
g)	Specifications of swinging drawbar (wherever fitted)	Evaluative	Should meet the requirements of IS 12362 (Part 3) (As amended from time to time)		Not provided	Not applicable
h)	1) Maximum travelling speed at rated engine speed in reverse gears, Kmph	Evaluative	Should not exceed 20 Kmph		12.76 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 applicable	Not applicable
16.1.11	Labeling of tractors (Provision of labeling plate):					
	1) Make	Evaluative	Should conform to the requirements of CMVR along-with declared value of PTO 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		KUBOTA	Yes
	2) Model	Evaluative			B2741S	Yes
	3) Year of manufacture	Evaluative			10/18	Yes
	4) Engine serial number	Evaluative			IJN7228	Yes
	5) Chassis serial number	Evaluative			KBTB30TNHLTKP C001	Yes
	6) Declaration of PTO power, (kW)	Evaluative			14.3	Yes
	7) Specific fuel consumption, (g/kWh)	Evaluative			320	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 78.03	Yes
(b)	Clearance between piston & cylinder liner at skirt, (mm)	Non Evaluative		0.30	0.050 to 0.064	Yes
(c)	Piston diameter	Non Evaluative		77.85	77.96 to 77.97	Yes
(d)	Ring end gap (mm):					
	- Top comp. ring.	Evaluative	To be specified by the manufacturer and supported by printed literature	1.25	0.25 to 0.30	Yes
	- 2 nd comp. ring.			1.25	0.45 to 0.50	Yes
	- Oil ring			1.25	0.35 to 0.40	Yes
(e)	Ring groove clearance (mm):					
	- Top comp. ring.	Evaluative	-do-	--Tapped rings--		Yes
	- 2 nd comp. ring.		-do-	0.20	0.100	Yes
	- Oil ring.		-do-	0.15	0.035 to 0.040	Yes

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1	2	3	4	5	6	7	
(f)	Clearance of main bearings (mm):						
	-	Diametrical clearance	Evaluative	-do-	0.40	0.068 to 0.118	Yes
	-	Crankshaft end float	Evaluative	-do-	0.50	0.20	Yes
(g)	Clearance of big end bearings, (mm):						
	-	Diametrical	Evaluative	-do-	0.40	0.061 to 0.73	Yes
	-	Axial	Evaluative	-do-	0.50	0.25	Yes
(h)	Clearance between king pin and bush, (mm)	Non Evaluative	-do-	In place of king pin & bush bearing are provided.		Yes	
(i)	Clearance between center pin and bush, (mm)	Non Evaluative	-do-	0.45	0.10 to 0.13	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: 12207-2019	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 2 major breakdowns and neither of them is of repetitive nature.	None	Yes
3.	Minor	Evaluative	There are not more than 5 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 five that is, (1 major + 4 minor) or 5 minor breakdowns.	None	Yes

16.4 Salient Observations:

16.4.1 Laboratory tests:

16.4.1.1 PTO Performance:

- i) The maximum PTO power was recorded as **13.6 kW** against the declaration of **14.3 kW**, which meets the requirement of IS: 12207-2019 as regard to tolerance limit.
- ii) The specific fuel consumption corresponding to maximum power was recorded as **319 g/kWh** against the declaration of **320 g/kWh** which meets the requirement of IS:12207-2019 as regard to tolerance limit..
- iii) The maximum equivalent crankshaft torque was recorded as **64.3 N-m** against the declaration of **65.8 N-m**, which meets the requirement of IS: 12207-2019 as regard to tolerance limit.
- iv) The backup torque is **28.6 %** which meets the evaluative requirement of IS: 12207-2019.

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16.4.1.2 Drawbar performance test :

- i) Maximum drawbar power with unballast condition was recorded as **11.9 kW** against the minimum requirement of **10.2 kW** which meet the requirement of IS: 12207-2019 as regard to tolerance limit.

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 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.

16.5 Field test :

During the dry land operation (rotavation operation) the fan belt of radiator (cooling system) was broken. So, it was replaced with new one of same specification.

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).

16.6 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) Vertical retainness at inner side of clutch pedal should be provided.
- ii) Provision of spark arrester in the exhaust system.
- iii) Working clearance between the position and main gear shift lever is less than the minimum requirement.
- iv) Type of Suspension & dampening system should be provided in the operator's seat.
- v) There should be provision of master shield.
- vi) Fuel level positions in fuel level gauge should be provided.

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's manual of **KUBOTA A211N, A211N-Optional, B2441, B2741 & B2741S** tractors.
- ii) Illustrated part's catalogue of **KUBOTA A211N-Optional, A211N, B2441, B2741 & B2741S** tractors.
- iii) Workshop manual of **KUBOTA A211N-Optional, A211N, B2441, B2741 & B2741S** 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.

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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
09 Months (February, 2020 to October, 2020)	10 Months	Yes	---

TESTING AUTHORITY:

C.S. RAGHUWANSHI
AGRICULTURAL ENGINEER

C. V. CHIMOTE
TEST ENGINEER

J.J.R. NARWARE
DIRECTOR

Test report is compiled by: **Sh. Shivkumar Sharma**, Senior Technical Assistant.

18. APPLICANT'S COMMENTS

Para no.	Our reference	Comments
18.1	16.5	We would look into the cause of fan belt & if necessary then take a necessary action through our R&D consultation.

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ANNEXURE-I

BRIEF SPECIFICATION OF IMPLEMENTS USED DURING FIELD TEST

S. No.	Parameters	MB Plough	Rotavator
1	Make	Mahindra & Mahindra	Kubota
2	Type	Mounted	Mounted
3	No. of Discs / Blades	Two	20 in 5 flanges
4	Type of Bottom / Blades	General purpose	Hatchet
5	Size of Bottom / Blades (mm)	255	230 x 60 x 6.5
6	Spacing of Bottom /Flanges, (mm)	170	258
7	Lower hitch point span, (mm)	480	485
8	Mast height, (mm)	375	380
9	Overall Dimensions (mm):		
	Length	1035	955
	Width	760	1460
	Height	840	925
10	Gross Mass, (Kg)	95	205

ANNEXURE-II

TRACTOR RUN HOURS DURING TEST

A.	LABORATORY AND TRACK TESTS:	HOURS
1.	Running-in	--
2.	PTO performance test	11.6
3.	Power lift and hydraulic pump performance test	2.5
4.	Drawbar performance test	19.0
5.	Turning ability	0.2
6.	Location of centre of gravity	0.2
7.	Operator's field of vision	0.2
8.	Brake test	1.5
9.	Noise measurement	1.7
10.	Mechanical vibration test	0.8
11.	Theoretical speed test	1.4
B.	FIELD TEST:	
1.	MB ploughing	10.1
2.	Rotavation	10.2
3.	Wetland cultivation (including water proof)	15.2
C.	HAULAGE TEST:	8.4
D.	Miscellaneous test and other run hours including idle run, transportation, trials and preparation for test	5.2
	TOTAL:	90.7