

व्यावसायिक परीक्षण रिपोर्ट  
COMMERCIAL TEST REPORT (Variant)

श्रमा / No. : T - 1037/1562/2016  
माह / Month : September, 2016



**KUBOTA MU5501 4WD TRACTOR**



सत्यमेव जयते

भारत सरकार

**GOVERNMENT OF INDIA**

कृषि एवं किसान कल्याण मंत्रालय

(कृषि, सहकारिता एवं किसान कल्याण विभाग, मशीनीकरण एवं प्रौद्योगिकी प्रभाग)

**MINISTRY OF AGRICULTURE AND FARMERS WELFARE**

(Deptt. of Agriculture, Co-operation & Farmers Welfare, Mechanization & Technology Division)

केन्द्रीय कृषि मशीनरी प्रशिक्षण एवं परीक्षण संस्थान

**CENTRAL FARM MACHINERY TRAINING & TESTING INSTITUTE**

(An ISO : 9001 - 2008 Certified Institute)

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## 2. FUEL AND LUBRICANTS

**2.1 Fuel** : The High-speed diesel oil supplied by M/s Indian Oil Corporation Limited having density of 0.836 g/cc at 15°C was used.

**2.2 Lubricants:**

S. No.	Particulars	As recommended by the manufacturer	As used during the test
1.	Engine oil	SAE 10 W 30	As recommended
2.	Gearbox, differential, rear axle, rear final drive brake, steering and hydraulic system oil	Kubota UDT or SUPER UDT fluid	Oil originally filled in the systems were not changed
3.	Front axle and front final drive	Kubota UDT or SUPER UDT fluid or SAE 80-90	--do--
4.	Grease	NLGI-2 or NLGI-1	MP Grease

## 3. ESSENTIAL TESTS

### 3.1. SPECIFICATIONS

	<u>Base Model</u>	<u>Variant Model</u>
<b>3.1.1 Tractor:</b>		
Make	: Kubota	Kubota
Model	: MU5501	MU5501 4WD
Brand name, if any	: None	None
Type	: Four wheeled, Rear wheel driven (2WD), General purpose, Agricultural tractor.	Four wheel, Four wheel drive (4WD), General Purpose, Agricultural Tractor
Year of manufacture	: GG (i.e.July,2014)	FH (i.e.June, 2015)
Chassis number	: JKUM10SATGTGPB003	KBTM20TNHHTFPB008
Country of Origin	: Thailand	Thailand
<b>3.1.2 Engine:</b>		
Make	: Kubota Engine (Thailand) co., Ltd.(apa)	Kubota Engine (Thailand) co., Ltd.(apa)
Model	: V2403-M-DI-T	V2403-M-DI-T (a sticker is pasted on LHS of cylinder head)
Type	: Four strokes, Liquid cooled, Turbocharged, Direct injection, Diesel engine.	
Serial number	: BEE4301	BFC5626
<b>Engine speed (Manufacturer's recommended production setting)(rpm) :</b>		
- Maximum speed at no load	: 2450 to 2550	2450 to 2550
- Low idle speed	: 1025 to 1050	1025 to 1050
- Speed at maximum torque	: 1100 to 1500	1100 to 1500
<b>Rated speed, (rpm):</b>		
- For PTO use	: 2300	2300
- For drawbar use	: 2300	2300

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1	2	3	4	5	6
	h)	<b>Front wheel:</b>	Various configuration in base & variant models (refer para 3.18.1).		<b>Changed</b>
	i)	<b>Differential</b>			
		Reduction through crown wheel and bevel pinion	NA	2.3:1 (23/10T)	<b>Changed</b>
	j)	<b>Front final drive</b>			
		Type	NA	Crown wheel & bevel pinion	<b>Changed</b>
		Reduction through final drive	NA	5.1:1 (51/10T)	<b>Changed</b>
	k)	<b>Sheet metal:</b>			
		Style of bonnet & Fender			
		- Colour	Orange	Orange	No change
		-Decals (Sticker)	<b>KUBOTA MU5501</b>	<b>KUBOTA MU5501 4WD</b>	<b>Changed</b>
	l)	Unballasted mass of tractor, (kg)	2215	2440	<b>Changed</b>

## 6. SUMMARY OF OBSERVATIONS, COMMENTS & RECOMMENDATIONS

On the basis of test conducted the performance results have been summarized as evaluative (mandatory) and non – evaluative (not mandatory) parameters applicable for qualifying Minimum Performance Criteria as per clause-4 table-1 of Indian Standard **12207: 2014** for acceptance of tractor for the purpose of subsidies/NABARD financing for the applicable features for this tractor model.

### 6.1 Evaluative & Non Evaluative Parameters:

Sl. No.	Characteristic	Category (Evaluative / Non Evaluative)	Requirements as per IS: 12207-2014	Values declared by the applicant/ requirement		As observed		Whether Variant model meets the requirements (Yes/No)
				Base model	Variant Model	Base model	Variant model	
1	2	3	4	5 a	5 b	6 a	6 b	7
<b>5.1.1</b>	<b>PTO Performance :</b>							
<b>a)</b>	- Max. 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	35	35	34.5	36.4	Yes
<b>b)</b>	Specific fuel consumption corresponding to maximum power, (g/kWh)	Non Evaluative	± 5%	249	249	247	243	Yes

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1	2	3	4	5 a	5 b	6 a	6 b	7
<b>6.1.2 Drawbar performance :</b>								
<b>a)</b>	Maximum drawbar pull with ballast corresponding to 15 percent wheel slip, (kN)	Non Evaluative	Minimum 65% of static mass with ballast	20.08 (R) <small>Minimum</small> 24.6(D)	21.45 (R) <small>Minimum</small> 30.2(D)	22.86	31.42	Yes
<b>b)</b>	Max. 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.	14.12 (R) <small>Minimum</small> 18.8 (D)	15.55 (R) <small>Minimum</small> 23.0 (D)	20.04	22.82	Yes
<b>c)</b>	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.	27.6 (R) <small>Minimum</small> 29.3 (D)	29.1 (R) <small>Minimum</small> 33.5 (D)	30.8	31.0	Yes
<b>d)</b>	Maximum transmission oil temperature (°C)	Non Evaluative	The declared value should not exceed the maximum value specified by oil company	120	120	80	89	Yes
<b>6.1.3 Noise measurement:</b>								
<b>a)</b>	Maximum ambient noise emitted by the tractor, dB(A)	Evaluative	As per CMVR	88 (R)	88 (R)	80	81	Yes
<b>b)</b>	Maximum noise at operator's ear level, dB(A)	Evaluative	As per CMVR	96 (R)	96 (R)	94	94	Yes
<b>6.1.4 Labelling of tractors (Provision of labeling plate):</b>								
1)	Make	Evaluative	Should conform to the requirements of CMVR along-with declared value of PTO HP	--	Kubota			Yes
2)	Model	Evaluative		--	MU5501 4WD			Yes
3)	Year of manufacture	Evaluative		--	FH (i.e June, 2015 )			Yes
4)	Engine number	Evaluative		--	BFL 5626			Yes
5)	Chassis number	Evaluative		--	KBTM20TNHHTF PB008			Yes
6)	Declaration of PTO power, kW	Evaluative		--	35.0 @2300rpm	kW		

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<b>6.1.5 Literature (Submission to test agency)</b>						
<b>(a)</b>	Operator manual	Evaluative	Provided/ Not Provided	As per relevant IS Code (IS 8132)	Provided	Yes
<b>(b)</b>	Parts Catalogue	Evaluative	Provided/Not Provided	Provided	Provided	Yes
<b>(c)</b>	Workshop/Service manual	Evaluative	Provided/Not Provided	Provided	Provided	Yes

## **6.2 Salient Observations:**

### **6.2.1 Laboratory tests:**

#### **6.2.1.1 PTO Performance:**

- i) The maximum PTO power was observed as 36.4 kW against the declaration of 35.0 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 **243 g/kWh** against the declaration of **249 g/kWh**, which is within the tolerance limit of IS: 12207-2014.

#### **6.2.1.2 Drawbar performance:**

The creeping of LHS tyre over rim was recorded as 35 mm during 10 hours drawbar performance test. This should be looked into for necessary corrective action.

#### **6.2.1.3 Specifications of Power Take-off Shaft:**

The parameter  $d\emptyset$ , Refer Fig.2 (a) of PTO shaft does not meet the requirement of IS: 4931:1995. This should be looked into for necessary corrective action.

#### **6.2.1.4 Operator's Seat:**

Longitudinal distance from seat index point to centre of differential lock pedal and centre of steering control wheel of operator's seat does not meet the requirements of IS: 12343:1998 (Re-affirmed in March, 2009) and calls for necessary corrective action.

## **6.3 Maintenance / Service Problems:**

No noticeable maintenance or service problem was observed during the test. However, suitable provision for draining the sediments/water may be provided at the fuel tank.

## **6.4 Recommendation with regard to safety on tractor:**

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

- i) The spark arrester has not been provided in the exhaust system.
- ii) Coupling to attach trailer brakes should be provided.
- iii) Longitudinal distance from seat index point to centre of differential lock pedal and centre of steering control wheel of operator's seat should be within the limit for easy handling of tractor.
- iv) Provision of master shield for PTO shaft.
- v) Front tow hook should be provided.

## **6.5 Adequacy of Literature supplied with machine:**

### **6.5.1** The following literature has been supplied with the tractor

- a) Service Manual of KUBOTA MU5501 tractor.
- b) Parts Catalogue of KUBOTA MU5501 tractor.
- c) Operator's manual of KUBOTA MU5501 tractor.

**6.5.2** The literature should also be brought out as per IS: 8132-1999 (Reaffirmed in March, 2009) for the guidance of users and service personnel in national as well as regional languages for this model of tractor.



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The results of the tests carried out on variant model "KUBOTA MU5501 4WD Tractor" have been compared with those on base model "KUBOTA MU5501 Tractor" and found within the limit, as specified in Indian Standard: 12207-2014.

## 7. 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
4 Month (May , 2016 to August, 2016)	10 Months	Yes	None

## TESTING AUTHORITY:

 <b>RAJNEESH PATEL</b> AGRICULTURAL ENGINEER	 <b>C.V CHIMOTE</b> TEST ENGINEER	 <b>Y.K RAO</b> SENIOR AGRICULTURAL ENGINEER
 <b>J.J.R. NARWARE</b> DIRECTOR		

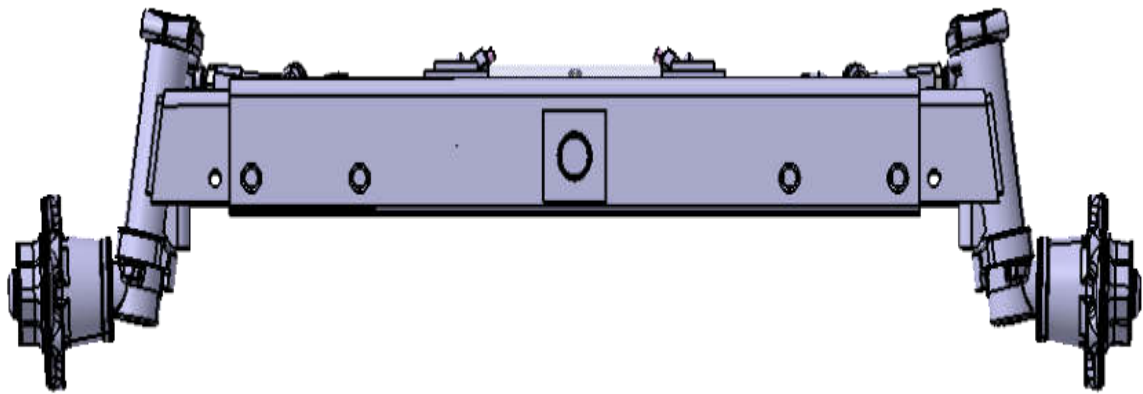
The report compiled by: Shri Rajneesh Patel, Agricultural Engineer.

## 8. APPLICANT'S COMMENTS

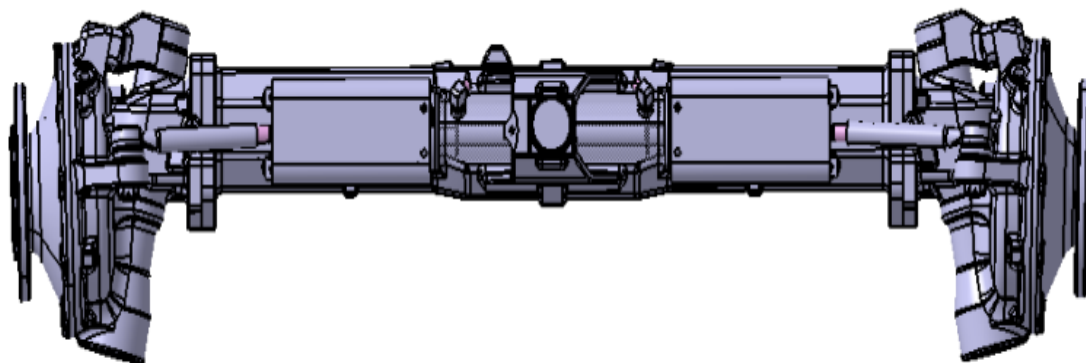
Para No.	Applicant's Comments
8.1	-Nil-

ANNEXURE-I

FRONT AXLE DESIGN ON BASE MODEL KUBOTA MU5501



FRONT AXLE DESIGN ON VARIANT MODEL KUBOTA MU5501 4WD

**ANNEXURE-II****TRACTOR RUN HOURS DURING TEST**

<b>A.</b>	<b>LABORATORY AND TRACK TESTS</b>	<b>HOURS</b>
1.	Running –in	--
2.	PTO Performance Test	2.92
3.	Drawbar Performance Test	15.50
4.	Noise Measurement	1.75
5.	Theoretical speed test	1.08
<b>B.</b>	Miscellaneous test and other run hours, including idle run transportation, trial and preparation for test.	3.40
	<b>Total</b>	<b>24.65</b>