

Application Reference No. 28/2022-23/33

(यह परीक्षण रिपोर्ट 31/12/2027 तक वैध है / THIS TEST REPORT IS VALID UPTO 31/12/2027)



Make of Agricultural Tractor : Mahindra
Model : 575 DI SP Plus
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
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CENTRAL FARM MACHINERY TRAINING & TESTING INSTITUTE
TRACTOR NAGAR, BUDNI (M.P.) 466 445
(An ISO 9001:2015 Certified Institute)

T-1693/2224/2022	MAHINDRA, 575 DI SP PLUS TRACTOR - INITIAL COMMERCIAL TEST
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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

Month: December	Test Report No.: T-1693/2224/2022	Year: 2022
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[C]	Tractor manufacturer's name and address	:	M/s. Mahindra & Mahindra Limited (Farm Equipment Sector) Mahindra Research Valley, Mahindra World City, Plot no. 41/1, Anjur P.O., District Chengalpattu – 603004.
[D]	Location of tractor assembly	:	(i) M/s. Mahindra & Mahindra Limited (Farm Equipment Sector), Hingna Road, Hingna MIDC, Nagpur– 440016 (ii) M/s. Mahindra & Mahindra Limited (Farm Equipment Sector) Agri Business Development Center, Khatima Panipat Highway, Udham Singh Nagar, Vil. Lalpur, Tehsil-Kichha, Rudrapur – 263 153 (iii) M/s. Mahindra & Mahindra Limited (Farm Equipment Sector), Agri Development Center, Vil-Mehla Tehsil - Dudu Jaipur- Ajmer Road, Jaipur– 303 007 (iv) M/s. Mahindra & Mahindra Limited (Farm Equipment Sector), Near Bidar "T" Junction , Mahindra Nagar, Zaheerabad- 502 220 Medak District, Andhra Pradesh (v) M/s. Mahindra & Mahindra Limited (Farm Equipment Sector), Akurli Road, Kandivli (E), MUMBAI – 400 101
[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: -Engine	:	30
	-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 (trade name)	:	575 DI SP PLUS
[C]	Type	:	Rear Wheel Drive, Standard Agricultural Tractor.
[C]	Month & year of manufacture	:	06/22
[D]	Country of origin	:	India

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1.1.2 Numbers:

[D] 1st Serial No. or prototype : MBNTFALAEKNH00001
[C] Serial No. : MBNTFALAPNNC01640

1.2 Engine:

[D] Manufacturer's address : Mahindra & Mahindra Limited
(Farm Equipment Sector),
(i) Akurli Road, Kandivali (E), Mumbai - 400101
(ii) MIDC, Hingna Road, Nagpur – 440028
(iii) Khatima Panipat Highway, Rudrapur, Udhamasinghnagar, 263153
(iv) Jaipur Ajmer Road, Jaipur – 303007
(v) Near Bidar "t" junction, Mahindra Nagar, Zaheerabad – 502220
(vi) Mahindra Research Valley, Mahindra World City, Plot No.41/1, Anjur P.O., Kanchipuram District, Chengalpattu - 603004

[C] Make : Mahindra
[C] Model : MTDHI30NA047B3A
[C] Type : Four stroke, naturally aspirated, liquid cooled, direct injection, diesel engine.
[C] Serial No. : NNB2GEE0130

1.2.1 Cylinders:

[C] Number/disposition : Four, vertical, in-line
[D] Bore / Stroke, (mm) : 88.9 / 120
[D] Capacity, cm³ : 2979
[D] Compression ratio : 20 (±1): 1
[D] Arrangement of valves : Overhead, inline
[D] Cylinder liners : Wet, replaceable
[D] Type of combustion chamber : Re-entrant cavity on piston crown

1.2.2 Supercharging : Not Available

1.2.3 Fuel system:

[C] Fuel feed system : Gravity and force feed

Filter(s):

[C] Make : Bosch
[C] Model : F 002 H20 170
[C] Type : Spin-on paper element
[C] Number(s) : Two
[D] Capacity of fuel tank, (l) : 53.4

Injection pump:

[C] Make : Bosch
[C] Model : F 002 A2Z A66, PES4A85D320RS2000
[C] Type : Inline, plunger
[C] Serial Number : 27314128

Manufacturer's production setting of injection pump:

[C] Flow rate (rated engine speed & full load), (kg/h) : 7.26
[D] Timing : 6.5 ± 1 degree before TDC

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4. OPTIONAL TEST RESULTS

As the applicant has not applied for any optional tests, therefore no optional tests was conducted.

5. REPAIRS

--None--

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: 12207-2019 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: 12207-2019	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.	31.2 (D)	30.6	Yes
b)	Power at rated engine speed, (kW)	Non Evaluative	-do-	31.2 (D)	30.6	Yes
c)	Specific fuel consumption corresponding to maximum power, (g/kWh)	Evaluative	+ 10% max.	248 (D)	237	Yes
d)	Maximum equivalent crankshaft torque, (Nm)	Non Evaluative	$\pm 8\%$	192 (D)	176.4	No
e)	Back-up torque, percent	Evaluative	12 percent	12 (D) 12 (R)	20.5	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 high ambient condition should not exceed the declaration.	130(D)	111	Yes
	2) Coolant	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.	119(D)	101	Yes
g)	Engine oil consumption, (g/kWh)	Evaluative	Not exceeding 1% of SFC at max. Power under High ambient conditions.	2.42 Maximum (R)	0.93	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 Maximum (R)	0.31	Yes

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1	2	3	4	5	6	7	
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.	18.00 (D) 17.29 (R) Minimum	21.27	Yes	
b)	Max. drawbar pull with standard ballast corresponding to 15 percent wheel slip, (kN)	Evaluative	Minimum 70% of static mass of tractor without ballast or with standard ballast, as the case may be.	13.00 (D) 12.99 (R) Minimum	14.93	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.	24.96 (D) 24.5 (R) Minimum	26.9	Yes	
d)	Maximum transmission oil temperature, (°C)	Evaluative	The declared value should not exceed the maximum value specified by oil company	120 (D)	83	Yes	
6.1.3	Power lift and hydraulic pump performance:						
a)	Maximum lifting capacity throughout the range of lift, (kN):						
	1)	At hitch points	Evaluative	Tolerance of ± 10%	14.60 (D)	13.86	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.	10.20 (D) 7.20 (R) Minimum	10.97	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	15	Yes	
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)	6.53	Yes
	2)	Hot brake	Evaluative	10	10 (R)	6.60	Yes
b)	Maximum force exerted on the brake pedal to achieve a deceleration of 2.5 m/s ² , (N)	Evaluative	600	600 (R) Maximum	217 to 238	Yes	
c)	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	

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1	2	3	4	5	6	7	
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 (Part2)]	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)	Does not meet the requirement	No		
d)	Technical requirements for PTO shaft	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)	Does not meet the requirement	No		
f)	Specifications of linkage drawbar	Evaluative	Should meet the requirements of IS: 12953 (As amended from time to time)	Meets the requirement	Yes		
g)	Swinging drawbar (wherever fitted)	Evaluative	Should meet the requirement 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	11.40 (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. 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 applicable		
6.1.7	Labelling of tractors (Provision of labelling plate):						
	1) Make	Evaluative	Should conform to the requirements of CMVR along with maximum PTO Power in kW and year of manufacture in numerical form. <table border="1" style="display: inline-table; vertical-align: middle;"> <tr> <td>MM</td> <td>YY</td> </tr> </table> Digit 01 – 12 in box No.1 for MM will represent the months and next two digits in box No.2 for YY will represent the year of Manufacturing.	MM	YY	Mahindra	Yes
MM	YY						
	2) Model	Evaluative		575 DI SP PLUS	Yes		
	3) Month & Year of manufacture	Evaluative		06/22	Yes		
	4) Engine number	Evaluative		NNB2GEE0130	Yes		
	5) Chassis number	Evaluative		MBNTFALAPNN C01640	Yes		
	6) Maximum PTO power, (kW)	Evaluative		31.2	Yes		
	7) Specific fuel consumption ,g/kWh	Evaluative	248	Yes			

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1	2	3	4	5	6	7
6.1.8	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
6.1.9	Fitment of Roll Over Protective Structures (ROPS):					
	For tractor having more than 1150 mm rear track width	Evaluative	ROPS should meet the requirement of IS:1182 or OECD code or equivalent International Standard		Not fitted	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:12207-2019):					
S. No.	Category of breakdowns	Category (Evaluative / Non Evaluative)	Requirements as per IS: 12207-2019	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	None	Yes
3.	Minor	Evaluative	Not more than five 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 five, that is, (2 major + 3 minor) or (1 major + 4 minor) or 5 minor breakdowns.	None	Yes

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 1 Categories 1, 2, 3 & 4 (fourth revision) [IS:4468(Part-I) – 1997 (Reaffirmed in 2022)] : **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] : **Does not conform**
- 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**

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- 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)] : Conforms
- 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:

The maximum equivalent crankshaft torque was observed as 176.4 Nm against the declaration of 192 Nm and does not meet the requirement of IS: 12207-2019. Even though this parameter is categorized as 'Non-Evaluative', as per IS: 12207-2019, 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 Operator's seat:

The following parameter does not meet the requirement of IS: 12343-2021.

- i) Inclination of seat towards rear direction has been measured as 2 degree against the requirement of 3 to 12 degree.
- ii) Longitudinal adjustment forward and rear word from the mid position has been measured as 105 mm against the requirement of ± 25 mm (minimum) & ± 100 mm (Optimum).
- iii) Provision for adjustment of driver's mass has been specified as 50 to 120 kg against the requirement of 40 to 100 kg.
- iv) Vertical distance from SIP to centre of steering control wheel has been measured as 215 mm against the requirement of 265 to 385 mm.
- v) Upward position of silencer outlet with respect to SIP has been measured as 785 mm against the requirement of minimum 800 mm.

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

6.4.1.3 Operator's work place:

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

- i) Vertical retainers on both sides of brake & clutch pedal are not provided.
- ii) Width of foot step has been measured as 165 mm against the requirement of 200 mm.
- iii) Spark arresting device has not been provided in the exhaust system.

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

6.4.1.4 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 and lower hitch point height does not meet the requirements of IS:4468 (Part-I) – 1997.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 Specification of Tractor:

Discrepancies in the specification between the Specification sheet and Operator's manual are as under:

S. No.	Description	As per Specification Sheet	As per Operator's manual
a)	Maximum drawbar pull with ballast, kN	18.00	17.34
b)	Coolant as recommended	M/s BIL MT-92	Mahindra M-Star Coolz or coolant conforming to JIS K-2234 (P. No. 19-1)
c)	Coolant water ratio	20:80	In 1 litre of mineral water, add 50 to 60 ml concentrated antirust additive (Refer P. No. 12-6)
d)	Transmission oil	M-TRAC 30	M-Star genuine OIB oil or Servo MTRAC 30 (P. No. 19-1)

6.6 Maintenance / Service Problems:

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

6.7 Recommendation with regard to safety on tractor:

- i) Fuel shutoff knob does not remain in stop position as per the requirement of IS: 8133-2021.
- ii) Identification of hand controls by colour has not been provided as per the requirement as laid down in Table – 5 of IS: 8133-2021.
- iii) 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.
- iv) The neutral position has not been marked for gear selection on both the main gear shifting lever and range selection lever as per the requirement as laid down in Table-1 of IS: 8133-2021.
- v) The working clearance between draft control lever and RHS fender has been measured as 60 mm against the minimum requirement of 70 mm.

Above parameters should be looked into for necessary corrective action.

6.8 Adequacy of Literature supplied with machine:

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

- a) Operator Manual for "Mahindra 575 DI SP Plus" tractor model.
- b) Parts catalogue for "Mahindra 575 DI SP Plus" tractor model.
- c) Service manual for "Mahindra 575 DI SP Plus" tractor model.



6.8.2 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) Recommended ballast masses for different operations.

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

TESTING AUTHORITY

C. V. CHIMOTE TEST ENGINEER	
P.K. PANDEY DIRECTOR	

Draft Test Report compiled by **Pramod Yadav**, Agricultural Engineer.

7. APPLICANT'S COMMENTS

Para No.	Our reference	Applicant's comments
7.1	6.3 (v, vi & viii), 6.4.1.1, 6.4.1.2, 6.4.1.3 & 6.7 9 (ii, iii & v)	Parameters will be studied, and necessary action will be initiated.
7.2	6.5	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	12.7
3.	Power lift and hydraulic pump performance test	2.2
4.	Drawbar performance test	17.5
5.	Brake performance test	2.0
6.	Nominal speed test	0.7
B.	Miscellaneous test and other run hours including idle run, transportation, trials and preparation for test	3.7
TOTAL:		38.8