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**COMMERCIAL TEST REPORT (Variant)**

L&[; k/No. : **T- 1249/1776/2019**  
ekg /Month : **June, 2019**

¼; g i jh{k.k fji ksvZ **30/06/2022** rd oſk gſA **THIS TEST REPORT IS VALID UPTO 30/06/2022)**



**MAHINDRA 605 DI MS 4WD S+ TRACTOR**  
**(Brand name: Arjun Novo)**



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**GOVERNMENT OF INDIA**

**MINISTRY OF AGRICULTURE AND FARMERS WELFARE**

**(Deptt. of Agricultural, Cooperation & Farmer's Welfare, Mechanization & Technology Division)**

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**CENTRAL FARM MACHINERY TRAINING & TESTING INSTITUTE**

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|                   |  |
|-------------------|--|
| T- 1249/1776/2019 | MAHINDRA 605 DI MS 4WD S+ TRACTOR –<br>(Brand Name: Arjun Novo) - Commercial (Variant) |
|                   | THIS TEST REPORT IS VALID UPTO: 30/06/2022   |

Manufacturer : M/s. Mahindra & Mahindra Limited  
(Farm Equipment Sector)  
Akurli Road, Kandivli (E)  
Mumbai – 400 101

|             |                                   |            |
|-------------|-----------------------------------|------------|
| Month: June | Test Report No. T- 1249/1776/2019 | Year: 2019 |
|-------------|-----------------------------------|------------|



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| T- 1249/1776/2019 | <b>MAHINDRA 605 DI MS 4WD S+ TRACTOR –<br/>(Brand Name: Arjun Novo) - Commercial (Variant)</b> |
|                   | <b>THIS TEST REPORT IS VALID UPTO: 30/06/2022</b>  |

Type of Test : **COMMERCIAL (Variant)**

Test code/Procedure : IS: 5994-1998 (Reaffirmed in 2014) and IS: 12207-2014

Period of Test : October, 2018 to May, 2019

Test Report No. : **T- 1249/1776/2019**

Month/Year : **June, 2019**

- i) The results reported in this report are observed values and no corrections have been applied for atmospheric and site conditions.
- ii) The data given in this report pertain to the particular machine submitted by the applicant for test.
- iii) The results presented in this report do not in any way attribute to the durability of the machine.
- iv) This report should not be reproduced in part or full without prior permission of the Director, Central Farm Machinery Training and Testing Institute, Budni (M.P.).
- v) This is a Variant test report and, should be read in conjunction with the Test Report of base model i.e. **“Mahindra 605 DI PS Tractor (Brand name: Arjun Novo)”** bearing **No. T- 954/1472/2015, February 2015.**

| SELECTED CONVERSIONS |                          |                                |
|----------------------|--------------------------|--------------------------------|
| Sl. No               | Units                    | Conversion Factor              |
| 1                    | <b>Force:</b>            |                                |
|                      | 1 kgf                    | 9.80665 N                      |
|                      |                          | 2.20462 lbf                    |
| 2                    | <b>Power:</b>            |                                |
|                      | 1 mechanical horse power | 1.01387 metric horse power     |
|                      |                          | 745.7 W                        |
|                      | 1 Ps                     | 735.5 W                        |
|                      | 1 kW                     | 1.35962 Ps                     |
| 3                    | <b>Pressure:</b>         |                                |
|                      | 1 psi                    | 6.895 kPa                      |
|                      | 1 kgf/cm <sup>2</sup>    | 98.067 kPa = 735.56 mm of Hg   |
|                      | 1 bar                    | 100 kPa = 10 N/cm <sup>2</sup> |
|                      | 1 mm of Hg               | 1.3332 m-bar                   |

| ABBREVIATIONS |                                 |
|---------------|---------------------------------|
| apa           | As per applicant                |
| TDC           | Top Dead Centre                 |
| IS            | Indian Standard                 |
| LHS /RHS      | Left Hand Side/ Right Hand Side |
| Hg            | Mercury                         |
| Temp.         | Temperature                     |
| N.R.          | Not recorded                    |
| rpm           | Revolutions per minute          |
| O.D/I.D       | Outer diameter/ Inner diameter  |
| N.A.          | Not available/Not applicable    |
| PTO           | Power take-off                  |
| R.H.          | Relative Humidity               |
| SIP           | Seat Index Point                |
|               |                                 |

|                   |  |
|-------------------|--|
| T- 1249/1776/2019 | MAHINDRA 605 DI MS 4WD S+ TRACTOR –<br>(Brand Name: Arjun Novo) - Commercial (Variant) |
|                   | THIS TEST REPORT IS VALID UPTO: 30/06/2022   |

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| T- 1249/1776/2019 | <b>MAHINDRA 605 DI MS 4WD S+ TRACTOR –<br/>(Brand Name: Arjun Novo) - Commercial (Variant)</b> |
|                   | <b>THIS TEST REPORT IS VALID UPTO: 30/06/2022</b>  |

|   |  |
|---|--|
| Manufacturer                                    | : <b>M/s. Mahindra &amp; Mahindra Limited<br/>(Farm Equipment Sector)<br/>Akurli Road, Kandivali (E)<br/>MUMBAI – 400 101</b>  |
| Location of other manufacturing plants<br>(apa) | : <b>M/s. Mahindra &amp; Mahindra Limited<br/>(Farm Equipment Sector)<br/>Hingna Road, Hingna MIDC,<br/>NAGPUR- 440 016</b><br>: <b>M/s. Mahindra &amp; Mahindra Limited<br/>(Farm Equipment Sector)<br/>Agri Business Development Centre, Khatima<br/>Panipat Highway, Udham Singh Nagar,<br/>Vil-Lalpur, Tehsil-Kichha,<br/>RUDRAPUR-263153</b><br>: <b>M/s. Mahindra &amp; Mahindra Limited<br/>(Farm Equipment Sector)<br/>Agri Development Centre, Vil-Mehla<br/>Tehsil-Dudu Jaipur- Ajmer Road,<br/>JAIPUR-303 007</b><br>: <b>M/s. Mahindra &amp; Mahindra Limited<br/>(Farm Equipment Sector)<br/>Near Bidar “T” Junction , Mahindra<br/>Nagar, Zaheerabad- 502 220</b><br>: <b>M/s. Mahindra &amp; Mahindra Limited<br/>(Farm Equipment Sector)<br/>Mahindra Research Valley-AFS, Mahindra<br/>World City, Plot No. 41/1, Anjur P.O.,<br/>Chengalpattu – 603 004<br/>Kanchipuram District</b> |
| Test requested by (applicant)                   | : <b>M/s. Mahindra &amp; Mahindra Limited<br/>(Farm Equipment Sector)<br/>Akurli Road, Kandivli (E)<br/>Mumbai – 400 101</b>   |
| Selected for test by                            | : Applicant  |
| Place of running-in                             | : At applicant’s works   |
| <b>Duration of said running-in (hrs):</b>       |  |
| - Engine  | : 15   |
| - Transmission                                  | : 32   |
| <b>Method of Selection</b>                      | : The tractor was submitted directly by the applicant<br>for test. Hence method of selection is not known.   |

|                   |  |
|-------------------|--|
| T- 1249/1776/2019 | <b>MAHINDRA 605 DI MS 4WD S+ TRACTOR –<br/>(Brand Name: Arjun Novo) - Commercial (Variant)</b> |
|                   | <b>THIS TEST REPORT IS VALID UPTO: 30/06/2022</b>  |

### 1. SCOPE OF TEST

The “Mahindra 605 DI PS Tractor (Brand name: Arjun Novo)” tractor had undergone “Initial Commercial Test” at this Institute and bearing a test report No. T- 954/1472/2015 was released in February, 2015. Now, the applicant has submitted an application vide letter No. Nil dated 14.12.2016 for testing of “Mahindra 605 DI MS 4WD S+ (Brand name: Arjun Novo)” tractor as a Variant of “Mahindra 605 DI PS (Brand name: Arjun Novo)” tractor.

The specifications submitted by the applicant have been examined and a list of following changes in the technical specifications declared by the applicant between “Mahindra 605 DI PS Tractor (Brand name: Arjun Novo)” and “Mahindra 605 DI MS 4WD S+ Tractor (Brand name: Arjun Novo)” are tabulated. The applicant has requested to test the “Mahindra 605 DI MS 4WD S+ Tractor (Brand name: Arjun Novo)” as a variant of “Mahindra 605 DI PS (Brand name: Arjun Novo) tractor:-

The major difference in the specifications of Base model and Variant model are listed below:

| S. No.                                   | Parameters   | Base Model<br>(Test Report No. T-954/1472/2015)Feb                   | Variant Model  |
|--|--|--|--|
| 1  | 2  | 3  | 4  |
| 1.                                       | Model of tractor                                       | 605 DI PS  | 605 DI MS 4WD S+   |
| 2.                                       | Type of tractor  | Four-wheel, rear-wheel driven, general purpose, agricultural tractor | Four-wheel, four-wheel driven, general purpose, agricultural tractor                                     |
| 3.                                       | Type of drive  | 2WD  | 4WD  |
| 4.                                       | Model of engine  | MSI 452 3A   | MSI 4503A  |
| <b>Valve clearance, (cold/hot), (mm)</b> |  |  |  |
| 5.                                       | Inlet valve  | 0.3/ 0.4   | 0.3/ 0.3   |
|  | Exhaust valve  | 0.3/ 0.4   | 0.4/ 0.4   |
| 6.                                       | Maximum speed at no load                               | 2400 to 2500   | 2250 to 2350   |
| 7.                                       | Model /group combination number of fuel injection pump | Bosch, India<br>E B40 289 300  | Bosch, India<br>F 002 A2Z 016,<br>PES4A95D320RS2000  |
| 8.                                       | Suction pressure at maximum power, (kPa)               | 0.80 to 1.10   | 2.13 to 2.27   |
| 9.                                       | Exhaust pressure at maximum power, (kPa)               | 6.93 to 9.07   | 11.73 to 11.87   |
| 10.                                      | Minimum permissible lubricating oil pressure, (kPa)    | 100  | 200  |
| 11.                                      | Exhaust gas recirculation (EGR)                        | Provided   | Not provided   |
| 12.                                      | Type of cooling device/inter cooler, if any            | Coil type having 05 numbers of coils                                 | Not Available  |
| 13.                                      | Fuel tank capacity, (l)                                | 65.0   | 60.5   |
| 14.                                      | Bare radiator capacity, (l)                            | 4.40   | 4.80   |
| 15.                                      | Expansion tank capacity, (l)                           | 1.00   | 0.90   |
| 16.                                      | Total cooling capacity, (l)                            | 10.65  | 9.45   |
| 17.                                      | Capacity & rating of battery                           | 12V, 88 Ah at 20-hour discharge rate                                 | 12V, 100 Ah at 20-hour discharge rate  |
| 18.                                      | <b>Front differential unit:</b>                        |  |  |
|  | Type   | <b>NA</b>  | Crown wheel and bevel pinion with differential unit accommodated inside the centre of front axle housing |

|                   |  |
|-------------------|--|
| T- 1249/1776/2019 | <b>MAHINDRA 605 DI MS 4WD S+ TRACTOR –<br/>(Brand Name: Arjun Novo) - Commercial (Variant)</b> |
|                   | <b>THIS TEST REPORT IS VALID UPTO: 30/06/2022</b>  |

| 1   | 2  | 3  | 4  |
|-----|--|--|--|
|     | Reduction through crown wheel and bevel pinion                             | <b>NA</b>  | 2.84:1 (37/13T)  |
| 19. | <b>Front axle &amp; front final drive:</b>                                 |  |  |
|     | Type   | <b>NA</b>  | Epicyclic  |
|     | Reduction through final drive  | <b>NA</b>  | 6:1 (Sun-12T, planet-23T & ring-60T)   |
|     | <b>No. of speeds:-</b>   |  |  |
|     | - Forward  | 15   | 15   |
|     | - Reverse  | 03   | 15   |
|     | Additional no of speed   | None   | 12   |
| 20. | Total transmission Oil capacity, (l)                                       | 36.50 (common with differential rear axle, final drive, hydraulic, steering and brake system). | 39.40 (common with differential rear axle, final drive, hydraulic, steering and brake system). |
| 21. | Front towing hitch , (mm)  | Not provided   | Provided   |
| 22. | Size & ply rating of front tyres   | 7.50 – 16, 8 PR  | 8.3 – 24, 6 PR   |
| 23. | Wheel base, (mm)   | 2150   | 2220   |
| 24. | Overall length, ,width ,Height (mm)  | 3645,1920 & 2130   | 3680,1940 & 2140   |
| 25. | Mass of un-ballasted ballasted tractor, (kg)                               | 970/1570/2540  | 1090/1600/2690   |
| 26. | Specific fuel consumption declared corresponding to maximum power, (g/kWh) | 251  | 258  |
| 27. | Maximum equivalent crankshaft torque declared, (Nm)                        | 178.0  | 196.0  |
| 28. | Decals (stickers)  | Mahindra 605 DI PS<br>(Arjun NOVO)   | Mahindra 605 DI MS<br>4WD S+ (Arjun NOVO)  |

Subsequent to the examination of the case in the light of **Indian Standard IS: 12207- 2014**, the following tests were considered to be carried out:-

- Specification checking
- Nominal speed test
- PTO performance test
- Drawbar performance test
- Noise level test
- Turning Ability
- Location of Centre of Gravity

## 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/cc at 15°C was used.

### 2.2 Lubricants:

|    | Particulars   | As recommended by the manufacturer | As used during the test                              |
|----|---|------------------------------------|--|
| 1. | Engine oil  | 15W40 Maximile                     | As recommended                                       |
| 2. | Transmission, differential, rear axle, front axle, brake, steering and hydraulic system oil | TRACT ELF MM                       | Oil originally filled in the tractor was not changed |
| 3. | Grease  | MP3 Lithium base                   | Servo grease MP                                      |

|                   |  |
|-------------------|--|
| T- 1249/1776/2019 | <b>MAHINDRA 605 DI MS 4WD S+ TRACTOR –<br/>(Brand Name: Arjun Novo) - Commercial (Variant)</b> |
|                   | <b>THIS TEST REPORT IS VALID UPTO: 30/06/2022</b>  |

### 3. ESSENTIAL TESTS

#### 3.1. SPECIFICATIONS

| 3.1.1 Tractor:  | <u>Base Model</u>   | <u>Variant Model</u>   |
|---|---|--|
| Make :  | Mahindra  | Mahindra   |
| Model :   | 605 DI PS   | 605 DI MS 4WD S+   |
| Brand name :  | Arjun Novo  | Arjun Novo   |
| Type :  | Four-wheel, rear-wheel driven, general purpose, agricultural tractor                                      | Four-wheel, four-wheel driven, general purpose, agricultural tractor |
| Year of manufacture :   | 2014  | 2016   |
| Chassis number :  | N9MB 00002  | MBNWHBDWFGNF00001  |
| Country of Origin :   | INDIA   | INDIA  |
| <br>  |   |  |
| 3.1.2 Engine:   |   |  |
| Make :  | Mahindra  | Mahindra   |
| Model :   | MSI452 3A   | MSI4503A   |
| Serial number :   | N9MB 00002  | NGF4WBA0001  |
| Type :  | Four stroke, naturally aspirated, liquid cooled, direct injection, diesel engine.                         |  |
| <b>Engine speed (Manufacturer's recommended production setting),(rpm) :</b> |   |  |
| - Maximum speed at no load :  | 2400 to 2500  | 2250 to 2350   |
| - Low idle speed :  | 750 to 850  | 750 to 850   |
| - Speed at maximum torque :   | 1100 to 1300  | 1100 to 1300   |
| <b>Rated speed, (rpm):</b>  |   |  |
| - For PTO use :   | 2100  | 2100   |
| - For drawbar use :   | 2100  | 2100   |
| <br>  |   |  |
| 3.1.3 Cylinder & Cylinder Head:   |   |  |
| Number :  | Four  | Four   |
| Disposition :   | Vertical, inline  | Vertical, inline   |
| Bore/stroke, (mm) :   | 96/122  | 96/122   |
| Capacity as specified by the applicant, (cc) :                              | 3532  | 3532   |
| Compression ratio, (apa) :  | 18.3 (±0.5):1   | 18.3 (±0.5):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) :   | 0.3/ 0.4  | 0.3/ 0.3   |
| - Exhaust valve, (mm) :   | 0.3/ 0.4  | 0.4/ 0.4   |
| <br>  |   |  |
| 3.1.4 Fuel System:  |   |  |
| Type of fuel feed system :  | Gravity and force feed  |  |
| <br>  |   |  |
| 3.1.4.1 Fuel tank:  |   |  |
| Capacity, (l) :   | 65.00   | 60.5   |
| Location :  | Above clutch housing  |  |
| Provision for draining of sediments/ water :                                | Provided  |  |
| Material of fuel tank :   | Metallic  |  |
| 3.1.4.2 Water separator   | : <b>Not provided</b> , however a drain plug is provided at the bottom of fuel filter to drain the water. |  |



|                   |  |
|-------------------|--|
| T- 1249/1776/2019 | <b>MAHINDRA 605 DI MS 4WD S+ TRACTOR –<br/>(Brand Name: Arjun Novo) - Commercial (Variant)</b> |
|                   | <b>THIS TEST REPORT IS VALID UPTO: 30/06/2022</b>  |

| <b>3.1.4.3 Fuel feed pump:</b>                      | <u>Base Model</u>                                      | <u>Variant Model</u>                              |
|---|--|---|
| Make :  | Bosch, India   |   |
| Type :  | Plunger type with hand primer                          |   |
| Model/Group combination No. :                       | FP/ KS 22AD62,<br>9 440 030 029                        | FP/ KSG 22AD105,<br>F002 A50 040                  |
| Provision of sediment bowl :                        | Provided   |   |
| Method of drive :                                   | Through camshaft of fuel injection pump                |   |
| <b>3.1.4.4 Fuel filters:</b>                        |  |   |
| Make :  | Bosch, India   | Bosch, India                                      |
| Model/Group combination No. :                       | F002 H20 117   | F002 H20 117                                      |
| Number :  | Two  |   |
| Type of elements                                    |  |   |
| -Primary :  | Paper  | Paper   |
| -Secondary :  | Paper  | Paper   |
| Capacity of final stage filter, (l) :               | 0.60   | 0.45  |
| <b>3.1.4.5 Fuel Injection pump:</b>                 |  |   |
| Make :  | Bosch, India   |   |
| Model/Group combination No. :                       | E B40 289 300  | F 002 A2Z 016,<br>PES 4A95D320RS2000              |
| Type :  | Inline plunger type                                    |   |
| Serial number :                                     | 31014522   | 65514400  |
| Method of drive :                                   | Through timing gears                                   |   |
| <b>3.1.4.6 Fuel injectors:</b>                      |  |   |
| Make :  | Bosch, India   |   |
| Model/Group combination No. :                       | Holder No. F002C70 552<br>Nozzle No. DSLA147P1379      | Holder No. 0432193410<br>Nozzle No. DSLA 147P1379 |
| Type :  | Multihole (Six holes)                                  |   |
| Manufacturer's production pressure setting, (MPa) : | 2.5 + 0.10   |   |
| Injection timing :                                  | 3.5 <sup>0</sup> ± 1 degree before TDC                 |   |
| Firing order :                                      | 1-3-4-2  |   |
| <b>3.1.4.7 Governor:</b>                            |  |   |
| Make :  | Bosch, India   |   |
| Model/Group combination no. :                       | E 042 233 300  | RSV400...1050A2C1790R                             |
| Type :  | Mechanical, centrifugal, variable speed                |   |
| Rated engine speed, (rpm) :                         | 2100   |   |
| Governed range of engine speed (rpm) :              | 800 to 2500  | 750 to 2350                                       |
| <b>3.1.5 Air Intake system:</b>                     |  |   |
| <b>3.1.5.1 Pre-cleaner:</b>                         | Not provided   |   |
| <b>3.1.5.2 Air cleaner:</b>                         |  |   |
| Make :  | Donaldson  |   |
| Type :  | Dry type.  |   |
| Location :  | In front of radiator, under the bonnet                 |   |
| Range of suction pressure at maximum power, (kPa) : | 0.80 to 1.10   | 2.13 to 2.27                                      |
| Number of elements :                                | Two  |   |
| <b>Details of elements:</b>                         |  |   |
| Type (material) :                                   | Primary (Polyester felt) & Secondary (Cellulose fiber) |   |
| <b>Size of filter element:</b>                      |  |   |
| <b>Size (OD/ID), mm</b>                             | <b>-Primary</b>  | <b>-Secondary</b>                                 |
| Length :  | 162.5/95.7   | 91.9/76.2   |
| Length :  | 345  | 340   |
| Air flow restriction indicator :                    | Provided on dash board                                 |   |
| Dust unloading valve :                              | Provided   |   |

|                   |  |
|-------------------|--|
| T- 1249/1776/2019 | <b>MAHINDRA 605 DI MS 4WD S+ TRACTOR –<br/>(Brand Name: Arjun Novo) - Commercial (Variant)</b> |
|                   | <b>THIS TEST REPORT IS VALID UPTO: 30/06/2022</b>  |

Maintenance schedule in case of base & variant model : Cleaning of primary element at 100 hrs of operation /earlier if required in arduous condition & then at every 500 hours of operation. Replace primary element at every 900 hours of operation or 3 cleaning of primary filter element. Replace secondary (safety cartridge) element change at every 2500 hours or 3 replacements of primary filter element.

**3.1.6 Exhaust System:**

|  |   |   |                        |
|--|---|---|------------------------|
| Type of silencer                                       | : | Updraft, (Cylindrical)                    | Updraft, (Cylindrical) |
| Position of silencer outlet with respect to SIP, (mm): |   |   |                        |
| - Vertical   | : | 860                                       | 675                    |
| - Longitudinal   | : | 1470                                      | 1445                   |
| - Lateral  | : | 450 (on RHS)                              | 455 (on RHS)           |
| Range of exhaust gas pressure at maximum power, (kPa)  | : | 6.93 to 9.07                              | 11.73 to 11.87         |
| Provision of spark arrestor                            | : | <b>None</b>                               |                        |
| Provision against entry of rain water.                 | : | A bend is provided at the top of silencer |                        |

**3.1.6.1 EGR Details:**

|          |   |  |            |
|----------|---|--|------------|
| Make     | : | Padmini                                  | Not fitted |
| Type     | : | Electrically operated                    | Not fitted |
| Location | : | On LHS of engine at air intake manifold. | NA         |

**3.1.7 Lubricating system:**

|                             |   |   |       |
|-----------------------------|---|---|-------|
| Type                        | : | Force feed cum splash   |       |
| Oil sump capacity, (l)      | : | 10.00   | 9.50  |
| Total lub oil capacity, (l) | : | 10.40   | 10.00 |
| Oil change period           | : | First change after 100 hours and subsequently after every 400 hours of operation  |       |
| Cooling device, (if any)    | : | Coil type oil cooler provided, having five numbers of coils. The cooler is connected with water pump outlet & engine water jackets. | NA    |

**Filters:**

|        |   |  |               |
|--------|---|--|---------------|
| Make   | : | Not available                                | Not available |
| Type   | : | Full flow, spin on, throwaway paper element. |               |
| Number | : | One  |               |

**Pump:**

|                                     |   |                     |            |
|-------------------------------------|---|---------------------|------------|
| Type                                | : | Gear type           |            |
| Method of drive                     | : | Through timing gear |            |
| Pressure release setting, (kPa)     | : | 392 ± 49            | 350 to 450 |
| Minimum permissible pressure, (kPa) | : | 100                 | 200        |

**3.1.8 Cooling system:**

|                     |   |  |   |
|---------------------|---|--|---|
| Type                | : | Forced circulation of coolant  |   |
| Coolant recommended | : | Ethylene glycol, having coolant and water in ratio 0.05:1  | MOBILE COOLZ COOLANT ADDITIVE, having coolant and water in ratio 0.05:1 |
| Details of pump     | : | Centrifugal, semi open impeller having seven vanes of 99 mm diameter and driven by crank shaft pulley through coggled "V" belt common to alternator. |   |

|                   |  |
|-------------------|--|
| T- 1249/1776/2019 | <b>MAHINDRA 605 DI MS 4WD S+ TRACTOR –<br/>(Brand Name: Arjun Novo) - Commercial (Variant)</b> |
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|  | <u>Base Model</u>  | <u>Variant Model</u>                  |
|--|--|---------------------------------------|
| Details of fan                               | : Suction type, having seven polypropylene blades of 455 mm diameter and mounted on water pump shaft |                                       |
| Means of temperature control                 | : Thermostat   |                                       |
| Bare radiator capacity, (l)                  | 4.40   | 4.80                                  |
| Capacity of expansion flask, (l)             | 1.00   | 0.90                                  |
| Total coolant capacity, (l)                  | 10.65  | 9.45                                  |
| Radiator cap pressure, (kPa)                 | 88   | 88                                    |
| <b>3.1.9 Starting System:</b>                |  |                                       |
| Type   | : 12V, DC, Electrical  |                                       |
| Aid for cold starting                        | : <b>None</b>  |                                       |
| Any other device provided for easy starting. | : <b>None</b>  |                                       |
| <b>3.1.10 Electrical System:</b>             |  |                                       |
| <b>3.1.10.1 Battery:</b>                     |  |                                       |
| Make & Model                                 | Exide Express  | Exide Express & MHD 1000              |
| Type   | : Lead acid  |                                       |
| Capacity and rating                          | 12V, 88 Ah at 20-hour discharge rate   | 12V, 100 Ah at 20-hour discharge rate |
| Location                                     | : On RHS of clutch housing, in separate metallic box.  |                                       |
| <b>3.1.10.2 Starter:</b>                     |  |                                       |
| Make   | : Lucas –TVS   |                                       |
| Model  | 6M14   | M14                                   |
| Type   | : Pre-engaging, solenoid operated  |                                       |
| Capacity and rating                          | : 12V, 2.2 kW  |                                       |
| Serial Number                                | 260-25-115A  | 26241072                              |
| <b>3.1.10.3 Generator:</b>                   |  |                                       |
| Make   | : Lucas TVS  |                                       |
| Model  | : SIA 114  |                                       |
| Type   | : Alternator   |                                       |
| Serial number                                | : Not available  |                                       |
| Output rating                                | 12V, 45 Ampere   | 12V, 45 Ampere                        |
| Method of drive                              | : Through hydraulic pump pulley by a cogged “V” belt common to water pump                            |                                       |
| <b>3.1.10.4 Voltage regulator</b>            | : In built in alternator   |                                       |

| Description                         | No. & capacity of bulbs | Height of the centre of beam above ground level, (mm) |                      | Size of beam, (mm) |                      | Distance between centre of the beam and outside edge of tractor at standard rear track setting, (mm) |                      |
|-------------------------------------|-------------------------|---|----------------------|--------------------|----------------------|--|----------------------|
|                                     |                         | <u>Base model</u>                                     | <u>Variant model</u> | <u>Base model</u>  | <u>Variant model</u> | <u>Base model</u>  | <u>Variant model</u> |
| 1                                   | 2                       | 3   | 4                    | 5                  | 6                    | 7  | 8                    |
| <b>Front Lights:</b>                |                         |   |                      |                    |                      |  |                      |
| - Head lights                       | 2, 12V, 60/55W          | 1230  | 1220                 | 165 x 110          | 165 x 110            | 817  | 817                  |
| - Parking lights                    | 2, 12V, 5W              | 1430  | 1400                 | 65 x 75            | 65 x 75              | 320  | 320                  |
| - Turn Indicators-cum-Hazard lights | 2, 12V, 21W             | 1430  | 1400                 | 70 x 75            | 70 x 75              | 255  | 255                  |
| - Reflectors (Red)                  | 2                       | 1430  | 1400                 | 40 x 65            | 40 x 65              | 375  | 375                  |

|                   |  |
|-------------------|--|
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| 1                                   | 2             | 3    | 4    | 5       | 6       | 7   | 8   |
|-------------------------------------|---------------|------|------|---------|---------|-----|-----|
| <b>Rear lights:</b>                 |               |      |      |         |         |     |     |
| -Tail light-cum-brake light         | 2, 12V, 21/5W | 1405 | 1395 | 65 x 75 | 65 x 75 | 330 | 330 |
| - Turn Indicators-cum-Hazard lights | 2,12V, 21W    | 1405 | 1395 | 70 x 75 | 70 x 65 | 255 | 255 |
| - Plough light (on RHS mudguard)    | 1, 12V, 55 W  | 1400 | 1420 | 110 Φ   | 110 Φ   | 635 | 635 |
| - Reflectors (Red)                  | 2             | 1405 | 1395 | 40 x 65 | 40 x 65 | 390 | 390 |
| Registration plate Light (RHS)      | 1,12V,5W      | 1270 | 1300 | 30 x 25 | 30 x 25 | 960 | 960 |

**3.1.11 Instrument panel details: -**

|   | <u>Base model</u> | <u>Variant model</u> |
|---|-------------------|----------------------|
| i) Engine speed analog cum digital cumulative run hour meter (0 to 25) x 100 rpm. | Provided          | Provided             |
| ii) Coolant temperature gauge (with colour zones)                                 | Provided          | Provided             |
| iii) Fuel level gauge (with colour zones).  | Provided          | Provided             |
| iv) Lub.oil pressure indicator light  | Provided          | Provided             |
| v) Main switch (key-turn type)  | Provided          | Provided             |
| vi) Combination Light switch (Rotary type)  | Provided          | Provided             |
| vii) Light switch (High-low beam switch)  | Provided          | Provided             |
| viii) Turn indicator light switch (two way)                                       | Provided          | Provided             |
| ix) Side/Hazard warning light Indicator   | Provided          | Provided             |
| x) Battery charging indicator light   | Provided          | Provided             |
| xi) Head light (long beam) 'ON' indicator light                                   | Provided          | Provided             |
| xii) Parking brake indicator light  | Provided          | Provided             |
| xiii) Air cleaner clogging indicator  | Provided          | Provided             |
| xiv) Horn push button   | Provided          | Provided             |
| xv) Hand accelerator lever  | Provided          | Provided             |
| xvi) Steering control wheel   | Provided          | Provided             |
| xvii) Neutral light switch  | Provided          | Provided             |
| xviii) Plough light switch  | Provided          | Provided             |
| xix) Mobile charger socket  | Provided          | Provided             |
| xx) Re-set knob push type   | Provided          | Provided             |
| xxi) Service reminder tell-tale   | Provided          | Provided             |
| xxii) Fuel shut off knob  | Provided          | Provided             |

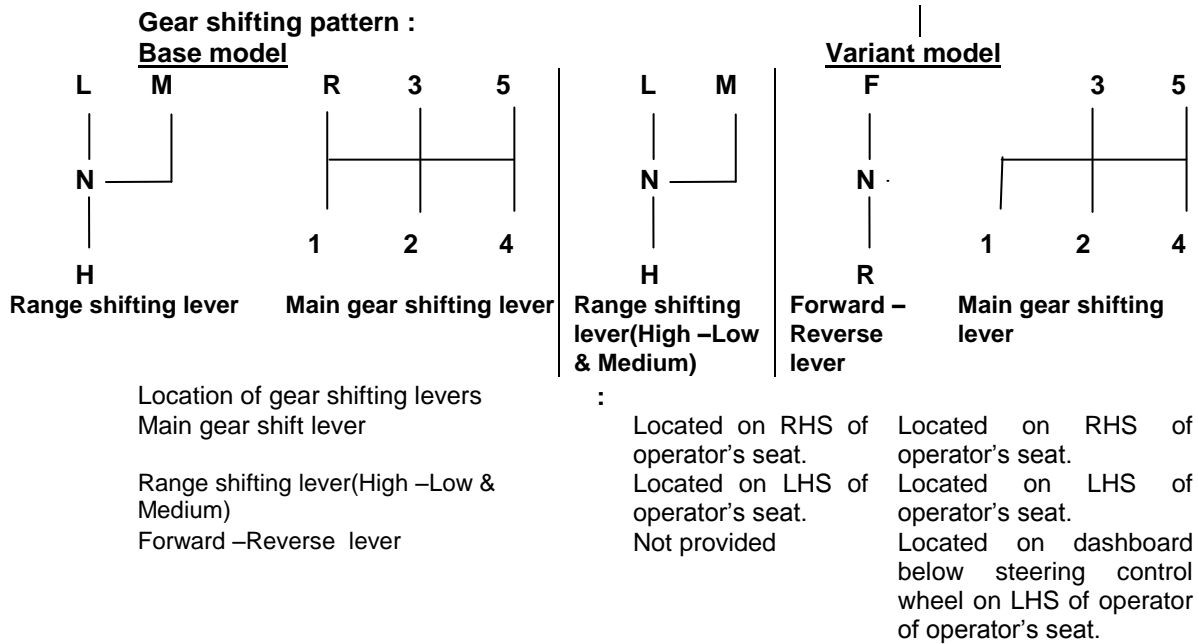
**3.1.12 Transmission System:**

**3.1.12.1 Clutch:**

|                             | <u>Base model</u> | <u>Variant model</u>  |
|-----------------------------|-------------------|---|
| Make                        |                   | Luk. India Pvt. Ltd.  |
| Type                        |                   | Dual, dry friction plate and pads diaphragm type.                     |
| No. of friction plate, (s)  |                   | Two   |
| <b>Size, {(OD/ID)(mm)}:</b> |                   |   |
| - Transmission              |                   | 310/197 Φ   |
| - PTO                       |                   | 280/165 Φ   |
| <b>Method of operation:</b> |                   |   |
| - Transmission              |                   | By depressing the pedal fully provided on the LHS of operator's seat. |
| - PTO                       |                   | By pulling a hand lever provided on LHS of operator's seat.           |

**3.1.12.2 Gear box:**

|      |  |  |
|------|--|--|
| Make |  | Mahindra & Mahindra  |
| Type |  | Mechanical, combination of constant and partial synchromesh gears. |



|  |   |
|--|---|
| Oil capacity, (l)<br><br>Oil changing period | : 36.5 (common with differential rear axle, final drive, hydraulic, steering and brake system)   39.4 (common with differential rear axle, final drive, hydraulic, steering and brake system)<br>: After every 1300 hours of operation. |
|--|---|

|   |  |
|---|--|
| <b>3.1.12.3 Nominal speeds:</b><br>- Forward<br><br>- Reverse | : 1.63 to 32.04   1.63 to 32.07 (Variation 0 to 0.09 %)<br>: 3.10 to 17.24   1.56 to 30.55 |
|---|--|

|   |  |
|---|--|
| <b>3.1.12.4 Rear Differential unit:</b><br>Type<br><br>Reduction through crown wheel and bevel pinion<br><b>Differential lock:</b><br>Type<br>Location<br>Method of operation | : Crown wheel & pinion with differential unit accommodated inside the differential housing.<br>: 3.692: 1 (48/13 T)<br><br>: Dog clutch<br>: Planetary sun shaft near differential housing<br>: By depressing a pedal provided in RHS of operator’s seat |
|---|--|

|  |   |
|--|---|
| <b>3.1.12.5 Rear axle &amp; final drive:</b><br>Type<br>Reduction through final drive<br>Oil capacity of final drive, (l)<br><br>Oil changing period | : Planetary reduction unit<br>: 7.000 : 1 (15T Sun, 37 T Planets & 90T Ring)<br>: 36.50 (common with gearbox, differential, hydraulic, brake & steering system)   39.40 (common with gearbox, differential, hydraulic, brake & steering system)<br>: After every 1300 hours of operation. |
|--|---|

|                   |  |
|-------------------|--|
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| <b>3.1.12.6 Front Differential unit:</b>          | <b><u>Base model</u></b>  | <b><u>Variant model</u></b>  |
|---|---|--|
| Type :  | NA  | Crown wheel and bevel pinion with differential unit accommodated inside the centre of front axle housing |
| Reduction through crown wheel and bevel pinion :  | NA  | 2.84:1 (37/13 T)   |
| Oil capacity of differential housing, (l) :       | NA  | NA   |
| Oil changing period :                             | NA  | NA   |
| <b>Differential lock</b> :                        | NA  | NA   |
| <b>3.1.12.7 Front axle and front final drive:</b> |   |  |
| Make :  | NA  | Carraro  |
| Type :  | NA  | Epicyclic  |
| Reduction through final drive :                   | NA  | 6:1 (sun-12T, planet-23T, ring-60T)  |
| Oil capacity of final drive housing, (l) :        | NA  | 0.55 (on each portal)  |
| Oil changing period :                             | NA  | First change after 150 to 200rs. Subsequently after every 1500 hrs.                                      |
| <b>3.1.13 Power lift (Hydraulic system):</b>      |   |  |
| Make :  | Mahindra (apa)  |  |
| Type :  | Open centre, live & ADDC  |  |
| No. and type of cylinder :                        | One, single acting  |  |
| Type of linkage lock for transport :              | Hydraulic, Isolating valve in its close position acts as a transport lock.  |  |
| <b>3.1.13.1 Hydraulic pump:</b>                   |   |  |
| - Make :  | Dynamatics  |  |
| - Type :  | Gear pump (Tandem)  |  |
| - Location & drive :                              | On RHS of engine & through timing gear  |  |
| No. & type of filters :                           | Three   |  |
|   | <ul style="list-style-type: none"> <li>i) One strainer inside the differential housing</li> <li>ii) Full flow spin on paper element type</li> <li>iii) Orifice filter on distributor</li> </ul> |  |
| Hydraulic oil capacity, (l) :                     | 36.5 (common with gearbox, differential, rear axle, final drive, brake and steering system)   | 39.4 (common with gearbox, differential, rear axle, final drive, brake and steering system)              |
| Oil change period :                               | After every 1300 hours of operation.  |  |
| Provision for external tapping :                  | Provided  |  |
| Details of control levers :                       | <ul style="list-style-type: none"> <li>i) Position control lever (black)</li> <li>ii) Draft control lever (red)</li> <li>iii) Response control knob on distributor</li> </ul>                   |  |
| Method of draft sensing :                         | Through top link  |  |

|                   |  |
|-------------------|--|
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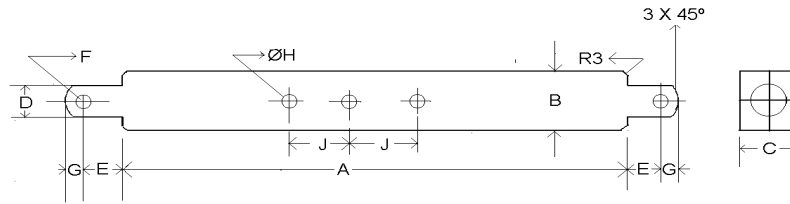
**3.1.13.2 Three-point linkage:**

| S. No.      | Observations  |                       | As per IS: 4468- (Part-1) -1997 (Reaffirmed in Oct., 2017) (Cat.I / Cat.II), (mm) | As measured (mm) |               | Remarks in case of variant model |
|-------------|---|-----------------------|---|------------------|---------------|----------------------------------|
|             |   |                       |   | Base model       | Variant model |                                  |
| 1           | 2   |                       | 3   | 4                | 5             | 6                                |
| <b>I</b>    | <b>Upper hitch points:</b>  |                       |   |                  |               |                                  |
|             | a)  | Dia of hitch pin hole | 19.30 to 19.50/<br>25.70 to 25.90   | 19.37/<br>25.82  | 25.70         | Conforms to Cat. II              |
|             | b)  | Width of ball         | 44.0 (max.) /<br>51.0 (max.)  | 38.8/43.0        | 38.6          | Conforms                         |
| <b>II</b>   | <b>Lower hitch points:</b>  |                       |   |                  |               |                                  |
|             | a)  | Dia of hitch pin hole | 22.40 to 22.65 /<br>28.70 to 29.00  | 29.00            | 28.86         | Conforms to Cat. II              |
|             | b)  | Width of ball         | 34.8 to 35.0 /<br>44.8 to 45.0  | 37.87            | 37.80         | <b>Does not conform</b>          |
| <b>III</b>  | Lateral distance from lower hitch point to centre line of tractor.                                      |                       | 359 (min.) / 435 (min.)   | 432              | 432           | Conforms to Cat. I               |
| <b>IV</b>   | Lateral movement of lower hitch points  |                       | 100 (min)/125 (min)   | 160              | 385           | Conforms                         |
| <b>V</b>    | Distance from end of power take-off to centre of lower hitch point (lower links in horizontal position) |                       | 450 to 575/<br>550 to 625   | 475              | 480           | Conforms to Cat. I               |
| <b>VI</b>   | Transport height  |                       | 820 (min)/950 (min)   | 790,890          | 930           | Conforms to Cat. I               |
| <b>VII</b>  | Power range(without force)  |                       | 560(min)/650 (min)  | 625,680          | 645           | Conforms to Cat. I               |
| <b>VIII</b> | Leveling adjustment   |                       | 100 (min)/100 (min)   | 380              | 425           | Conforms                         |
| <b>IX</b>   | Lower hitch point clearance   |                       | 100 (min)/100 (min)   | 215              | 235           | Conforms                         |
| <b>X</b>    | Lower hitch point height  |                       | 200 (max)/200 (max)   | 110,265          | 200           | Conforms                         |

**3.1.13.3 Drawbar:**

**3.1.13.3.1 Linkage Drawbar [Refer Fig.1]:**

| Notation      | As per IS: 12953-1990 (Reaffirmed in Oct.,2017), (Cat.I) / (Cat.II), (mm) | As measured, (mm) |               | Remarks in case of variant model |
|---------------|---|-------------------|---------------|----------------------------------|
|               |   | Base model        | Variant model |                                  |
| A             | 683 ± 1.5 / 825 ± 1.5   | 825               | 825           | Conforms to Cat-II               |
| B             | 75 (min) / 75 (min)   | 75                | 76            | Conforms                         |
| C             | 30 (min) / 30 (min)   | 32                | 32            | Conforms                         |
| D $\emptyset$ | 21.79 to 22.0 / 27.79 to 28.00  | 27.79             | 27.83         | Conforms to Cat-II               |
| E             | 39.0 (min) / 49.0 (min)   | 52.9              | 54.1          | Conforms                         |
| F $\emptyset$ | 12.0 (min) / 12.0 (min)   | 12.5              | 12.1          | Conforms                         |
| G             | 15.0 (min) /15.0 (min)  | 16.6              | 15.7          | Conforms                         |
| H $\emptyset$ | 25 ± 1 / 25 ± 1   | 25                | 24.5          | Conforms                         |
| J             | 80 ± 1.5 / 80 ± 1.5   | 80.0              | 80.7          | Conforms                         |
| No. of holes  | 7 / 9   | 9                 | 9             | Conforms to Cat-II               |



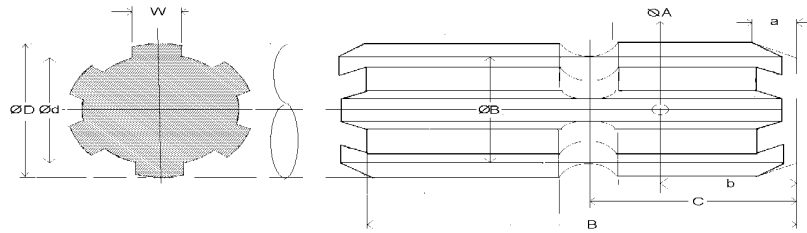
**Fig. 1: DIMENSIONAL NOTATIONS FOR LINKAGE TYPE DRAWBAR**

- 3.1.13.3.2 Swinging drawbar** : **Not provided**
- 3.1.14 Power take-off shaft:**
- |   |  |                      |
|---|--|----------------------|
|   | <b>Base model</b>  | <b>Variant model</b> |
| Type  | Type-I, Independent  |                      |
| Method of engaging  | By a hand lever provided on LHS of operator's seat & separate lever for varying the speed provided behind the operator seat above differential housing |                      |
| No. of shaft, (s)   | One  |                      |
| PTO speed corresponding to rated engine speed, (rpm)                      | 569  |                      |
| Other speeds corresponding to rated engine speed, (rpm)                   | 771 (Economy)  |                      |
| Distance behind rear axle, (mm)   | 360  | 460                  |
| Engine to PTO speed ratio   | 3.692: 1 for 540 & 2.722: 1 for 540 Economy  |                      |
| Whether the PTO shaft is capable to transmitting the full power of engine | Yes  |                      |

**3.1.14.1 Specifications of Power Take-Off Shaft:**

| Specification                        | As per IS: 4931-1995<br>(Reaffirmed in 2014), Type-1  | As observed  |  | Remarks in case of variant model |
|--------------------------------------|---|--|--|----------------------------------|
|                                      |   | Base model   | Variant model  |                                  |
| 1                                    | 2   | 3  | 4  | 5                                |
| Nominal speed, (rpm)                 | 540 ± 10  | 540 rpm of PTO shaft corresponds to 1994 rpm of engine | 1994 rpm of PTO shaft corresponds to 540 rpm of engine | Conforms                         |
| No. of splines                       | 6   | 6  | 6  | Conforms                         |
| Direction of rotation                | Clockwise   | Clockwise  | Clockwise  | Conforms                         |
| Location                             | The position of the centre of the end of pto shaft shall be within 50mm to right or left of the centre line of the tractor. | In the centre line of the tractor                      | In the centre line of the tractor                      | Conforms                         |
| <b>Dimensions, (mm) [See Fig.2]:</b> |   |  |  |                                  |
| DØ                                   | 34.79 ± 0.06  | 34.80  | 34.80  | Conforms                         |
| dØ                                   | 28.91 ± 0.05  | 28.93  | 28.90  | Conforms                         |
| BØ                                   | 29.4 ± 0.1  | 29.4   | 29.4   | Conforms                         |
| AØ (optional)                        | 8.3 ± 0.1   | 8.3  | 8.2  | Conforms                         |
| W                                    | 8.69 - 0.09<br>- 0.16   | 8.58   | 8.65   | Conforms                         |
| a                                    | 7   | 7  | 7  | Conforms                         |
| b (optional)                         | 25 ± 0.5  | 25.0   | 25.3   | Conforms                         |
| c                                    | 38  | 38   | 38   | Conforms                         |
| X                                    | 30°   | 30°  | 30°  | Conforms                         |
| B                                    | 76 (min)  | 82   | 84   | Conforms                         |
| h                                    | 450 to 675  | 630  | 630  | Conforms                         |



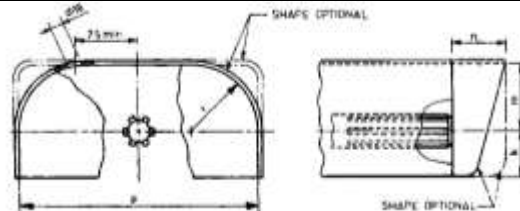


**Fig.2: DIMENSIONAL NOTATIONS FOR TYPE-I POWER TAKE-OFF SHAFT**

**3.1.14.2 Provision of power take-off shaft shield:**

Specifications of power take-off shaft shield for type I & II PTO [See Fig. 2(b)]:

| Specification | As per IS<br>4931-1995 | As observed |               | Remark in case of<br>variant model |
|---------------|------------------------|-------------|---------------|------------------------------------|
|               |                        | Base model  | Variant model |                                    |
| k             | 70 (min)               | -10         | 0             | <b>Does not Conform</b>            |
| m             | 125 ± 5                | 75          | 66.5          | <b>Does not Conform</b>            |
| n             | 85 ± 5                 | 80          | 80.2          | Conforms                           |
| p             | 285 ± 5                | 140         | 133           | <b>Does not Conform</b>            |
| r             | 76 (max)               | 10          | 0             | Conforms                           |



**Fig. 2. (b): DIMENSIONAL NOTATION OF PTO SHAFT MASTER SHIELD**

**3.1.15 Towing hitch:**

**3.1.15.1 Front**

|                                 | <u>Base model</u>   | <u>Variant model</u>    |
|---------------------------------|---------------------|-------------------------|
| Front                           | <b>Not provided</b> | Provided                |
| Type                            | --                  | Clevis                  |
| Location                        | --                  | At the front of tractor |
| Height above ground level, (mm) | --                  | 734                     |
| Type of adjustment              | --                  | Fixed                   |
| Dia of pin hole, (mm)           | --                  | 59.1                    |
| Width of clevis, (mm)           | --                  | 31.6                    |

**3.1.15.2 Rear**

|   |  |        |
|---|--|--------|
| Type                                    | Clevis   | Clevis |
| Location                                | At rear of transmission housing  |        |
| <b>Height above ground level, (mm):</b> |  |        |
| - Maximum                               | 735  | 733    |
| - Minimum                               | 460  | 448    |
| - No. of positions                      | 8  | 8      |
| - Type of adjustment                    | By changing the position of hitch and reversing hitch on its mounting bracket. |        |
| <b>Distance of hitch point, (mm):</b>   |  |        |
| -From rear wheel centre                 | 500  | 600    |
| -From power take-off shaft end          | 140  | 140    |
| Dia of pin hole, (mm)                   | 30.3   | 29.9   |
| Width of clevis, (mm)                   | 75.0   | 75.5   |

|  | <u>Base model</u> | <u>Variant model</u>  |
|--|-------------------|---|
| <b>3.1.16 Steering:</b>  |                   |   |
| Make   | :                 | Danfoss   |
| Type   | :                 | Hydrostatic, power steering   |
| Location   | :                 | Above the clutch housing  |
| Method of operation  | :                 | Manual, by steering control wheel   |
| Diameter of steering control wheel, (mm)   | :                 | 420   |
| Make & type of pump  | :                 | Dynamics & gear pump (tandem)   |
| Location & method of drive   | :                 | On RHS of engine & driven through timing gears  |
| Make, number, type & location of hydraulic ram cylinder  | :                 | Ognibene, one, double acting & centralized behind front axle.   |
| Steering oil capacity, (l)   | :                 | 36.50 (common with gear box, differential, rear axle, final drive, hydraulic & brake system)   39.4 (common with gear box, differential, rear axle, final drive, hydraulic & brake system)      |
| Lubricant change period  | :                 | After every 1300 hours of operation.  |
| <b>3.1.17 Brakes:</b>  |                   |   |
| <b>3.1.17.1 Service Brake:</b>   |                   |   |
| Make   | :                 | JMI   |
| Type   | :                 | Mechanical, oil immerse disc brakes   |
| Location   | :                 | On rear axle shaft, outside of the differential housing   |
| No. of disc(s)   | :                 | Three (on each wheel side)  |
| Area of liners, (cm <sup>2</sup> )   | :                 | 1232.9 (on each wheel side)   |
| Material of liners   | :                 | Non-Asbestos (apa)  |
| Method of operation  | :                 | Individual or combined RHS foot pedal operated.   |
| Oil capacity, (l)  | :                 | 36.50 (Common with gearbox, differential, rear axle, final drive, hydraulic & steering system)   39.40 (Common with gearbox, differential, rear axle, final drive, hydraulic & steering system) |
| Oil change period  | :                 | After every 1300 hours of operation.  |
| <b>3.1.17.2 Parking Brake:</b>   |                   |   |
| Type   | :                 | Ratchet and tooth type locking mechanism.   |
| Location & Method of operation   | :                 | A hand lever is provided below the dashboard which is to be pulled to lock the service brake acts as parking brake.   |
| <b>3.1.18 Wheel Equipment:</b>   |                   |   |
| <b>3.1.18.1 Steered Wheel(s):</b>  |                   |   |
| Make   | :                 | MRF Shakti   Apollo   |
| Number   | :                 | Two   Two   |
| Type of tyre   | :                 | Pneumatic, ribbed   Pneumatic, traction   |
| Size   | :                 | 7.50 - 16   8.3 - 24  |
| Ply rating   | :                 | 8   6   |
| Maximum permissible loading capacity of each tyre at inflation pressure recommended for road work, (kgf) | :                 | 535 at 196 kPa   705 at 190 kPa   |

|                   |  |  |
|-------------------|--|--|
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|   | <u>Base model</u>  | <u>Variant model</u>  |
|---|--|---|
| Recommended inflation pressure, kPa:  |  |   |
| - for field work  | : 160  | 152   |
| - for transport   | : 196  | 193   |
| Track width, (mm)   | : 1390 (std.) & 1460   | 1335, 1375, 1475, <b>1525 (std.)</b> , 1715, 1775, 1835 & 1905                        |
| Method of changing track width  | : By reversing the wheel discs   | By reversing the wheel disc & changing the position of wheel disc on off-set rim lugs |
| 3.1.18.2 <b>Drive wheel (s):</b>  |  |   |
| Make & size of rim  | : SSWL, 5.50E x 16   | WILP, W7 x 24   |
| Make  | : MRF Shakti   | MRF Shaktilife  |
| Number  | : Two  | Two   |
| Type of tyre  | : Pneumatic, traction  |   |
| Size & Ply rating   | : 14.9 -28 & 12 PR   | 14.9 -28 & 12 PR  |
| Maximum permissible loading capacity of each tyre at inflation pressure recommended for road work, (kgf)                            | : 1600 kgf at 137 kPa  | 1675 kgf at 152 kPa   |
| <b>Recommended inflation pressure, (kPa):</b>   |  |   |
| - For field work  | : 118  | 118   |
| - For transport   | : 137  | 152   |
| Track width, (mm)   | : 1440,1450, <b>1540 (std.)</b> , 1600, 1680, 1700 & 1810                                | 1435, <b>1545 (std)</b> , 1615, 1715, 1725, & 1815                                    |
| Make & size of wheel rim  | : WIL, W13 x 28  | SSWL, W13 x 28  |
| Method of changing track width  | : By reversing the wheel disc & changing the position of wheel disc on off-set rim lugs. |   |
| 3.1.18.3 <b>Wheel base, (mm)</b>  | : 2150   | 2220  |
| Method of changing wheel base, if any, and range  | : <b>None</b>  | <b>None</b>   |
| 3.1.19 <b>Operator's seat:</b>  |  |   |
| Make  | : Not available  | Not available   |
| Type  | : Cushioned seat with back rest  |   |
| Type of Suspension  | : 02, Helical coil spring  |   |
| Type of Damping   | : 01, Hydraulic shock absorber   |   |
| <b>Range of adjustment, (mm):</b>   |  |   |
| Vertical  | : ± 60   | ± 30  |
| Lateral   | : Nil  | Nil   |
| Longitudinal  | : ± 50   | ± 75  |
| 3.1.20 <b>Provision for safety and comfort of operator:</b>   |  |   |
| 3.1.20.1 <b>Operator's Seat:</b>  |  |   |
| Meets the minimum requirements of IS: 12343-1998, (Re-affirmed in 2014) <b>except the following:</b>                                |  |   |
|   | <u>Base model</u>  | <u>Variant model</u>  |
| i) Width of seat.   |  | i) Longitudinal distance form Seat Index Point to differential lock pedal             |
| ii) Inclination of seat towards rear direction.   |  |   |
| 3.1.20.2 <b>Conformity with IS: 6283 (Part 1 -2006 &amp; Part 2-2007 ) (Re-affirmed in 2014) :</b>                                  |  |   |
| Controls and displays are identifiable with symbols meets the requirements as per <b>IS: 6283 (Part 1&amp;2) – 2006 &amp; 2007.</b> |  |   |

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**3.1.20.3 Conformity with IS: 8133-1983 (Re-affirmed in 2014) :**

Location and movement of various controls meets the requirement of IS: 8133-1983, **except the following:**

- |   |   |
|---|---|
| i) The fuel shut-off lever does not remain in stop position | i) The fuel shut-off lever does not remain in stop position |
|---|---|

**3.1.20.4 Conformity with IS:12239 (Part-1)-1996 (Re-affirmed in 2014) :**

Meets the requirements of IS: 12239 (Part-1) – 1996, **except the following:**

- |  |  |
|--|--|
| i) The spark arrester has not been provided in the exhaust system. | i) The spark arrester has not been provided in the exhaust system. |
|--|--|

**3.1.20.5 Conformity with IS:12239 (Part-2)-1999 (Re-affirmed in 2014) :**

Meets the requirements of IS:12239 (Part-2)-1999, **except the following:**

- |  |  |
|--|--|
| i) The working clearance around the position control lever does not meet the requirement of above referred standard. | i) The working clearance around the position control lever does not meet the requirement of above referred standard. |
|--|--|

**3.1.20.6 Conformity with IS: 14683 – 1999 (Re-affirmed in 2014) :**

Lighting requirements conform to IS: 14683-1999.

**3.1.20.7 Rear view mirror:**

Rear view mirror has been provided.

**3.1.21 Labeling of tractor:**

The labeling plate riveted on LHS of the inner side of mudguard, provides the following information:

|                                   |   |   |
|-----------------------------------|---|---|
| <b>Name of Manufacturer</b>       | : | <b>M/s. Mahindra &amp; Mahindra Limited,<br/>Farm Equipment Sector, India</b> |
| Make                              | : | Mahindra  |
| Model                             | : | 605 DI MS 4WD S+  |
| Year of manufacture               | : | GF (September, 2016)  |
| Engine Serial Number              | : | NGF4WBA0001   |
| Chassis Serial Number             | : | MBNWHBDWFGNF00001   |
| Maximum PTO Power, kW             | : | 33.5  |
| Specific fuel consumption, gm/kWh | : | 258   |

**3.1.22 Ballast Mass, (kg):**

| Particulars               |             | As used during drawbar test |               | As recommended for field test |               | As recommended for road test |               |
|---------------------------|-------------|-----------------------------|---------------|-------------------------------|---------------|------------------------------|---------------|
|                           |             | Base model                  | Variant model | Base model                    | Variant model | Base model                   | Variant model |
| Front                     | C.I. weight | Nil                         | Nil           | Nil                           | Nil           | Nil                          | Nil           |
|                           | Water       | Nil                         | Nil           | Nil                           | Nil           | Nil                          | Nil           |
| Rear                      | C.I. weight | 518                         | 222           | 148                           | 74            | 148                          | 148           |
|                           | Water       | 360                         | 360           | 360                           | 360           | Nil                          | Nil           |
| Additional weight, if any |             | Nil                         | Nil           | Nil                           | Nil           | Nil                          | Nil           |

**3.1.23 Mass of tractor, (kg):**

|         |   | <b>Unballasted</b> | <b>Unballasted</b> |
|---------|---|--------------------|--------------------|
| - Front | : | 970                | 1090               |
| - Rear  | : | 1570               | 1600               |
| - Total | : | 2540               | 2690               |

**3.1.24 Overall dimensions, (mm):**

| - Length                     | : | 3645                             | 3680  |
|------------------------------|---|----------------------------------|---|
| - Width                      | : | 1920                             | 1940  |
| - Height (with exhaust pipe) | : | 2130                             | 2140  |
| Minimum ground clearance     | : | 395 (below transmission housing) | 345 (below front axle differential housing) |

|                   |  |
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|               |   |                   |                      |
|---------------|---|-------------------|----------------------|
| <b>3.1.25</b> | <b>Number of external lubricating points:</b> | <u>Base model</u> | <u>Variant model</u> |
|               | - Oiling                                      | : Nil             | Nil                  |
|               | - Grease cups                                 | : 02              | Nil                  |
|               | - Grease nipples                              | : 17              | 22                   |
| <b>3.1.26</b> | <b>Colour of tractor:</b>                     |                   |                      |
|               | Chassis & engine                              | : Smoke grey      | Dark grey            |
|               | Sheet metal:                                  |                   |                      |
|               | Bonnet, Mudguard                              | : Red             | Red                  |
|               | Rim & disc                                    | : Silver          | Silver               |
| <b>3.1.27</b> | <b>Protective structure:</b>                  | Not provided      | Not provided         |

### 3.2 NOMINAL SPEED TEST

| Movement | Gear No. | No of engine revolutions for one revolution of driving wheel |                      | Nominal speed at rated engine speed when fitted with <b>14.9-28 size</b> tyres of <b>640 mm</b> radius index, (kmph) |                      | Variation in nominal speed (%) |
|----------|----------|--|----------------------|--|----------------------|--------------------------------|
|          |          | <u>Base model</u>  | <u>Variant model</u> | <u>Base model</u>  | <u>Variant model</u> |                                |
| <b>1</b> | <b>2</b> | <b>3</b>   | <b>4</b>             | <b>6</b>   | <b>7</b>             | <b>8</b>                       |
| Forward  | L1       | 310.62   | 310.49               | 1.63   | 1.63                 | 0.0                            |
|          | L2       | 214.33   | 214.59               | 2.36   | 2.36                 | 0.0                            |
|          | L3       | 149.22   | 148.92               | 3.40   | 3.40                 | 0.0                            |
|          | L4       | 118.48   | 118.28               | 4.28   | 4.28                 | 0.0                            |
|          | L5       | 88.65  | 88.13                | 5.72   | 5.75                 | 0.5                            |
|          | M1       | 105.2  | 105.25               | 4.82   | 4.81                 | -0.2                           |
|          | M2       | 72.75  | 72.65                | 6.96   | 6.98                 | 0.3                            |
|          | M3       | 50.56  | 50.45                | 10.02  | 10.07                | 0.5                            |
|          | M4       | 40.01  | 40.05                | 12.67  | 12.65                | -0.2                           |
|          | M5       | 29.72  | 29.77                | 17.05  | 17.01                | -0.24                          |
|          | H1       | 55.89  | 55.75                | 9.07   | 9.06                 | -0.11                          |
|          | H2       | 38.59  | 38.63                | 13.13  | 13.13                | 0.00                           |
|          | H3       | 26.82  | 26.79                | 18.89  | 18.93                | 0.21                           |
|          | H4       | 21.26  | 21.23                | 23.84  | 23.86                | 0.08                           |
|          | H5       | 15.81  | 15.80                | 32.04  | 32.07                | 0.09                           |
| Reverse  | RL1      | --   | 325.50               | --   | 1.56                 | --                             |
|          | RL2      | --   | 224.69               | --   | 2.25                 | --                             |
|          | RL3      | --   | 156.29               | --   | 3.24                 | --                             |
|          | RL4      | --   | 124.17               | --   | 4.07                 | --                             |
|          | RL5      | --   | 92.29                | --   | 5.48                 | --                             |
|          | RM1      | --   | 110.08               | --   | 4.60                 | --                             |
|          | RM2      | --   | 76.07                | --   | 6.65                 | --                             |
|          | RM3      | --   | 52.84                | --   | 9.58                 | --                             |
|          | RM4      | --   | 41.95                | --   | 12.10                | --                             |
|          | RM5      | --   | 31.21                | --   | 16.21                | --                             |
|          | RH1      | --   | 58.49                | --   | 8.66                 | --                             |
|          | RH2      | --   | 40.37                | --   | 12.56                | --                             |
|          | RH3      | --   | 28.02                | --   | 18.11                | --                             |
|          | RH4      | --   | 22.25                | --   | 22.77                | --                             |
|          | RH5      | --   | 16.56                | --   | 30.55                | --                             |
| LR       | 163.48   | --   | 3.10                 | --   | --                   |                                |
| MR       | 55.47    | --   | 9.13                 | --   | --                   |                                |
| HR       | 29.38    | --   | 17.24                | --   | --                   |                                |

|                   |  |
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### 3.3 PTO PERFORMANCE TEST

| S. No. | Particulars   | Base Model   | Variant Model                             |
|--------|---|--|---|
| 1      | Date(s) of test   | 04.07.2014, 07.07.2014,<br>08.07.2014 & 09.07.2014 | 20.12.2018 & 21.12.2018                   |
| 2      | Tractor run at this Institute prior to start of PTO test, (h) | 9.8  | 5.87                                      |
| 3      | Dynamometer test bench used                                   | SAJ AG 250 Eddy current.                           | Fuchino ESF-1000 Eddy current dynamometer |

The PTO performance test under natural ambient conditions and high ambient conditions are conducted on variant model. The results of power take-off performance test base & variant models are tabulated in **Table-1**.

**Table-1**

| 1  | Power, (kW) | Speed, (rpm) |        | Fuel Consumption |        |          | Specific energy, (kWh/ l) |
|--|-------------|--------------|--------|------------------|--------|----------|---------------------------|
|  |             | PTO          | Engine | (l/h)            | (kg/h) | (kg/kWh) |                           |
| 2  | 3           | 4            | 5      | 6                | 7      | 8        |                           |
| <b>a) Maximum power – 2 hours test:</b>  |             |              |        |                  |        |          |                           |
| Base model   | 33.7        | 582          | 2149   | 9.91             | 8.29   | 0.246    | 3.40                      |
|  | 31.1        | 582          | 2149   | 9.38             | 7.84   | 0.252    | 3.32*                     |
| Variant model  | 34.3        | 569          | 2101   | 9.87             | 8.25   | 0.241    | 3.48                      |
|  | 32.1        | 569          | 2100   | 9.41             | 7.87   | 0.245    | 3.41*                     |
| <b>b) Power at rated engine speed (2100 rpm):</b>                                |             |              |        |                  |        |          |                           |
| Base model   | 32.4        | 569          | 2101   | 9.66             | 8.08   | 0.249    | 3.36                      |
|  | 30.5        | 569          | 2101   | 9.31             | 7.78   | 0.256    | 3.26*                     |
| Variant model  | 34.3        | 569          | 2101   | 9.87             | 8.25   | 0.241    | 3.48                      |
|  | 32.1        | 569          | 2100   | 9.41             | 7.87   | 0.245    | 3.41*                     |
| <b>c) Power at standard power take-off speed (540 ± 10 rpm):</b>                 |             |              |        |                  |        |          |                           |
| Base model   | 32.7        | 540          | 1994   | 9.33             | 7.80   | 0.239    | 3.49                      |
|  | 30.7        | 540          | 1994   | 8.98             | 7.51   | 0.245    | 3.41*                     |
| Variant model  | 33.2        | 540          | 1994   | 9.32             | 7.79   | 0.235    | 3.56                      |
|  | 31.6        | 540          | 1994   | 9.41             | 7.64   | 0.242    | 3.46*                     |
| <b>d) Varying loads at rated engine speed:</b>                                   |             |              |        |                  |        |          |                           |
| <b>i) Torque corresponding to maximum power available at rated engine speed:</b> |             |              |        |                  |        |          |                           |
| Base model   | 32.4        | 569          | 2101   | 9.66             | 8.08   | 0.249    | 3.36                      |
| Variant model  | 34.3        | 569          | 2101   | 9.87             | 8.25   | 0.241    | 3.48                      |
| <b>ii) 85% of the torque obtained in (i) :</b>                                   |             |              |        |                  |        |          |                           |
| Base model   | 29.1        | 600          | 2215   | 8.88             | 7.42   | 0.255    | 3.28                      |
| Variant model  | 30.5        | 565          | 2197   | 9.07             | 7.58   | 0.249    | 3.37                      |
| <b>iii) 75% of the torque obtained in (ii):</b>                                  |             |              |        |                  |        |          |                           |
| Base model   | 22.2        | 611          | 2256   | 7.34             | 6.13   | 0.276    | 3.03                      |
| Variant model  | 23.2        | 600          | 2215   | 7.37             | 6.16   | 0.266    | 3.15                      |
| <b>iv) 50% of the torque obtained in (ii) :</b>                                  |             |              |        |                  |        |          |                           |
| Base model   | 15.2        | 626          | 2311   | 5.99             | 5.01   | 0.329    | 2.54                      |
| Variant model  | 15.6        | 606          | 2237   | 5.78             | 4.83   | 0.310    | 2.70                      |
| <b>v) 25% of the torque obtained in (ii):</b>                                    |             |              |        |                  |        |          |                           |
| Base model   | 7.8         | 642          | 2370   | 4.67             | 3.90   | 0.500    | 1.67                      |
| Variant model  | 8.0         | 6.21         | 2293   | 4.39             | 3.67   | 0.459    | 1.82                      |
| <b>vi) Unloaded:</b>   |             |              |        |                  |        |          |                           |
| Base model   | 0           | 656          | 2422   | 3.32             | 2.77   | 0        | 0                         |
| Variant model  | 1.7         | 634          | 2341   | 3.28             | 2.74   | 1.612    | 0.52                      |

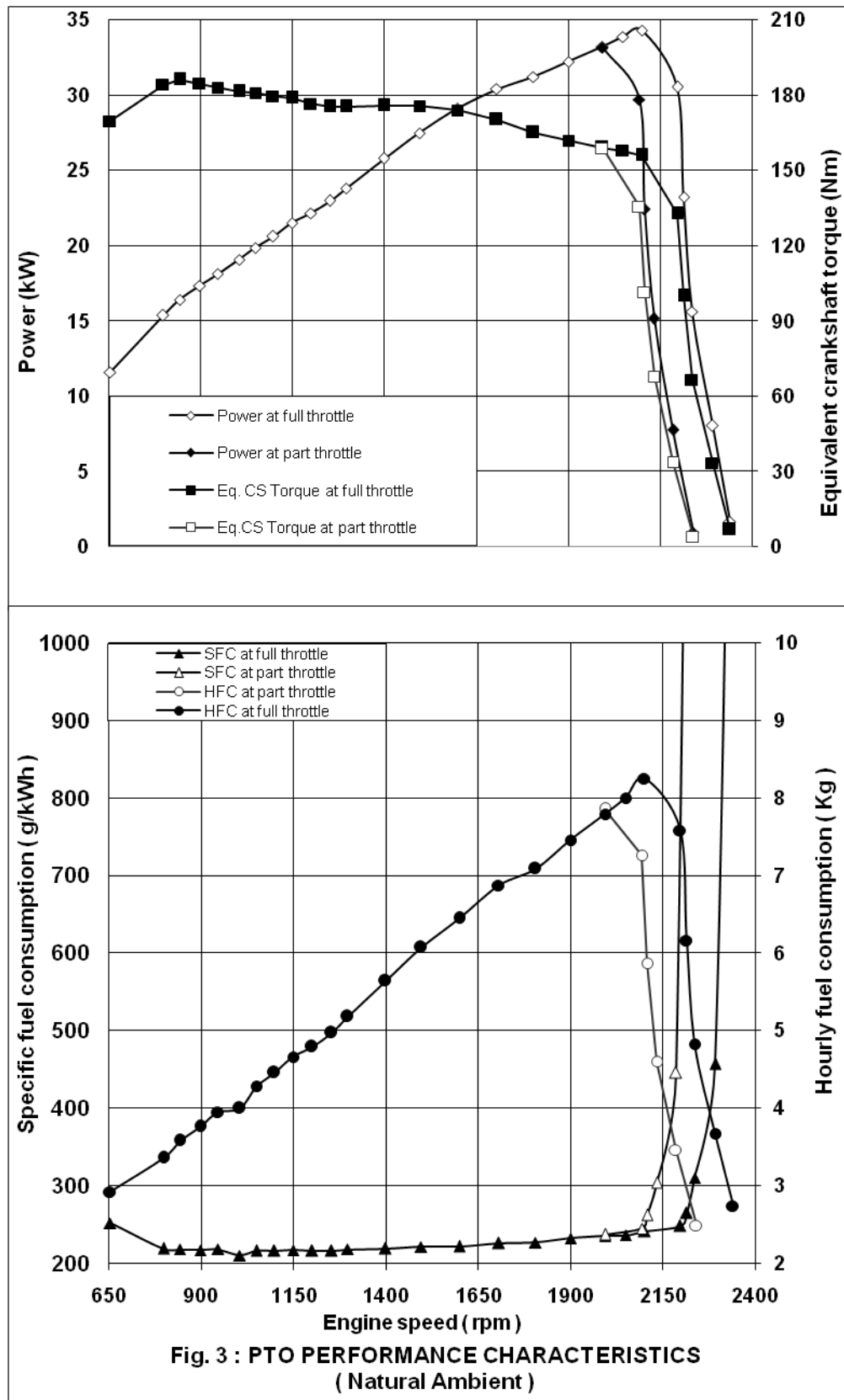


Fig. 3 : PTO PERFORMANCE CHARACTERISTICS  
( Natural Ambient )

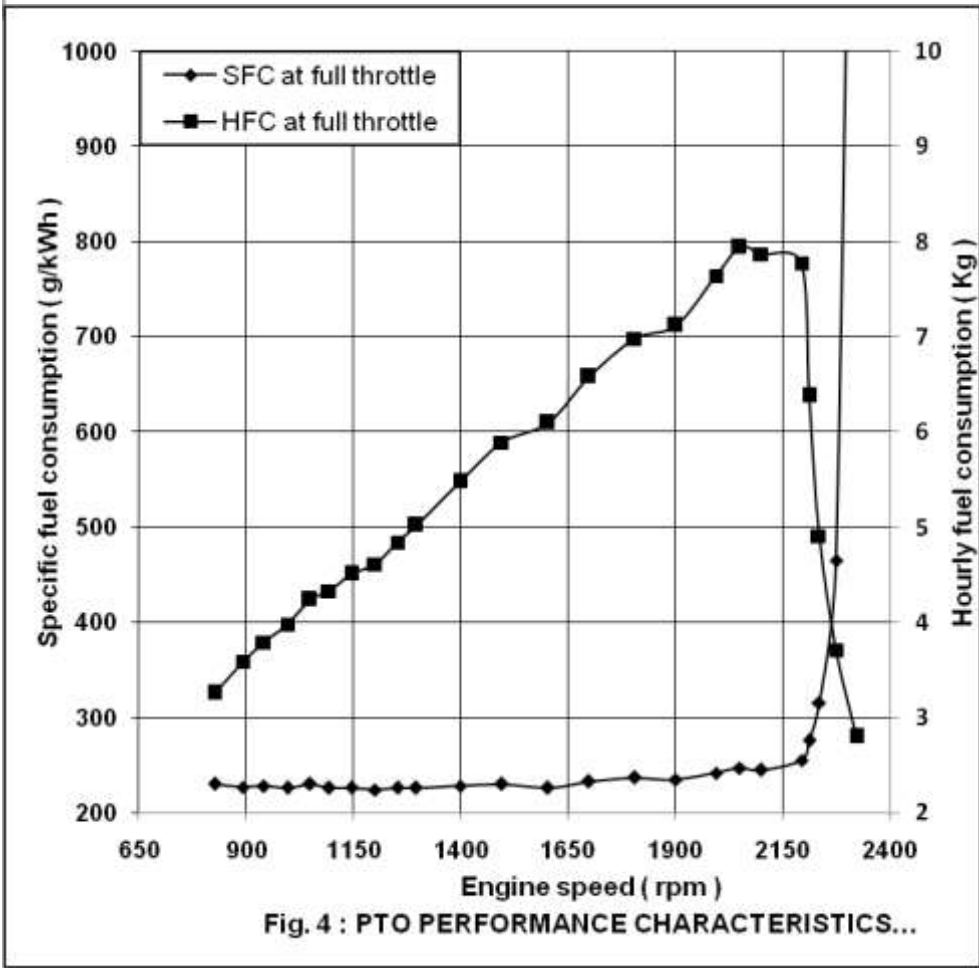
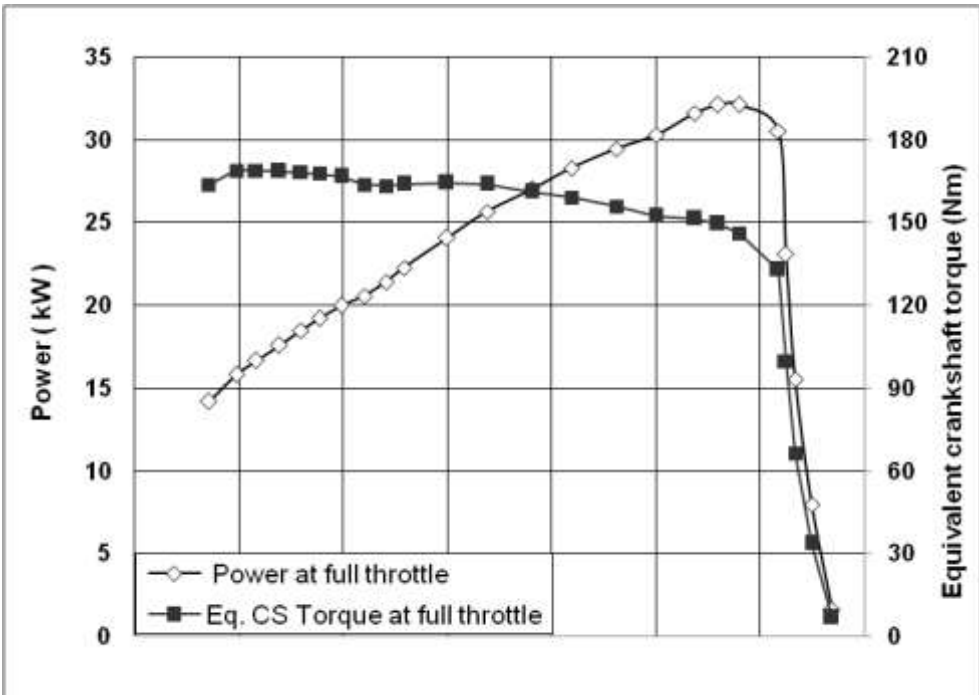
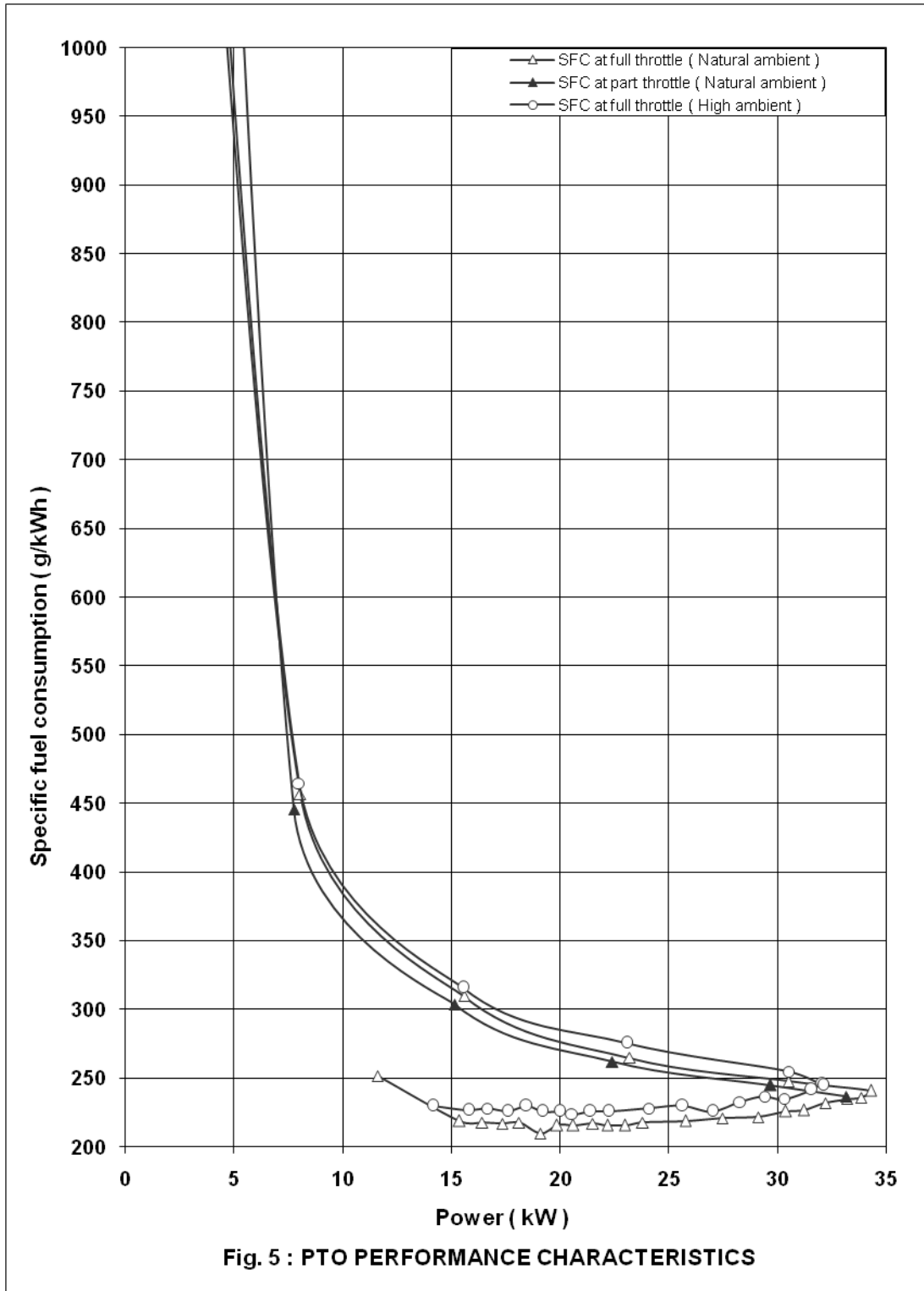


Fig. 4 : PTO PERFORMANCE CHARACTERISTICS...





|                   |  |
|-------------------|--|
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| 1  | 2    | 3   | 4    | 5    | 6    | 7     | 8    |
|--|------|-----|------|------|------|-------|------|
| <b>e) Varying loads at part throttle:</b>  |      |     |      |      |      |       |      |
| <b>i) Torque corresponding to maximum power available at standard PTO speed (540 ± 10 rpm)::</b> |      |     |      |      |      |       |      |
| Base model   | 32.7 | 540 | 1994 | 9.33 | 7.80 | 0.239 | 3.49 |
| Variant model  | 33.2 | 540 | 1994 | 9.32 | 7.79 | 0.235 | 3.56 |
| <b>ii) 85% of the torque obtained in (i) :</b>   |      |     |      |      |      |       |      |
| Base model   | 28.2 | 549 | 2027 | 8.23 | 6.88 | 0.244 | 3.43 |
| Variant model  | 29.7 | 567 | 2093 | 8.68 | 7.26 | 0.244 | 3.42 |
| <b>iii) 75% of the torque obtained in (ii):</b>  |      |     |      |      |      |       |      |
| Base model   | 21.5 | 559 | 2064 | 6.73 | 5.63 | 0.261 | 3.20 |
| Variant model  | 22.4 | 571 | 2108 | 7.02 | 5.87 | 0.262 | 3.19 |
| <b>iv) 50% of the torque obtained in (ii) :</b>  |      |     |      |      |      |       |      |
| Base model   | 14.8 | 573 | 2116 | 5.42 | 4.53 | 0.307 | 2.72 |
| Variant model  | 15.2 | 578 | 2134 | 5.50 | 4.60 | 0.303 | 2.76 |
| <b>v) 25% of the torque obtained in (ii):</b>  |      |     |      |      |      |       |      |
| Base model   | 7.6  | 591 | 2182 | 4.18 | 3.49 | 0.459 | 1.82 |
| Variant model  | 7.8  | 592 | 2186 | 4.14 | 3.46 | 0.444 | 1.88 |
| <b>vi) Unloaded:</b>   |      |     |      |      |      |       |      |
| Base model   | 0    | 607 | 2241 | 2.90 | 2.42 | 0     | 0    |
| Variant model  | 1.0  | 607 | 2241 | 2.98 | 2.49 | 2.490 | 0.34 |

**\*Under high ambient condition**

| Sl. No. | Parameters   | Base Model      |              | Variant Model   |                |
|---------|--|-----------------|--------------|-----------------|----------------|
|         |  | Natural Ambient | High Ambient | Natural Ambient | High Ambient   |
| 1       | 2  | 3               | 4            | 5               | 6              |
| i)      | No load maximum speed, (rpm)   | 2422            | 2411         | 2341            | 2322           |
| ii)     | Equivalent crankshaft torque at maximum power, (Nm)                    | 149.7           | 138.40       | 155.87          | 145.99         |
| iii)    | Maximum equivalent crank shaft torque, (Nm)                            | 176.7           | 164.5        | 186.15          | 168.76         |
| iv)     | Engine speed at maximum equivalent crankshaft torque, (rpm)            | 1152            | 1148         | 842             | 941            |
| v)      | Backup torque, (%)   | 18.03           | --           | 19.43           | --             |
| vi)     | <b>Smoke level</b> , maximum light absorption coefficient, (per meter) | 0.23            | --           | 0.09            | --             |
| v)      | <b>Range of atmospheric condition:</b>                                 |                 |              |                 |                |
|         | - Temperature, (°C)  | 24 to 26        | 42 to 44     | 28 to 29        | 43 to 45       |
|         | - Pressure, (kPa)  | 97.4 to 98.4    | 90.6 to 99.2 | 99.1 to 99.5    | 100.5 to 101.1 |
|         | - Relative humidity, (%)   | 56.2 to 62.6    | 35.1 to 48   | 29 to 32        | 17 to 19       |
| vi)     | <b>Maximum Temperature, (°C):</b>                                      |                 |              |                 |                |
|         | - Engine oil   | 103             | 114          | 114             | 122            |
|         | - Coolant  | 79              | 94           | 84              | 100            |
|         | - Fuel   | 53              | 68           | 48              | 53             |
|         | - Air intake   | 27              | 45           | 30              | 47             |
|         | - Exhaust gas  | 541             | 546          | 500             | 503            |
| vii)    | <b>Pressure at maximum power:</b>                                      |                 |              |                 |                |
|         | - Intake air, (kPa)  | 0.8 to 1.1      | 0.9 to 1.1   | 2.1 to 2.3      | 2.1 to 2.3     |
|         | - Exhaust gas, (kPa)   | 6.9 to 9.1      | 9.73 to 11.3 | 11.7 to 11.9    | 14.1 to 14.5   |
| viii)   | <b>Consumptions:</b>   |                 |              |                 |                |
|         | Lub. Oil (g/kWh)   | --              | 0.452        | --              | 0.285          |
|         | -Coolant (% of total coolant capacity)                                 | --              | Nil          | --              | Nil            |

|                   |  |
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#### 4. OTHER APPLICABLE TEST

##### 4.1 DRAWBAR PERFORMANCE TEST

|  | <u>Base model</u>                    | <u>Variant model</u>                        |
|--|--------------------------------------|---|
| Date(s) of test  | : 22.10.2014,28.10.2014 & 29.10.2014 | 26.3.2019,27.03.2019,28.3.2019 & 29.03.2019 |
| Tractor run at the Institute prior to start of drawbar performance test, (h) | : 25.47                              | 16.18                                       |
| Type of track  | : Concrete                           | Concrete                                    |
| <b>Height of drawbar, (mm):</b>  |                                      |   |
| - without ballast  | : 600                                | 450   |
| - with ballast   | : 525                                | 450   |

**4.1.1** The drawbar performance test was conducted with unballasted tractor. The results of drawbar performance test consisting of maximum power and pull at unballasted tractor are tabulated in **Table – 2**.

##### 4.2 NOISE MEASUREMENT

###### 4.2.1 Noise at bystander's position:

|                                | <u>Base model</u> | <u>Variant model</u> |
|--------------------------------|-------------------|----------------------|
| Date of test                   | : 27.05.2014      | 20.11.2019           |
| Type of track                  | : Concrete        | Concrete             |
| Background noise level, Db (A) | : 55              | 56                   |
| <b>Atmospheric conditions:</b> |                   |                      |
| Temperature, (°C)              | : 36              | 29                   |
| Pressure, (kPa)                | : 98.6            | 97.5                 |
| Relative humidity, (%)         | : 32              | 35                   |
| Wind velocity, (m/s)           | : 1.5             | 1.6                  |

| S. No. | G e a r | Travelling speed before acceleration, (kmph) | Noise level, dB (A)  |
|--------|---------|--|----------------------|
|        |         | <u>Variant model</u>                         | <u>Variant model</u> |
| 1.     | L1      | 1.37   | 83                   |
| 2.     | L2      | 1.99   | 82                   |
| 3.     | L3      | 2.82   | 82                   |
| 4.     | L4      | 3.58   | 82                   |
| 5.     | L5      | 4.80   | 82                   |
| 6.     | M1      | 4.04   | 82                   |
| 7.     | M2      | 5.86   | 82                   |
| 8.     | M3      | 8.27   | 82                   |
| 9.     | M4      | 10.44  | 82                   |
| 10.    | M5      | 13.85  | 83                   |
| 11.    | H1      | 7.60   | 82                   |
| 12.    | H2      | 10.84  | 82                   |
| 13.    | H3      | 15.32  | 83                   |
| 14.    | H4      | 19.41  | 85                   |
| 15.    | H5      | 25.62  | 84                   |

Table - 2

**DRAWBAR PERFORMANCE TEST**

| Gear   | Travel Speed, (km/h) | Draw-bar power, (kW) | Draw-bar pull, (kN) | Engine Speed, (rpm) | Wheel Slip, (%) | Fuel consumption |       | Specific Energy, (kWh/l) | Atmospheric conditions |                 |          | Temperature (°C) |            |          | Max. sustained pull, (kN) |             |
|--|----------------------|----------------------|---------------------|---------------------|-----------------|------------------|-------|--------------------------|------------------------|-----------------|----------|------------------|------------|----------|---------------------------|-------------|
|  |                      |                      |                     |                     |                 | (kg/kWh)         | (l/h) |                          | Temp (°C)              | Pre-ssure (kPa) | R.H. (%) | Fuel             | Trans. oil | Co-olant |                           | Eng-ine oil |
| 1  | 2                    | 3                    | 4                   | 5                   | 6               | 7                | 8     | 9                        | 10                     | 11              | 12       | 13               | 14         | 15       | 16                        | 17          |
| <b>i) Maximum power test (Tractor Unballasted condition) with 4 WD in engaged condition:</b> |                      |                      |                     |                     |                 |                  |       |                          |                        |                 |          |                  |            |          |                           |             |
| L2   | 2.19                 | 13.9                 | 22.81               | 2218                | 14.9            | 0.384            | 6.38  | 2.18                     | 31                     | 99.3            | 31       | 48               | 84         | 77       | 119                       | 23.56       |
| L3   | 3.10                 | 20.0                 | 23.23               | 2189                | 15.2            | 0.349            | 8.35  | 2.40                     | 30                     | 99.4            | 27       | 46               | 86         | 79       | 122                       | 23.94       |
| L4   | 3.82                 | 24.4                 | 22.97               | 2133                | 15.0            | 0.331            | 9.66  | 2.53                     | 29                     | 99.4            | 27       | 43               | 84         | 80       | 125                       | 23.51       |
| L5   | 5.55                 | 26.3                 | 17.09               | 2098                | 6.4             | 0.309            | 9.72  | 2.71                     | 29                     | 99.5            | 27       | 44               | 83         | 79       | 124                       | 20.75       |
| M1   | 4.59                 | 26.6                 | 20.86               | 2129                | 8.8             | 0.310            | 9.86  | 2.70                     | 28                     | 99.5            | 26       | 43               | 80         | 76       | 121                       | 22.85       |
| M2   | 6.86                 | 26.4                 | 13.85               | 2100                | 4.7             | 0.311            | 9.82  | 2.69                     | 27                     | 99.4            | 24       | 42               | 77         | 76       | 118                       | 17.17       |
| M3   | 10.07                | 27.7                 | 9.91                | 2106                | 3.4             | 0.303            | 10.04 | 2.76                     | 26                     | 99.5            | 27       | 40               | 58         | 76       | 115                       | 11.19       |
| H1   | 9.03                 | 26.0                 | 10.36               | 2098                | 3.3             | 0.314            | 9.77  | 2.66                     | 26                     | 99.5            | 25       | 42               | 75         | 77       | 122                       | 13.21       |
| <b>ii) Maximum power test (Tractor ballasted condition) with 4 WD in engaged condition:</b>  |                      |                      |                     |                     |                 |                  |       |                          |                        |                 |          |                  |            |          |                           |             |
| L2   | 2.12                 | 16.0                 | 27.06               | 2206                | 14.8            | 0.374            | 7.16  | 2.23                     | 35                     | 98.7            | 18       | 50               | 89         | 77       | 122                       | 27.94       |
| L3   | 3.00                 | 22.7                 | 27.30               | 2174                | 15.1            | 0.342            | 9.29  | 2.44                     | 36                     | 98.8            | 17       | 50               | 89         | 87       | 129                       | 28.08       |
| L4   | 3.98                 | 26.1                 | 23.57               | 2098                | 7.2             | 0.301            | 9.40  | 2.78                     | 34                     | 98.9            | 17       | 50               | 86         | 82       | 128                       | 27.84       |
| L5   | 5.55                 | 26.3                 | 17.04               | 2102                | 3.9             | 0.305            | 9.60  | 2.74                     | 33                     | 99.0            | 19       | 49               | 83         | 81       | 125                       | 20.88       |
| M1   | 4.58                 | 26.8                 | 21.06               | 2105                | 5.3             | 0.299            | 9.59  | 2.79                     | 32                     | 99.1            | 21       | 47               | 80         | 80       | 124                       | 24.88       |
| M2   | 6.80                 | 27.1                 | 14.37               | 2098                | 2.8             | 0.295            | 9.56  | 2.83                     | 31                     | 99.2            | 21       | 47               | 77         | 80       | 125                       | 17.29       |
| M3   | 8.95                 | 26.7                 | 10.73               | 2098                | 1.5             | 0.303            | 9.68  | 2.76                     | 31                     | 99.2            | 23       | 46               | 64         | 80       | 124                       | 13.11       |
| H1   | 9.95                 | 29.4                 | 9.02                | 2099                | 1.5             | 0.328            | 9.79  | 2.54                     | 30                     | 99.3            | 26       | 45               | 58         | 78       | 114                       | 11.91       |

Contd..Table-2

| Gear  | Travel Speed, (km/h) | Draw-bar power, (kW) | Draw-bar pull, (kN) | Engine Speed, (rpm) | Wheel Slip, (%) | Fuel consumption |       | Specific Energy, (kWh/l) | Atmospheric conditions |                 |          | Temperature (°C) |            |                 | Max. sustained pull, (kN) |             |
|---|----------------------|----------------------|---------------------|---------------------|-----------------|------------------|-------|--------------------------|------------------------|-----------------|----------|------------------|------------|-----------------|---------------------------|-------------|
|   |                      |                      |                     |                     |                 | (kg/kWh)         | (l/h) |                          | Temp (°C)              | Pre-ssure (kPa) | R.H. (%) | Fuel             | Trans. oil | Coolant (water) |                           | Eng-ine oil |
| 1   | 2                    | 3                    | 4                   | 5                   | 6               | 7                | 8     | 9                        | 10                     | 11              | 12       | 13               | 14         | 15              | 16                        | 17          |
| <b>vi) Five hours test at 75 percent of pull obtained at max. Power (ballasted wheeled tractor):</b>    |                      |                      |                     |                     |                 |                  |       |                          |                        |                 |          |                  |            |                 |                           |             |
| M1  | 4.90                 | 15.80                | 21.52               | 2204                | 5.9             | 0.325            | 8.53  | 2.53                     | 19 to 32               | 98.8 to 98.9    | 24 to 35 | 34 to 47         | 58 to 88   | 72 to 76        | 113 to 123                | --          |
| <b>vii) Five hours test at pull corresponding to 15 percent wheel slip (ballasted wheeled tractor):</b> |                      |                      |                     |                     |                 |                  |       |                          |                        |                 |          |                  |            |                 |                           |             |
| L3  | 3.07                 | 27.3                 | 23.26               | 2188                | --              | 0.336            | 9.62  | 2.42                     | 33 to 39               | 98.1 to 98.8    | 19 to 27 | 48 to 54         | 89 to 103  | 79 to 87        | 125 to 131                | --          |

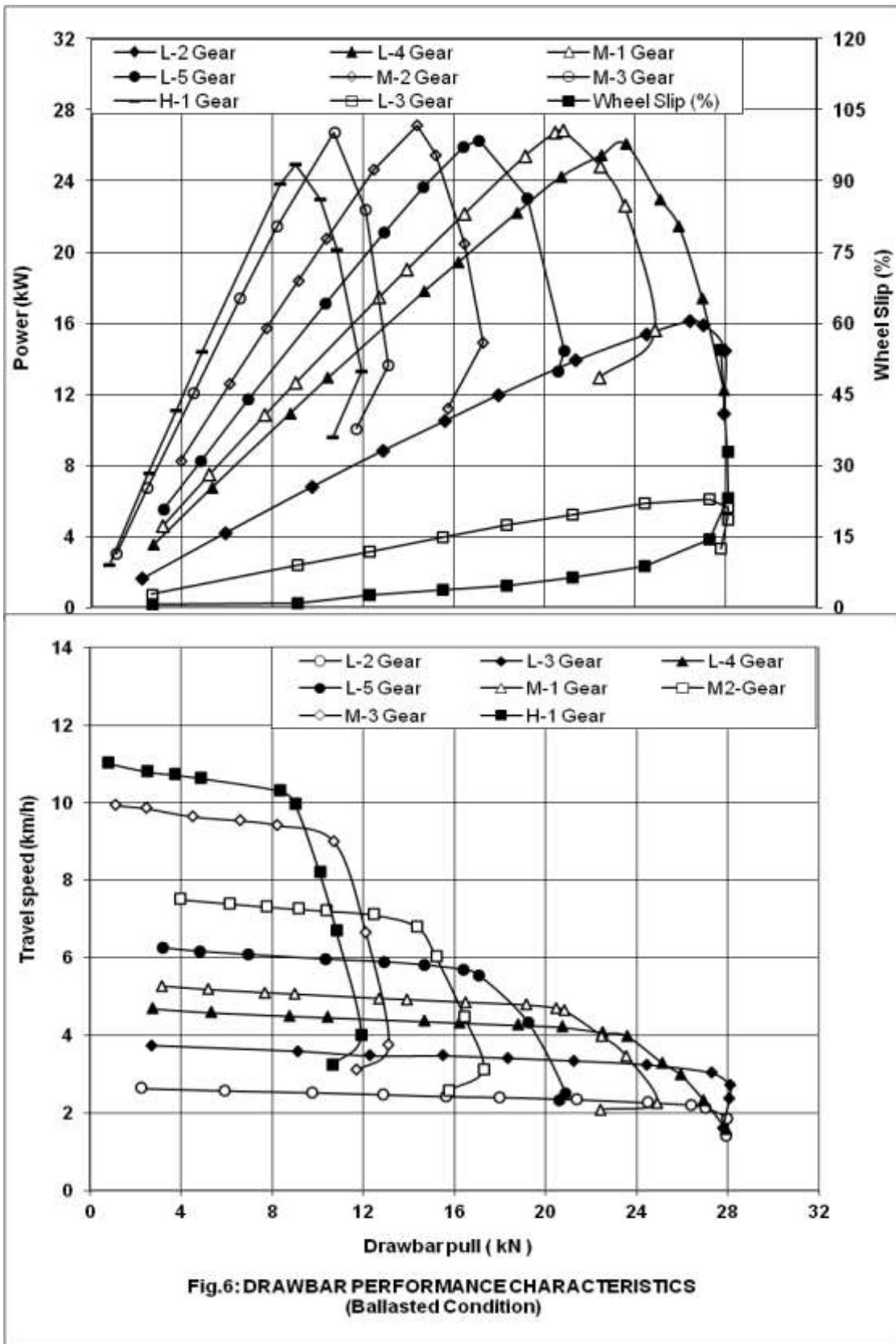
i) The coolant (water) and lub oil consumption for both during 10 hours test were observed as 0.50 and Nil.

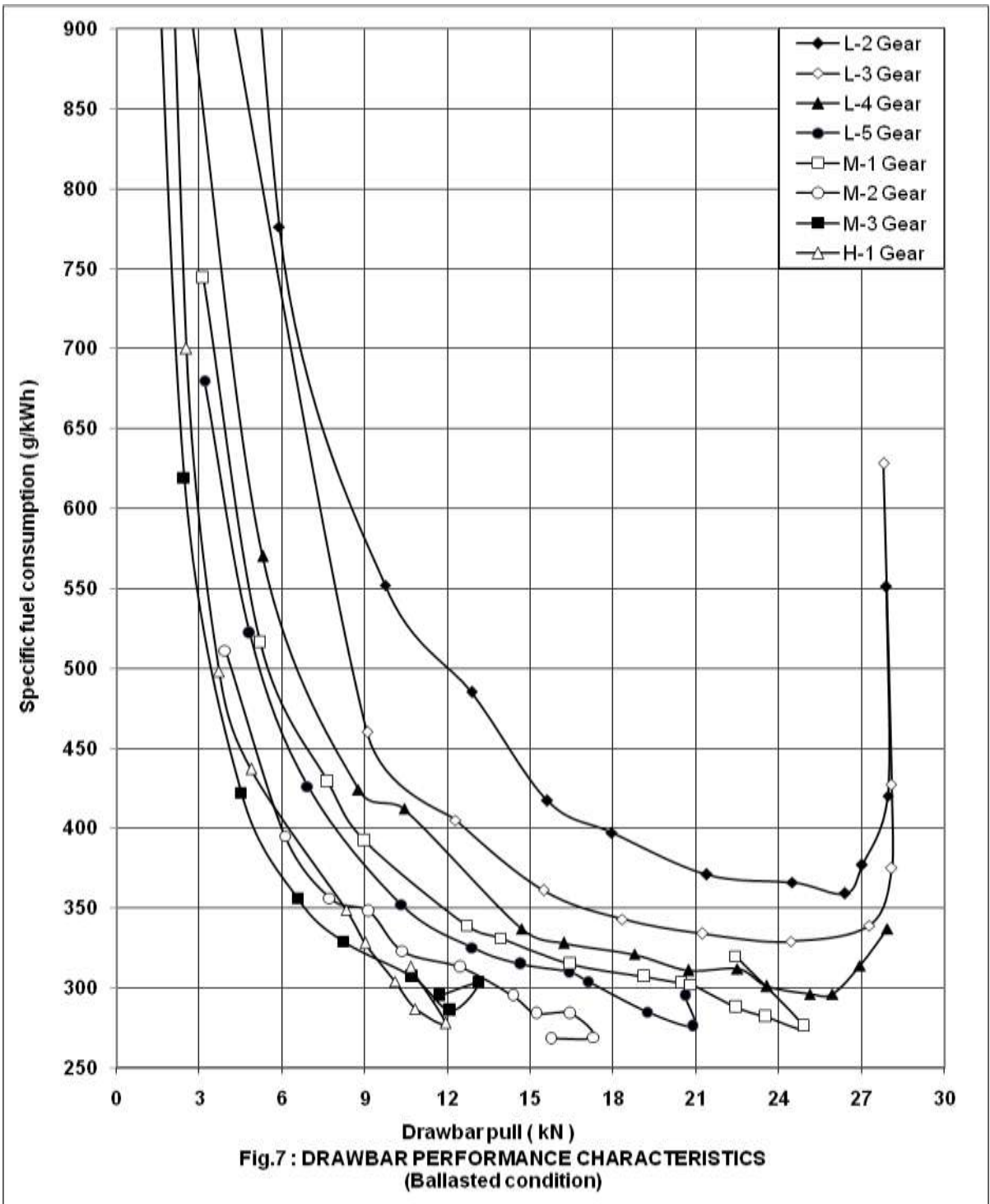
ii) Tyre Creeping, (mm):

- LHS : 15  
- RHS : 30

iii) Maximum temperatures during entire drawbar test, (°C):

Engine oil : 131  
Coolant (water) : 88  
Transmission oil : 103  
Fuel : 54





|                   |  |
|-------------------|--|
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#### 4.2.2 Noise at operator's ear level:

|                                | <u>Base model</u> | <u>Variant model</u> |
|--------------------------------|-------------------|----------------------|
| Date of test                   | 22.10.2014        | 27.03.2019           |
| Type of track                  | Concrete          | Concrete             |
| Background noise level, Db (A) | 54                | 54                   |
| <b>Atmospheric conditions:</b> |                   |                      |
| Temperature, (°C)              | 33                | 30                   |
| Pressure, (kPa)                | 99.3              | 99.2                 |
| Relative humidity, (%)         | 26                | 32                   |
| Wind velocity, (m/s)           | 0.9               | 1.4                  |

#### Test data (Variant model):

| Gear | Drawbar pull at which the tractor develops the max. noise level, (kN) | Corresponding travelling speed, (kmph) | Noise level, dB (A) |
|------|---|--|---------------------|
| 1    | 2   | 3                                      | 4                   |
| L2   | 22.26 to 22.76  | 2.24 to 2.19                           | 92                  |
| L3   | 16.07 to 23.21  | 3.45 to 3.10                           | 92                  |
| L4   | 20.98 to 23.24  | 4.07 to 3.73                           | 93                  |
| L5   | 17.01 to 17.03  | 5.59 to 5.54                           | 94                  |
| M1   | 20.78 to 20.80  | 4.50 to 4.49                           | 94                  |
| *M2  | 13.48   | 7.01                                   | 94                  |
| M3   | 5.20 to 9.69  | 10.72 to 10.08                         | 93                  |
| H1   | 9.97 to 10.36   | 9.43 to 9.03                           | 93                  |

\*Gear corresponds to the nominal travelling speed nearest to **7.5 kmph**

#### 4.3 TURNING ABILITY

| Characteristics        | Minimum turning diameter,(m) |      | Minimum clearance diameter,(m) |      |
|------------------------|------------------------------|------|--------------------------------|------|
|                        | LHS                          | RHS  | LHS                            | RHS  |
| <b>Base model:</b>     |                              |      |                                |      |
| Brakes released        | 7.24                         | 7.24 | 7.84                           | 7.84 |
| Brake applied          | 6.37                         | 6.37 | 6.97                           | 6.97 |
| <b>Variant model :</b> |                              |      |                                |      |
| Brakes released        | 9.40                         | 9.53 | 9.80                           | 9.87 |
| Brake applied          | 7.06                         | 7.16 | 7.38                           | 7.52 |

#### 4.4 LOCATION OF CENTRE OF GRAVITY

| Condition   | Particulars   | Coordinates          |                      |
|---|---|----------------------|----------------------|
|   |   | <u>Base model</u>    | <u>Variant model</u> |
| Tractor under unballasted condition but with all the liquid reservoirs full & the operator replaced by a 75 kg mass on the seat | Height above ground, (mm)   | 699                  | 732                  |
|   | Distance forward from the vertical plane containing the axis of rear wheels, (mm)                     | 806                  | 908                  |
|   | Distance from the median plane parallel to the longitudinal axis of tractor bisecting the track, (mm) | 4.5<br>(towards RHS) | 3<br>(towards LHS)   |

#### 5. ADJUSTMENTS, DEFECTS, BREAKDOWNS AND REPAIRS

| Sl. No. | Adjustments/Defects/Breakdowns and Repairs | Tractor run hours |
|---------|--|-------------------|
|         | --None--                                   | --                |



|                   |  |
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**6. COMPARISON BETWEEN BASE MODEL AND VARIANT MODEL  
(Based on Table 3 & 4 of Indian Standard 12207: 2014)**

| Sl. No.                                 | Clause No       | Features  | Observation on base model<br>(T-954/1472/2015,<br>February, 2015)  | Observation on variant model | Remarks              |               |
|---|-----------------|---|--|------------------------------|----------------------|---------------|
| 1                                       | 2               | 3   | 4  | 5                            | 6                    |               |
| 1.                                      | i)              | <b>Clutch:</b><br>Single/dual/dry/wet / independent clutch/increase in size of clutch | Dual, dry friction plate and pads, diaphragm type of size 310.1/196.8 and 279.9/164.9 (OD/ID), respectively. |                              | No change            |               |
| 2.                                      | ii)             | <b>Air cleaner:</b>   |  |                              |                      |               |
|   |                 | Type  | Dry  | Dry                          | No change            |               |
|   |                 | Location  | In front of radiator under the bonnet  |                              | No change            |               |
|   |                 | Intake pressure, at max. power, (kPa)   | 0.80 to 1.10   | 2.13 to 2.27                 | <b>Changed</b>       |               |
| 3.                                      | iii)            | <b>Exhaust system:</b>  |  |                              |                      |               |
|   |                 | Type  | Updraft, cylindrical, under the bonnet   |                              | No change            |               |
|   |                 | Location  | On RHS above exhaust manifold  |                              | No change            |               |
|   |                 | Exhaust pressure, at max. power, (kPa)  | 6.93 to 9.07   | 11.73 to 11.87               | <b>Changed</b>       |               |
| 4.                                      | iv)             | <b>Gear Box:</b>  |  |                              |                      |               |
|   |                 | - Type  | Mechanical, Combination of constant & partial synchromesh gears  |                              | No change            |               |
| <b>Reduction ratio of transmission:</b> |                 |   |  |                              |                      |               |
|   | <b>Movement</b> | <b>Gear</b>   | <b>Base model</b>  | <b>Variant model</b>         | <b>Variation (%)</b> | <b>Remark</b> |
|   | <b>Forward</b>  | L1  | 310.62   | 310.49                       | 0.0                  | No change     |
|   |                 | L2  | 214.33   | 214.59                       | 0.1                  | No change     |
|   |                 | L3  | 149.22   | 148.92                       | 0.2                  | No change     |
|   |                 | L4  | 118.48   | 118.28                       | 0.2                  | No change     |
|   |                 | L5  | 88.65  | 88.13                        | 0.6                  | No change     |
|   |                 | M1  | 105.2  | 105.25                       | 0.1                  | No change     |
|   |                 | M2  | 72.75  | 72.65                        | 0.1                  | No change     |
|   |                 | M3  | 50.56  | 50.45                        | 0.2                  | No change     |
|   |                 | M4  | 40.01  | 40.05                        | 0.1                  | No change     |
|   |                 | M5  | 29.72  | 29.77                        | 0.2                  | No change     |
|   |                 | H1  | 55.89  | 55.75                        | 0.3                  | No change     |
|   |                 | H2  | 38.59  | 38.63                        | 0.1                  | No change     |
|   |                 | H3  | 26.82  | 26.79                        | 0.1                  | No change     |
|   |                 | H4  | 21.26  | 21.23                        | 0.1                  | No change     |
|   |                 | H5  | 15.81  | 15.8                         | 0.1                  | No change     |
|   | <b>Reverse</b>  | LR1   | --   | 325.50                       | --                   | --            |
|   |                 | LR2   | --   | 224.69                       | --                   | --            |
|   |                 | LR3   | --   | 156.29                       | --                   | --            |
|   |                 | LR4   | --   | 124.17                       | --                   | --            |
|   |                 | LR5   | --   | 92.29                        | --                   | --            |
|   |                 | MR1   | --   | 110.08                       | --                   | --            |
|   |                 | MR2   | --   | 76.07                        | --                   | --            |
|   |                 | MR3   | --   | 52.84                        | --                   | --            |
|   |                 | MR4   | --   | 41.95                        | --                   | --            |
|   |                 | MR5   | --   | 31.21                        | --                   | --            |
|   |                 | HR1   | --   | 58.49                        | --                   | --            |
|   |                 | HR2   | --   | 40.37                        | --                   | --            |
|   |                 | HR3   | --   | 28.02                        | --                   | --            |
|   |                 | HR4   | --   | 22.25                        | --                   | --            |
|   |                 | HR5   | --   | 16.56                        | --                   | --            |
|   | LR              | 163.48  | --   | --                           | --                   |               |
|   | MR              | 55.47   | --   | --                           | --                   |               |
|   | HR              | 29.38   | --   | --                           | --                   |               |

|                   |  |
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| 1  | 2     | 3   | 4   | 5  | 6              |
|----|-------|---|---|--|----------------|
| 5. | v)    | <b>Nominal speed (kmph):</b>                                    |   |  |                |
|    |       | - Forward   | 1.63 to 32.04                                       | 1.63 to 32.07<br>(Variation of 0.00 to 0.09 %)                   | <b>Changed</b> |
|    |       | - Reverse   | 3.10 to 17.24                                       | 1.56 to 30.55  | <b>Changed</b> |
|    |       | Additional no. of speed   | None  | LR1,LR2,LR3, LR4,LR5,MR1, MR2,MR3,MR4,MR5,HR1,HR2,HR3, HR4 & HR5 | <b>Changed</b> |
| 6. | vi)   | <b>Fitment/change of engine accessories:</b>                    |   |  |                |
|    |       | -Expansion tank capacity, (l)                                   | 1.00  | 0.90   | <b>Changed</b> |
|    |       | - Bare Radiator Capacity, (l)                                   | 4.40  | 4.80   | <b>Changed</b> |
|    |       | - Total coolant capacity, (l)                                   | 10.65   | 9.45   | <b>Changed</b> |
|    |       | Air compressors   | Not provided  | Not provided   | No change      |
|    |       | Oil coolers   | Coil type having 05 numbers of coil                 | Not Provided   | <b>Changed</b> |
| 7. | vii)  | <b>Brake system:</b>  |   |  |                |
|    |       | Type-disc, drum, oil immersed brakes                            | Mechanical, oil immersed disc brakes                |  | No Change      |
|    |       | Size of disc/drum, (cm <sup>2</sup> )                           | 1232.87 (on each wheel side)                        | 1232.87 (on each wheel side)                                     | No Change      |
| 8. | viii) | <b>Type of three-point linkage:</b>                             |   |  |                |
|    |       | Type  | Cat.I/Cat.II  | Cat.I/Cat.II   | No change      |
|    |       | Rear/front mounted  | Rear mounted  | Rear mounted   | No change      |
| 9. | ix)   | <b>PTO shafts:</b>  |   |  |                |
|    |       | Location  | Centrally located                                   | Centrally located  | No change      |
|    |       | Type  | Type-I, independent                                 | Type-I, independent  | No change      |
| 10 | x)    | <b>Type of drive:</b>   |   |  |                |
|    |       | 2WD or 4WD  | 2WD   | 4WD  | <b>Changed</b> |
| 11 | xi)   | <b>Hydraulic pump drive:</b>                                    |   |  |                |
|    |       | Location  | On RHS of Engine                                    | On RHS of Engine   | No change      |
|    |       | Type of drive   | Through timing gears                                |  | No change      |
|    |       | Hydraulic pump speed corresponding to rated engine speed, (rpm) | 2363  | 2363   | No change      |
| 12 | xii)  | <b>Positioning of hydraulic sensing mechanism:</b>              |   |  |                |
|    |       | Lower link, top link, etc.                                      | Through top link                                    | Through top link   | No change      |
| 13 | xiii) | <b>Final Reduction:</b>   |   |  |                |
|    |       | Location  | Outside of differential housing                     |  | No change      |
|    |       | Type  | Planetary reduction                                 |  | No change      |
|    |       | Brake location  | On rear axle shaft, outside of differential housing |  | No change      |
| 14 | xiv)  | <b>Type of fuel Injection pump:</b>                             |   |  |                |
|    |       | Inline/Rotary/Common rail                                       | Inline plunger                                      | Inline plunger   | No change      |

|                   |  |
|-------------------|--|
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| 1   | 2   | 3   | 4                               | 5                                      | 6              |
|-----|---|---|---------------------------------|--|----------------|
| 15. | <b>Changes related to engine parameters (as per Table-4)</b>                              |   |                                 |  |                |
|     | a)  | Engine operating principle (spark/ compression ignition, two/four stroke) | Compression Ignition, 4 strokes | Compression Ignition, 4 strokes        | No change      |
|     | b)  | Number & arrangement of cylinders   | Four, vertical inline           | Four, vertical inline                  | No change      |
|     | c)  | Maximum declared PTO power, (kW)  | 33.5                            | 33.5                                   | No change      |
|     | d)  | Engine displacement, (cc)   | 3532                            | 3532                                   | No change      |
|     | e)  | Rated engine speed, (rpm)   | 2100                            | 2100                                   | No change      |
|     | f)  | Naturally aspirated/turbo charged   | Naturally aspirated             | Naturally aspirated                    | No change      |
| 16. | <b>Change related to ergonomics, safety comfort, statutory / regulatory requirements:</b> |   |                                 |  |                |
|     | a)  | IS: 10273   | Conformed                       | Conforms                               | No change      |
|     | b)  | IS: 4931  | Did not conform                 | Conforms                               | change         |
|     | c)  | IS: 4468  | Did not conform                 | Does not conform                       | No change      |
|     | d)  | IS: 12953   | Conformed                       | Conforms                               | No change      |
|     | e)  | IS:12343  | Did not conform                 | Does not conform                       | No change      |
|     | f)  | IS:12239 (Pt-I)   | Did not conform                 | Does not conform                       | No change      |
|     | g)  | IS:12239 (Pt-II)  | Did not conform                 | Does not conform                       | No change      |
|     | h)  | IS:8133   | Did not conform                 | Does not conform                       | No change      |
|     | i)  | IS: 6283  | Conformed                       | Conforms                               | No change      |
|     | j)  | IS:14683  | Conformed                       | Conforms                               | No change      |
| 17. | <b>Other changes:</b>   |   |                                 |  |                |
|     | i)  | Decals (sticker)  | Mahindra 605 DI PS (Arjun NOVO) | Mahindra 605 DI MS 4WD S+ (Arjun NOVO) | <b>Changed</b> |

|                   |  |
|-------------------|--|
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### 7. 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

#### 7.1 Evaluative & Non-Evaluative Parameters:

| Sl. No.      | Characteristic  | Category (Evaluative /Non-Evaluative) | Requirements as per <b>IS: 12207-2014</b>   | 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</b> | <b>PTO Performance:</b>   |                                       |   |   |               |             |               |  |
| 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 >26 kW. – 7.5/+10% for PTO power ≤ 26 kW or-5 / +10% for engine power >26 kW. – 7.5/+10% for engine power ≤ 26 kW      | 33.5  | 33.5          | 33.7        | 34.3          | Yes  |
| b)           | Power at rated engine speed (kw)                                  | Non-Evaluative                        | -do-  | 33.5  | 33.5          | 32.5        | 34.3          | Yes  |
| c)           | Specific fuel consumption corresponding to maximum power, (g/kWh) | Non-Evaluative                        | + 5%  | 251   | 258           | 246         | 241           | Yes  |
| d)           | Maximum equivalent crankshaft torque (Nm)                         | Non-Evaluative                        | ± 8%  | 178.0   | 196           | 176.7       | 186.2         | Yes  |
| e)           | Back-up torque, percent   | Non-Evaluative                        | 10 percent, min   | 10% (R)<br>15(D)                              | 15.0          | 18.0        | 19.4          | Yes  |
| f)           | Maximum operating temperature (°C)                                |                                       |   |   |               |             |               |  |
|              | 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.                           | 130 (D)                                       | 130 (D)       | 114         | 122           | 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 (D)                                       | 112 (D)       | 94          | 100           | Yes  |
| g)           | Engine oil consumption, (g/kWh)                                   | Evaluative                            | Not exceeding 1% of SFC at max. power under High ambient conditions   | 2.52 (R)                                      | 2.51 (R)      | 0.45        | 0.29          | Yes  |

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| 1  | 2  | 3              | 4  | 5 a                            | 5 b                            | 6 a   | 6 b   | 7   |
|--|--|----------------|--|--------------------------------|--------------------------------|-------|-------|-----|
| h)   | Smoke level  | 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 per meter (R)<br>0.20 (D) | 3.25 per meter (R)<br>0.20 (D) | 0.23  | 0.09  | Yes |
| <b>7.1.2 Drawbar performance :</b>                               |  |                |  |                                |                                |       |       |     |
| a)   | Maximum drawbar pull with ballast corresponding to 15 percent wheel slip, (kN)   | Non evaluative | Minimum 65% of static mass of tractor with ballast   | 16.19 (R)<br>22.0 (D)          | 20.88 (R)<br>20.86 (D)         | 27.36 | 27.3  | Yes |
| b)   | Maximum drawbar pull with Unballast corresponding to 15 percent wheel slip, (kN) | Evaluative     | Minimum 65% of static mass of tractor without ballast  | 16.25 (R)<br>16 (D)            | 17.15 (R)<br>17.15 (D)         | 19.94 | 23.23 | Yes |
| c)   | 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. | 26.99 (R)<br>26.8 (D)          | 27.4 (R)<br>26.8 (D)           | 27.7  | 27.7  | Yes |
| <b>7.1.3 Noise measurement:</b>                                  |  |                |  |                                |                                |       |       |     |
| a)   | Maximum ambient noise emitted by the tractor dB(A)                               | Evaluative     | As per CMVR  | 88 (R)                         | 88 (R)                         | 85    | 85    | Yes |
| b)   | Maximum noise at operator's ear level dB(A)                                      | Evaluative     | As per CMVR  | 98 (R)                         | 96 (R)                         | 93    | 94    | Yes |
| <b>7.1.4 Labeling of tractors (Provision of labeling plate):</b> |  |                |  |                                |                                |       |       |     |
| 1)   | Make   | Evaluative     | Should conform to the requirements of CMVR along-with declared value of PTO HP   | --                             | Mahindra                       |       | Yes   |     |
| 2)   | Model  | Evaluative     |  | --                             | 605 DI MS 4WD S+               |       | Yes   |     |
| 3)   | Year of manufacture  | Evaluative     |  | --                             | FG (September,2016)            |       | Yes   |     |
| 4)   | Engine number  | Evaluative     |  | --                             | NGF4WBA0001                    |       | Yes   |     |
| 5)   | Chassis number   | Evaluative     |  | --                             | MBNWHBDWFGNF00001              |       | Yes   |     |
| 6)   | Declaration of PTO power, kW   | Evaluative     |  | --                             | 33.5                           |       | Yes   |     |
| <b>7.1.3 Literature (Submission to test agency):</b>             |  |                |  |                                |                                |       |       |     |
| (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   |     |

## 7.2 Salient Observations:

### 7.2.1 Laboratory tests:

#### 7.2.1.1 PTO performance:

- i) The maximum PTO power in case of base and variant model was observed as **33.7 & 34.3 kW** against the declaration of **33.5 kW**, which is within the tolerance limit as specified in IS:12207-2014.

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- ii) The specific fuel consumption in case of base and variant models corresponding to maximum power was observed as **246 & 241 g/kWh** against the declaration of **251 & 258 g/kWh** respectively, which meets the requirement of **IS:12207-2014** in case of variant model.
- iii) The maximum equivalent crankshaft torque in case of base and variant models was observed as **176.7 & 186.2 g/kWh** against the declaration of **178 & 196 g/kWh** respectively, which is within the tolerance limit as specified in IS: 12207-2014.
- iv) The backup torque was observed as in case of base and variant models **18.0 & 19.4 %**.

**7.2.1.2 Drawbar performance:**

- i) The maximum drawbar power in case of base and variant model was observed as **27.7 & 27.7 kW** under unballast condition against the declaration of **26.8 kW**, which is within the specified limit.
- ii) The maximum drawbar pull corresponding to 15% wheel slip in case of base and variant model was observed as **19.94 kN & 23.23 kN** under unballast condition against the declaration of **16.0 kN & 17.15 kN** respectively, which is within the specified limit.
- iii) The creeping of LHS & RHS of rear tyre over rim was recorded as 15 mm & 30 mm during 10 hour drawbar performance test. This is recommended to looked into for necessary corrective action.

**7.2.1.3 Operator's seat:**

The dimension of longitudinal distance from seat index point to the centre of differential lock pedal does not meet the requirement of IS: 12343-1998 (Re-affirmed in 2014). This is recommended to looked into for necessary corrective action.

**7.2.1.4 Three point linkage:**

- i) The width of ball of lower hitch point does not meet the requirement of IS:4468 (part-1):1997 (Reaffirmed in Oct., 2017). This may be looked into for necessary corrective action.

**7.2.1.5 Nominal speed :**

The nominal speed of the tractor recorded as **22.77 & 30.55 kmph** in high reverse gear **RH4 & RH5** respectively .The speed recorded in reverse gear **RH4 & RH5** is not safe as far as the reversing of tractor is concerned. This should be looked into for necessary corrective action.

**7.3 Maintenance / Service Problems:**

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

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

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

- i) The fuel shut-off lever does not remain in stop position
- ii) The spark arrester has not been provided in the exhaust system.

**7.5 Adequacy of Literature supplied with machine:**

**7.5.1** The following literature has been supplied with the tractor

- a) Service Manual for Mahindra, 605 MS 4WD S+ (Arjun Novo) tractor.
- b) Parts Catalogue for Mahindra, 605 MS 4WD S+ (Arjun Novo) tractor.
- c) Operator's manual Mahindra, 605 MS 4WD S+ (Arjun Novo) tractor.

**7.5.2** It is therefore, recommended that above said literature may be brought out as per IS: 8132-1999 (Reaffirmed in 2014) for the guidance of users and service personnel in national as well as regional languages for this model of tractor.

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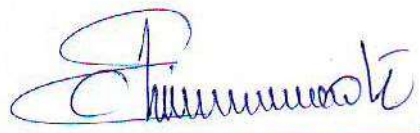
#### 8. CITIZEN CHARTER

| Duration of Test                        | Time frame for Testing & Evaluation as per Citizen Charter | Whether the Test Report is released within the time frame given in Citizen Charter | Remarks |
|---|--|--|---------|
| 8 Month<br>(October, 2018 to May, 2019) | 07 Months  | Yes  | None    |

#### TESTING AUTHORITY:



**C.S. RAGHUWANSHI**  
AGRICULTURAL ENGINEER



**C.V. CHIMOTE**  
TEST ENGINEER



**J.J.R. NARWARE**  
DIRECTOR

The report compiled by: **Shri Vithato Keyho**, Senior Technical Assistant

#### 9. APPLICANT'S COMMENTS

| Para No. | Our Reference   | Applicant's comments   |
|----------|---|--|
| 9.1      | 7.2.1.1(ii),7.2.1.3,7.2.1.4<br>(i),7.2.1.5 & 7.4 (i,ii) | Observations will be studied and necessary action will be initiated. |

|                   |  |
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**ANNEXURE-I**

**TRACTOR RUN HOURS DURING TEST**

| <b>A.</b>    | <b>LABORATORY AND TRACK TESTS</b>  | <b>HOURS</b> |
|--------------|--|--------------|
| 1.           | Running –in  | --           |
| 2.           | PTO performance test   | 10.1         |
| 3.           | Drawbar performance test   | 21.6         |
| 4.           | Noise measurement  | 0.5          |
| 5.           | Turning Ability  | 0.5          |
| 6.           | Location of centre of gravity  | 0.2          |
| 7.           | Nominal speed test   | 3.4          |
| <b>B.</b>    | Miscellaneous test and other run hours, including idle run transportation, trial and preparation for test. | 0.7          |
| <b>Total</b> |  | <b>37.0</b>  |