

व्यावसायिक परीक्षण रिपोर्ट (द्वितीय बैच परीक्षण)
COMMERCIAL TEST REPORT (Second Batch Test)

संख्या/No. : T- 1731/2262/2023
माह/Month : May, 2023

[Application Reference No-28/2022-23/31]

(यह परीक्षण रिपोर्ट 31/05/2030 तक वैध है/THIS TEST REPORT IS VALID UPTO 31/05/2030)



KUBOTA B2441 TRACTOR



भारत सरकार

कृषि एवं किसान कल्याण मंत्रालय
(कृषि एवं किसान कल्याण विभाग)

GOVERNMENT OF INDIA

MINISTRY OF AGRICULTURE AND FARMERS WELFARE
(DEPARTMENT OF AGRICULTURE & FARMERS WELFARE)

केन्द्रीय कृषि मशीनरी प्रशिक्षण एवं परीक्षण संस्थान

ट्रैक्टर नगर, बुदनी (म.प्र.) 466 445

CENTRAL FARM MACHINERY TRAINING & TESTING INSTITUTE

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

(An ISO 9001: 2015 Certified Institute)

e-mail: fmti-mp@nic.in Web site: fmttibudni.gov.in Telephone: 07564-299003

T- 1731/2262/2023	KUBOTA B2441 Tractor - Commercial (Second Batch Test)
	THIS TEST REPORT IS VALID UPTO: 31/05/2030

3. RUNNING-IN

As per the recommendation of the applicant, running-in was conducted for a duration of 50.0 hours consisting of engine running-in prior to start of test.

- 3.1 Engine running -in** : Engine running-in was conducted for duration of 50 hours consisting of 1 cycle, each of 2,8,8,8 & 24 hours duration at the recommended load.
- 3.2 Transmission running-in** : Not recommended

4.SPECIFICATIONS

- 4.1 Tractor:**
- Make : Kubota
 Model : B2441
 Brand name : None
 Variants. If any : None
 Type : Four wheeled drive, standard agricultural tractor
 Month & Year of manufacture : 05 & 22
 Chassis number : KBTB20TNLNTE39461
 Country of origin : Thailand
- 4.2 Engine:**
- Manufacture : Kubota corporation 1-2-47, Shikitsu-Hingashi, Naniwa-ku,Osaka,556-8601, Japan
 Make : Kubota, Japan
 Model : D1105
 Type : Four stroke, naturally aspirated, in-direct injection, liquid cooled, diesel engine
 Serial number : 1MZ4714
 Year of manufacture : 2022
 Country of origin : Japan
- 4.2.1 Engine speed (rpm), (Manufacturer's recommended production settings):**
- Maximum speed at no load : 2720 to 2820
 - Low idle speed : 1050 to 1150
 - Speed at maximum torque : 1600 to 1800
- Rated speed, (rpm):**
- For PTO use : 2600
 - For drawbar use : 2600
- 4.3 Cylinder & Cylinder Head:**
- Number : Three
 Disposition : Vertical inline
 Bore/stroke, (mm) : 78/78.4 (apa)
 Capacity as specified by the applicant, (cc) : 1123
 Compression ratio : 24 :1
 Type of cylinder head : Mono-block
 Type of cylinder liners : Wet, Non-replaceable
 Type of combustion chamber : In-direct combustion, Swirl chamber on piston crown
 Arrangement of valves : Overhead, inline
- Valve clearance (cold):**
- Inlet valve, (mm) : 0.145 to 0.185
 - Exhaust valve, (mm) : 0.145 to 0.185

T- 1731/2262/2023	KUBOTA B2441 Tractor - Commercial (Second Batch Test)
	THIS TEST REPORT IS VALID UPTO: 31/05/2030

17. SUMMARY OF OBSERVATIONS, COMMENTS & RECOMMENDATIONS

17.1 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:

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
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: $\pm 5\%$ for PTO power or engine power >26 kW, $\pm 10\%$ for PTO power or Engine power ≤ 26 kW.	13.0 (D)	13.1	Yes
b)	Power at rated engine speed, (kW)	Non-Evaluative	-do-	13.0 (D)	13.1	Yes
c)	Specific fuel consumption corresponding to maximum power, (g/kWh)	Evaluative	+ 10% maximum	314 (D)	311	Yes
d)	Maximum equivalent crankshaft torque, (Nm)	Non-Evaluative	$\pm 8\%$	58.3 (D)	57.1	Yes
e)	Back-up torque, percent, (%)	Evaluative	12 %	22.2 (D)	18.7	Yes
f)	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.	130 (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)	117	Yes
g)	Engine oil consumption, (g/kWh)	Evaluative	Not exceeding 1% of SFC at max. power under High ambient conditions	3.15 Maximum (R)	1.04	Yes
h)	Smoke level	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 Maximum (R)	0.46	Yes

T- 1731/2262/2023	KUBOTA B2441 Tractor - Commercial (Second Batch Test)
	THIS TEST REPORT IS VALID UPTO: 31/05/2030

1	2	3	4	5	6	7	
17.1.2	Drawbar performance :						
a)	Maximum drawbar pull with ballast corresponding to 15 percent wheel slip, (kN)	Non-Evaluative	Minimum 70% of static mass with ballast	5.50 (D)	7.98	Yes	
				5.97 (R) Minimum			
b)	Max. drawbar pull without ballast corresponding to 15 percent wheel slip, (kN)	Evaluative	Minimum 70% of static mass of tractor without ballast	5.00 (D)	6.21	Yes	
				4.05 (R) Minimum			
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.	10.4 (D)	11.5	Yes	
				9.8 (R) Minimum			
d)	Maximum transmission oil temperature (°C)	Evaluative	The declared value should not exceed the maximum value specified by oil company	120 (D)	108	Yes	
17.1.3	Power lift and hydraulic pump performance:						
a)	Maximum lifting capacity throughout the range of lift, (kN):						
	1)	At hitch points	Evaluative	±10%	6.0 (D)	5.54	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	3.20 (D) 3.08 (R) Minimum	4.07	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	The observed value should not exceed 50 mm	11 (D)	00	Yes	
				50 (R) Maximum			

T- 1731/2262/2023	KUBOTA B2441 Tractor - Commercial (Second Batch Test)
	THIS TEST REPORT IS VALID UPTO: 31/05/2030

1	2	3	4	5	6	7
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 unballasted, (m):					
	1) Cold brake	Evaluative	10	10 (R)	5.16	Yes
	2) Hot brake	Evaluative	10	10 (R)	5.37	Yes
b)	Maximum force exerted on the brake pedal to achieve a deceleration of 2.5 m/s ² (N)	Evaluative	600	600 (R) Maximum	319 to 339	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	Yes	Yes
17.1.5	Noise measurement:					
a)	Maximum ambient noise emitted by the tractor dB(A)	Evaluative	As per CMVR	88(R)	77	Yes
b)	Maximum noise at operator's ear level dB(A)	Evaluative	As per CMVR	96(R)	91	Yes
c)	Amplitude of mechanical vibrations at:					
	1) Left foot rest	Non-Evaluative	100 microns (max)	100(R)	60	Yes
	2) Right foot rest				60	Yes
	3) Seat (with driver seated)				90	Yes
	4) Steering wheel				140	No
17.1.6	Air cleaner:					
	Air cleaner oil pull over, (%)	Non-Evaluative	0.25 % (maximum)	Dry type air cleaner is provided	Not applicable	--
17.1.7	Haulage requirements:					
a)	Gross mass of the trailers, (tones):					
	1) Two wheel	Non-Evaluative	--	1.5 (D)	1.5	Yes
b)	Distance travelled / liter of fuel consumption, (km/l):					
	1) Two wheel	Non-Evaluative	--	6.8 to 8.8 (D)	7.95 to 8.03	Yes
c)	Fuel consumption (ml/km/tonne):					
	1) Two wheel	Non-Evaluative	--	79 to 89 (D)	83.01 to 83.82	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 (R)	The major breakdowns were not observed in the field test during initial commercial testing of this tractor model having test report No. T-894/1409/2013 (November,2013). So, as per the provision as laid down in clause 7.2 of IS: 12207- 2019, the field test during the batch testing of this tractor model was not conducted.	--
	1) Clutch assembly	-do-				
	2) Brake housings	-do-				
	3) Front axle hubs	-do-				
	4) Engine Oil	-do-				
	5) Transmission Oil	-do-				

T- 1731/2262/2023	KUBOTA B2441 Tractor - Commercial (Second Batch Test)
	THIS TEST REPORT IS VALID UPTO: 31/05/2030

1	2	3	4	5	6	7
17.1.9	Safety features:					
a)	Guards against moving and hot parts	Evaluative	Belt drives, pullies, silencer, hydraulic pipes (As per IS 12239 (Part2))	Meets the requirement		Yes
b)	Lighting arrangement	Evaluative	As per CMVR	Meets the requirement		Yes
c)	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)	Not applicable as the rear track width of the tractor is less than 1150 mm.		Not applicable
d)	Technical requirements for PTO shaft	Non-Evaluative	Should meet the requirements of IS: 4931 (As amended from time to time)	Meets the requirement		Yes
e)	Dimensions of three-point linkage	Non-Evaluative	Should meet the requirements of IS: 4468 (Part-I) (As amended from time to time)	Does not meet the requirement		No
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
	Swinging drawbar			Not Provided		--
17.1.10	Labelling of tractors (Provision of labelling plate):					
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.	Kubota		Yes
2)	Model	Evaluative		B2441		Yes
3)	Month & year of manufacturer	Evaluative		05 & 22		Yes
4)	Chassis number	Evaluative		KBTB20TNLNTE39461		Yes
5)	Engine number	Evaluative		1MZ4714		Yes
6)	Declaration of PTO power, (kW)	Evaluative		13.0		Yes
7)	Specific fuel consumption, (g/kWh)	Evaluative		314		Yes
17.1.11	Discard limit for:					
(a)	Cylinder bore diameter, (mm)	Evaluative	To be specified by the manufacturer and supported by the printed literature	78.15 (D)	78.002 to 78.010	Yes
(b)	Clearance between piston & cylinder liner at skirt, (mm)	Non-Evaluative		0.30 (D)	0.043 to 0.044	Yes
(c)	Piston diameter	Evaluative		-do-	77.85	77.965 to 77.967
(d)	Ring end gap, (mm):					
-	Top comp. ring.	Evaluative	-do-	1.25(D)	0.25 to 0.30	Yes
-	2 nd comp. ring.		-do-	1.25(D)	0.55 to 0.60	Yes
-	Oil ring.		-do-	1.25(D)	0.40	Yes
(e)	Ring groove clearance, (mm):					
-	Top comp. ring.	Evaluative	To be specified by the manufacturer and supported by the printed literature	0.20 (D)	-Tapered-	--
-	2 nd comp. ring.			0.20 (D)	0.093 to 0.094	Yes
-	Oil ring.			0.15 (D)	0.044 to 0.045	Yes

T- 1731/2262/2023	KUBOTA B2441 Tractor - Commercial (Second Batch Test)
	THIS TEST REPORT IS VALID UPTO: 31/05/2030

1	2	3	4	5	6	7
(f)	Clearance of main bearings, (mm):					
-	Diametrical clearance	Evaluative	-do-	0.20 (D)	0.068 to 0.085	Yes
-	Crankshaft end float	Evaluative		0.50 (D)	0.20	Yes
(g)	Clearance of big end bearings, (mm):					
(h)	- Diametrical	Evaluative	-do-	0.20 (D)	0.079 to 0.088	Yes
	- Axial	Evaluative	-do-	0.50 (D)	0.20 to 0.25	Yes
(i)	Clearance between king pin and bush, (mm)	Non-Evaluative	-do-	N.A.	Not applicable	--
(k)	Clearance between centre pin and bush, (mm)	Non-Evaluative	-do-	0.45 (D)	0.110 to 0.125	Yes
17.1.12	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
17.1.13	Fitment of Roll Over Protective Structures (ROPS):					
	For tractor having more than 1150 mm rear track width	Evaluative	ROPS should meet the requirement of IS:1182 or OECD code or equivalent International Standard		Not fitted	Not applicable
17.1.14	Standard Accessories	Evaluative	Trailer hitch, front tow hook, linkage drawbar should be provided with tractor		Provided	Yes
17.1.15	Accessories (optional)	Non Evaluative	Ballast weight, if fitted, should meet the requirement of CMVR		Provided	Yes
17.2	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- 1731/2262/2023	KUBOTA B2441 Tractor - Commercial (Second Batch Test)
	THIS TEST REPORT IS VALID UPTO: 31/05/2030

17.3 Salient Observations:

17.3.1 Laboratory tests:

17.3.1.1 Mechanical Vibration:

The amplitude of mechanical vibration on various assemblies marked as (*) in Chapter – 11 of this test report is on higher side. This calls for dampening down of vibrations especially on left foot rest, right foot rest, seat and steering wheel to improve the operational comfort and service life of components.

17.3.1.2 Three-point linkage:

- i) The lateral movement of lower hitch points, lateral distance from lower hitch point to centre line of the tractor of three-point linkage & transport height does not meet the requirements of IS:4468 (Part-I) – 1997. This should be looked into for necessary corrective action.
- ii) Some of the parameters of three-point linkages conform to Cat. 1N and some of them conform to Cat. I. Keeping in view the spirit of standardization, necessary improvements may be incorporated.

17.3.1.3 Operator's work place:

Operator's work place meets the requirements of IS: 12239 (Part-I) 2018, except the following:

- (i) Provision of vertical retainers at inner sides of clutch pedal.
- (ii) Provision of spark arresting device in the exhaust system.
- (iii) Working clearance around the position control, draft control lever, range selection lever & PTO engaging lever & 4WD engaging lever & RHS mudguard was measured 55,55 & 25 mm respectively against the minimum requirement of 70 mm.

17.4 Maintenance / Service Problems:

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

17.5 Recommendation with regard to safety on tractor:

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

- i) Grease lubricant type and frequency.
- ii) Colour code for engine revolution gauge, engine oil pressure, fuel level gauge & water temperature gauge has not been provided as per the requirement of IS: 6283-Part-2-2007.
- iii) Identification of hand control by colour coding of engine speed control, transmission control, parking brake (orange) & differential locks (yellow) has not been provided as per the requirement as laid down in Table – 5 of IS: 8133-2021.
- iv) The hand accelerator lever, when moved away from the operator (i.e., forward) decreases the engine speed, which does not meet the requirement as laid down in Table – 1 of IS: 8133-2021.
- v) PTO master shield has not been provided as per IS:12239 (Part-2).

All of the above should be looked into for necessary corrective action.

17.6 Adequacy of Literature supplied with machine:

17.6.1 Literature was supplied with the tractor for reference during the test.



- a) Operator's manual (For Kubota A211N, A211N-Optional, B2441 and B2741S tractors models).
- b) Illustration part's list (For Kubota A211N, A211N-Optional, B2441 and B2741S tractors models).
- c) Service manual (For Kubota A211N, A211N-Optional, B2441 and B2741S tractors models).

17.6.2 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:

- i) Service schedule and grade of steering oil.
- ii) Safe hitch height while using trailer.
- iii) Recommended tyre inflation pressure for road & field work.

T- 1731/2262/2023	KUBOTA B2441 Tractor - Commercial (Second Batch Test)
	THIS TEST REPORT IS VALID UPTO: 31/05/2030

TESTING AUTHORITY:

C. V. CHIMOTE TEST ENGINEER	
A.K. UPADHYAY DIRECTOR (I/C)	

Draft test report compiled by **Chanchlesh Singh Raghuwanshi**, Agricultural Engineer.

18. APPLICANT'S COMMENTS

Para no.	Our reference	Applicant comments
18.1	17.5	We will review the same with Kubota Engineering Team & if necessary, then will try to go for necessary correction.

T- 1731/2262/2023	KUBOTA B2441 Tractor - Commercial (Second Batch Test)
	THIS TEST REPORT IS VALID UPTO: 31/05/2030

ANNEXURE-I

BRIEF SPECIFICATION OF TRAILER DECLARED AS MATCHING TRAILER BY APPLICANT

S.No.	Parameters	Trailer
1.	Make & model of trailer	SAI FABS, Bangalore
2.	Type of trailer	Semi-Trailer
3.	Number of axles	Single
4.	Un laden weight of Trailer, kg	550
5.	Overall dimension of trailer, (mm)	
	Overall length	3165
	Overall width	1690
	Overall height	1100
	Wheel base	Not applicable
	Wheel track	1520
6.	Dimension of fitted Platform, (mm):	
	Length	2305
	Width	1630
	Height from ground	530
7.	Brakes of trailers	Not provided

ANNEXURE – II

TRACTOR RUN HOURS DURING TEST

A.	LABORATORY AND TRACK TESTS:	HOURS
1.	Running-in	50.0
2.	PTO performance test	11.2
3.	Power lift and hydraulic pump performance test	3.9
4.	Drawbar performance test	14.3
5.	Brake test	1.0
6.	Noise measurement	0.8
7.	Mechanical vibration test	0.8
8.	Theoretical speed test	1.4
B.	HAULAGE TEST:	8.3
C.	Miscellaneous test and other run hours including idle run, transportation, trials and preparation for test	3.0
	TOTAL:	91.7