

प्रारंभिक व्यावसायिक परीक्षण रिपोर्ट  
INITIAL COMMERCIAL TEST REPORT

संख्या/No. : T-1772/2303/2023  
माह/Month : September, 2023

Application Reference No. 28/2022-23/115

(यह परीक्षण रिपोर्ट 30/09/2023 तक वैध है / THIS TEST REPORT IS VALID UPTO 30/09/2023)



**Make of Agricultural Tractor : Mahindra**  
**Model : NOVO 655 DI PP 4WD V1**  
**Manufactured by : Mahindra & Mahindra Limited,**  
**(Farm Equipment Sector) Mahindra Research**  
**Valley, Mahindra World City, Plot no. 41/1, Anjur**  
**P.O., District: Chengalpattu – 603 004.**



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  
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T-1772/2303/2023	MAHINDRA, NOVO 655 DI PP 4WD V1 - INITIAL COMMERCIAL TEST
	THIS TEST REPORT IS VALID UPTO: 30/09/2023

## 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 15<sup>th</sup> 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

Month: September	Test Report No.: T-1772/2303/2023	Year: 2023
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GOVERNMENT OF INDIA  
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CENTRAL FARM MACHINERY TRAINING AND TESTING INSTITUTE – BUDNI	Page 2 of 34
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T-1772/2303/2023	<b>MAHINDRA, NOVO 655 DI PP 4WD V1 - INITIAL COMMERCIAL TEST</b>
	<b>THIS TEST REPORT IS VALID UPTO: 30/09/2023</b>

[C]	Tractor manufacturer's name and address	:	<b>M/s. Mahindra &amp; Mahindra Limited (Farm Equipment Sector)</b> Mahindra Research Valley, Mahindra World City, Plot no. 41/1, Anjur P.O., District Chengalpattu – 603004.
[D]	Location of other manufacturing plants	:	Mahindra & Mahindra Limited (Farm Equipment Sector) i) Akurli Road, Kandivali (E), Mumbai – 400 101 ii) MIDC Hingna Road, Nagpur– 440 028 iii) Khatima Panipat Highway, Rudrapur, Udham Singh Nagar – 263 153 iv) Jaipur Ajmer Road, Jaipur– 303 007 v) Near Bidar “T” Junction, Mahindra Nagar, Zaheerabad- 502 220 vi) Mahindra Research Valley, Mahindra World City, Plot no. 41/1, Anjur P.O., District Chengalpattu – 603 004
[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	:	30
	-Transmission	:	32
[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 (trade name)	:	NOVO 655 DI PP 4WD V1
[C]	Type	:	Four Wheel Drive, Standard Agricultural Tractor.
[C]	Month & year of manufacture	:	12/22
[D]	Country of origin	:	India

#### 1.1.2 Numbers:

[D]	1 <sup>st</sup> Serial No. of prototype	:	MBNWHBF93NNG00001
[C]	Serial No.	:	MBNWHBF93NNJ00010

T-1772/2303/2023	MAHINDRA, NOVO 655 DI PP 4WD V1 - INITIAL COMMERCIAL TEST
	THIS TEST REPORT IS VALID UPTO: 30/09/2023

## 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
<b>MANDATORY TESTS: (As per Ministry's Office Memorandum No. 13-17/2021-M&amp;T (I&amp;P) dated 28<sup>th</sup> of July, 2022).</b>						
<b>6.1.1 PTO Performance:</b>						
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 $\leq 26$ kW.	44.0 (D)	44.3	Yes
b)	Power at rated engine speed, (kW)	Non Evaluative	-do-	44.0 (D)	44.3	Yes
c)	Specific fuel consumption corresponding to maximum power, (g/kWh)	Evaluative	Should not be more than 10% of declared value.	264 (D)	275	Yes
d)	Maximum equivalent crankshaft torque, (Nm)	Non Evaluative	$\pm 8\%$	277 (D)	254.6	Yes
e)	Back-up torque, percent	Evaluative	Should be min. 12%	25 (D) 12 (R)	26.5	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.	135 (D)	134	Yes
	2) Coolant	Evaluative	Observed value should not exceed the declared value or boiling point of coolant at radiator cap pressure whichever is lower. The boiling point of the coolant at radiator pressure shall be provided by the applicant.	110 (D)	110	Yes
g)	Engine oil consumption, (g/kWh)	Evaluative	Not exceeding 1% of SFC at Max power under natural ambient condition. The value would be based on the test conducted under natural ambient condition	2.75 Maximum (R)	0.50	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). Max Smoke level shall be reported out of 6 readings tested as per IS 12062 and observed value should be well within the required limits.	3.25 per meter Maximum (R)	0.05	Yes

T-1772/2303/2023	MAHINDRA, NOVO 655 DI PP 4WD V1 - INITIAL COMMERCIAL TEST
	THIS TEST REPORT IS VALID UPTO: 30/09/2023

1	2	3	4	5	6	7
<b>6.1.2</b>	<b>Drawbar performance:</b>					
<b>a)</b>	Max. drawbar pull with ballast corresponding to 15 percent wheel slip, (kN)	Non Evaluative	Minimum 70% of static mass of tractor with ballast.	25.6 (D)	*	*
<b>b)</b>	Max. drawbar pull with standard ballast corresponding to 15 percent wheel slip, (kN)	Evaluative	In case of tractors having total static mass $\geq$ 1500 kg, Min 70% of static mass of tractor without ballast or with standard ballast, as the case may be. In case of light weight tractors having $\leq$ 1500 kg total static mass of tractor, Min. 65% of static mass of tractor without ballast or with standard ballast, as the case may be.	23.2 (D) 26.48 (R) Minimum	31.46	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 Minimum 75% of PTO power as referred in SI No. i) a) of PTO performance in case of light weight tractors having $\leq$ 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.	35.2 (D) 35.4 (R) Minimum	38.5	Yes
<b>d)</b>	Maximum transmission oil temperature, ( $^{\circ}$ C)	Evaluative	The declared value should not exceed the recommendation by the oil manufacturer. The observed value should not exceed the declared value throughout the drawbar test.	120 (D)	100	Yes

\*Applicant vide letter no. FD/BVH/ICT/NOVO655PP4WDV1/23-24/07, dated 22.08.2023 has requested not to conduct the ballasted drawbar performance test & ten-hour drawbar test which was allowed as per the additional guidelines for testing of tractors as per new regime of testing of tractors vide an OM No. 13-32/2023-M&T(I&P) (FTS-125476) dated 16.05.2023. Accordingly, drawbar performance test under standard ballasted condition was conducted only.

<b>6.1.3 Power lift and hydraulic pump performance:</b>							
<b>a)</b>	Maximum lifting capacity throughout the range of lift, (kN):						
	1)	At hitch points	Evaluative	Should not be less than 90% of declared value.	26.5 (D) 23.85 (R) Minimum	26.63	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.	19.1 (D) 10.43 (R) Minimum	19.28	Yes

T-1772/2303/2023	<b>MAHINDRA, NOVO 655 DI PP 4WD V1 - INITIAL COMMERCIAL TEST</b>
	<b>THIS TEST REPORT IS VALID UPTO: 30/09/2023</b>

1	2	3	4	5	6	7	
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
<b>6.1.4</b>	<b>Brake performance at 25 kmph:</b>						
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)	8.54	Yes
	2)	Hot brake	Evaluative	10	10 (R)	8.63	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
<b>6.1.5</b>	<b>OPTIONAL TESTS: As the applicant has not applied for any optional tests, therefore no optional tests was conducted.</b>						
<b>6.1.6</b>	<b>Safety features :</b>						
a)	Guards against moving and hot parts		Evaluative	Belt drives, pulleys, silencer, hydraulic pipes [As per IS 12239 (Part2)]	Meets the requirement		Yes
b)	Lighting arrangement		Evaluative	As per CMVR	Conforms		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)	<b>Does not meet the requirement</b>		<b>No</b>
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: 4468 (Part-I) (As amended from time to time)	<b>Does not meet the requirement</b>		<b>No</b>
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)	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.	Provided (The audible warning signal on tractor is activated when the speed in reverse gear reaches to 20 kmph ) & a sticker is pasted on LHS mudguard.		Yes

T-1772/2303/2023	MAHINDRA, NOVO 655 DI PP 4WD V1 - INITIAL COMMERCIAL TEST
	THIS TEST REPORT IS VALID UPTO: 30/09/2023

1	2	3	4	5	6	7		
<b>6.1.7</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, Specific fuel consumption (SFC) corresponding to maximum power in g/kWh and year of manufacture in numerical form <table border="1" style="margin-left: 20px;"><tr><td>MM</td><td>YY</td></tr></table> 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.	MM	YY	Mahindra	Yes
	MM	YY						
	2)	Model	Evaluative		NOVO 655 DI PP4WD V1	Yes		
	3)	Month & Year of manufacture	Evaluative		12 / 22	Yes		
	4)	Engine number	Evaluative		NNJ5SEE0027	Yes		
	5)	Chassis number	Evaluative		MBNWHBF93NNJ0001 0	Yes		
	6)	Maximum PTO power, (kW)	Evaluative		44.0	Yes		
7)	Specific fuel consumption, (g/kWh)	Evaluative	264		Yes			
<b>6.1.8</b>	<b>Literature (Submission to test agency):</b>							
(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			
<b>6.1.9</b>	<b>Fitment of Roll Over Protective Structures (ROPS):</b>							
	For tractor having more than 1150 mm rear track width	Evaluative	ROPS should meet the requirement of IS: 11821 or OECD code or equivalent International Standard.	ROPS fitted [Meets the requirement of IS: 1182 (Part-2) as per Cl. 1.13 of this test report.	Yes			
<b>6.1.10</b>	Standard Accessories	Evaluative	Trailer hitch, front tow hook, linkage drawbar should be provided with tractor	Provided	Yes			
<b>6.1.11</b>	Accessories (optional)	Non Evaluative	Ballast weight, if fitted, should meet the requirement of CMVR	Provided	Yes			
<b>6.2</b>	<b>CATEGORY OF BREAKDOWNS / DEFECTS ( As per clause 5.0 of IS:12207-2022):</b>							
S. No.	Category of break-downs	Category (Evaluative / Non Evaluative)	Requirements as per IS: 12207-2022	As observed	Whether meets the Requirement (Yes/No)			
1.	Critical	Evaluative	There is no 'critical breakdown' during the course of testing.	None	Yes			
2.	Major	Evaluative	There are not more than 2 major breakdowns and neither of them should be of repetitive nature.	None	Yes			
3.	Minor	Evaluative	There are not more than 5 minor defects during the test and neither of them should of repetitive 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.	None	Yes			

T-1772/2303/2023	MAHINDRA, NOVO 655 DI PP 4WD V1 - INITIAL COMMERCIAL TEST
	THIS TEST REPORT IS VALID UPTO: 30/09/2023

### 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: Categories 1N, 1, 2N, 2, 3N, 3, 4N & 4 [IS 17231: 2019]  | : | <b>Does not conform</b> |
| iv)   | Drawbar for agricultural tractors – Link type [IS 12953:1990 (Reaffirmed Year 2022)]   | : | Conforms                |
| v)    | Agricultural tractors- Operator’s seat technical requirement [IS12343 - 2021]  | : | <b>Does not conform</b> |
| vi)   | Guide for safety & comfort of operator of agricultural tractors:Part 1 General requirements (first revision):[IS 12239 (Part 1) - 2018]  | : | <b>Does not conform</b> |
| 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)]   | : | <b>Does not conform</b> |
| viii) | Guide lines for location and operation of operator controls on agricultural tractors and machinery [IS: 8133 - 2021]   | : | <b>Does not conform</b> |
| 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)] | : | <b>Does not conform</b> |
| 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:

Applicant vide letter no. FD/BVH/ICT/NOVO655PP4WDV1/23-24/06 dated 03.08.2023 has recommended that tractor operating range is from 1000 rpm to rated engine rpm under full load condition. Hence during PTO performance test, varying speed test was conducted upto 1000 rpm of engine only under natural and high ambient condition.

##### 6.4.1.2 Drawbar performance test:

- (i) Applicant vide letter no. FD/BVH/ICT/NOVO655PP4WDV1/23-24/07, dated 22.08.2023 has requested not to conduct the ballasted drawbar performance test & ten-hour drawbar test which is allowed as per the additional guideline for testing of tractors as per new regime of testing of tractors vide an 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.
- (ii) The applicant also requested to restrict the drawbar performance test to 1000 engine rpm as per minimum operating range of tractor under full load condition. Hence, drawbar performance test was conducted upto 1000 rpm of engine only.

##### 6.4.1.3 Three point linkage:

The dimensions viz. diameter of hitch pin hole & width of ball of upper hitch points, diameter of hitch pin hole & width of ball of lower hitch points, lateral distance from lower hitch point to centre line of tractor and lateral movement of lower hitch points does not meet the requirements of IS 17231: 2019. This should be looked into for necessary corrective action.



T-1772/2303/2023	MAHINDRA, NOVO 655 DI PP 4WD V1 - INITIAL COMMERCIAL TEST
	THIS TEST REPORT IS VALID UPTO: 30/09/2023

#### 6.4.2 Operator's seat:

The following parameters do not meet the requirement of IS: 12343-2021.

- i) Provision for adjustment of driver's mass has been specified as 50 to 120 kg against the requirement of 40 to 100 kg.
- ii) Longitudinal distance from SIP centre of differential lock pedal has been measured as 190 mm against the requirement of 410 to 720 mm.
- iii) Vertical distance from SIP to centre of steering control wheel has been measured as 220 mm against the requirement of 265 to 385 mm.

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

#### 6.4.3 Operator's work place:

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

- i) Vertical retainers on inner side of clutch pedal are not provided.
- ii) Spark arresting device has not been provided in the exhaust system.

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

#### 6.4.4 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 hand controls 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) In engine revolution gauge, colour zone should be provided as per IS: 6283 (Part-1 & Part- 2) – 1998 (Reaffirmed in January, 2019).
- iv) The working clearance between draft control lever & position control lever and between RHS mudguard & tipping trailer lever have been measured as 20 mm against the minimum requirement of 70 mm as per the requirement of IS: 12239 (Part II) - 2019.

#### 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: -


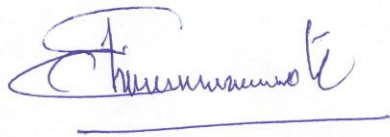

- a) Operator Manual for "Mahindra Novo 655 DI PP 4WD V1" tractor models.
- b) Parts catalogue for "Mahindra Novo 655 DI PP 4WD V1" tractor model.
- c) Service manual for "Mahindra Novo 655 DI PP 4WD V1" tractor model.

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) Safe hitch height for trailer

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

## TESTING AUTHORITY

C. K. TIJARE AGRICULTURAL ENGINEER	
C. V. CHIMOTE TEST ENGINEER	
A. K. UPADHYAY DIRECTOR (I/C)	

Draft Test Report compiled by C. K. Tijare, Agricultural Engineer & Poonam Khurasia, Senior Technical Assistant.

## 7. APPLICANT'S COMMENTS

Para no.	Our reference	Comments
7.1	6.7.2	Parameters in product literature 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	12.3
3.	Power lift and hydraulic pump performance test	4.4
4.	Drawbar performance test	7.2
5.	Brake performance test	2.3
6.	Nominal speed test	6.7
B.	Miscellaneous test and other run hours including idle run, transportation, trials and preparation for test	0.2
<b>TOTAL:</b>		33.1