व्यावसायिक वैरिएंट परीक्षण रिपोर्ट (प्रथम बैच) संख्या / No. : T-1502/2029/2020

COMMERCIAL VARIANT TEST REPORT (1st Batch) माह / Month : December, 2020

(यह परीक्षण रिपोर्ट 31/12/2025 तक वैध है। / THIS TEST REPORT IS VALID UP TO : 31/12/2025)

KUBOTA, MU4501 4WD 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

(An ISO : 9001 - 2015 Certified Institute)

Tractor Nagar, Budni (M.P.) 466 445

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Telephone : 07564 - 234729, 234743

	Compression ratio	:	20.2: 1
	Type of cylinder head	:	Monoblock
	Type of cylinder liners	:	Wet, Non-replaceable
	Type of combustion chamber	:	Direct Injection, Re-entrant cavity on piston crown.
	Arrangement of valves	:	Overhead, Inline
	Valve clearance (cold):		
	- Inlet valve, (mm)	:	0.18 to 0.22
	- Exhaust valve, (mm)	:	0.18 to 0.22
3.1.4	**Fuel System:**		
	Type of fuel feed system	:	Gravity and force feed
3.1.4.1	**Fuel tank:**		
	Capacity, (l)	:	64.5
	Location	:	Above clutch housing
	Provision for draining of sediments/ water	:	Not provided
	Material of fuel tank	:	Plastic
3.1.4.2	**Water separator:**	:	
	Make	:	Engine Tech Systems, India
	Type	:	Transparent, inverted funnel, gravity Separation
	Location	:	On RHS of engine, between fuel tank and fuel feed pump
3.1.4.3	**Fuel feed pump:**		
	Make	:	Kyosan-Denki, Japan (apa)
	Type	:	Diaphragm-operated cam drive
	Model/Group combination No.	:	Not available
	Provision of sediment bowl	:	Not Provided
	Method of drive	:	Through cam shaft of fuel injection pump
3.1.4.4	**Fuel filters:**		
	Make	:	Bosch
	Model/Group combination No.	:	F002 H20 139
	Number	:	Two
	Type of elements:		
	- Primary	:	Paper
	- Secondary	:	Paper
	Capacity of final stage filter, (l)	:	0.87
3.1.4.5	**Fuel Injection pump:**		
	Make	:	Bosch Corp., Japan (Zexel, Japan) (apa)
	Model/Group combination No.	:	NP-PFR4KX, 39438,1J890 510 12 (Part number)
	Type	:	Inline, plunger
	Location	:	On RHS of engine
	Serial number	:	1J876-51011
	Method of drive	:	Through timing gears

7. SUMMARY OF OBSERVATIONS, COMMENTS & RECOMMENDATIONS

7.1 On the basis of tests conducted the performance results have been summarized as evaluative (mandatory) and non-evaluation (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 obser-ved	Whether meets the require-ments (Yes / No)
1	2	3	4	5	6	7
7.1.1	**PTO Performance :**					
a)	Max. power under 2 h test, (kW) (Natural ambient condition)	Evaluative	Declared value to be achieved with a tolerance of: ± 5% for PTO power or engine power >26 kW, ± 10% for PTO power or Engine power ≤ 26 kW.	29.2 (D)	28.6	Yes
b)	Power at rated engine speed, (kW)	Non Evaluative	-do-	29.2 (D)	28.6	Yes
c)	Specific fuel consumption corresponding to maximum power, (g/kWh)	Evaluative	+ 10% Max.	249 (D)	263	Yes
d)	Maximum equivalent crankshaft torque, (Nm)	Non Evaluative	± 8%	152.8 (D)	139.9	**No**
e)	Back-up torque, percent	Evaluative	12 % (Minimum)	30 (D) 12 (R)	28.2	Yes
7.1.2	**Drawbar performance:**					
a)	Maximum drawbar pull with ballast corresponding to 15 percent wheel slip, (kN)	Non Evaluative	Minimum 70% of static mass with ballast	24.24 (D) 18.12 Minimum (R)	24.04	Yes
b)	Maximum drawbar pull with unballast or standard ballast corresponding to 15 percent wheel slip, (kN)	Evaluative	Minimum 70% of static mass of tractor without / standard ballast	18.84 (D) 14.00 Minimum (R)	19.12	Yes

1	2	3	4	5	6	7
c)	Maximum drawbar power with unballast or with standard ballast as the case may be, kW	Evaluative	Minimum 80 % of PTO power as referred in Sl No. i) a) of PTO performance in case of tractors having total static mass > 1500 kg Minimum 75 % of PTO power as referred in Sl 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 Sl No. i) a) of engine performance in case of tractors which do not have a PTO shaft.	25.11 (D) 22.9 Minimum (R)	25.5	Yes
d)	Maximum transmission oil temperature (^{o}C)	Evaluative	The declared value should not exceed the maximum value specified by oil company	120 (D)	81	Yes
7.1.3	**Noise measurement :**					
a)	Maximum ambient noise emitted by the tractor dB(A)	Evaluative	As per CMVR	88 (R)	80	Yes
b)	Maximum noise at operator's ear level dB(A)	Evaluative	As per CMVR	96 (R)	91	Yes
7.1.4	**Safety features :**					
a)	Guards against moving and hot parts	Evaluative	Belt drvies, pullies, silencer, hydraulics pipes(as per IS-12239 Part 2)	Meet the requirements		Yes
b)	Lighting arrangement	Evaluative	As per CMVR	Meet the requirements		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)	**Does not meet the requirements**		**No**
d)	Technical requirements for PTO shaft	Evaluative	Should meet the requirements of IS: 4931 (As amended from time to time)	Meet the requirements		Yes
e)	Dimensions of three point linkage	Non Evaluative	Should meet the requirements of IS: 4468 (Part-I) (As amended from time to time)	Meet the requirements		Yes
f)	Specifications of linkage drawbar	Evaluative	Should meet the requirements of IS 12953 (As amended from time to time)	Meet the requirements		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 appli-cable

1	2		3	4	5	6	7
h)	1)	Maximum travelling speed at rated engine speed in reverse gears, kmph	Evaluative	Should not exceed 20 kmph		13.43 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.		Not fitted	Not appli-cable
7.1.5	**Labelling of tractors (Provision of labelling plate):**						
	1)	Make	Evaluative	Should conform to the requirements of CMVR along with maximum declared value of PTO power in kW and for month & 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			MU4501 4WD	Yes
	3)	Month & Year of manufacture	Evaluative			02 / 20	Yes
	4)	Engine number	Evaluative			BLC0076	Yes
	5)	Chassis number	Evaluative			KBTM30TNHN TB52872	Yes
	6)	Declaration of PTO power, kW	Evaluative			29.2	Yes
7.1.6	**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
7.1.7	**Fitment of Roll Over Protective Structure (ROPS):** for tractors having more than 1150 mm rear track width		Evaluative	ROPS should meet the requirement of IS:11821 or OECD code or equivalent International Standard	Provided	Not Fitted	Not Appli-cable
7.1.8	**Standard accessories**		Evaluative	Trailer hitch, front tow hook, linkage drawbar should be provided with tractor	Provided	Provided	Yes
7.1.9	**Accessories (Optional)**		Non Evaluative	Ballast weights if fitted should meet the requirement of CMVR.	Provided	Provided	Yes

7.2	CATEGORY OF BREAKDOWNS / DEFECTS (As per clause 5.0 of IS:12207-2019) :				
S. No.	**Category of Breakdown**	**Category (Evaluative / Non Evaluative)**	**Requirements as per IS: 12207-2019**	**As observed**	**Whether meets the requirement (Yes/No.)**
1.	Critical breakdown	Evaluative	There is no 'critical breakdown' during the course of testing	None	Yes
2.	Major breakdowns	Evaluative	There are not more than 1 major breakdowns and neither of them is of repetitive nature	None	Yes
3.	Minor breakdowns	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

7.3 Salient Observations:

7.3.1 Laboratory tests:

7.3.1.1 PTO Performance:

i) The maximum PTO power was recorded as **28.6 kW** against the declaration of **29.2 kW,** which meets the requirement of IS: 12207-2019 with regard to tolerance limit.

ii) The specific fuel consumption corresponding to maximum power was recorded as **263 g/kWh** against the declaration of **249 g/kWh**, which is within the tolerance limit of IS: 12207-2019.

iii) The maximum equivalent crankshaft torque was recorded as **139.9 N-m** against the declaration of **152.8 N-m**, which is not within the permissible limit as specified in IS: 12207-2019. This should be looked into for necessary corrective action.

iv) The backup torque is **28.2 %** and meets the requirement of IS: 12207-2019

7.3.1.2 Drawbar Performance:

i) The maximum drawbar pull with standard ballast condition corresponding to 15 % wheel slip was recorded as **19.12 kN** against the declaration of **18.84 kN** which meets the requirement of IS: 12207-2019 with regard to tolerance limit.

ii) The maximum drawbar power with standard ballasted condition was recorded as **25.5 kW** against the declaration of **25.11 kW**, which meets the requirement of IS: 12207-2019 with regards to tolerance limit.

iii) During ten hours drawbar performance test, creeping of LHS & RHS rear tyre over the rims was recorded as **35 & 40 mm** respectively. This should be looked into for necessary corrective action.

7.3.1.3 Operator's seat:

The dimensions of longitudinal distance from centre of differential lock pedal and steering control wheel to Seat Index Point does not meet the requirement of the IS: 12343 -1998 (Re-affirmed in 2014). This should be looked into for necessary corrective action.

7.4 Maintenance / Service Problems:

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

7.5 Recommendation with regard to safety on tractor:

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

i) Longitudinal distance from centre of differential lock pedal to seat index point is recorded as 160 mm against the requirement of 355 to 770 mm. It should be provided as per IS: 12343-1998, (Re-affirmed in 2014)

ii) Longitudinal distance from centre of steering control wheel to seat index point is recorded as 550 mm against the requirement of 425 to 525 mm. It should be provided as per IS: 12343-1998, (Re-affirmed in 2014)

iii) Spark arrester is not provided in the exhaust system. It should be provided as per IS:12239 (Part-2)-1999 (Re-affirmed in 2014).

iv) Master shield around the PTO shaft has not been provided. It should be provided as per IS:4931-1995 (Re-affirmed in 2014).

v) The working clearance between position and draft control lever of hydraulic system was recorded as 45 mm against the minimum requirement 70 mm. It should be provided as per IS:12239 (Part-2)-1999 (Re-affirmed in 2014).

7.6 Adequacy of Literature:

7.6.1 Following literature of following tractor models were supplied with the test sample for reference during the test.

a) Service Manual of KUBOTA MU4501 & KUBOTA MU4501 4WD tractor models

b) Parts Catalogue of KUBOTA MU4501 & KUBOTA MU4501 4WD tractor models

c) Operator's manual of KUBOTA MU4501 & KUBOTA MU4501 4WD tractor models

7.6.2 The literature should be brought out in national as well as other regional languages of India for guidance of users.

The results of the tests carried out on variant model **"Kubota, MU4501 4WD"** tractor have been compared with those on base model **"Kubota, MU4501"** tractor tested vide test report No. **T-1480/2007/2020 (September, 2020)** and found within the limit, as specified in IS: 12207-2019.

8. CITIZEN CHARTER

Time frame for Testing & Evaluation as per Citizen Charter	Duration of Test	Whether the Test Report is released within the time frame given in Citizen Charter	Remarks
10 Months	05 Months (August, 2020 to December, 2020)	Yes	None

TESTING AUTHORITY:

RAJNEESH PATEL
AGRICULTURAL ENGINEER

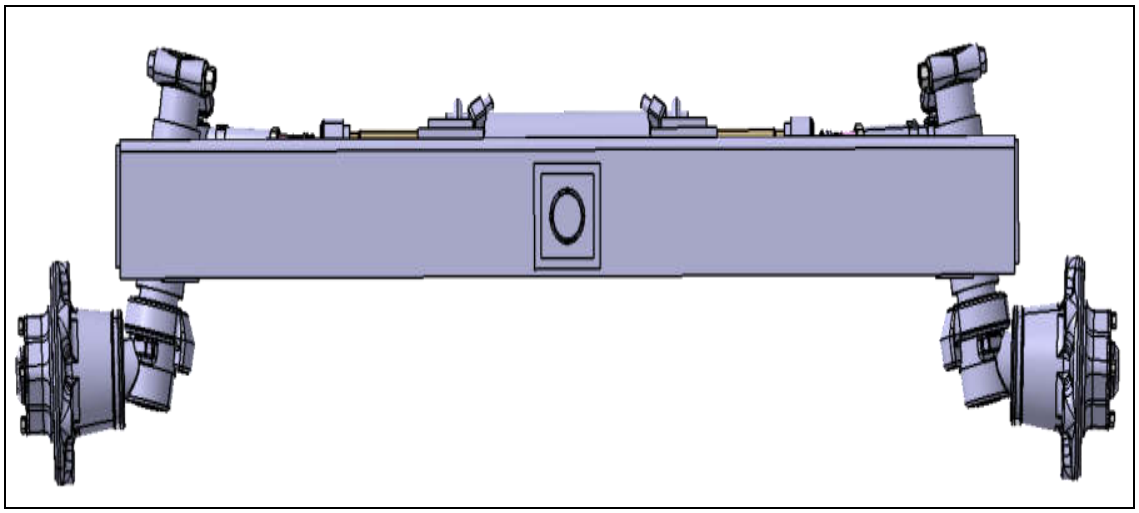
C.V. CHIMOTE
TEST ENGINEER

J.J.R. NARWARE
DIRECTOR

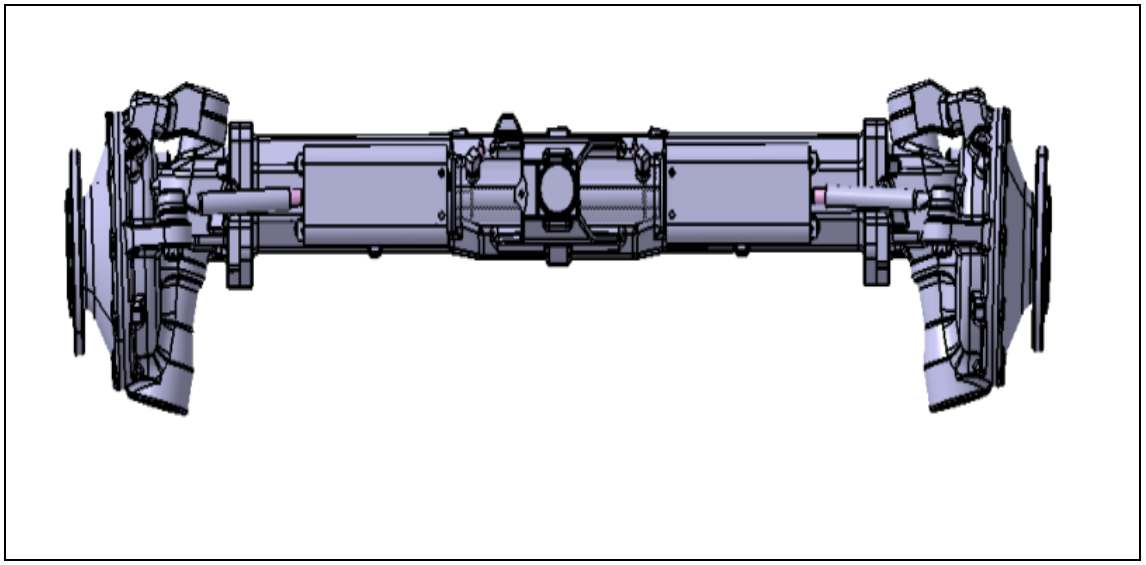
9. APPLICANT'S COMMENTS

Para No.	Our Reference	Applicant's comments
--Nil--		

ANNEXURE-I



FRONT AXLE DESIGN ON BASE MODEL KUBOTA MU4501



FRONT AXLE DESIGN ON VARIANT MODEL KUBOTA MU4501 4WD

ANNEXURE – II

TRACTOR RUN HOURS DURING TEST

A.	LABORATORY AND TRACK TESTS	HOURS
1.	Running-in	50.53
2.	PTO performance test	3.80
3.	Drawbar performance test	14.89
4.	Noise measurement test	0.98
5.	Nominal speed test	1.64
C.	Miscellaneous test and other run hours including idle run, transportation, trials and preparation for test	2.05
TOTAL:		**73.89**