



MAHINDRA, 555 DI POWER + TRACTOR



सत्यमेव जयते

भारत सरकार

GOVERNMENT OF INDIA

कृषि एवं किसान कल्याण मंत्रालय

(कृषि, सहकारिता एवं किसान कल्याण विभाग, मशीनीकरण एवं प्रोद्योगिकी प्रभाग)

MINISTRY OF AGRICULTURE AND FARMERS WELFARE

(Deptt. of Agriculture, Co-operation & Farmers Welfare, 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-1039/1564/2016

**MAHINDRA, 555 DI POWER + TRACTOR –
Commercial (Variant)**

Subsequent to the examination of the case in the light of Indian Standard 12207: 2014, the following tests were considered to be carried out on the variant model :

1. Specification checking
2. Nominal speed test
3. Two-hour maximum PTO power test under natural ambient condition

2. FUEL AND LUBRICANTS

2.1 Fuel : The High-speed diesel oil supplied by M/s Indian Oil Corporation Limited having density of **0.836 g/cm³** at 15°C was used.

2.2 Lubricants:

| Sl. No. | Particulars | As recommended by the manufacturer | As used during the test |
|---------|--|------------------------------------|--|
| 1. | Engine oil | SAE 15 W 40 | As recommended |
| 2. | Transmission, Hydraulic, differential, brakes, rear final drive. | TRACT ELF MM | Oil originally filled in the tractor was not changed |
| 3. | Steering system | SAE-140 | --do-- |
| 4. | Grease | MP3 Lithium base | Servo grease MP |

3. ESSENTIAL TESTS

3.1 SPECIFICATIONS

| | Base Model | Variant Model |
|---|---|---|
| 3.1.1 Tractor: | | |
| Make | : Mahindra | Mahindra |
| Model | : Arjun 605 DI V2 | 555 DI Power + |
| Type | : Four wheel, two wheel driven unit construction, General Purpose, Agricultural Tractor | |
| Year of manufacture | : 2011 | 2016 |
| Brand name | : Ultra 1 | None |
| Chassis number | : NPA134 | NRAJ00064 |
| Country of Origin | : INDIA | INDIA |
| 3.1.2 Engine: | | |
| Make | : Mahindra | Mahindra |
| Model | : NE457R3A | NE4573A |
| Type | : Four stroke, turbo charged, liquid cooled, direct injection, diesel engine. | Four stroke, naturally aspirated, liquid cooled, direct injection, diesel engine. |
| Serial number | : NPA134 | NRAJ00064 |
| Engine speed (Manufacturer's recommended production setting), (rpm): | | |
| - Maximum speed at no load | : 2150 to 2250 | 2325 to 2475 |
| - Low idle speed | : 800 to 900 | 750 to 850 |
| - Speed at max. torque | : 1300 to 1500 | 1000 to 1200 |
| Rated speed, (rpm) | : 2000 | 2100 |



T-1039/1564/2016

MAHINDRA, 555 DI POWER + TRACTOR – Commercial (Variant)

6. SUMMARY OF OBSERVATIONS, COMMENTS & RECOMMENDATIONS

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 12207:2014 for acceptance of tractor for the purpose of subsidies/NABARD financing for the applicable features for this tractor model.

6.1 Evaluative and Non Evaluative Parameters:

| S. No. | Characteristic | Category (Evaluative / Non Evaluative) | Requirements as per IS: 12207-2014 | Declaration/ Requirement | | As observed | | Whether variant mode meets the requirement: (Yes/No) |
|--|---|--|---|--------------------------|---------------|-----------------|----------------|--|
| | | | | Base Model | Variant Model | Base model | Variant model | |
| 1 | 2 | 3 | 4 | 5 a | 5 b | 6a | 6b | 7 |
| 6.1.1 PTO Performance : | | | | | | | | |
| a) | - Max. power under 2 h test, (kW) (Natural ambient condition) | Evaluative | Declared value to be achieved with a tolerance of: -5 / +10% for PTO power >26kW. -7.5/+10% for PTO power ≤ 26 kW | 36.7 (D) | 36.7 (D) | 36.4 | 35.3 | Yes |
| b) | Specific fuel consumption corresponding to maximum power, (g/kWh) | Non Evaluative | ± 5% | 251 (D) | 251 (D) | 231 | 258 | Yes |
| 6.1.2 Labelling of tractors (Provision for labeling plate): | | | | | | | | |
| | 1) Make | Evaluative | Should conform to the requirements of CMVR along-with declared value of PTO HP | -- | | Mahindra | Mahindra | Yes |
| | 2) Model | Evaluative | | -- | | ARJUN 605 DI V2 | 555 DI POWER + | Yes |
| | 3) Year of manufacture | Evaluative | | -- | | 2011 GB | 2016 LG | Yes |
| | 4) Engine number | Evaluative | | -- | | NPA 134 | NRAJ 00064 | Yes |
| | 5) Chassis number | Evaluative | | -- | | NPA 134 | NRAJ 00064 | Yes |
| | 6) Declaration of PTO power, (kW) | Evaluative | | -- | | 36.7 | 36.7 | Yes |
| 6.1.3 Literature (Submission to test agency): | | | | | | | | |
| a) | Operator Manual | Evaluative | Provided/ Not provided | Provided | | Provided | | Yes |
| b) | Operator Manual | Evaluative | Provided/ Not provided | Provided | | Provided | | Yes |
| c) | Operator Manual | Evaluative | Provided/ Not provided | Provided | | Provided | | Yes |



T-1039/1564/2016

**MAHINDRA, 555 DI POWER + TRACTOR –
Commercial (Variant)****6.2 Salient Observations:****6.2.1 Laboratory tests:****6.2.1.1 PTO Performance:**

- i) The maximum PTO power in case of base & variant models was observed as 36.4 & 35.3 kW respectively against the declaration of 36.7 kW, which is within the tolerance limit as specified in IS:12207-2014. But the variation of 3.02% among the base model and variant model which is on lower side. This should be looked in to.
- ii) The specific fuel consumption in case of base & variant models corresponding to maximum power was observed as 231 & 258 g/kWh, respectively against the declaration of 251 g/kWh, which is within the tolerance limit as specified in IS:12207-2014. But the variation of 11.69% among the base model and variant model which is on higher side. This should be looked in to for corrective necessary action.

6.2.1.2 Three point linkage:

- i) The width of ball of lower hitch points does not meet the requirement of IS: 4468 (Part-1)-1997. This may be looked into for necessary corrective action.
- ii) The lateral distance from lower hitch point to centre line of tractor does not meet the requirement of IS: 4468 (Part-1)-1997. This may be looked into for necessary corrective action.

6.2.1.3 Power take off shaft:

Dimensions "d \emptyset " and "A \emptyset " (Refer Fig.1) of power take of shaft does not meet the requirement of IS: 4931-1995. This should be looked into for necessary corrective action.

6.2.1.4 Labelling Plate:

The same engine and chassis serial number of the tractor was punched (NRAJ00064661) at labelling plate. **The engine and chassis serial number of the tractor should be given separately for its noteworthy identification.**

6.2.1.5 Coolant capacity:

The total coolant capacity of the cooling system of variant model has been declared as 11.90 liter over the total coolant capacity of 10.20 liter for its base model i.e. 16.67% increase in the cooling capacity. However the total cooling capacity of variant model was recorded as 9.00 liter, which is 11.76% less than the cooling capacity of its base model. This should be looked into.

6.3 Maintenance / Service Problems:

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

6.4 Recommendation with regard to safety on tractor:

The following requirements, inter alia, may be considered for incorporation on the tractor as per relevant Indian Standards:

- i) Provision for spark arresting device in exhaust system.
- ii) Length of seat from sea index point and longitudinal & vertical distance from seat index point to centre of steering control wheel should be within the limit of easy handling of tractor.
- iii) Stop compression ignition is provided but does not remain in stop position.

6.5 Adequacy of Literature supplied with machine:

6.5.1 The following literature was supplied with the tractor for reference during the test:

- i) Operator's manual
- ii) Parts Catalogue
- iii) Service manual



T-1039/1564/2016





**MAHINDRA, 555 DI POWER + TRACTOR –
Commercial (Variant)**

- 6.5.2 The operator's manual may be revised as per IS: 8132-1999 with the inclusion of, inter alia, the following:
- The type of steering system as "Mechanical" instead of "Hydrostatic Power Steering"
 - Size of drive wheels as "16.9 x 28" instead of "14.9 x 28".
- 6.5.3 The printed literature supplied with the test sample is in English and Hindi. The literature may be brought out as per IS: 8132-1999 (Reaffirmed in March, 2009) for the guidance of user and service personnel in national as well as other regional languages.

7. CITIZEN CHARTER

| Time frame for Testing & Evaluation as per Citizen Charter | Duration of test | Whether the report is released within the time frame given in the Citizen Charter | Remark |
|--|--|---|--------|
| 10 Months | 2 Months (July, 2016 to August, 2016) | Yes | None |

TESTING AUTHORITY:

| | | |
|---|---|--|
|  C. K. TIJARE AGRICULTURAL ENGINEER |  C. V. CHIMOTE TEST ENGINEER |  Y. K. RAO SENIOR AGRICULTURAL ENGINEER |
|  J.J.R. NARWARE DIRECTOR | | |

8. APPLICANT'S COMMENTS

| Para No. | Our Reference | Applicant's comments |
|----------|---|---|
| 8.1 | 6.2.1.1 (i & ii), 6.2.1.2 (i & ii), 6.2.1.3, 6.2.1.5, 6.4 (i, ii & iii) & 6.5.2 (i & ii), | Observation will be studied and necessary action will be incorporated. |
| 8.2 | 6.2.1.4 | We have studied your valuable suggestions and initiated the process for implementation of different engine and chassis numbering system on Mahindra tractor models. |



T-1039/1564/2016

MAHINDRA, 555 DI POWER + TRACTOR –
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ANNEXURE- I

TRACTOR RUN HOURS DURING TEST

| A. | LABORATORY AND TRACK TESTS | HOURS |
|----|--|-------------|
| 1. | Running-in | Nil |
| 2. | Nominal speed test | 0.93 |
| 3. | PTO performance test | 3.38 |
| B. | Miscellaneous test and other run hours including idle run, transportation, trials and preparation for test | 1.00 |
| | TOTAL: | 5.31 |