

व्यावसायिक परीक्षण रिपोर्ट (प्रथम बैच परीक्षण)

संख्या / No. : T-1577/2105/2021

COMMERCIAL TEST REPORT (First Batch Test)

माह / Month : August, 2021

(यह परीक्षण रिपोर्ट 31/08/2026 तक वैध है। / THIS TEST REPORT IS VALID UPTO : 31/08/2026)

[ONLINE TESTING]



## MAHINDRA, JIVO 245 DI TRACTOR



भारत सरकार

कृषि एवं किसान कल्याण मंत्रालय

(कृषि, सहकारिता एवं किसान कल्याण विभाग)

GOVERNMENT OF INDIA

MINISTRY OF AGRICULTURE AND FARMERS WELFARE

(DEPARTMENT OF AGRICULTURE, CO-OPERATION AND FARMERS WELFARE)

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The “**MAHINDRA, JIVO 245 DI**” tractor had undergone “Initial Commercial Test” at this Institute vide test report No. T-1112/1638/2017 released in October, 2017. Now the applicant has submitted online application No. 28/2020-21/8 dated 20.11.2020 for first batch testing of “MAHINDRA, JIVO 245 DI” tractor.

All necessary tests as per Table-1 of clause 6.0 of IS: 5994 - 1998 (Reaffirmed in 2019) were carried out and test report released as under.

<b>Manufacturer</b>	: M/s. Mahindra & Mahindra Ltd. (Farm Equipment Sector) Mahindra Research Valley Mahindra World City, Plot No. 41/1, Anjur P.O., Chengalpattu , Kanchipuram District , Tamilnadu,India – 603204.
<b>Location of manufacturing plants (apa)</b>	: M/s.Deepak Diesel Pvt.ltd. Survey no. 287/1, Shapar Village Main Road & Shaper (Veraval), Dist.Rajkot-360024 (Gujrat) (M/s.DDP ltd. is contract manufacturer of M&M ltd.)
<b>Test requested by (applicant)</b>	: The Manufacturer
Selected for test by	: Applicant
Place of running-in	: At manufacturer work place
Duration of said running-in, (h):	
- Engine	: 30
- Transmission	: 30
<b>Method of Selection</b>	: Due to Covid-19 pandemic, it was not possible to conduct the random selection. Nor was it possible for applicant to facilitate the random selection. As a last resort, applicant requested to allow the direct submission of test sample which was allowed

## 1. SPECIFICATIONS

<b>1.1 Tractor:</b>	
Make	: Mahindra
Model	: JIVO 245 DI
Brand name	: None
Variant, if any	: None
Type	: Four wheeled, 4WD, Unit construction, General purpose, Agricultural tractor.
Month & Year of manufacture	: 12 & 20
Chassis number	: MBNZKGBKFLGJ00001
Country of origin	: India
<b>1.2 Engine:</b>	
Make	: Mahindra
Model	: MDI 1365 NX24
Type	: Four stroke, naturally aspirated, water cooled, direct injection, diesel engine.
Serial number	: GLJ4WLA7224
Year of manufacture	: 2020 (apa)
<b>1.2.1 Engine speed (rpm), (Manufacturer’s recommended production settings):</b>	
- Maximum speed at no load	: 2500 to 2600
- Low idle speed	: 950 to 1150
- Speed at maximum torque	: 1300 to 1500
<b>Rated speed, (rpm):</b>	
- For PTO use	: 2300
- For drawbar use	: 2300

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### 15. SUMMARY OF OBSERVATIONS, COMMENTS & RECOMMENDATIONS

15.1 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 observ ed	Whether meets the require ments (Yes/No)
1	2	3	4	5	6	7
<b>15.1.1</b>	<b>PTO Performance:</b>					
a)	Max. 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 $\leq 26$ kW.	16.5 (D)	15.5	Yes
b)	Power at rated engine speed, (kW)	Non-Evaluative	-do-	16.5 (D)	15.5	Yes
c)	Specific fuel consumption corresponding to maximum power, (g/kWh)	Evaluative	+ 10% Max.	275 (D)	271	Yes
d)	Maximum equivalent crankshaft torque, (Nm)	Non-Evaluative	$\pm 8\%$	81 (D)	80	Yes
e)	Back-up torque, percent	Evaluative	12 percent	18 (D) 12 (R)	24.6	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 high ambient condition should not exceed the declaration.	130 (D)	124	Yes
	2) Coolant (liquid)	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.	112 (D)	108	Yes
g)	Engine oil consumption,(g/kWh)	Evaluative	Not exceeding 1% of SFC at max. power under High ambient conditions	1 % of SFC(D) 2.76 (R) Maximum	1.03	Yes
h)	Smoke level, ( $m^{-1}$ )	Evaluative	Maximum light absorption coefficient of 3.25 per meter or equivalent BOSCH No. 5.2 or 75 Hat ridge value (As per CMVR)	3.25 (R)	0.05	Yes

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1	2	3	4	5	6	7
<b>15.1.2 Drawbar performance:</b>						
a)	Maximum drawbar pull with ballast corresponding to 15 percent wheel slip, (kN)	Non-Evaluative	Minimum 70% of static mass with ballast	Ballasting not recommended by the manufacturer		Not applicable
b)	Maximum drawbar pull without ballast corresponding to 15 percent wheel slip, (kN)	Evaluative	Minimum 70% of static mass of tractor without/standard ballast	7.40 (D) 7.52 (R) Minimum	8.89	Yes
c)	Maximum drawbar power without ballast, or with standard ballast as the case may be, (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.	13.2 (D) 11.6 (R) Minimum	12.8	Yes
d)	Maximum transmission oil temperature (°C)	Evaluative	The declared value should not exceed the maximum value specified by oil company.	120 (D)	64	Yes
<b>15.1.3 Power lift and hydraulic pump performance :</b>						
a)	Maximum lifting capacity throughout the range of lift, (kN):					
	1) At hitch points	Evaluative	±10 percent	7.35 (D)	7.41	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	4.41 (D) 3.65 Minimum (R)	5.20	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	The observed value should not exceed 50 mm	50 (D) 50 (R) Maximum	05	Yes
<b>15.1.4 Brake performance at 25 kmph:</b>						
a)	Maximum stopping distance at a force equal to or less than 600 N on brake pedal with un ballast, (m):					
	1) Cold brake	Evaluative	10	10 (R)	8.1	Yes
	2) Hot brake	Evaluative	10	10 (R)	8.5	Yes
b)	Maximum force exerted on the brake pedal to achieve a deceleration of 2.5 m/s <sup>2</sup> (N)	Evaluative	600	600 (R)	330 to 420	Yes

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1	2	3	4	5	6	7
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 (R)	Yes	Yes
<b>15.1.5</b>	<b>Noise measurement :</b>					
a)	Maximum ambient noise emitted by the tractor dB(A)	Evaluative	88 dB(A) for >1.5 tonne GVW and 85 dB(A) for <1.5 tonne GVW (as per CMVR)	85 (R)	80	Yes
b)	Maximum noise at operator's ear level dB(A)	Evaluative	As per CMVR	96 (R)	96	Yes
<b>15.1.6</b>	<b>Amplitude of mechanical vibrations at :</b>					
1)	Left foot rest	Non-Evaluative	100 microns (max)	100 (R)	256	<b>No</b>
2)	Right foot rest		-do-		172	<b>No</b>
3)	Seat (with driver seated)		-do-		48	Yes
4)	Steering wheel		do-		227	<b>No</b>
<b>15.1.7</b>	<b>Air cleaner oil pull over :</b>					
	Maximum air cleaner oil pull over	Evaluative	0.25 % (max.)	Dry type air cleaner is fitted		Not applicable
<b>15.1.8</b>	<b>Haulage requirements :</b>					
a)	<b>Gross mass of the trailers, (tonne):</b>					
1)	Two wheel	Non Evaluative	As specified by the manufacturer	2.5 (D)	2.5	Yes
b)	<b>Distance travelled / litre of fuel consumption, (km/l):</b>					
1)	Two wheel	Non Evaluative	As specified by the manufacturer	7.79 (D)	7.66 to 7.95	Yes
c)	<b>Fuel consumption (ml/km/tonne):</b>					
1)	Two wheel	Non Evaluative	As specified by the manufacturer	42.8 (D)	50.29 to 52.22	<b>No</b>
<b>15.1.9</b>	<b>Wetland cultivation :</b>					
	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)	No ingress of water and / or mud was observed during ICT test vide test report no. T-1112/1638 /2017 (October,2017). So, as per clause 7.2 of IS:12207-2019, test was not conducted.	Yes
1)	Clutch assembly	-do-				
2)	Brake housings	-do-				
3)	Front axle hubs	-do-				
4)	Engine Oil	-do-				
5)	Transmission Oil	-do-				

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1	2	3	4	5	6	7
<b>15.1.10</b>	<b>Safety features :</b>					
a)	Guards against moving and hot parts	Evaluative	Belt drives, pulleys, 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)		Not applicable as the rear track width of tractor 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)		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 applicable
h)	1) Maximum travelling speed at rated engine speed in reverse gears, kmph	Evaluative	Should not exceed 20 Kmph		(6.41 kmph) Meet the requirements	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 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
<b>15.1.11</b>	<b>Labelling of tractors (Provision of labelling plate):</b>					
	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		Mahindra	Yes
	2) Model	Evaluative		JIVO 245 DI	Yes	
	3) Month & Year of manufacture	Evaluative		12 & 20	Yes	
	4) Engine number	Evaluative		GLJ4WLA7224	Yes	
	5) Chassis number	Evaluative		MBNZKGBFL GJ00001	Yes	
	6) Declaration of PTO power, kW (HP)	Evaluative		16.5(22.1)	Yes	
	7) Specific fuel consumption (g/kWh) (gm/hph)	Evaluative		275 (205)	Yes	

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1	2	3	4	5	6	7
<b>15.1.12</b>	<b>Discard limit for:</b>					
(a)	Cylinder bore diameter, (mm)	Evaluative	To be specified by Manufacturer	89.13	88.904 to 88.922	Yes
(b)	Clearance between piston & cylinder liner at skirt, (mm)	Non Evaluative		0.200	0.110 to 0.111	Yes
(c)	Piston diameter at skirt, mm	Non Evaluative		88.15	88.810 to 88.812	Yes
(d)	<b>Ring end gap (mm):</b>					
	- Top comp. ring.	Evaluative	-do-	2.5	0.35 to 0.40	Yes
	- 2 <sup>nd</sup> comp. ring.		-do-	2.5	0.50 to 0.60	Yes
	- Oil ring.		-do-	2.0	0.40 to 0.50	Yes
(e)	<b>Ring groove clearance (mm):</b>					
	- Top comp. ring.	Evaluative	-do-	0.30	Tapered ring	--
	- 2 <sup>nd</sup> comp. ring.	-do-	-do-	0.30	0.074 to 0.075	Yes
	- Oil ring.	-do-	-do-	0.20	0.055 to 0.057	Yes
(f)	<b>Clearance of main end bearings, (mm):</b>					
	- Diametrical	Evaluative	-do-	0.20	0.052 to 0.073	Yes
	- Crank shaft end float	Evaluative	-do-	0.60	0.10	Yes
(g)	<b>Clearance of big end bearings, (mm):</b>					
	- Diametrical	Evaluative	-do-	0.20	0.073 to 0.106	Yes
	- Axial	Evaluative	-do-	0.75	0.20	Yes
(h)	Clearance between king pin and bush,(mm)	Non Evaluative	-do-	Not applicable	Not applicable	--
(i)	Clearance between center pin and bush,(mm)	Non Evaluative	-do-	0.30	0.060 to 0.130	Yes
<b>15.1.13</b>	<b>Literature (Submission to test agency):</b>					
(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
<b>15.1.14</b>	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	Not Provided	Not fitted	Not applicable
<b>15.1.15</b>	Standard accessories	Evaluative	Trailer hitch, front tow hook, linkage drawbar should be provided with tractor	Provided	Provided	Yes
<b>15.1.16</b>	Accessories (Optional)	Non Evaluative	Ballast weights if fitted should meet the requirement of CMVR.	Not Provided	Not fitted	Not applicable

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15.2 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	No critical breakdown	None	Yes
2.	Major breakdowns	Evaluative	Not more than one and neither of them should be repetitive in nature	None	Yes
3.	Minor breakdowns	Evaluative	Not more than three and frequency of each should 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

**15.3 Salient Observations:**

**15.3.1 Laboratory tests:**

**15.3.1.1 PTO Performance Test:**

- i) The maximum power in case of previous & present sample were observed as 15.7 & 15.5 kW respectively, against the declaration of 16.5 kW, which meets the requirement of IS: 12207-2019 with regard to tolerance limit.
- ii) The specific fuel consumption corresponding to maximum power in case of previous & present sample was recorded as 262 & 271 g/kWh respectively against the declaration of 275 g/kWh, which meets the requirement of IS: 12207-2019 with regard to tolerance limit.
- iii) The maximum equivalent crankshaft torque in case of previous & present sample were recorded as 79.4 & 80.0 Nm against the declaration of 81.0 Nm, which meets the requirement of IS: 12207-2019 with regard to tolerance limit.
- iv) The backup torque was observed as 24.6 % and meets the evaluative requirement of IS: 12207-2019.

**15.3.1.2 Drawbar performance test:**

- i) Maximum drawbar pull in case of previous & present sample without ballast corresponding to 15 percent wheel slip, (kN) was recorded as 9.52 kN & 8.89 kN respectively which meets the requirement of IS: 12207-2019 with regard to tolerance limit.
- ii) Maximum drawbar power in case of previous & present sample without ballast condition was recorded as 14.9 kW & 12.8 kW respectively which meets the minimum requirement of IS: 12207-2019.

**15.3.1.3 Hydraulic performance test:**

- i) Maximum lifting capacity throughout the range of lift at hitch point and standard frame was recorded as 12.41 kN & 9.49 kN respectively against the declaration of 11.8 kN & 9.10 kN respectively which meets the requirement of IS: 12207-2019 with regard to tolerance limit.

**15.3.1.4 Mechanical Vibration:**

The amplitude of mechanical vibration on various assemblies marked as (\*) in **Chapter - 8** of this test report is on higher side. This calls for dampening down of vibrations especially on LHS foot rest and steering control wheel to improve the operational comfort and service life of components.

**15.4 Maintenance / Service Problems:**

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



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**15.5 Recommendation with regard to safety on tractor:**

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

- i) Provision of master shield & the working clearance between the PTO engaging lever & mudguard should be provided as IS: 12239 (Part-II) (Reaffirmed in 2019).
- ii) Fuel shut-off knob should remain in "STOP" position as per IS:8133-1983 (Reaffirmed in 2019).
- iii) Hand holds for easy mounting and dismounting of operator, vertical retainer at inner side of clutch pedal & provision for spark arresting device should be provided as IS :12239 (Part-I)-2018.


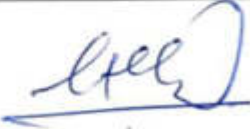

**15.6 Adequacy of Literature supplied with machine:**

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

- a) Operator's Manual for Mahindra, JIVO 245 DI Tractor.
- b) Part's catalogue Mahindra, JIVO 245 DI Tractor.
- c) Service Manual Mahindra, JIVO 245 DI Tractor.

**15.6.2** The supplied literature was found adequate. However, these literatures should be brought out in national as well as other regional languages of India for guidance of users.

**TESTING AUTHORITY:**

<b>C.V. CHIMOTE</b> TEST ENGINEER	
<b>Y.K. RAO</b> SENIOR AGRICULTURAL ENGINEER	
<b>P.K. PANDEY</b> DIRECTOR	

Draft test report compiled by C.S. Raghuwanshi, Agricultural Engineer.

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#### 16. APPLICANT'S COMMENTS

Para No.	Our Reference	Applicant's Comments
16.1	15.3.1.4 & 15.5 (i), (ii), & (iii)	Observations will be studied & necessary action will be incorporated.
16.2	15.6.2	Literatures are available in various regional languages of India.

#### ANNEXURE- I

#### TRACTOR RUN HOURS DURING TEST

A.	LABORATORY AND TRACK TESTS	HOURS
1.	Running-in	60.0
2.	PTO performance test	10.3
3.	Drawbar performance test	13.9
4.	Power lift and hydraulic pump performance test	5.0
5.	Brake test	1.0
6.	Noise measurement	1.1
7.	Mechanical vibration test	1.0
8.	Nominal speed test	1.4
<b>B.</b>	<b>HAULAGE TEST</b>	6.7
<b>C.</b>	Miscellaneous test and other run hours including idle run, transportation, trials and preparation for test	3.6
<b>TOTAL:</b>		<b>104.0</b>