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INLAND TRANSPORT COMMITTEE

World Forum for Harmonization of Vehicle Regulations

One-hundred-and-forty-eighth session
Geneva, 23 - 26 June 2009
Item 4.2.19 of the provisional agenda

1958 AGREEMENT

Consideration of draft amendments to existing Regulations

Proposal for Supplement 5 to Regulation No. 85
(Measurement of net power)

Submitted by the Working Party on Pollution and Energy */

The text reproduced below was adopted by the Working Party on Pollution and Energy (GRPE) at its fifty-seventh session. It is based on ECE/TRANS/WP.29/GRPE/2009/3, as amended by para. 41 of the report. It is submitted to the World Forum for Harmonization of Vehicle Regulations (WP.29) and to the Administrative Committee (AC.1) for consideration (ECE/TRANS/WP.29/GRPE/57, para. 41).

*/ In accordance with the programme of work of the Inland Transport Committee for 2006-2010 (ECE/TRANS/166/Add.1, programme activity 02.4), the World Forum will develop, harmonize and update Regulations in order to enhance performance of vehicles. The present document is submitted in conformity with that mandate.

Content - Annexes, amend to read:

- "Annex 1 - Essential characteristics of the internal combustion engine and information concerning the conduct of tests
- Annex 2 - Essential characteristics of the electric drive train and information concerning the conduct of tests
- Annex 3a - Communication concerning the approval or extension or refusal or withdrawal of approval or production definitely discontinued of a drive train type pursuant to Regulation No. 85
- Annex 3b - Communication concerning the approval or extension or refusal or withdrawal of approval or production definitely discontinued of a vehicle type with regard to the drive train type pursuant to Regulation No. 85
- Annex 4 - Arrangements of approval marks.....
- Annex 5 - Method for measuring internal combustion engine net power
- Annex 6 - Method for measuring net power and the maximum 30 minutes power of electric drive trains.....
- Annex 7 - Checks on conformity of production"

The text of the Regulation,

Paragraph 1.2., amend to read:

- "1.2. The internal combustion engines belong to one of the following categories:
- Reciprocating piston engines (positive-ignition or compression-ignition), but excluding free piston engines;
 - Rotary piston engines (positive-ignition or compression ignition).
 - Naturally aspirated or supercharged engines."

Insert new paragraph 2.4., to read:

- "2.4. "Maximum net power" means the maximum value of the net power measured at full engine load."

Paragraphs 2.4. to 2.5.3. (former), renumber as paragraphs 2.5. to 2.6.3.

Insert a new paragraph 2.7., to read:

- "2.7. "Standard-production equipment" means equipment provided by the manufacturer for a particular application."

Paragraph 4.3., amend to read:

"4.3. Notice of approval or of extension or of refusal of approval of a drive train type pursuant to this Regulation shall be communicated to the Parties to the 1958 Agreement applying this Regulation by means of a form conforming to the model in Annex 3a to this Regulation."

Insert a new paragraph 4.4., to read:

"4.4. Notice of approval or of extension or of refusal of approval of vehicle type with regard to the drive train type pursuant to this Regulation shall be communicated to the Contracting Parties to the 1958 Agreement applying this Regulation by means of a form conforming to the model in Annex 3b to this Regulation."

Paragraphs 4.4. to 4.8. (former), renumber as paragraphs 4.5. to 4.9.

Paragraph 5.2.2., amend to read:

"5.2.2. Measurements shall be taken at a sufficient number of engine speeds to define correctly the power curve between the lowest and the highest engine speeds recommended by the manufacturer. This range of speeds shall include the speeds of revolution at which the engine produces its maximum power and its maximum torque. For each speed, the average of at least two stabilized measurements is to be determined."

Paragraph 5.2.3.3.2., amend to read:

"5.2.3.3.2. In the case of an engine without self-adaptive fuelling:

The fuel used shall be the one available on the market with a Wobbe index at least 52.6 MJm⁻³ (4°C, 101.3 kPa). In case of dispute the fuel used shall be the reference fuel G20 specified in Annex 8, i.e. the fuel with the highest Wobbe Index, or"

Paragraph 5.2.3.3.3., amend to read:

"5.2.3.3.3. In the case of an engine labelled for a specific range of fuels:

The fuel used shall be the one available on the market with a Wobbe index at least 52.6 MJm⁻³ (4°C, 101.3 kPa) if the engine is labelled for the H-range of gases, or at least 47.2 MJm⁻³ (4°C, 101.3 kPa) if the engine is labelled for the L-range of gases. In case of dispute the fuel used shall be the reference fuel G20 specified in Annex 8 if the engine is labelled for the H-range of gases, or the reference fuel G23 if the engine is labelled for the L-range of gases, i.e. the fuel with the highest Wobbe Index for the relevant range, or"

Insert a new paragraph 5.2.3.5., to read:

"5.2.3.5. Positive ignition engines of vehicles that can run either on petrol or on a gaseous fuel, are to be tested with both fuels, in accordance with the provisions in paragraphs 5.2.3.1. to 5.2.3.3. The vehicles that can be fuelled with both petrol and a gaseous fuel, but where the petrol system is fitted for emergency purposes or starting only and of which the petrol tank cannot contain more than 15 litres of petrol will be regarded for the test as vehicles that can only run a gaseous fuel."

Paragraph 5.2.5., amend to read:

"5.2.5. The test report shall contain the results and all the calculations required to find the net power, as listed in the appendix to Annex 5 to this Regulation together with the characteristics of the engine listed in Annex 1 to this Regulation. In order to draw up this document, the competent authority may use the report prepared by an approved or recognized laboratory pursuant to the provisions of this Regulation."

Annex 1, amend to read:

"Annex 1

ESSENTIAL CHARACTERISTICS OF THE INTERNAL COMBUSTION ENGINE AND INFORMATION CONCERNING THE CONDUCT OF TESTS

The following information, if applicable, shall be supplied in triplicate and include a list of contents. Any drawings shall be supplied in appropriate scale and in sufficient detail on size A4 or on a folder of A4 format. Photographs, if any, shall show sufficient detail.

If the systems, components or separate technical units have electronic controls, information concerning their performance shall be supplied.

- 0. GENERAL IDENTIFICATION OF THE VEHICLE.....
- 0.1. Make (trade name of manufacturer):
- 0.2. Type and general commercial description(s):
- 0.3. Means of identification of type, if marked on the vehicle:
- 0.3.1. Location of that marking:
- 0.4. Category of vehicle:
- 0.5. Name and address of manufacturer:
- 0.8. Address(es) of assembly plant(s):

- 1. GENERAL CONSTRUCTION CHARACTERISTICS OF THE VEHICLE
- 1.1. Photographs and/or drawings of a representative vehicle:
- 1.2. Hand of drive: left/right: 1/

- 2.0. POWER PLANT
- 2.1. Manufacturer:

- 2.2. Manufacturer's engine code (as marked on the engine, or other means of identification):
- 2.3. Working principle: positive ignition/compression ignition, four stroke/two stroke 1/
- 2.4. Number and arrangement of cylinders:
- 2.5. Bore: mm
- 2.6. Stroke:mm
- 2.7. Firing order:
- 2.8. Engine capacity: cm³
- 2.9. Volumetric compression ratio:
- 2.10. Drawings of combustion chamber, piston crown and, in the case of positive ignition engines, piston rings:
- 2.11. Maximum net power:kW at min⁻¹
(manufacturer's declared value)
- 2.12. Maximum permitted engine speed as prescribed by the manufacturer:min⁻¹
- 2.13. Maximum net torque 1/:Nm atmin⁻¹
(manufacturer's declared value)

- 3.0. Fuel: diesel oil/petrol/LPG/NG 1/
- 3.1. RON, leaded:
- 3.2. RON, unleaded:
- 3.3. Fuel feed
- 3.3.1. By carburettor(s): yes/no 1/
- 3.3.1.1. Make(s):
- 3.3.1.2. Type(s):
- 3.3.1.3. Number fitted:
- 3.3.1.4. Adjustments
- 3.3.1.4.1. Jets:
- 3.3.1.4.2. Venturis:
- 3.3.1.4.3. Float-chamber level:
- 3.3.1.4.4. Mass of float:
- 3.3.1.4.5. Float needle:
Or the curve of fuel delivery plotted against the air flow and settings required to keep to the curve
- 3.3.1.5. Cold start system: manual/automatic 1/
- 3.3.1.5.1. Operating principle(s):
- 3.3.1.5.2. Operating limits/settings: 1/
- 3.3.2. By fuel injection (compression ignition only): yes/no 1/
- 3.3.2.1. System description:
- 3.3.2.2. Working principle: direct injection/pre-chamber/swirl chamber 1/
- 3.3.2.3. Injection pump
- 3.3.2.3.1. Make(s):
- 3.3.2.3.2. Type(s):
- 3.3.2.3.3. Maximum fuel delivery: 1/..... mm³/stroke or cycle at a pump speed of: min⁻¹ or, alternatively, a characteristic diagram:
- 3.3.2.3.4. Injection timing:
- 3.3.2.3.5. Injection advance curve:

- 3.3.2.3.6. Calibration procedure: test bench/engine 1/
- 3.3.2.4. Governor
 - 3.3.2.4.1. Type:
 - 3.3.2.4.2. Make:
 - 3.3.2.4.3. Cut-off point
 - 3.3.2.4.3.1. Cut-off point under load: min⁻¹
 - 3.3.2.4.3.2. Cut-off point without load: min⁻¹
 - 3.3.2.4.4. Maximum speed without load:min⁻¹
 - 3.3.2.4.5. Idle speed:
 - 3.3.2.5. Injection piping
 - 3.3.2.5.1. Length: mm
 - 3.3.2.5.2. Internal diameter: mm
 - 3.3.2.6. Injector(s)
 - 3.3.2.6.1. Make(s):
 - 3.3.2.6.2. Type(s):
 - 3.3.2.6.3. Opening pressure: kPa or characteristic diagram:
 - 3.3.2.7. Cold start system
 - 3.3.2.7.1. Make(s):
 - 3.3.2.7.2. Type(s):
 - 3.3.2.7.3. Description:
 - 3.3.2.8. Electronic control unit
 - 3.3.2.8.1. Make(s):
 - 3.3.2.8.2. Description of the system:
- 3.3.3. By fuel injection (positive ignition only): yes/no 1/
 - 3.3.3.1. Working principle: intake manifold (single-/multi-point 1/) direct injection/other (specify): 1/
 - 3.3.3.2. Make(s):
 - 3.3.3.3. Type(s):
 - 3.3.3.4. System description
 - 3.3.3.4.1. Type or number of the control unit:
 - 3.3.3.4.2. Type of fuel regulator:
 - 3.3.3.4.3. Type of air-flow sensor:
 - 3.3.3.4.4. Type of fuel distributor:
 - 3.3.3.4.5. Type of pressure regulator:
 - 3.3.3.4.6. Type of throttle housing:

In the case of systems other than continuous injection give equivalent details.
 - 3.3.3.5. Injectors: opening pressure: kPa or characteristic diagram:
 - 3.3.3.6. Injection timing:
 - 3.3.3.7. Cold start system
 - 3.3.3.7.1. Operating principle(s):
 - 3.3.3.7.2. Operating limits/settings: 1/
- 4.0. Feed pump
 - 4.1. Pressure: kPa or characteristic diagram:
- 5.0. Electrical system

- 5.1. Rated voltage: V, positive/negative ground 1/
- 5.2. Generator
 - 5.2.1. Type:
 - 5.2.2. Nominal output: VA
- 6.0. Ignition
 - 6.1. Make(s):
 - 6.2. Type(s):
 - 6.3. Working principle:
 - 6.4. Ignition advance curve:
 - 6.5. Static ignition timing degrees before TDC
 - 6.6. Contact-point gap: mm
 - 6.7. Dwell-angle: degrees
- 7.0. Cooling system (liquid/air) 1/
 - 7.1. Nominal setting of the engine temperature control mechanism:
 - 7.2. Liquid
 - 7.2.1. Nature of liquid:
 - 7.2.2. Circulating pump(s): yes/no 1/
 - 7.2.3. Characteristics, or
 - 7.2.3.1. Make(s):
 - 7.2.3.2. Type(s):
 - 7.2.4. Drive ratio(s):
 - 7.2.5. Description of the fan and its drive mechanism:
 - 7.3. Air
 - 7.3.1. Blower: yes/no 1/
 - 7.3.2. Characteristics:, or
 - 7.3.2.1. Make(s):
 - 7.3.2.2. Type(s):
 - 7.3.3. Drive ratio(s):
- 8.0. Intake system
 - 8.1. Pressure charger: yes/no 1/
 - 8.1.1. Make(s):
 - 8.1.2. Type(s):
 - 8.1.3. Description of the system (e.g. maximum charge pressure: kPa, wastegate if applicable):
 - 8.2. Intercooler: yes/no 1/
 - 8.3. Description and drawings of inlet pipes and their accessories (plenum chamber, heating device, additional air intakes, etc.):
 - 8.3.1. Intake manifold description (include drawings and/or photos):
 - 8.3.2. Air filter, drawings:, or
 - 8.3.2.1. Make(s):
 - 8.3.2.2. Type(s):
 - 8.3.3. Intake silencer, drawings:, or
 - 8.3.3.1. Make(s):
 - 8.3.3.2. Type(s):

- 9.0. Exhaust system
- 9.1. Description and/or drawing of the exhaust manifold:
- 9.2. Description and/or drawing of the exhaust system:
- 9.3. Maximum allowable exhaust back pressure at rated engine speed and at 100 per cent load: kPa

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

- 11.0. Valve timing or equivalent data
- 11.1. Maximum lift of valves, angles of opening and closing, or timing details of alternative distribution systems, in relation to dead-centres:
- 11.2. Reference and/or setting ranges: 1/

- 12.0. Measures taken against air pollution
- 12.1. Additional anti-pollution devices (if any, and if not covered by another heading)
- 12.2. Catalytic converter: yes/no 1/
 - 12.2.1. Number of catalytic converters and elements:
 - 12.2.2. Dimensions, shape and volume of the catalytic converter(s):
- 12.3. Oxygen sensor: yes/no 1/
- 12.4. Air injection: yes/no 1/
- 12.5. Exhaust gas recirculation: yes/no 1/
- 12.6. Particulate trap: yes/no 1/
 - 12.6.1. Dimensions, shape and capacity of the particulate trap:
- 12.7. Other systems (description and operation):

- 13.0. LPG fuelling system: yes/no 1/
- 13.1. Approval number according Regulation No. 67:
- 13.2. Electronic engine management control unit for LPG fuelling:
 - 13.2.1. Make(s):
 - 13.2.2. Type(s):
 - 13.2.3. Emission-related adjustment possibilities:
- 13.3. Further documentation:
- 13.3.1. Description of the safeguarding of the catalyst at switch-over from petrol to LPG or back:
- 13.3.2. System lay-out (electrical connections, vacuum connections compensation hoses, etc.):
- 13.3.3. Drawing of the symbol:

- 14.0. NG fuelling system: yes/no 1/
- 14.1. Approval number according to Regulation No. 110:
- 14.2. Electronic engine management control unit for NG fuelling:
 - 14.2.1. Make(s):
 - 14.2.2. Type(s):
 - 14.2.3. Emission-related adjustment possibilities:
- 14.3. Further documentations:

- 14.3.1. Description of the safeguarding of the catalyst at switch-over from petrol to NG or back:
- 14.3.2. System lay-out (electrical connections, vacuum connections compensation hoses, etc.):
- 14.3.3. Drawing of the symbol:
- 15.0. Temperatures permitted by the manufacturer
- 15.1. Cooling system
- 15.1.1. Liquid cooling
Maximum temperature at outlet: °C
- 15.1.2. Air cooling
- 15.1.2.1. Reference point:
- 15.1.2.2. Maximum temperature at reference point: °C
- 15.2. Maximum outlet temperature of the inlet intercooler: °C
- 15.3. Maximum exhaust temperature at the point in the exhaust pipe(s) adjacent to the outer flange(s) of the exhaust manifold: °C
- 15.4. Fuel temperature
minimum: °C
maximum: °C
- 15.5. Lubricant temperature
minimum: °C
maximum: °C
- 16.0. Lubrication system
- 16.1. Description of the system
- 16.1.1. Position of the lubricant reservoir:
- 16.1.2. Feed system (by pump/injection into intake/mixing with fuel, etc.) 1:
- 16.2. Lubricating pump
- 16.2.1. Make(s):
- 16.2.2. Type(s):
- 16.3. Mixture with fuel
- 16.3.1. Percentage:
- 16.4. Oil cooler: yes/no 1/
- 16.4.1. Drawing(s):, or
- 16.4.1.1. Make(s):
- 16.4.1.2. Type(s):
- Other auxiliary equipment driven by the engine (as per item 2.3.2. of Annex 5) (list and brief description if necessary):
- 17.0. Additional information on test conditions (for positive ignition engines only)
- 17.1. Spark plugs
- 17.1.1. Make:
- 17.1.2. Type:
- 17.1.3. Spark-gap setting:
- 17.2. Ignition coil

- 17.2.1. Make:
- 17.2.2. Type:
- 17.3. Ignition condenser
- 17.3.1. Make:
- 17.3.2. Type:
- 17.4. Radio interference suppression equipment
- 17.4.1. Make:
- 17.4.2. Type:

.....
(Date, file)

1/ Delete where not applicable."

Annex 3, renumbered as Annex 3a and amend to read:

"Annex 3a

COMMUNICATION

(Maximum format: A4 (210 x 297 mm))



issued by: Name of administration:

.....
.....
.....

concerning:

- 2/ APPROVAL GRANTED
APPROVAL EXTENDED
APPROVAL REFUSED
APPROVAL WITHDRAWN
PRODUCTION DEFINITELY DISCONTINUED

of a drive train pursuant to Regulation No. 85.

Approval No Extension No

1. Trade name or mark of drive train or set of drive trains:
2. Internal combustion engine:
 - 2.1. Make:
 - 2.2. Type:
 - 2.3. Manufacturer's name and address:
3. Electric drive train(s):
 - 3.1. Make:
 - 3.2. Type:
 - 3.3. Manufacturer's name and address:
5. Drive train or set of drive trains submitted for approval on:
6. Technical service responsible for conducting approval tests:
7. Date of report issued by that service:
8. Number of report issued by that service:
9. Location of the approval mark:

- 10. Reason(s) for extension of approval (if applicable): 2/

- 11. Internal combustion engine
 - 11.1. Declared figures
 - 11.1.1. Maximum net power:kW, at min.⁻¹
 - 11.1.2. Maximum net torque:Nm, at min.⁻¹
 - 11.2. Essential characteristics of the engine type:
 - Operating principle: four stroke/two stroke 2/
 - Number and layout of cylinders:
 - Cylinder capacity:cm³
 - Fuel feed: carburettor/indirect injection/direct injection 2/
 - Pressure-charger device: Yes/No 2/
 - Exhaust gas cleaning device: Yes/No 2/
 - 11.3. Engine fuel requirements: leaded petrol / unleaded petrol / diesel fuel / NG / LPG: 2/
.....

- 12. Electric drive train(s):
- 12.1. Declared figures
 - 12.1.1. Maximum net power:kW, at min.⁻¹
 - 12.1.2. Maximum net torque:Nm, at min.⁻¹
 - 12.1.3. Maximum net torque at zero speed:.....
.....Nm
 - 12.1.4. Maximum 30 minutes power:kW
- 12.2. Essential characteristics of the electric drive train
 - 12.2.1. Test DC voltage: V
 - 12.2.2. Working principle:
 - 12.2.3. Cooling system:
 - Motor: liquid/air 2/
 - Variator: liquid/air 2/

- 13. Approval granted/extended/refused/withdrawn 2/

- 14. Place:

- 15. Date:

- 16. Signature:

- 17. The documents filed with the request for approval or extension may be obtained on request.

1/ Distinguishing number of the country which has granted/extended/refused/withdrawn approval (see approval provisions in the Regulation).

2/ Strike out what does not apply."

Insert a new Annex 3b, to read:

"Annex 3b

COMMUNICATION

(Maximum format: A4 (210 x 297 mm))



issued by: Name of administration:

.....
.....
.....

concerning:

- 2/ APPROVAL GRANTED
APPROVAL EXTENDED
APPROVAL REFUSED
APPROVAL WITHDRAWN
PRODUCTION DEFINITELY DISCONTINUED

of a vehicle type with regard to the drive train pursuant to Regulation No. 85.

Approval No Extension No

1. Vehicle make and type:
2. Manufacturer's name and address:
3. If applicable, name and address of manufacturer's representatives:
4. Trade name or mark of drive train or set of drive trains:
5. Internal combustion engine:
 - 5.1. Make:
 - 5.2. Type:
 - 5.3. Manufacturer's name and address:
6. Electric drive train(s):
 - 6.1. Make:
 - 6.2. Type:
 - 6.3. Manufacturer's name and address:
7. Drive train or set of drive trains submitted for approval on:
8. Technical service responsible for conducting approval tests:

- 9. Date of report issued by that service:
- 10. Number of report issued by that service:

- 11. Location of the approval mark:

- 12. Reason(s) for extension of approval (if applicable): 2/

- 13. Internal combustion engine
 - 13.1. Declared figures
 - 13.1.1. Maximum net power:kW, at min^{-1}
 - 13.1.2. Maximum net torque:Nm, at min^{-1}
 - 13.2. Essential characteristics of the engine type:
 - Operating principle: four stroke/two stroke 2/
 - Number and layout of cylinders:
 - Cylinder capacity: cm^3
 - Fuel feed: carburettor/indirect injection/direct injection 2/
 - Pressure-charger device: Yes/No 2/
 - Exhaust gas cleaning device: Yes/No 2/
 - 13.3. Engine fuel requirements: leaded petrol / unleaded petrol / diesel fuel / NG / LPG: 2/

- 14. Electric drive train(s):

- 15.1. Declared figures
 - 15.1.1. Maximum net power:kW, at min^{-1}
 - 15.1.2. Maximum net torque:Nm, at min^{-1}
 - 15.1.3. Maximum net torque at zero speed:
Nm
 - 15.1.4. Maximum 30 minutes power:
kW
- 15.2. Essential characteristics of the electric drive train
 - 15.2.1. Test DC voltage: V
 - 15.2.2. Working principle:
 - 15.2.3. Cooling system:
 - Motor: liquid/air 2/
 - Variator: liquid/air 2/

- 16. Approval granted/extended/refused/withdrawn 2/

- 17. Place:

- 18. Date:

- 19. Signature:

- 20. The documents filed with the request for approval or extension may be obtained on request.

1/ Distinguishing number of the country which has granted/extended/refused/withdrawn approval (see approval provisions in the Regulation).

2/ Strike out what does not apply."

Annex 5,

Insert a new paragraph 3.1., to read:

"3.1. The net power test shall consist of a run at full throttle for positive-ignition engines and at fixed full load fuel-injection-pump setting for compression-ignition engines, the engine being equipped as specified in Table 1."

Paragraphs 3.1. to 3.4. (former), renumber as paragraphs 3.2. to 3.5.

Paragraph 3.5., renumber as paragraph 3.6 and amend to read:

"3.6. Observed brake load, fuel consumption and inlet air temperature data shall be taken simultaneously and shall be the average of two stabilized consecutive values which do not vary more than 2 percent for the brake load and fuel consumption."

Paragraphs 3.6. and 3.7. (former), renumber as paragraph 3.7. and 3.8.

Paragraphs 3.8. and 3.9. (former), renumber as paragraphs 3.9. and 3.10. and amend to read:

"3.9. The temperature of the lubricating oil measured in the oil pump or within the oil sump or at the outlet from the oil cooler, if fitted shall be maintained within the limits established by the engine manufacturer.

3.10. An auxiliary regulating system may be used if necessary to maintain the temperature within the limits specified in paragraphs 3.7., 3.8. and 3.9. above of this annex."

Paragraph 4.2., amend to read:

"4.2. Engine speed: The measurement shall be accurate to within ± 0.5 per cent. Engine speed shall be measured preferably with an automatically synchronized revolution counter and chronometer (or counter-timer)."

Annex 5 – Appendix

Insert a new item 1.2.6., to read:

"1.2.6. of the exhaust measured at the point adjacent to the outlet flange(s) of the exhaust manifold(s)..... °C"

Insert a new item 1.3., to read:

"1.3. Engine speed when idling: min⁻¹"

Items 1.3. to 1.3.2. (former), renumber as items 1.4. to 1.4.2.

Insert new items 1.5. to 1.5.2., to read:

"1.5. Characteristics of the opacimeter

1.5.1. Make:

1.5.2. Type:"

Insert a new item 2.1.4.1., to read:

"2.1.4.1. MON No:"

Items 2.1.4.1. to 2.1.4.2. (former), renumber as items 2.1.4.2. to 2.1.4.3.

Add a new table 1., to read:

"Table 1

	Engine speed (min ⁻¹)	Nominal flow G (litres/second)	Limit absorption values (m ⁻¹)	Measured absorption values (m ⁻¹)
1				
2				
3				
4				
5				
6				

Maximum net power: kW at min⁻¹

Maximum net torque: Nm at min⁻¹"
