व्यावसायिक परीक्षण रिपोर्ट (प्रथम बैच परीक्षण) संख्या/No. : T- 1610/2141/2021

COMMERCIAL TEST REPORT (1st Batch Test) माह/Month : December,2021

ONLINE TESTING

(यह परीक्षण रिपोर्ट 31/12/2026 तक वैध है। / THIS TEST REPORT IS VALID UPTO:31/12/2026)



MAHINDRA, 555 DI POWER+ 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) केन्द्रीय कृषि मशीनरी प्रशिक्षण एवं परीक्षण संस्थान

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CENTRAL FARM MACHINERY TRAINING & TESTING INSTITUTE

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MAHINDRA, 555 DI POWER + TRACTOR Commercial- (First Batch Test)

THIS TEST REPORT IS VALID UPTO: 31/12/2026

Test requested by : The Manufacturer
Selected for test by : The Manufacturer
Place of running-in : At Manufacturer works

Duration of said running-in, (h):

- Engine : 15 - Transmission : 30

Method of Selection : Due to Covid-19 Pandemic, it was not possible to

conduct the random selection. Nor was 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

1.1 Tractor:

Make : Mahindra Model : 555 DI Power +

Brand name : None Variants, if any : None

Type : Four wheeled, Rear wheel driven, General

purpose, Unit Construction, Agricultural Tractor

Month & Year of manufacture : 03 & 21

Chassis number : MBNBEBBKEMNM00005

Country of origin : India

1.2 Engine:

Make : Mahindra Model : NE 457 3A

Type : Four stroke, naturally aspirated, liquid cooled,

direct injection, diesel engine

Serial number : NML2UCE0456

Country of origin : India

Engine speed (rpm), (Manufacturer's recommended production settings):

Maximum speed at no load
Low idle speed
Speed at maximum torque
2325 to 2475
750 to 850
1000 to 1200

Rated speed, (rpm):

- For PTO use : 2100 - For drawbar use : 2100

1.3 Cylinder & Cylinder Head:

Number : Four

Disposition : Vertical, inline
Bore/stroke, (mm) : 99/122
Capacity as specified by the : 3532

applicant, (cc)

Compression ratio : 18.3 (±0.5):1

Type of cylinder head : Monoblock

Type of cylinder liners : Wet, replaceable

Type of combustion chamber : Re-entrant bowl, cavity on piston head

Arrangement of valves : Overhead, inline

Valve clearance (cold / Hot):

- Inlet valve, (mm) : 0.30 / 0.40 - Exhaust valve, (mm) : 0.40 / 0.50

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17. SUMMARY OF OBSERVATIONS, COMMENTS & RECOMMENDATIONS

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:-

	_ as c	inder:-	1		1	,	
S. No.		Characteristic	Category (Evaluative/ Non Evaluative)	Requirements as per IS: 12207-2019	Values declared by the applicant (D) / Require- ments (R)	observed	Whether meets the require- ments (Yes/No)
1		2	3	4	5	6	7
15.1.1	PTO	Performance:					
a)	2 h t (Nati cond	lition)	Evaluative	Declared value to be achieved with a tolerance of: ± 5 per cent for PTO Power & or engine power > 26 kW ±10 per cent for PTO Power & or engine ≤ 26 kW	36.7 (D)	36.0	Yes
b)	spee	er at rated engine ed, (kW)	Non Evaluative	-do-	36.7 (D)	36.0	Yes
с)	corre maxi (g/k\	sumption esponding to imum power, Wh)	Evaluative	+ 10% Max.	251 (D)	265	Yes
d)			Non Evaluative	± 8%	225 (D)	210.9	Yes
e)	Back	k-up torque, percent	Evaluative	12 percent, min.	13(D) 12 (R)Min	28.9	Yes
f)	Max	imum operating tem	perature(°C	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)	113	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)	101	Yes
g)		ine oil sumption, (g/kWh)	Evaluative	Not exceeding 1% of SFC at max. power under High ambient conditions	2.67 (R) Maximum	0.206	Yes
h)	Smo	oke level, (m ⁻¹)	Evaluative	Maximum light absorption coefficient of 3.25 per metre or equivalent BOSCH No. 5.2 or 75 Hatridge value (As per CMVR)	3.25 (R) Maximum	0.34	Yes

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1	2	3	4	5	6	7
17.1.2	Drawbar performance	_	_		J	•
a)	Maximum drawbar pull with ballast	Non Evaluative		22.72 (D)	00.50	Vaa
	corresponding to 15 percent wheel slip, (kN)		mass with ballast	22.45 (R)	26.56	Yes
b)	Maximum drawbar pull without ballast	Evaluative	Minimum 70% of static	15.93 (D)		
	corresponding to 15 percent wheel slip, (kN)		mass of tractor without/ standard ballast	15.65 (R) Minimum	19.36	Yes
c)	Maximum drawbar power without ballast, or with standard	Evaluative	Minimum 80 % of PTO power as referred in SI No. i) a) of PTO performance in case of	29.4 (D)	20 G	Voc
d)	ballast as the case may be, kW Maximum transmission	Evaluative	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.	28.8 (R) Minimum	30.6 89	Yes
u)	oil temperature (°C)	Evaluative	should not exceed the maximum value specified by oil company	110 (D)	69	res
17.1.3	Power lift and hydraul					
a)	Maximum lifting capacit			10.10 (5)	47.04	\ <u>/</u>
	1) At hitch points2) With the standard frame	Evaluative 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	16.18 (D) 11.28 (D) 8.47 (R) Minimum	17.01 12.73	Yes 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	02	Yes

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1	2	3	4	5	6	7
17.1.4	Brake performance at		7	3	U	, , , , , , , , , , , , , , , , , , ,
a)	Maximum stopping di ballast, (m):		force, equal to or le	ess than 600	N on brake peda	I with road
	1) Cold brake	Evaluative	10	10 (R)	7.12	Yes
	2) Hot brake	Evaluative	10	10 (H) 10 (R)	7.12	Yes
b)	Maximum force	Evaluative	600	600 (R)	181	Yes
, D)	exerted on the brake	Lvaluative	000	000 (11)	to	163
	pedal to achieve a				228	
	deceleration of 2.5				220	
	m/s ² (N)					
c)	Whether parking	Evaluative	Yes / No	Yes	Yes	Yes
	brake is effective at a					
	force of 600 N at foot					
	pedal(s) or 400 N at					
4745	hand lever, N					
17.1.5	Noise measurement : Maximum ambient		As per CMVR	Q0 /D\	83	Yes
a)	noise emitted by the	Lvalualive	AS DEL CIVIAL	88 (R)	os	162
	tractor dB(A)					
b)	Maximum noise at	Evaluative	As per CMVR	96 (R)	94	Yes
	operator's ear level			- (-)	-	= =
	dB(A)					
17.1.6	Amplitude of mechan	ical vibratio	ns at :			
	Left foot rest			100	83	Yes
	2) Right foot rest	Non	100 microns (max)	Maximum	77	Yes
	3) Seat (with operator)	Evaluative	Too morono (max)	(R)	36	Yes
	4) Steering wheel			` '	61	Yes
17.1.7	Haulage requirements					
a)	Gross mass of the trail	· · · · · · · · · · · · · · · · · · ·	To be declared by	F 0	F 0	Voc
	- Four wheel	Non Evaluative	To be declared by the manufacturer	5.0 7.0	5.0 7.0	Yes Yes
b)	Distance travelled / litre			7.0	7.0	res
D)	- Two wheel	Non	To be declared by	4.8 to 4.83	5.30 to 5.44	Yes
	- Four wheel	Evaluative	the manufacturer	4.8 to 4.83	5.34 to 5.34	Yes
c)	Fuel consumption (ml/k		the manadaterer	4.0 to 4.00	3.04 10 3.04	100
0,	- Two wheel		To be also be as allowed by	41.4to 41.7	00 75 to 07 70	Vaa
		Non Evaluative	To be declared by the manufacturer		36.75 to 37.72	Yes
	- Four wheel	Evaluative	lile manufacturer	41.4to 41.7	25.90 to 26.77	Yes
17.1.8	Wetland cultivation :	l = 1 .:	- · · · · · · · ·	T		
	1) Clutch assembly	Evaluative	The identified	There	No ingress of	Yes
	Brake housings Front axle hubs	-do- -do-	assemblies should essentially meet		water and / or	
	4) Engine Oil	-do-	the requirement of	be no ingress	mud was	
	5) Transmission Oil	-do-	IS: 11082. No	of water	observed	
	o) Hansinission Oil	-40-	water ingress in	and / or	during the test.	
			the identified	mud	-	
			assembly given in	maa		
			column-2. If			
			tractor does not			
			meet the			
			requirements of			
			wetland cultivation, it may			
1			be recommended			
			for dry land			
			operation only.			
<u> </u>	1 1	1	, ₁ , ,	1		

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1		2	3	4	5	6	7
17.1.9	Sai	fety features:		<u> </u>		. 0	'
a)		ards against	Evaluative	Belt drives, pulleys, silencer,	Mee	et the	Yes
	mo	ving and hot parts		hydraulics pipes (as per IS-12239 Part 2)		ements	
b)	_	hting angement	Evaluative	As per CMVR	Meet the requirements		Yes
с)	req (Tr mo rea	ating juirements actors having re than 1150 mm ir track width)	Non- Evaluative	Should meet the requirements of IS: 12343 (As amended from time to time)	requir	t meet the ements	No
d)	req	chnical Juirements PTO shaft	Evaluative	Should meet the requirements of IS: 4931 (As amended from time to time)		et the ements	Yes
e)		nensions of three- nt linkage	Non- Evaluative	Should meet the requirements of IS: 4468 (Part-I) (As amended from time to time)		et the ements	Yes
f)	link	ecifications of age drawbar	Evaluative	Should meet the requirements of IS 12953 (As amended from time to time)	requir	et the ements	Yes
g)	Sw	ecifications of inging drawbar herever fitted)	Evaluative	Should meet the requirements of IS 12362 (Part 3) (As amended from time to time)	Not	fitted	Not appli cable
h)	1)	Maximum travelling speed at rated engine speed in reverse gears, kmph	Evaluative	Should not exceed 20 Kmph	(Me	Skmph et the ements)	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. 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	Fitted	Not appli cable
17.1.10		pelling of tractors (F					
	1)	Make	Evaluative	Should conform to the requirements of CMVR along-	Mahindra		Yes
	3)	Model Month & Year of manufacture	Evaluative Evaluative	with declared value of PTO in kW and year of manufacture in	555 DI P 03 & 21	ower+	Yes Yes
	4)	Engine number	Evaluative	numerical	NML2UC	CE0456	Yes
	5)	Chassis number	Evaluative	MM YY Digit 01-12 in box No.1 for MM will represent the month and		BBKEMN	Yes
	6)	Declaration of PTO power, kW (hp)	Evaluative	next two digit in the box No.2 for YY will represent the year of manufacturing	36.7 (49.	.2)	Yes
	7)	Specific fuel consumption, g/kWh (g/hph)	Evaluative		251 (187	()	Yes

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1	2	3	4	5	6	7
17.1.11	Discard limit for:	_		-		
a)	Cylinder bore diameter, (mm)	Evaluative	To be specified by manufacturer	96.522	96.001 to 96.028	Yes
b)	Clearance between piston & cylinder liner at skirt, (mm)	Non Evaluative	-do-	0.5	0.111 to 0.137	Yes
c)	Piston diameter, (mm)	Non Evaluative	-do-	95.600	95.891 to 95.908	Yes
d)	Ring end gap (mm):	T			, ,	
	- Top comp. ring.	<u> </u>	To be specified by	2.50	0.35 to 0.45	Yes
	- 2 nd comp. ring.	Evaluative	Manufacturer	2.50	1.00 to 1.10	Yes
	- Oil ring.			2.00	0.45 to 0.50	Yes
e)	Ring groove clearance	(mm):				
	- Top comp. ring.		To be specified by		Tapered	
	- 2 nd comp. ring.	Evaluative	Manufacturer	0.30	0.064 to 0.070	Yes
	- Oil ring.			0.25	0.052 to 0.056	Yes
f)	Diametrical clearance of main bearings,(mm):					
	- Diametrical	Evaluative	To be specified by	0.80	0.053 to 0.097	Yes
	Crankshaft end float, (mm)	Evaluative	Manufacturer	0.90	0.17	Yes
g)	Clearance of big end be	earings, (mn			I	.,
	- Diametrical	Evaluative	To be specified by	0.200	0.059 to 0.099	Yes
	- Axial		Manufacturer	0.750	0.20	Yes
h)	Clearance between king pin and bush, (mm)	Non Evaluative	To be specified by Manufacturer	0.200	0.144 to 0.190	Yes
i)	Clearance between center pin and bush, (mm)	Non Evaluative	To be specified by Manufacturer	0.205	0.100 to 0.133	Yes
17.1.12	Literature (Submission	to test agen	icv):			
a)	Operator manual		Literature should	Provided	Provided	Yes
b)	Parts Catalogue		meet the	Provided	Provided	Yes
c)	Service manual	Evaluative	requirement of Indian Standard: 8132	Provided	Provided	Yes
d)	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
е)	Standard accessories	Evaluative	Trailer hitch, front tow hook, linkage drawbar should be provided with tractor	Provided	Provided	Yes
f)	Optional Accessories	Non Evaluative	Ballast weights if fitted should meet the requirement of CMVR.	Provided	Provided	Yes

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17.2	Category of brea	kdowns / defe	ects (as per clause 5.0 of IS:1220)	7-2019):	
S. No.	Category of breakdowns	Category (Evaluative / Non- Evaluative)	Requirements as per IS: 12207-2019	As observed	Whether meets the Requirem- ents (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.	(Mn-18) Minor-18	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	One	Yes

17.3 Salient Observations:

17.3.1 Laboratory tests:

17.3.1.1 PTO Performance Test:

- i) The maximum PTO power was recorded as 35.3 kW & 36.0 kW in case of previous & present sample respectively against the declaration of 36.7 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 258 g/kWh & 265 g/kWh in case of previous & present sample respectively against the declaration of 251 g/kWh, which meets the requirement of IS: 12207-2019 with regard to tolerance limit.
- iii) The backup torque was observed as 28.9 % & meets the evaluative requirement of IS: 12207-2019.

17.3.1.2 Drawbar performance test:

i) During ten hours drawbar performance test, creeping of LHS & RHS rear tyre over the rims was recorded as 65 & 25 mm. This should be looked into for necessary corrective action.

17.3.1.3 Hydraulic performance test:

The moment about rear axle with standard frame was calculated as 19.35 kN-m. Whereas, the moment about front axle was calculated as 17.41 kN-m under unballasted & ballasted condition. The moment about rear axle with standard frame is on higher side as compared to the moment about front axle. Therefore, it is recommended that the lifting capacity of the hydraulic system may be reduced suitably or ballast mass recommendation may be reviewed to avoid the front lifting of the tractor.

17.3.1.4 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 to improve the operational comfort and service life of components.

17.3.1.5 Specifications of three point linkage:

Some of the parameters of three point linkage conform to Cat. I and some of them conform to Cat.II. Keeping in view the spirit of standardization, necessary improvement may be incorporated.

17.3.1.6 Field operation:

During the field test ploughing operation, leakage of oil was observed from the hydraulic pump outlet pipe. Thereafter 'O-ring' in between pump & hydraulic connector (Part no.000377952R1) was replaced with new ones. This breakdown defect has been categorized under "Mn-18" (Minor -18) (damage of O-ring) of IS:12207-2019.

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17.3.1.7 Component/assembly inspection:

The backlash of crown wheel & pinion was measured as 0.29 mm against the discard limit 0.21 mm. This calls for improvement of quality of the components and necessary corrective action.

17.3.1.8 Recommendation with regard to safety on tractor:

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

- Longitudinal distance from seat index point to centre of differential lock pedal has been measured as 250 mm against the requirement of 355 to 770 mm as per IS: 12343-1998 (Re-affirmed in January, 2019).
- ii) Longitudinal distance from SIP to centre of steering control wheel has been measured as 570 mm against the requirement of 425 to 525 mm as per IS: 12343-1998 (Re-affirmed in January, 2019).
- iii) There shall be provision of spark arrester in the exhaust system of tractor's engine as per IS: 12239 (Part-2)-1999 (Re-affirmed in January, 2019).
- iv) There shall be provision of master shield around the PTO shaft as per IS: 4931-1995 (Reaffirmed in January, 2019).
- v) Working clearance around the position and draft control lever has been measured as 40 mm and LHS fender against the minimum requirement of 70 mm as per IS: 12239 (Part-2) – 1999 (Reaffirmed in January, 2019).
- Fuel shut off lever does not remain in stop position without the application of sustained manual effort as per IS:8133-1983 (Re-affirmed in January, 2019).

17.4 Adequacy of Literature supplied with machine:

- 17.4.1 The following literature was supplied with the tractor for reference during the test.
 - Operator's manual for Mahindra 555 DI Power+ tractor models.
 - Spare part's catalogue for Mahindra 555 DI Power+ tractor models.
 - Service manual for Mahindra 555 DI Power+ tractor models.

The supplied literature was found adequate as per IS: 8132-1999 (Reaffirmed in 2019).

TESTING AUTHORITY:

C.V. CHIMOTE TEST ENGINEER	Americanion to
P.K. PANDEY DIRECTOR	- UZn-7008/g

Test report compiled by: C.S. Raghuwanshi, Agricultural Engineer.

	MAHINDRA, 555 DI POWER + TRACTOR	
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18. APPLICANT'S COMMENTS

Para no.	Our reference	Applicant comments
18.1	17.3.1.8 (i) & (ii)	Observations will be studied and necessary action
		will be initiated.

ANNEXURE- I

BRIEF SPECIFICATION OF IMPLEMENTS USED DURING FIELD TEST

S. No.	Items	Disc Plough	Rotavator
1.	Make	Vasundhara krishi Yantra	Mahindra
2.	Type	Mounted	Mounted
3.	No. of Disc/blades	Three	42, in 8 flanges
4.	Type of Disc/blades	Plain concave	Hatchet
5.	Size of bottoms/blades, (mm)	660	250 x 80 x 7
6.	Spacing of bottoms/flanges, (mm)	510	220
7.	Lower hitch point span, (mm)	850	860
8.	Mast height, (mm)	390	520
9.	Overall dimensions, (mm):		
	- Length	1900	950
	- Width	1090	1950
	- Height	1150	1110
10.	Gross mass, (kg)	280	440

<u>ANNEXURE – II</u>

BRIEF SPECIFICATION OF FULL CAGE WHEEL

S. No.	Items	Specification
1.	Туре	Full cage wheel
2.	Diameter, (mm)	1265
3.	Width, (mm)	950
4.	No. and types of lugs	26, Straight lugs made of M.S. angle section welded to angle iron frame
5.	Size of angle section, (mm)	50 x 50 x 5
6.	Length of lugs, (mm)	470
7.	Spacing of lugs, (mm)	265
8.	Weight of each cage wheels (kg)	130

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ANNEXURE - III

TRACTOR RUN HOURS DURING TEST

A.	LABORATORY AND TRACK TESTS	HOURS
1.	Running-in	45.0
2.	PTO performance test	11.8
3.	Power lift and hydraulic pump performance test	3.9
4.	Drawbar performance test	18.7
5.	Turning ability	0.3
6.	Location of centre of gravity	0.2
7.	Operator's field of vision	0.2
8.	Brake test	2.0
9.	Noise measurement	1.8
10.	Mechanical vibration test	1.0
11	Theoretical speed test	0.7
B.	FIELD TEST:	
	Disc ploughing	11.2
	Rotavation	10.1
	Puddling (including 5.0 hours water proof test)	15.6
C.	HAULAGE TEST:	5.5
D.	Miscellaneous test and other run hours including idle run,	2.7
	transportation, trials and preparation for test	
	TOTAL:	130.7