

प्रारंभिक व्यावसायिक परीक्षण रिपोर्ट
INITIAL COMMERCIAL TEST REPORT

संख्या/No. : T- 1819/2350/2024
माह/Month : February, 2024

Application Reference No. 28/2022-23/149

(यह परीक्षण रिपोर्ट - 28/02/2029 तक वैध है / THIS TEST REPORT IS VALID UPTO - 28/02/2029)



Make of Agricultural Tractor : MAHINDRA
Model : 215 V1
Manufactured by : Mahindra & Mahindra Limited
(Farm Equipment Sector)
Mahindra Research Valley, Mahindra
World City, Plot no. 41/1, Anjur P.O.,
District Chengalpattu - 603004.



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

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IMPORTANT INFORMATION

The Government of India, Ministry of Agriculture and Farmers' Welfare has directed, vide a OM No. 13-17/2021-M&T(I&P) dated 28.07.2022, that since 15th August, 2022, only mandatory tests will be carried out on a tractor unless applicant has expressly requested for optional tests as well, mentioned in the above captioned OM.

In the instant case, there is no request from the applicant to carry out the optional tests hence only Mandatory Tests, as given below, have been conducted and reported in this report:-

1. PTO performance
2. Hydraulic performance
3. Drawbar performance
4. Brake performance

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- [C] **Tractor manufacturer's name and address** : **Mahindra & Mahindra Limited (Farm Equipment Sector)**
Mahindra Research Valley, Mahindra World City, Plot no. 41/1, Anjur P.O., District Chengalpattu - 603004.
- Deepak Diesel Pvt. Ltd.**
Survey no. 287/1, Shapar Village Main Road, Shapar (Veraval), Dist: Rajkot – 360024 (M/s. DDP Ltd. is contract manufacturer of M&M Ltd.)
- [C] Submitted for test by (Applicant) : The Manufacturer
- [C] Selected for test by : The Ministry vide OM No. 13-17/2021 - M&T (I&P) dated 28.07.2022, has allowed the applicant to submit the test sample directly to the Institute without requiring any random selection for Initial Commercial Testing. Thus, the applicant directly submitted the test sample to the Institute for test.
- [D] Place of running-in : At manufacturer's works
- [D] Duration of running-in, (h):
-Engine : 15
-Transmission : 30
- [C] Location of test : Government of India,
Central Farm Machinery Training and Testing Institute, P.O. - Tractor Nagar,
BUDNI - 466445 (M.P.), INDIA

1. SPECIFICATIONS OF TRACTOR

1.1 Identification:

1.1.1 Denomination

- [C] Make of tractor : Mahindra
- [C] Model : 215 V1
- [C] Type : Rear Wheel Drive, Standard Agricultural Tractor.
- [C] Month & year of manufacture : 01/23
- [D] Country of origin : India

1.1.2 Numbers:

- [D] 1st Serial No. or prototype : MBNZJEAXUPGK27018
- [C] Serial No. : MBNZJEAXUPGK27018

1.2 Engine:

- [D] Manufacturer's address : **Mahindra & Mahindra Ltd. (FES) at Deepak Diesel Pvt. Ltd.**
Survey no. 287/1, Shapar Village Main Road, Shapar (Veraval), Dist: Rajkot – 360024 (M/s. DDP Ltd. is contract manufacturer of M&M Ltd.)
- [C] Make : Mahindra
- [C] Model : FMW100
- [C] Type : Four-stroke, water cooled, naturally aspirated, direct injection, diesel engine.
- [C] Serial No. : GPK6BAA2953

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5. REPAIRS

S. No.	Adjustment/Defect/Breakdown and Repair	Tractor run hours
5.1	During lifting capacity at hitch point, leakage of hydraulic oil was observed from pressure pipe due to the breakage of pressure pipe ferrule (end). Upon this, the applicant vide letter No. FD/BVH/ICT/215V1/23-24/10 dated 13.12.2023 has requested to replace the "Pressure Pipe (pump to control valve)" causing the hydraulic oil leakage, which was allowed. Therefore, "Pressure Pipe" (Part No. 008002107B91, Quantity – 1 No.) was replaced with new one having same specification. This defect is categorized as Major defect (Mj-21) as per IS: 12207-2022.	23.5

6. SUMMARY OF OBSERVATIONS, COMMENTS & RECOMMENDATIONS

- 6.1 On the basis of test conducted the performance results have been summarized as evaluative (mandatory) / Non-evaluative (Non-mandatory) parameters applicable for Qualifying Minimum Performance criteria as per Clause-4 (Table-1) of IS: 12207-2022 for acceptance of the tractor for the purpose of subsidies/NABARD financing are summarized as under:

Sl. No.	Characteristic	Category (Evaluative / Non Evaluative)	Requirements as per IS: 12207-2022	Values declared by the applicant/ (D) Requirement (R)	As observed	Whether meets the requirements (Yes/No)
1	2	3	4	5	6	7
MANDATORY TESTS: (As per Ministry's Office Memorandum No. 13-17/2021-M&T (I&P) dated 28th of July, 2022).						
6.1.1	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 and or engine power > 26 kW. $\pm 10\%$ for PTO power and or engine ≤ 26 kW.	8.5 (D)	8.5	Yes
b)	Power at rated engine speed, (kW)	Non Evaluative	-do-	8.5 (D)	8.5	Yes
c)	Specific fuel consumption corresponding to maximum power, (g/kWh)	Evaluative	+ 10% max.	285 (D)	280	Yes
d)	Maximum equivalent crankshaft torque, (Nm)	Non Evaluative	$\pm 8\%$	40.5 (D)	47.4	No
e)	Back-up torque, percent	Evaluative	12% min.	12 (D) 12 (R)	34.3	Yes
f)	Maximum operating temperature, ($^{\circ}$ C):					
	1) Engine oil	Evaluative	The declared value should not exceed the max. value specified by the oil company and the observed value under natural ambient/high ambient condition should not exceed the declaration.	130 (D)	82	Yes

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1	2	3	4	5	6	7	
	2)	Coolant	Evaluative	Observed value should not exceed the declared value or boiling point of the coolant at radiator cap pressure whichever is lower. The boiling point of the coolant at radiator pressure shall be provided by the applicant.	112 (D)	76	Yes
g)	Engine oil consumption, (g/kWh)		Evaluative	Not exceeding 1% of SFC at max. Power under natural ambient conditions.	2.80 (R) Maximum	1.52	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 (R) Maximum	0.18	Yes
6.1.2	Drawbar performance:						
a)	Max. drawbar pull with ballast corresponding to 15 percent wheel slip, (kN)		Non Evaluative	Minimum 70% of static mass of tractor with ballast.	*	*	*
b)	Max. drawbar pull without ballasted 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.	5.40 (D) 5.39 (R) Minimum	8.00	Yes
c)	Maximum drawbar power without ballast/ with standard 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.	6.8 (D) 6.4 (R) Minimum	8.00	Yes
d)	Maximum transmission oil temperature, (°C)		Evaluative	The declared value should not exceed the maximum value specified by oil company.	110 (D)	63	Yes
*Applicant vide letter no. FD/BVH/ICT/215V1/23-24/03 dated 04.10.2023 has requested to conduct the testing as per the additional guideline for testing of tractors vide OM No. 13-32/2023-M&T (I&P) (FTS-125476) dated 16.05.2023. Accordingly, drawbar performance test under unballasted condition was conducted only.							
6.1.3	Power lift and hydraulic pump performance:						
a)	Maximum lifting capacity throughout the range of lift, (kN):						
	1)	At hitch points	Evaluative	Should not be less than 90% of declared value.	7.30 (D) 6.57 (R) Minimum	7.69	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.	4.40 (D) 2.00 (R) Minimum	4.77	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.	50 (D) Maximum	00	Yes

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1	2	3	4	5	6	7	
6.1.4	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	10 (R)	7.66	Yes
	2)	Hot brake	Evaluative	10	10 (R)	7.88	Yes
b)	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	
6.1.5	OPTIONAL TESTS: As the applicant has not applied for any optional tests, therefore no optional tests was conducted.						
6.1.6	Safety features:						
a)	Guards against moving and hot parts	Evaluative	Belt drives, pulleys, 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 (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 (Tractors rear track width is less than 1150 mm)	--		
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: 17231-2019 (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 (As amended from time to time)	Meets the requirement	Yes		
g)	Specifications of swinging drawbar (wherever fitted)	Non Evaluative	Should meet the requirement of IS: 12362 (Part 3) (As amended from time to time)	Not provided	Not applicable		
h)	Audible warning signal on tractor	Evaluative	If tractor travel speed in reverse gear exceeds 20 kmph, an audible warning signal on tractor shall get activated. A sticker to the effect that "operating the tractor beyond 20 kmph speed in reverse gear is not safe" should be prominently displayed.	Not provided	Not applicable		

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1	2	3	4	5	6	7	
6.1.7	Labelling of tractors (Provision of labeling plate):						
1)	Make	Evaluative	Should conform to the requirements of CMVR along with maximum PTO Power in kW, specific fuel consumption (SFC) corresponding to maximum power in g/kWh and year of manufacture in numerical form. <table border="1" style="margin: 5px auto; width: 100px; height: 20px;"> <tr> <td style="width: 50px;">MM</td> <td>YY</td> </tr> </table>	MM	YY	Mahindra	Yes
MM	YY						
2)	Model	Evaluative		215 V1	Yes		
3)	Month & Year of manufacture	Evaluative		01/23	Yes		
4)	Engine number	Evaluative		GPK6BAA2953	Yes		
5)	Chassis number	Evaluative		MBNZJEAXUPG K27018	Yes		
6)	Maximum PTO power, (kW)	Evaluative		8.5	Yes		
7)	Specific fuel consumption, g/kWh	Evaluative	285	Yes			
6.1.8	Literature (Submission to test agency):						
(a)	Operator manual	Evaluative	The printed literature in booklet form should be provided as per IS 8132 and should submit along with the test sample.	Provided	Yes		
(b)	Parts Catalogue	Evaluative		Provided	Yes		
(c)	Workshop/ Service manual	Evaluative		Provided	Yes		
6.1.9	Fitment of Roll Over Protective Structures (ROPS):						
	For tractor having more than 1150 mm rear track width	Evaluative if fitted	ROPS should meet the requirement of IS:1182 or OECD code or equivalent International Standard	Not fitted (Tractor rear track width is less than 1150 mm)	Not applicable		
6.1.10	Standard Accessories	Evaluative	Trailer hitch, front tow hook, linkage drawbar should be provided with tractor	Provided	Yes		
6.1.11	Accessories (optional)	Non Evaluative	Ballast weight, if fitted, should meet the requirement of CMVR	Not fitted	Not applicable		
6.2	CATEGORY OF BREAKDOWNS / DEFECTS (As per clause 5.0 of IS:12207-2022):						
S. No.	Category of break downs	Category (Evaluative / Non Evaluative)	Requirements as per IS: 12207-2022	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.	One*	Yes		
3.	Minor	Evaluative	Not more than five and neither of them should be repetitive in nature.	None	Yes		
4.	Total breakdowns	Evaluative	In no case, the total number of breakdowns should exceed five, that is, (2 major + 3 minor) or (1 major + 4 minor) or 5 minor breakdowns.	One	Yes		
* During lifting capacity at hitch point, leakage of hydraulic oil was observed from pressure pipe due to the breakage of pressure pipe ferrule (end). Upon this, the applicant vide letter No. FD/BVH/ICT/215V1/23-24/10 dated 13.12.2023 has requested to replace the "Pressure Pipe (pump to control valve)" causing the hydraulic oil leakage, which was allowed. Therefore, "Pressure Pipe" (Part No. 008002107B91, Quantity – 1 No.) was replaced with new one having same specification. This defect is categorized as Major defect (Mj-21) as per IS: 12207-2022.							

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6.3 Conformity with following IS:

- | | | | |
|-------|--|---|---|
| i) | Guidelines for declaration of power and specific fuel consumption and labeling of agricultural tractors (First revision) [IS:10273 -1987 (Reaffirmed Year 2019)] | : | Conforms |
| ii) | Agricultural tractors - Rear mounted power take-off - Types 1, 2 and 3 (third revision) [IS:4931-1995 (Reaffirmed Year 2019)] | : | Conforms |
| iii) | Agricultural wheeled tractors – Rear mounted three-point linkage: Part 2 Categories 1, 2, 3 & 4 (fourth revision) [IS:17231-2019] | : | Does not conform |
| iv) | Drawbar for agricultural tractors – Link type [IS 12953:1990 (Reaffirmed Year 2022)] | : | Conforms |
| v) | Agricultural tractors- Operator’s seat technical requirement [IS12343 - 2021] | : | Not applicable
<small>(Tractor rear track width is less than 1150 mm)</small> |
| vi) | Guide for safety & comfort of operator of agricultural tractors:Part 1 General requirements (first revision):[IS 12239 (Part 1) - 2018] | : | Does not conform |
| vii) | Tractors and machinery for agriculture and forestry – Technical means for ensuring safety Part 2: Tractors (first revision) (IS 12239 (Part 2) 1999) (Reaffirmed Year 2019)] | : | Does not conform |
| viii) | Guide lines for location and operation of operator controls on agricultural tractors and machinery [IS: 8133 - 2021] | : | Does not conform |
| ix) | Tractors and machinery for agriculture and forestry, powered lawn and garden equipment - Symbols for operator controls and other displays Part2 Symbols for agricultural tractors and machinery [IS: 6283(Part-1) - 2006 (Reaffirmed Year 2019) and IS: 6283 (Part-2) – 2007 (Reaffirmed Year 2019)] | : | Does not conform |
| x) | Agricultural Tractors and Machinery-Lighting device for travel on public roads (IS:14683-1999) (Reaffirmed Year 2019)] | : | Conforms |

6.4 Salient Observations:

6.4.1 Laboratory tests:

6.4.1.1 PTO Performance Test:

The maximum equivalent crankshaft torque was recorded as 47.4 N-m against the declaration of 40.5 N-m and does not meet the requirement of IS: 12207-2022. Even though this parameter is categorized as ‘Non-Evaluative’, as per IS:12207-2022, yet for the sake of improvement it would be advisable to look into the matter to make it conforming to the requirement.

6.4.1.2 Hydraulic performance test:

During lifting capacity at hitch point, leakage of hydraulic oil was observed from pressure pipe due to the breakage of pressure pipe ferrule (end). Upon this, the applicant vide letter No. FD/BVH/ICT/215V1/23-24/10 dated 13.12.2023 has requested to replace the “Pressure Pipe (pump to control valve)” causing the hydraulic oil leakage, which was allowed. Therefore, “Pressure Pipe” (Part No. 008002107B91, Quantity – 1 No.) was replaced with new one having same specification. This defect is categorized as **Major defect (Mj-21)** as per IS: 12207-2022.

6.4.1.3 Operator’s work place:

The following parameters does not meet the requirement of IS: 12239 (Part-I) 2018.

- i) Vertical retainer on inner side of clutch pedal was not provided
- ii) Spark arresting device has not been provided in the exhaust system
- iii) Master shield has not been provided.

Therefore, all of the above should be looked into for necessary corrective action.

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6.4.1.4 Three point linkage:

The dimensions viz. transport height & power range (without force) does not meet the requirements of IS 17231: 2019. This should be looked into for corrective action.

6.4.1.5 PTO master shield:

PTO master shield has not been provided on tractor. This should be looked into for necessary corrective action.

6.5 Maintenance / Service Problems:

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

6.6 Recommendation with regard to safety on tractor:

- i) Identification of control lever by colour has not been provided as per the requirement as laid down in Table - 5 of IS: 8133-2021.
- ii) 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.
- iii) Color code on illuminated display has not been provided as per the requirement as laid down in IS: 6283 (Part 2): 2007.
- iv) Provision of safety against accidental start of engine does not provided.
- v) Differential lock has not been provided.
- vi) The distance between engine stop control and start control was measured 240 mm against the maximum requirement of 150 mm.
- vii) The working clearance between draft control lever and mudguard was measured 10 mm against the minimum requirement of 70 mm.

Above parameters should be looked into for necessary corrective action.

6.7 Adequacy of Literature supplied with machine:

6.7.1 The following literatures were supplied with the test tractor for reference during the test: -




- a) Operator's Manual for "Mahindra 215 V1" tractor model.
- b) Parts catalogue for "Mahindra 215 V1" tractor model.
- c) Service manual for "Mahindra 215 V1" tractor model.

6.7.2 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) Tractor model was specified as Yuvraj 215 (pg. no. 1-1 & 11-2) & Yuvraj 215 DI (pg. no. 12-9).
- ii) Matching implements of tractor for different field operations.

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TEST CARRIED OUT AT C.F.M.T. & T.I., BUDNI (M.P.), INDIA
TESTING AUTHORITY

B.N. DIXIT AGRICULTURAL ENGINEER	
R.P. PANDEY SENIOR INSTRUMENTATION ENGINEER	
A. K. UPADHYAY DIRECTOR (I/C)	

Draft Test Report compiled by **Vithato Keyho**, Senior Technical Assistant.

7. APPLICANT'S COMMENTS

Para No.	Our reference	Applicant's comments
7.1	Clause no 5.1 & 6.4.1.2	This type of leakage is not noticed as of now at our customer's level. However, root cause analysis of leakage will be done once we receive the test sample and necessary corrective action will be taken accordingly.
7.2	Clause no. 6.7.2	Parameters will be studied and necessary action will be initiated.

ANNEXURE-I

TRACTOR RUN HOURS DURING TEST

A.	LABORATORY AND TRACK TESTS:	HOURS
1.	Running-in	Applicant has declared it to be conducted on their work place.
2.	PTO performance test	19.1
3.	Power lift and hydraulic pump performance test	0.9
4.	Drawbar performance test	2.6
5.	Brake performance test	1.0
6.	Nominal speed test	0.7
B.	Miscellaneous test and other run hours including idle run, transportation, trials and preparation for test.	8.7
TOTAL:		33.0