



**MAHINDRA, 395 DI SUPER TURBO TRACTOR  
(Brand Name: Bhoomiputra MKM)**



**भारत सरकार**

**GOVERNMENT OF INDIA**

कृषि मंत्रालय (कृषि एवं सहकारिता विभाग, मशीनीकरण एवं प्रोद्योगिकी प्रभाग)

Ministry of Agriculture (Deptt. of Agri. & Co-op, Mechanization & Technology Division)

**केन्द्रीय कृषि मशीनरी प्रशिक्षण एवं परीक्षण संस्थान**

**CENTRAL FARM MACHINERY TRAINING & TESTING INSTITUTE**

**(An ISO : 9001-2008 Certified Institute)**

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T-884/1399/2013

**MAHINDRA, 395 DI SUPER TURBO TRACTOR**  
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**3. ESSENTIAL TESTS**  
**3.1. SPECIFICATIONS**

	<u>Base Model</u>	<u>Variant Model</u>
<b>3.1.1 Tractor:</b>		
Make	: Mahindra	Mahindra
Model	: 295 DI Super Turbo	395 DI Super Turbo
Brand name	: Sarpanch MKM	Bhoomiputra MKM
Type	: Four wheel, Rear-wheel drive, General Purpose, Agricultural Tractor	
Year of manufacture	: 2006	2012 (LC)
Chassis Serial number	: NPT 101	NHBLO 101
Country of Origin	: INDIA	INDIA
<b>3.1.2 Engine:</b>		
Make	: Mahindra	Mahindra
Model	: MM 2050	MM 2050N3A
Type	: Four stroke, Turbo charged, water cooled, direct injection, diesel engine.	
Serial number	: NPT 101	NHBLO 101
<b>Engine speed (Manufacturer's recommended production setting)(rpm):</b>		
- Maximum speed at no load	: 2090±50	2075 to 2175
- Low idle speed	: 800±50	750 to 850
- Speed at maximum torque	: 1200 to 1400	1200 to 1400
<b>Rated speed, (rpm):</b>		
- For PTO use	: 1900	1900
- For drawbar use	: 1900	1900
<b>3.1.3 Cylinder &amp; Cylinder Head:</b>		
Number	: Three	Three
Disposition	: Vertical, inline	Vertical, inline
Bore/stroke, (mm)	: 88.9 / 110	88.9 / 110
Capacity as specified by the applicant, (cc)	: 2048	2048
Compression ratio, (apa)	: 18.5 : 1	18.5 : 1
Type of cylinder head	: Monoblock	Monoblock
Type of cylinder liners	: Wet, replaceable	Wet, replaceable
Type of combustion chamber	: Re-entrant bowl cavity on piston crown	
Arrangement of valves	: Overhead, inline	Overhead, inline
<b>Valve clearance (cold/hot):</b>		
- Inlet valve, (mm)	: 0.40 / 0.30 +0.00/-0.05	0.30 / 0.40
- Exhaust valve, (mm)	: 0.50 / 0.40+0.00/-0.05	0.40 / 0.50



T-884/1399/2013

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	<u>Base Model</u>	<u>Variant Model</u>
<b>3.1.4 Fuel System:</b>		
Type of fuel feed system	: Gravity and force feed	Gravity and forced feed
<b>3.1.4.1 Fuel tank:</b>		
Capacity, (l)	: 56.0	49.0
Location	: Above clutch housing	Above clutch housing
Provision for draining of sediments/ water	: <b>Provided</b>	<b>Provided</b>
Material of fuel tank	: Metallic	Metallic
<b>3.1.4.2 Water separator</b>	: N.A.	Not provided
<b>3.1.4.3 Fuel feed pump:</b>		
Type	: Plunger	Plunger
Make	: Bosch, India	Bosch, India
Model/Group combination No.	: FP/KS 22 AD 62, 9 440 030 029	9440 030 029 (apa)
Provision of sediment bowl	: Provided (metallic)	Provided (metallic)
Method of drive	: Through camshaft of fuel injection pump	
<b>3.1.4.4 Fuel filters:</b>		
Make	: MICO	Bosch, India
Model/Group combination No.	: 9 450 030 117	F 002 H20 117,
Number	: Two	Two
<b>Type of elements:</b>		
- Primary	: Cloth	Cloth
- Secondary	: Paper	Paper
Capacity of final stage filter, (l)	: 0.50	0.50
<b>3.1.4.5 Fuel Injection pump:</b>		
Make	: Bosch	Bosch (apa)
Model/Group combination No.	: E B40 2013 00	F 002 AOZ 735, PES 3A85D 320 RS 2000
Type	: Plunger, Inline	Plunger, Inline
Serial number	: 689003	20246728
Method of drive	: Through timing gears	Through timing gears
<b>3.1.4.6 Fuel injectors:</b>		
Make	: Bosch	Bosch, India
Model/Group combination No.	: F002 C70 552	F 002 C70 552,
Type	: Multi hole (five holes)	Multi hole (five holes)
Manufacturer's production pressure setting, (MPa)	: 24.52 + 0.78	25.0 + 0.8
Injection timing	: 5.5 ± 1 degree before TDC	4 ± 1 degree before TDC
Firing order	: 1 - 3 - 2	1 - 3 - 2



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

7.1 On the basis of test conducted the performance results have been summarized as evaluative (mandatory) and non – evaluative (not mandatory) parameters applicable for qualifying Minimum Performance Criteria as per clause-4 table-1 of Indian Standard 12207: 2008 for acceptance of tractor for the purpose of subsidies/NABARD financing for the applicable features for this tractor model.

Sl. No.	Characteristic	Category (Evaluative / Non Evaluative)	Requirements as per IS: 12207-2008	Values declared by the applicant/ requirement		As observed		Whether Variant model meets the requirements (Yes/No.)
				Base model	Variant Model	Base model	Variant model	
1	2	3	4	5 a	5 b	6 a	6 b	7
<b>7.1.1 PTO Performance :</b>								
a)	- Max. power under 2 hrs. test, (kW ) (Natural ambient condition)	Evaluative	Declared value to be achieved with a tolerance of: -5 / +10% for PTO power >35hp. -7.5/+10% for PTO power ≤ 35 hp	26.1	26.1	26.7	25.5	Yes
b)	Power at rated engine speed, (kW)	Non Evaluative	-do-	26.1	26.1	26.7	25.5	Yes
c)	Specific fuel consumption corresponding to maximum power, (g/kWh)	Non Evaluative	± 5%	237.8	237.8	232	240	Yes
<b>d) Maximum operating temperature (°C)</b>								
1)	Engine oil	Non 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.	125	129	119	105	Yes
2)	Coolant (water)	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	112	108	85	Yes



T-884/1399/2013

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7.1.2 Labelling of tractors (Provision of labelling plate):					
1)	Make	Evaluative	Should conform to the requirements of CMVR along with declared value of PTO HP	Mahindra	Yes
2)	Model	Evaluative		295 DI ST	Yes
3)	Year of manufacture	Evaluative		2006 J6	Yes
4)	Engine serial number	Evaluative		NPT 101	Yes
5)	Chassis serial number	Evaluative		NPT 101	Yes
6)	Declaration of PTO power, kW	Evaluative		26.1	Yes

7.2

**Salient Observations:**

7.2.1

**Laboratory tests:**

7.2.1.1

**PTO Performance:**

- The maximum PTO power in case of base and variant models were observed as 26.7 & 25.5 kW respectively against the declaration of 26.1 kW which is within the specified limit, But the variation of - 4.5%, which is towards lower side, this may be looked into.
- The specific fuel consumption in case of base and variant models corresponding to maximum power were observed as 232 & 240 g/kWh respectively against the declaration of 237.8 g/kWh, which is within the tolerance limit.

7.2.1.2

**Provision for safety and comfort of operator, (Conformity with IS: 12343-1998):**

- The operator's seat provided on the tractor does not meet the following requirements and calls for necessary improvement in respect of following.
- Longitudinal distance from seat index point to the centre of steering control wheel.

7.2.1.3

**Operator's work place: IS :12239 (Part-I& II)**

- The operator's work place provided on the tractor does not meet the following requirements and calls for necessary improvement in respect of following.
- Vertical retainers have not been provided on both sides of clutch & brake pedals.
  - Hydraulic pipe lines are not insulated properly.
  - Width of footsteps is less.
  - The provision for the spark arrester on silencer is not provided.
  - No hand hold for easy mounting & dismounting of the operator is provided.

7.2.1.4

**Labelling of tractor: -**

Labelling plate of tractor meets the requirements.

7.3

**Maintenance / Service Problems:**

No noticeable maintenance or service problem was observed during the test. However, suitable provision for draining the sediments/water may be provided at the fuel tank.

7.4

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

- The following requirements, inter alia, may be considered for incorporation on the tractor:
- Safety provisions against accidental start of engine.
  - Fuel shut-off knob shall remain in stop position without application of manual effort.
  - Vertical retainers on both sides of clutch & brake pedals should be provided
  - Proper insulation at hydraulic pipes may be provided



T-884/1399/2013

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7.5

**Adequacy of Literature supplied with machine:**

7.5.1

The following literatures were supplied by the manufacturer for reference during the test.

- Operator's manual for DI Tractors
- Part's catalogue Mahindra tractors
- Supplementary parts catalogue for Mahindra Sarpanch 395 DI tractors
- Service manual for Mahindra tractors

7.5.2

The revised literature submitted by the firm was found adequate. However, these literatures may also be brought out in national as well as other regional languages.

**8. CITIZEN CHARTER**

Time frame for Testing & Evaluation as per Citizen Charter	Duration of Test	Whether the Test Report is released within the time frame given in Citizen Charter	Remarks
10 Months	2 Months (June, 2013 to July, 2013)	Yes	None

**TESTING AUTHORITY:**

H. L. YADAV  
SENIOR AGRICULTURAL ENGINEER

C.R. LOHI  
DIRECTOR

Test report compiled by Shri Nitesh Kumar Verma, Senior Technical Assistant

**9. Applicant's Comments**

Para No.	Our Reference	Applicant's comments
9.1	6.2.1.2(i & ii), 6.2.1.3 (i), (iv), (v), & (vi), 6.4 (i), & (ii)	Observation will be studied and necessary action will be incorporated.