ANNEX I

Complete list of information for the purpose of EC type-approval of vehicles

3. POWER PLANT ([q]) (In the case of a vehicle that can run either on petrol, diesel, etc., or also in combination with another fuel, items shall be repeated ([+]))

3.1. Manufacturer:

3.1.1. Manufacturer's engine code as marked on the engine:

3.2. Internal combustion engine

3.2.1. Specific engine information

3.2.1.1. Working principle: positive ignition/compression ignition, four stroke/two stroke ([1])

3.2.1.2. Number and arrangement of cylinders:

3.2.1.2.1. Bore ([r]): … mm

3.2.1.2.2. Stroke ([r]): … mm

3.2.1.2.3. Firing order:

3.2.1.3. Engine capacity ([s]): … cm^3

3.2.1.4. Volumetric compression ratio ([2]):

3.2.1.5. Drawings of combustion chamber, piston crown and, in the case of positive ignition engines, piston rings:

3.2.1.6. Normal engine idling speed ([2]): … min^{-1}

3.2.1.6.1. High engine idling speed ([2]): … min^{-1}

3.2.1.7. Carbon monoxide content by volume in the exhaust gas with the engine idling ([2]): … % as stated by the manufacturer (positive ignition engines only)

3.2.1.8. Maximum net power ([t]): … kW at … min^{-1} (manufacturer's declared value)

3.2.1.9. Maximum permitted engine speed as prescribed by the manufacturer: … min^{-1}

3.2.1.10. Maximum net torque ([t]): … Nm at … min^{-1} (manufacturer's declared value)

3.2.2. Fuel: Diesel oil/Petrol/LPG/NG/Ethanol ([1]) …

3.2.2.1. RON, leaded:

3.2.2.2. RON, unleaded:

3.2.2.3. Fuel tank inlet: restricted orifice/label ([1])

3.2.3. Fuel tank(s)

3.2.3.1. Service fuel tank(s)

3.2.3.1.1. Number, capacity, material:

3.2.3.1.2. Drawing and technical description of the tank(s) with all connections and all lines of the breathing and venting system, locks, valves, fastening devices:

3.2.3.1.3. Drawing clearly showing the position of the tank(s) in the vehicle:

3.2.3.2. Reserve fuel tank(s)

3.2.3.2.1. Number, capacity, material:

3.2.3.2.2. Drawing and technical description of the tank(s) with all connections and all lines of the breathing and venting system, locks, valves, fastening devices:

3.2.3.2.3. Drawing clearly showing the position of the tank(s) in the vehicle:

3.2.4. Fuel feed

3.2.4.1. By carburettor(s): yes/no ([1])

3.2.4.1.1. Make(s):

3.2.4.1.2. Type(s):

3.2.4.1.3. Number fitted:

3.2.4.1.4. Adjustments ([2])

3.2.4.1.4.1.	Jets: …	Or the curve of fuel delivery plotted against the air flow and settings required to keep to the curve
3.2.4.1.4.2.	Venturis: …	
3.2.4.1.4.3.	Float-chamber level: …	
3.2.4.1.4.4.	Mass of float: …	
3.2.4.1.4.5.	Float needle: …	

3.2.4.1.5. Cold start system: manual/automatic ([1])

3.2.4.1.5.1. Operating principle(s):

3.2.4.1.5.2. Operating limits/settings ([1]) ([2])

3.2.4.2. By fuel injection (compression ignition only): yes/no ([1])

3.2.4.2.1. System description:

3.2.4.2.2. Working principle: direct injection/pre-chamber/swirl chamber ([1])

3.2.4.2.3. Injection pump

3.2.4.2.3.1. Make(s):

3.2.4.2.3.2. Type(s):

3.2.4.2.3.3. Maximum fuel delivery ([1]) ([2]): … mm^3/stroke or cycle at a pump speed of: … min^{-1} or, alternatively, a characteristic diagram:

3.2.4.2.3.4. Injection timing ([2]):

3.2.4.2.3.5. Injection advance curve ([2]):

3.2.4.2.3.6. Calibration procedure: test bench/engine ([1])

3.2.4.2.4. Governor

3.2.4.2.4.1. Type:

3.2.4.2.4.2. Cut-off point

3.2.4.2.4.2.1. Cut-off point under load: … min^{-1}

3.2.4.2.4.2.2. Cut-off point without load: … min^{-1}

3.2.4.2.5. Injection piping

3.2.4.2.5.1. Length: … mm

3.2.4.2.5.2. Internal diameter: … mm

3.2.4.2.6. Injector(s)

3.2.4.2.6.1. Make(s):

3.2.4.2.6.2. Type(s):

3.2.4.2.6.3. Opening pressure ([2]): … kPa or characteristic diagram ([2]):

3.2.4.2.7. Cold start system

3.2.4.2.7.1. Make(s):

3.2.4.2.7.2. Type(s):

3.2.4.2.7.3. Description:

3.2.4.2.8. Auxiliary starting aid

3.2.4.2.8.1. Make(s):

3.2.4.2.8.2. Type(s):

3.2.4.2.8.3. System description:

3.2.4.2.9. Electronic control unit

3.2.4.2.9.1. Make(s):

3.2.4.2.9.2. Description of the system:

3.2.4.3. By fuel injection (positive ignition only): yes/no ([1])

3.2.4.3.1. Working principle: intake manifold (single-/multi-point ([1]))/direct injection/other (specify) ([1])

3.2.4.3.2. Make(s):

3.2.4.3.3. Type(s):

3.2.4.3.4. System description

3.2.4.3.4.1.	Type or number of the control unit: …	In the case of systems other than continuous injection give equivalent details.
3.2.4.3.4.2.	Type of fuel regulator: …	
3.2.4.3.4.3.	Type of air-flow sensor: …	
3.2.4.3.4.4.	Type of fuel distributor: …	
3.2.4.3.4.5.	Type of pressure regulator: …	
3.2.4.3.4.6.	Type of micro switch: …	
3.2.4.3.4.7.	Type of idling adjustment screw: …	
3.2.4.3.4.8.	Type of throttle housing: …	
3.2.4.3.4.9.	Type of water temperature sensor: …	

3.2.4.3.4.10. Type of air temperature sensor: …

3.2.4.3.4.11. Type of air temperature switch: …

3.2.4.3.5. Injectors: opening pressure ([2]): … kPa or characteristic diagram:

3.2.4.3.6. Injection timing:

3.2.4.3.7. Cold start system

3.2.4.3.7.1. Operating principle(s):

3.2.4.3.7.2. Operating limits/settings ([1]) ([2]):

3.2.4.4. Feed pump

3.2.4.4.1. Pressure ([2]): … kPa or characteristic diagram ([2]):

3.2.5. Electrical system

3.2.5.1. Rated voltage: … V, positive/negative ground ([1])

3.2.5.2. Generator

3.2.5.2.1. Type:

3.2.5.2.2. Nominal output: … VA

3.2.6. Ignition

3.2.6.1. Make(s):

3.2.6.2. Type(s):

3.2.6.3. Working principle:

3.2.6.4. Ignition advance curve ([2]):

3.2.6.5. Static ignition timing ([2]): … degrees before TDC

3.2.6.6. Contact-point gap ([2]): … mm

3.2.6.7. Dwell-angle ([2]): … degrees

3.2.7. Cooling system: liquid/air ([1])

3.2.7.1. Nominal setting of the engine temperature control mechanism

3.2.7.2. Liquid

3.2.7.2.1. Nature of liquid:

3.2.7.2.2. Circulating pump(s): yes/no ([1])

3.2.7.2.3. Characteristics: or

3.2.7.2.3.1. Make(s):

3.2.7.2.3.2. Type(s):

3.2.7.2.4. Drive ratio(s):

3.2.7.2.5. Description of the fan and its drive mechanism:

3.2.7.3. Air

3.2.7.3.1. Blower: yes/no ([1])

3.2.7.3.2. Characteristics: or

3.2.7.3.2.1. Make(s):

3.2.7.3.2.2. Type(s):

3.2.7.3.3. Drive ratio(s):

3.2.8. Intake system

3.2.8.1. Pressure charger: yes/no ([1])

3.2.8.1.1. Make(s):

3.2.8.1.2. Type(s):

3.2.8.1.3. Description of the system (e. g. maximum charge pressure: … kPa; wastegate if applicable):

3.2.8.2. Intercooler: yes/no ([1])

3.2.8.3. Intake depression at rated engine speed and at 100 % load

minimum allowable: … kPa

maximum allowable: … kPa

3.2.8.4. Description and drawings of inlet pipes and their accessories (plenum chamber, heating device, additional air intakes, etc.):

3.2.8.4.1. Intake manifold description (include drawings and/or photos):

3.2.8.4.2. Air filter, drawings: or

3.2.8.4.2.1. Make(s):

3.2.8.4.2.2. Type(s):

3.2.8.4.3. Intake silencer, drawings: or

3.2.8.4.3.1. Make(s):

3.2.8.4.3.2. Type(s):

3.2.9. Exhaust system

3.2.9.1. Description and/or drawing of the exhaust manifold:

3.2.9.2. Description and/or drawing of the exhaust system:

3.2.9.3. Maximum allowable exhaust back pressure at rated engine speed and at 100 % load: … kPa

3.2.9.4. Exhaust silencer(s): For front, centre, rear silencer: construction, type, marking; where relevant for exterior noise: reducing measures in the engine compartment and on the engine:

3.2.9.5. Location of the exhaust outlet:

3.2.9.6. Exhaust silencer containing fibrous materials:

3.2.10. Minimum cross-sectional areas of inlet and outlet ports:

3.2.11. Valve timing or equivalent data

3.2.11.1. Maximum lift of valves, angles of opening and closing, or timing details of alternative distribution systems, in relation to dead centres:

3.2.11.2. Reference and/or setting ranges ([1]):

3.2.12. Measures taken against air pollution

3.2.12.1. Device for recycling crankcase gases (description and drawings):

3.2.12.2. Additional anti-pollution devices (if any, and if not covered by another heading)

3.2.12.2.1. Catalytic converter: yes/no ([1])

3.2.12.2.1.1. Number of catalytic converters and elements:

3.2.12.2.1.2. Dimensions, shape and volume of the catalytic converter(s):

3.2.12.2.1.3. Type of catalytic action:

3.2.12.2.1.4. Total charge of precious metals:

3.2.12.2.1.5. Relative concentration:

3.2.12.2.1.6. Substrate (structure and material):

3.2.12.2.1.7. Cell density:

3.2.12.2.1.8. Type of casing for the catalytic converter(s):

3.2.12.2.1.9. Location of the catalytic converter(s) (place and reference distance in the exhaust line):

3.2.12.2.1.10. Heat shield: yes/no ([1])

3.2.12.2.2. Oxygen sensor: yes/no ([1])

3.2.12.2.2.1. Type:

3.2.12.2.2.2. Location:

3.2.12.2.2.3. Control range:

3.2.12.2.3. Air injection: yes/no ([1])

3.2.12.2.3.1. Type (pulse air, air pump, etc.):

3.2.12.2.4. Exhaust gas recirculation: yes/no ([1])

3.2.12.2.4.1. Characteristics (flow rate, etc.):

3.2.12.2.5. Evaporative emissions control system: yes/no ([1])

3.2.12.2.5.1. Detailed description of the devices and their state of tune:

3.2.12.2.5.2. Drawing of the evaporative control system:

3.2.12.2.5.3. Drawing of the carbon canister:

3.2.12.2.5.4. Mass of dry charcoal: … grams

3.2.12.2.5.5. Schematic drawing of the fuel tank with indication of capacity and material:

3.2.12.2.5.6. Drawing of the heat shield between tank and exhaust system:

3.2.12.2.6. Particulate trap: yes/no ([1])

3.2.12.2.6.1. Dimensions, shape and capacity of the particulate trap:

3.2.12.2.6.2. Type and design of the particulate trap:

3.2.12.2.6.3. Location (reference distance in the exhaust line):

3.2.12.2.6.4. Method or system of regeneration, description and/or drawing:

3.2.12.2.7. On-board-diagnostic (OBD) system: yes/no ([1])

3.2.12.2.7.1. Written description and/or drawing of the MI:

3.2.12.2.7.2. List and purpose of all components monitored by the OBD system:

3.2.12.2.7.3. Written description (general working principles) for

3.2.12.2.7.3.1. Positive-ignition engines ([1])

3.2.12.2.7.3.1.1. Catalyst monitoring ([1]):

3.2.12.2.7.3.1.2. Misfire detection ([1]):

3.2.12.2.7.3.1.3. Oxygen sensor monitoring ([1]):

3.2.12.2.7.3.1.4. Other components monitored by the OBD system ([1]):

3.2.12.2.7.3.2. Compression-ignition engines ([1]):

3.2.12.2.7.3.2.1. Catalyst monitoring ([1]):

3.2.12.2.7.3.2.2. Particulate trap monitoring ([1]):

3.2.12.2.7.3.2.3. Electronic fuelling system monitoring ([1]):

3.2.12.2.7.3.2.4. Other components monitored by the OBD system ([1]):

3.2.12.2.7.4. Criteria for MI activation (fixed number of driving cycles or statistical method):

3.2.12.2.7.5. List of all OBD output codes and formats used (with explanation of each):

3.2.12.2.8. Other systems (description and operation):

3.2.13. Location of the absorption coefficient symbol (compression ignition engines only):

3.2.14. Details of any devices designed to influence fuel economy (if not covered by other items):

3.2.15. LPG fuelling system: yes/no ([1])

3.2.15.1. EC type-approval number according to Directive 70/221/EEC (when the Directive will be amended to cover tanks for gaseous fuels.):

3.2.15.2. Electronic engine management control unit for LPG fuelling

3.2.15.2.1. Make(s):

3.2.15.2.2. Type(s):

3.2.15.2.3. Emission-related adjustment possibilities:

3.2.15.3. Further documentation

3.2.15.3.1. Description of the safeguarding of the catalyst at switch-over from petrol to LPG or back:

3.2.15.3.2. System lay-out (electrical connections, vacuum connections compensation hoses, etc.):

3.2.15.3.3. Drawing of the symbol:

3.2.16. NG fuelling system: yes/no ([1])

3.2.16.1. EC type-approval number according to Directive 70/221/EEC (when the Directive will be amended to cover tanks for gaseous fuels):

3.2.16.2. Electronic engine management control unit for NG fuelling

3.2.16.2.1. Make(s):

3.2.16.2.2. Type(s):

3.2.16.2.3. Emission-related adjustment possibilities:

3.2.16.3. Further documentation

3.2.16.3.1. Description of the safeguarding of the catalyst at switch-over from petrol to NG or back:

3.2.16.3.2. System lay-out (electrical connections, vacuum connections compensation hoses, etc.):

3.2.16.3.3. Drawing of the symbol:

3.3. Electric motor

3.3.1. Type (winding, excitation):

3.3.1.1. Maximum hourly output: … kW

3.3.1.2. Operating voltage: … V

3.3.2. Battery

3.3.2.1. Number of cells:

3.3.2.2. Mass: … kg

3.3.2.3. Capacity: … Ah (Amp-hours)

3.3.2.4. Position:

3.4. Other engines or motors or combinations thereof (particulars regarding the parts of such engines or motors):

3.5. CO_2 emissions/fuel consumption ([u]) (manufacturer's declared value)

3.5.1. CO_2 mass emissions

3.5.1.1. CO_2 mass emissions (urban conditions): … g/km

3.5.1.2. CO_2 mass emissions (extra-urban conditions): … g/km

3.5.1.3. CO_2 mass emissions (combined): … g/km

3.5.2. Fuel consumption

3.5.2.1. Fuel consumption (urban conditions): … l/100 km/m^3/100 km ([1])

3.5.2.2. Fuel consumption (extra-urban conditions): … l/100 km/m^3/100 km ([1])

3.5.2.3. Fuel consumption (combined): … l/100 km/m^3/100 km ([1])

3.6. Temperatures permitted by the manufacturer

3.6.1. Cooling system

3.6.1.1. Liquid cooling

Maximum temperature at outlet: … K

3.6.1.2. Air cooling

3.6.1.2.1. Reference point:

3.6.1.2.2. Maximum temperature at reference point: … K

3.6.2. Maximum outlet temperature of the inlet intercooler: … K

3.6.3. Maximum exhaust temperature at the point in the exhaust pipe(s) adjacent to the outer flange(s) of the exhaust manifold: … K

3.6.4. Fuel temperature

minimum: … K

maximum: … K

3.6.5. Lubricant temperature

minimum: … K

maximum: … K

3.7. Engine-driven equipment

Maximum permissible power absorbed by the engine-driven equipment as specified in and under the operating conditions of Directive 80/1269/EEC, Annex I, item 5.1.1, at each engine speed as defined in item 4.1 in Annex III to Directive 88/77/EEC

3.7.1. Idling: … kW

3.7.2. Intermediate: … kW

3.7.3. Rated: … kW

3.8. Lubrication system

3.8.1. Description of the system

3.8.1.1. Position of lubricant reservoir:

3.8.1.2. Feed system (by pump/injection into intake/mixing with fuel, etc.) ([1])

3.8.2. Lubricating pump

3.8.2.1. Make(s):

3.8.2.2. Type(s):

3.8.3. Mixture with fuel

3.8.3.1. Percentage:

3.8.4. Oil cooler: yes/no ([1])

3.8.4.1. Drawing(s):

or

3.8.4.1.1. Make(s):

3.8.4.1.2. Type(s):

3.9. GAS FUELLED ENGINES (In the case of systems laid-out in a different manner, supply equivalent information).

3.9.1. Fuel: LPG/NG-H/NG-L/NG-HL ([1])

3.9.2. Pressure regulator(s) or vaporiser/pressure regulator(s) ([1])

3.9.2.1. Make(s):

3.9.2.2. Type(s):

3.9.2.3. Number of pressure reduction stages:

3.9.2.4. Pressure in final stage

minimum: … kPa

maximum: … kPa

3.9.2.5. Number of main adjustment points:

3.9.2.6. Number of idle adjustment points:

3.9.2.7. EC type-approval number according to …/…/EC:

3.9.3. Fuelling system: mixing unit/gas injection/liquid injection/direct injection ([1])

3.9.3.1. Mixture strength regulation:

3.9.3.2. System description and/or diagram and drawings:

3.9.3.3. EC type-approval number according to …/…/EC:

3.9.4. Mixing unit

3.9.4.1. Number:

3.9.4.2. Make(s):

3.9.4.3. Type(s):

3.9.4.4. Location:

3.9.4.5. Adjustment possibilities:

3.9.4.6. EC type-approval number according to …/…/EC:

3.9.5. Inlet manifold injection

3.9.5.1. Injection: single point/multipoint ([1])

3.9.5.2. Injection: continuous/simultaneously timed/sequentially timed ([1])

3.9.5.3. Injection equipment

3.9.5.3.1. Make(s):

3.9.5.3.2. Type(s):

3.9.5.3.3. Adjustment possibilities:

3.9.5.3.4. EC type-approval number according to …/…/EC:

3.9.5.4. Supply pump (if applicable)

3.9.5.4.1. Make(s):

3.9.5.4.2. Type(s):

3.9.5.4.3. EC type-approval number according to …/…/EC:

3.9.5.5. Injector(s)

3.9.5.5.1. Make(s):

3.9.5.5.2. Type(s):

3.9.5.5.3. EC type-approval number according to …/…/EC:

3.9.6. Direct injection

3.9.6.1. Injection pump/pressure regulator ([1])

3.9.6.1.1. Make(s):

3.9.6.1.2. Type(s):

3.9.6.1.3. Injection timing:

3.9.6.1.4. EC type-approval number according to …/…/EC:

3.9.6.2. Injector(s)

3.9.6.2.1. Make(s):

3.9.6.2.2. Type(s):

3.9.6.2.3. Opening pressure or characteristic diagram ([2]):

3.9.6.2.4. EC type-approval number according to …/…/EC:

3.9.7. Electronic control unit (ECU)

3.9.7.1. Make(s):

3.9.7.2. Type(s):

3.9.7.3. Adjustment possibilities:

3.9.8. NG fuel-specific equipment

3.9.8.1. Variant 1 (only in the case of approvals of engines for several specific fuel compositions)

3.9.8.1.1. Fuel composition:

methane (CH_4): basis: … %mole min. … %mole max. … %mole

ethane (C_2H_6): basis: … %mole min. … %mole max. … %mole

propane (C_3H_8): basis: … %mole min. … %mole max. … %mole

butane (C_4H_{10}): basis: … %mole min. … %mole max. … %mole

C_5/C_5+: basis: … %mole min. … %mole max. … %mole

oxygen (O_2): basis: … %mole min. … %mole max. … %mole

inert (N_2, He, etc.): basis: … %mole min. … %mole max. … %mole

3.9.8.1.2. Injector(s)

3.9.8.1.2.1. Make(s):

3.9.8.1.2.2. Type(s):

3.9.8.1.3. Others (if applicable): …

3.9.8.1.4. Fuel temperature

minimum: … K

maximum: … K

at pressure regulator final stage for gas fuelled engines.

3.9.8.1.5. Fuel pressure

minimum: … kPa

maximum: … kPa

at pressure regulator final stage, NG fuelled gas engines only.

3.9.8.2. Variant 2 (only in the case of approvals for several specific fuel compositions)