


[As per Document No. MoRTH/CMVR/TAP-115/116 Chapter No.2 of Part X, AIS 007-March, 2012]


Table-4D
TECHNICAL SPECIFICATIONS OF THE ENGINES FITTED ON AGRICULTURAL
TRACTORS/COMBINE
HARVESTERS/POWER TILLERS AND CONSTRUCTION EQUIPMENTS

[To be submitted by the Applicant/Manufacturer to testing Agency in duplicate on their Letter Head]


| | | | |
|------------|--|-------------|---|
| 1.0 | Description of Vehicle | | |
| 1.1 | Trade Name or mark of the Vehicle | | |
| 1.2 | Vehicle Type | | |
| 1.3 | Declared maximum PTO /Rotary Power, (kW) | | |
| 1.4 | Declared Rated PTO /Rotary power (kW) | | |
| 1.5 | FMTTI Test report no. | | |
| 2.0 | Manufacturer's name and address | | |
| 2.1 | Telephone No. | | |
| 2.2 | Fax No. | | |
| 2.3 | Email | | |
| 3.0 | Brief Details of Agricultural Tractor | | |
| 3.1 | Unladen mass of vehicle (kN) | | |
| 3.2 | Reference mass of the vehicle | | |
| 3.3 | Gross vehicle Weight | | |
| 3.4 | Gear Box | | |
| 3.5 | Manual or Automatic (If it is automatic, give all the pertinent data) | | |
| 3.6 | Number of Gears | | |
| 3.7 | Transmission Ratio | | Low gear selection High gear selection |
| 3.7.1 | Forward | First Gear | |
| 3.7.2 | | Second Gear | |
| 3.7.3 | | Third Gear | |
| 3.7.4 | | Fourth Gear | |
| 3.7.5 | Reverse | | |
| 3.8 | Gear Shifting Pattern | | |
| 3.9 | Reduction ratio through crown wheel and pinion/Final Drive Ratio | | |
| 3.10 | Tyre | | Front (Steered wheels) Rear (Drive wheels) |
| 3.10.1 | Dimensions | | |
| 3.10.2 | Dynamic Rolling Circumference | | |
| 3.10.3 | Type | | |
| 3.10.4 | Ply Rating | | |
| 3.10.5 | Tyre Pressure | | |
| 3.10.5.1 | - For field work, kpa (kg/cm ²) | | |
| 3.10.5.2 | - For road work, kpa (kg/cm ²) | | |
| 3.11 | Wheel Drive | | |
| 3.11.1 | Front | | |
| 3.11.2 | Rear | | |
| 3.12 | Vehicle Performance (Declared by Manufacturer) | | |
| 3.13 | Vehicle Max Speed | | |

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| Manufacturer : | Document No : | Test Agency :CFMT & TI, BUDNI (M.P.) | Cert No : |
| Signature | | Signature |  |
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| 3.14 | Acceleration (Max.) | |
| 4.0 | Essential Characteristics of Engine Family [Refer Appendix-1 of Part XV- Sub part (A)] | |
| 4.1 | Common Parameters | |
| 4.2 | Combustion Cycle (2 /4 cycle) | |
| 4.3 | Cooling Medium (air/water/oil) | |
| | Individual cylinder displacement | |
| | -Engines to be within a total spread of 15% | |
| | -Number of cylinders for engines with after-treatment device | |
| 4.4 | Method of Air Aspiration (Natural aspirated/ Pressure charged) | |
| 4.5 | Combustion chamber type / Design | |
| 4.5.1 | - Pre-chamber | |
| 4.5.2 | - Swirl chamber | |
| 4.5.3 | - Open chamber | |
| 4.6 | Valve and porting – Configuration, size and number | |
| 4.6.1 | - Cylinder head | |
| 4.6.2 | - Cylinder wall | |
| 4.6.3 | - Crankcase | |
| 4.7 | Fuel System | |
| 4.7.1 | - Pump-line-injector | |
| 4.7.2 | - In-line pump | |
| 4.7.3 | - Distributor pump | |
| 4.7.4 | - Single element | |
| 4.7.5 | - Unit Injector | |
| 4.7.6 | - Common rail direct injector | |
| 4.8 | Engine Management Systems | |
| 4.9 | Proof of Identity pursuant to drawing number(s): | |
| 4.9.1 | Charge cooling system | |
| 4.9.2 | Exhaust gas Recirculation | |
| 4.9.3 | Water Injection / Emulsion | |
| 4.9.4 | Air Injection/ Charge cooling system | |
| 4.9.5 | Exhaust gas after treatment system | |
| 4.9.5.1 | - Oxidation catalyst | |
| 4.9.5.2 | - Reduction catalyst | |
| 4.9.5.3 | - Thermal reactor | |
| 4.9.5.4 | - Particulates trap | |
| 4.10 | Proof of Identical (or lowest for the parent engine) ratio | |
| 4.11 | System capacity / fuel delivery per stroke, pursuant to diagram number(s) | |

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| 5.0 | Engine Family Listing | | | | |
| 5.1 | Name of Engine family | | | | |
| 5.2 | Specifications of Engine within this family | | | | |
| Engine Type | | | | | Parent Engine |
| No. of Cylinders | | | | | |
| Rated Speed (rpm) | | | | | |
| Rated gross power (kW) | | | | | |
| Max torque speed (rpm) | | | | | |
| Fuel delivery per stroke at rated speed (mm ³) | | | | | |
| Fuel delivery per stroke at Max Torque Speed (mm ³) | | | | | |
| Max Torque (Nm) | | | | | |
| Low idle speed (rpm) | | | | | |
| Cylinder displacement (in % of parent engine) | | | | | 100 |
| 6.0 (A) | Engine (Type within the Family) | | | | |
| 6.1 | Type (NA/TC/TCIC, DI/IDI) | | | | |
| 6.2 | Manufacturer's name & Manufacturing Plant address. | | | | |
| 6.3 | Working principle (four / two stroke) | | | | |
| 6.4 | Model name and identification | | | | |
| 6.5 | Type of fuel used | | | | |
| 6.6 | No.& Layout of cylinders & firing order | | | | |
| 6.7 | Swept volume cc | | | | |
| 6.8 | Bore(mm) | | | | |
| 6.9 | Stroke (mm) | | | | |
| 6.10 | Compression ratio (specify tolerance) | | | | |
| 6.11 | Engine performance (declared by the manufacturer,) | | | | |
| 6.11.1 | Max. Gross power of engine on bench kW (Specify standard and tolerance) | | | | |
| 6.11.2 | Maximum Gross torque on bench Nm @ rpm | | | | |
| 6.11.3 | Engine RPM at max. Power (specify tolerance) | | | | |
| Note: | In case of diesel engines the maximum Power and maximum Torque shall be specified as per conditions given in Chapter 6 of Part IV of Doc. MoSRTTH / CMVR / TAP-115 / 116 Issue No 3. 4 | | | | |
| 6.12 | Location of engine (Front / Rear) | | | | |
| 7.0 | Combustion : | | | | |
| 7.1 | Type of combustion chamber (Hemispherical / squish/others) | | | | |
| 7.2 | Drawings of combustion chamber and piston crown (mention drawing no) | | | | |
| 7.3 | Minimum cross section area of ports | | | | |
| 7.3.1 | Inlet mm ² | | | | |
| 7.3.2 | Outlet mm ² | | | | |

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| 8.0 | Cooling system : | |
| 8.1 | Liquid cooling system | |
| 8.1.1 | Nature of liquid and capacity | |
| 8.1.2 | Circulating pump yes/no | |
| 8.1.3 | Characteristics of Circulating pump or make(s) & type(s) | |
| 8.1.3.1 | Drive ratio | |
| 8.1.4 | Thermostat type and setting | |
| 8.2 | Air Cooling system | |
| 8.2.1 | Blower characteristics | |
| 8.2.1.1 | Make(s) | |
| 8.2.1.2 | Type(s) | |
| 8.2.1.3 | Drive ratio(s) | |
| 8.2.2 | Air ducting(std production) | |
| 9.0 | Temperature regulating system (yes/no) | |
| 9.1 | Brief description | |
| 10.0 | Temperature permitted by manufacturer ° C | |
| 10.1 | Liquid cooling:- | |
| 10.1.1 | Max. Temp. at engine Outlet | |
| 10.2 | Air cooling:- | |
| 10.2.1 | Reference point | |
| 10.2.2 | Max. temperature at reference point | |
| 10.3 | Max. outlet temperature of the intercooled-air | |
| 10.4 | Maximum exhaust temperature ° C | |
| 10.4.1 | Max. exhaust temperature (in case of diesel engines, at the point in the exhaust pipe(s) adjacent in outlet flange(s) of exhaust manifolds) | |
| 11.0 | Fuel temperature °C : | |
| 11.1 | Minimum | |
| 11.2 | Maximum | |
| 12.0 | Lubricant Temperature °C : | |
| 12.1 | Minimum | |
| 12.2 | Maximum | |
| 13.0 | Intake system : | |
| 13.1 | Supercharger / Turbocharger - yes/no | |
| 13.1.1 | Description of system | |
| 13.1.2 | Make(s) | |
| 13.1.3 | Type(s) & Part No. | |
| 13.2 | Intake manifold | |
| 13.2.1 | Description & Drawings | |
| 13.3 | Air filter | |
| 13.3.1 | Make | |
| 13.3.2 | Type & Part No. | |

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| 13.4 | Intake silencer | |
| 13.4.1 | Make | |
| 13.4.2 | Type | |
| 13.5 | Description & diagrams of inlet pipe & their accessories (dash pot, heating device, additional air intake etc.) | |
| 13.6 | Inter cooler | |
| 13.6.1 | Make | |
| 13.6.2 | Identification mark / & Part No. | |
| 14.0 | Fuel feed: | |
| 14.1 | Injection system description | |
| 14.2 | Working principle: intake manifold/ direct injection/ indirect injection/swirl chamber/others | |
| 14.3 | Fuel Pump | |
| 14.3.1 | Make(s) & country of origin | |
| 14.3.2 | Type(s) & Part No. | |
| 14.4 | Delivery mm ³ /per stroke at Rated speed and at Max Torque speed (specify tolerance) Or characteristic diagram (specify tolerance) | |
| 14.5 | Calibration procedure on engine/pump bench | |
| 14.6 | Injection timing deg BTDC (specify tolerance) | |
| 14.7 | Injection advance curve (attach the same) | |
| 14.8 | Injection advance (specify the tolerance) | |
| 14.9 | Injectors | |
| 14.9.1 | Type, (mention Holder & Nozzle no(s)) | |
| 14.9.2 | Make & country of origin | |
| 14.9.3 | Opening pressure (specify tolerance) or characteristic diagram | |
| 14.9.4 | Injection piping | |
| 14.9.5 | Length mm | |
| 14.9.6 | Internal diameter mm | |
| 15.0 | Device for recycling crank-case gases : | |
| 15.1 | Description & diagrams | |
| 16.0 | Governor : | |
| 16.1 | Make(s) & country of origin | |
| 16.2 | Type(s) | |
| 16.3 | Cut off point under load (rpm) | |
| 16.4 | Max. Speed without load (rpm) | |
| 16.5 | Idle Speed (rpm) | |
| 17.0 | Cold start device (starting aid): | |
| 17.1 | Make(s) | |
| 17.2 | Type(s) | |
| 17.3 | System description | |
| 18.0 | Starting System : | |
| 18.1 | Make(s) | |
| 18.2 | Type(s) | |
| 18.3 | System description | |

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| 19.0 | Valve timing / Port timing or equivalent data : | |
| 19.1 | Max. lift of valves | |
| 19.1.1 | Inlet mm | |
| 19.1.2 | Exhaust mm | |
| 19.2 | Angle of valves / port (w.r.t. top dead center) | |
| 19.3 | Inlet | |
| 19.3.1 | Opening | |
| 19.3.2 | Closing | |
| 19.4 | Exhaust | |
| 19.4.1 | Opening | |
| 19.4.2 | Closing | |
| 19.5 | Transfer | |
| 19.5.1 | Opening | |
| 19.5.2 | Closing | |
| 19.6 | Reference or setting ranges | |
| 19.7 | Valve gap (Hot & Cold) | |
| 19.7.1 | Inlet | |
| 19.7.2 | Exhaust | |
| 19.8 | Distribution by ports | |
| 19.8.1 | Volume of crank-case cavity with piston at TDC | |
| 19.8.2 | Description of reed valve if any with drawing | |
| 19.8.3 | Description (with drawing) of inlet ports, scavenging and exhaust ports with corresponding timing. (The drawing should include one representing the inner surface of the cylinder) | |
| 20.0 | Lubrication system : | |
| 20.1 | Description of system | |
| 20.2 | Lubrication oil capacity lit | |
| 20.3 | Position of lubricant reservoir | |
| 20.4 | Lubricating oil grade | |
| 20.5 | Feed system(pump, injection in to intake mixing with fuel etc..) | |
| 20.6 | Lubricating pump | |
| 20.6.1 | Make | |
| 20.6.2 | Type | |
| 20.7 | Mixture with fuel : yes/no, and if yes % | |
| 20.8 | Oil cooler : yes/no, and if yes Drawings/ makes & types | |
| 21.0 | Electrical equipment : | |
| 21.1 | Generator/alternator characteristics (specify tolerance) or | |
| 21.1.1 | Make | |
| 21.1.2 | Type | |
| 22.0 | Other engine driven auxiliaries: | |
| 22.1 | Enumeration & brief description, if necessary | |
| 23.0 | Idling System : | |
| 23.1 | Idling speed (rpm) (specify the tolerance) | |
| 23.2 | Description of settings and relevant requirements | |

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| 24.0 | Additional requirements for diesel engines: | | |
| 24.1 | Maximum permitted depression of air intake at characteristic place (Specify location of measurement) (kPa) | | |
| 24.2 | Exhaust back pressure at maximum Gross power and location of measurement (kPa) | | |
| 24.3 | Effective volume of exhaust-System (specify the tolerance & range) in liters (from exhaust manifold / TC outlet to tail pipe end), Enclose the exhaust system drawing and indicate the volume of each parts clearly. | | |
| 24.4 | Moment of inertia of combined flywheel & transmission at condition when no gear is engaged | | |
| 24.5 | Maximum rated speed (Specify the tolerance) | | |
| 24.6 | Minimum rated speed (Specify the tolerance) | | |
| 24.7 | Power absorbed by fan kW (specify the tolerance) | | |
| 24.8 | Max. Gross torque on bench, Nm @ rpm | | |
| 24.9 | Declared speed and powers of the engine/ submitted for type approval (Speeds to be agreed with the testing agency) | | |
| Measurement point* | Engine speed rpm | Gross Power kW** | |
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| * | See Chapter 3 of Part IV of Doc.MoSRTHTS/CMVR/TAP115/116 Issue No 3. 4 | | |
| ** | Gross power according to Chapter 6 of Part IV of Doc.MoSRTHTS/CMVR/TAP115/116 Issue No 3. 4 | | |
| 25.0 | Exhaust system : | | |
| 25.1 | Silencer, Number, Type and make | | |
| 25.2 | Identification mark (If proprietary) / Part No. | | |
| 25.3 | Internal dia of exhaust pipe | | |
| 25.4 | Description (with a general arrangement drawing of exhaust system along with its routing indicating the lengths of exhaust pipe, tail pipe and exhaust outlet location) | | |
| 25.5 | Minimum distance between exhaust pipe(s) and the fuel line | | |
| 26.0 | Additional emission control devices, such as catalytic converter etc. (if any & if not covered by another heading) | | |
| 26.1 | Catalyser make, Number | | |
| 26.2 | Identification Mark / Part No | | |
| 26.3 | Type of catalytic action (One/two/three way) | | |
| 26.4 | Total charge of precious metal (g/vehicle) | | |
| 26.5 | Relative concentration (%) | | |
| 26.5.1 | Platinum | | |
| 26.5.2 | Rhodium | | |
| 26.5.3 | Palladium | | |


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| 26.6 | Substrate (Monolythic metal/ Ceramic/ honeycomb) | |
| 26.7 | Cell density (cells per sq.inch) | |
| 26.8 | Type of casing for catalyser | |
| 26.9 | Diagram indicating the arrangement and position of catalytic converter w.r.t exhaust manifold) | |
| 26.10 | Electronic Control Unit (ECU) | |
| 26.10.1 | Make | |
| 26.10.2 | Identification mark | |
| 26.10.3 | Calibration Identification No. | |
| 26.11 | Secondary Air Injection | |
| 26.11.1 | Make | |
| 26.11.2 | Identification mark | |
| 26.12 | Exhaust Gas Recirculation System | |
| 26.12.1 | Make | |
| 26.12.2 | Type | |
| 26.12.3 | Identification mark | |

DECLARATION

I, ----- of M/s ----- hereby declare that information given above in page no. 1 to 8 is as per design / drawings of the prototype / commercial model of engine ----- submitted for test and is complete and correct to the best of my knowledge and belief. I also understand that in case of any information furnished above is found to be not correct or incomplete, then among other actions, the certificate is liable to be cancelled. It is further declared that this machine has never been tested by any of the test agency as referred in Rule 126 of CMVR 1989. It is further declared that no application has been submitted to any other agencies as referred in Rule 126 of CMVR 1989.

Applicant / Manufacturer :
Signature of Authorised Signatory :
Name :
Designation :
Place :
Date :
Countersigned :

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|------------------------------------|----------------------|---|---|
| Manufacturer : Signature | Document No : | Test Agency :CFMT & TI, BUDNI (M.P.) Signature Name: | Cert No :  |
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