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II

(Non-legislative acts)

DECISIONS

COMMISSION DECISION

of 27 March 2014

on the State aid scheme SA.36139 (13/C) (ex 13/N)

which the United Kingdom is planning to implement for video games

(notified under document C(2014) 1786)

(Only the English text is authentic)

(Text with EEA relevance)

(2014/764/EU)

THE EUROPEAN COMMISSION,

Having regard to the Treaty on the Functioning of the European Union, and in particular the first subparagraph of Article 108(2) thereof,

Having regard to the Agreement on the European Economic Area, and in particular Article 62(1)(a) thereof,

Having called on interested parties to submit their comments pursuant to those provisions ⁽¹⁾ and having regard to their comments,

Whereas:

I. PROCEDURE

- (1) On 25 January 2013 the United Kingdom notified the Commission of its intention to introduce a tax relief for video games from 1 April 2013 to 31 March 2017. The Commission requested additional information by letter dated 7 March 2013 which the United Kingdom provided by letter dated 22 March 2013.
- (2) By letter dated 16 April 2013, the Commission informed the United Kingdom that it had decided to initiate the procedure laid down in Article 108(2) of the Treaty in respect of the planned aid measure.
- (3) The Commission decision to initiate the procedure (the 'opening decision') was published in the *Official Journal of the European Union* ⁽²⁾. The Commission called on interested parties to submit their comments.
- (4) The United Kingdom submitted its comments on the decision by letter dated 17 May 2013. The Commission also received comments from interested parties. It forwarded them to the United Kingdom, which was given the opportunity to react; its comments were received by letters dated 22 August 2013. By letter dated 7 October 2013 the Commission asked the United Kingdom for additional information. The United Kingdom replied by letter dated 4 November 2013.

⁽¹⁾ Commission Decision in Case SA.36139 – UK video games tax relief (OJ C 152, 30.5.2013, p. 24).

⁽²⁾ Cf. footnote 1.

II. DESCRIPTION OF THE MEASURE AND REASONS FOR OPENING THE PROCEDURE

- (5) The objective of the United Kingdom video games tax relief measure is to provide an incentive to video games developers to produce culturally British or European video games. The measure is modelled on the United Kingdom film tax incentive approved by the Commission in 2006 ⁽³⁾ and extended in 2011 ⁽⁴⁾ until 31 December 2015.
- (6) The proposed overall budget of the measure, which is planned to run until March 2017, is GBP 115 million. The intended expenditure for the financial year 2013/2014 is GBP 10 million and for the three following financial years GBP 35 million each. The aid is financed by HM Treasury. The British Film Institute Certification Unit will be responsible for assessing applications for the certification of British cultural games.
- (7) Companies subject to United Kingdom Corporation Tax which develop qualifying video games would be able to claim tax relief on expenditure on goods and services used or consumed in the United Kingdom up to a value of 25 % of the production budget. The relief is obtained by an additional deduction of the qualifying production costs from the taxable income arising from the video game. However, not more than 80 % of the production budget may be deducted additionally. In case the beneficiary has incurred a loss in the accounting period, it may claim a payable tax credit. According to Section 1217CF(3) of the draft amendment to the Corporation Tax Act 2009, eligible expenditure is limited to core expenditure on designing, producing and testing the game.
- (8) The United Kingdom video games tax relief is subject to a cultural test similar to that of the United Kingdom film tax incentive. Both tests are divided into four sections: cultural content, cultural contribution, use of United Kingdom cultural hubs, and use of United Kingdom or EEA national or resident cultural practitioners.
- (9) As the notified measure is financed by a deduction of taxes normally due to the State budget, it is financed by the State. Video games are produced in several Member States and there is an internal market for such video games. Support for them may therefore affect trade and competition between Member States. Accordingly, the Commission found in the opening decision that the measure constitutes State aid within the meaning of Article 107(1) of the Treaty. The Commission also doubted whether the aid could be considered compatible with the internal market.
- (10) Firstly, the Commission doubted that it is necessary or proportionate to have territorial conditions attached to such aid. The United Kingdom has based the design of the proposed scheme on that of the United Kingdom film tax incentive. Therefore it has proposed that the tax relief would only be available on expenditure on goods or services used or consumed in the United Kingdom. However, the film incentive scheme makes use of a special exception to the usual ban on territorial restrictions, which is allowed by the Cinema communication ⁽⁵⁾ only with regard to production support for films and TV programmes, not with regard to video games.
- (11) Secondly, the Commission doubted that aid to games would be necessary, because they constitute a fast-growing market. The United Kingdom did not provide convincing evidence that there would be a market failure leading to the underproduction of culturally British video games in the absence of State aid.
- (12) Furthermore, the United Kingdom considers that the United Kingdom video games tax relief is compatible with the internal market in accordance with Article 107(3)(d) of the Treaty. The Commission was however not convinced that the cultural test proposed by the United Kingdom would in practice lead to a selective identification of the limited number of video games which represent a cultural quality which is not sufficiently offered by the market without aid and which would be essential to ensure that British and European cultural themes are represented and reflected in video games.

⁽³⁾ Commission Decision of 22 November 2006 in Case No N 461/05 — UK Film Tax Incentive (OJ C 9, 13.1.2007, p. 1).

⁽⁴⁾ Commission Decision of 27 January 2011 in Case No SA.33234 — UK Film Tax Incentive Extension (OJ C 142, 22.5.2012, p. 1).

⁽⁵⁾ Communication from the Commission on State aid for films and other audiovisual works (OJ C 332, 15.11.2013, p. 1). This was also the case in the communication from the Commission to the Council, the European Parliament, the Economic and Social Committee and the Committee of the Regions on certain legal aspects relating to cinematographic and other audiovisual works (OJ C 43, 16.2.2002, p. 6), which applied when the procedure laid down in Article 108(2) of the Treaty was initiated.

- (13) Finally, the Commission was concerned that the aid could fuel a subsidy race within the Union and doubted that the potential distortions of competition would be balanced by any positive effects.

III. COMMENTS FROM INTERESTED PARTIES

- (14) The Commission received comments from one Member State, France, national game developers associations of the United Kingdom, France, Germany, Finland, the European Game Developer Federation ('EGDF'), United Kingdom public bodies involved in the promotion of films, a broadcaster, and film production trade associations from the United Kingdom. All contributors underlined the cultural quality and importance games may have. They saw insufficient market incentives for the production of culturally more relevant games. None of them considered that there was a danger of a subsidy race among Member States.
- (15) Regarding the necessity of the aid, interested parties pointed out that the United Kingdom was losing its leading position in the video games market, that in 2012 less than 10 % of United Kingdom released games were developed in the United Kingdom, that the market was dominated by North America and Asia and that there was a staff drain to Canada. Contributors also pointed to the fact that the main challenges for Member States would be to address the competition from third countries which heavily subsidise games, in particular Canada.
- (16) The United Kingdom Independent Game Developers Association ('TIGA') submitted numerous examples of plans and projects in which United Kingdom/Europe-based video games could have been made with the help of a tax break but which were not in fact made. United Kingdom Interactive Entertainment ('Ukie'), which represents the games and interactive entertainment industry, observed that in the global games market there would be pressure on game developers to target products towards the widest possible market. This would in particular mean making them accessible to the North American market and increasingly to Far Eastern markets and meeting the cultural norms and expectations of those markets. This would place constant pressure on games developers in Europe not to emphasise the culturally European elements of their game in order to sell it to a global audience. Consequently, it would be less easy for developers of culturally European games to obtain private funding. Ukie therefore considered that the aid would assist in remedying a market failure.
- (17) France observed the tendency that games follow increasingly 'international stereotypes'.
- (18) On the other hand, TIGA reported that 54 % of independent United Kingdom developers' turnover is constituted by British sales. This would suggest a strong preference of United Kingdom purchasers for United Kingdom productions. Furthermore, according to TIGA, between 2008 and 2011 there were more business start-ups (216) than closures (197) in the sector.
- (19) Regarding a possible distortion of competition among Member States, TIGA admitted that lower costs influence decisions regarding the location of video games production companies; but it considered that the principal distortion would come from third countries, like Canada, where the industry would grow because of public support. According to TIGA, between 2008 and 2010 Canada's employment in the sector grew by 33 % while it declined in the United Kingdom by 9 %.

IV. COMMENTS FROM THE UNITED KINGDOM

1. Territorial spending obligations

- (20) Following the expression of the Commission's doubts whether territorial spending conditions inherent in the 'used or consumed in the UK' test would be appropriate, the United Kingdom has undertaken to address these concerns and to change the proposed legislation from 'used or consumed in the UK' to 'spent in the European Economic Area (EEA)', clarifying that any expenditure incurred in the EEA may be eligible for relief. Furthermore, they will seek to limit the amount of subcontracting costs which are eligible for funding. The supported producer may spend up to EUR 1 million of eligible core expenditure per project on subcontractors, in line with the video

games tax relief in France⁽⁶⁾. This ensures that an essential part of the game development is done by the beneficiary itself.

- (21) The United Kingdom considers that this limitation on the eligibility of subcontracted costs has a minor effect on trade between Member States. Discussions with representatives from across the video games industry, including small and large developers, have indicated that like other creative sectors, video games development is a highly collaborative process with the core development activities such as programming, design and lead artwork typically carried out in the same location.

2. Necessity of aid

- (22) Regarding the necessity of the aid due to an underproduction of cultural games, the United Kingdom has provided evidence demonstrating that such games are in decline, in relative and in absolute terms. The United Kingdom agrees that in general the video games sector is dynamic and growing. However, in 2012 less than 10 % of United Kingdom released games were developed in the United Kingdom, compared to 16 % in 2008. The United Kingdom also carried out a further analysis of games released in the United Kingdom between 2003 and 2012. The figures show a constant decline in the number of culturally British games and a sharp fall in their share of the market from 9 % of all games released in the United Kingdom (including games from other countries) in 2003 to 4 % in 2006, staying at 3 % from 2009 to 2012. In 2003, 41 % of the United Kingdom developed games would have passed the cultural test compared to only around 25 % in 2012.
- (23) The United Kingdom agrees that the rise of smartphone games has removed certain barriers to entry for smaller developers looking to enter the video games market. Indeed, figures released in 2011 show that the number of video games developed by start-up companies has increased in the last year. However, with a view to the content of the games, a survey by the Abertay University video games prototype programme shows that of 306 mobile and online games proposals presented to the University over the last 2 years from small and micro-businesses all around the United Kingdom, the overwhelming majority — 255 — featured neither a United Kingdom setting, character nor story⁽⁷⁾.
- (24) This could be explained by the fact that culturally significant games may have production costs equal to 'global games' but a significantly smaller market. Their production thus would involve a higher economic risk. Thus video games with culturally British/European content would be less commercially viable than those with more globalised content. Both international publishers and domestic developers are less likely to take risks in producing culturally relevant content and instead create more generic content aimed at international markets.
- (25) A survey by the United Kingdom found that the culturally British elements of game narratives are being eroded in an attempt to secure the global publishing deals needed to fund their development and ensure the survival of the developer. Nearly three quarters of British video games developers claimed that original intellectual property development had slowed or stopped in the previous five years. The survey found that many developers have had to change the cultural content of their games to satisfy commercial requirements. 53 % of respondents said they had changed characters and settings away from British or European subjects.
- (26) In view of this, the incentive objectives of the fund would be to make cultural products that are likely to be uneconomical, commercially viable, thereby promoting the production of new cultural products that would not have been made in the absence of the tax relief, and to support the development of skills for the sustainable production of cultural products, relevant British/EEA video games.

3. A discriminating cultural test

- (27) Finally, as regards the cultural test, which ensures that the scheme only covers distinctively cultural games, the United Kingdom explained that firstly, the tax authority, HM Revenue & Customs ('HMRC'), has a dedicated and specialist 'Creative Industries Unit' which will be responsible for administering and policing claims for the video

⁽⁶⁾ Commission Decision of 25 April 2012 in Case No SA.33943 — Prolongation du régime d'aide C 47/06 — Crédit d'impôt en faveur de la création de jeux vidéo (OJ C 230, 1.8.2012, p. 3).

⁽⁷⁾ The university collected the data in the course of its video games prototype programme which intends to help small enterprises turn their games into working prototypes.

games tax relief. The unit will risk assess claims, and this process includes ensuring that the rules for qualification are properly adhered to. There is thus a clear process in place for the application of the test.

- (28) As regards the elements of the test which help to determine the cultural quality of a game, the United Kingdom clarified that the majority of points available within the proposed cultural test relate to content. Up to 20 points out of 31 relate to the cultural content and contribution of the game. This includes elements like the location of the story, the lead characters, the subject matter on which the game is based, the use of the English language and the reflection of British culture and heritage. Only three points relate to the location of development activity and the remaining eight points are available where the relevant cultural practitioners, like scriptwriter, composer, designer, artist, or programmer, are British or EEA citizens or residents. The proposed test therefore has a strong focus on content over the location of activity. This focus on content is further strengthened by the application of a minimum cultural content rule, a 'golden points rule', which will ensure that only games with a sufficient number of cultural content points will pass the test.
- (29) This focus on content represents a constraint on the overall scope of the relief. The United Kingdom has undertaken analysis of games released there in 2006, 2009 and 2012, applying the cultural test retrospectively to all United Kingdom-made games released during this period. Of the 822 released in the United Kingdom in 2012, only 74 were made by United Kingdom developers, 25,7 % of which (19 games) would have passed the cultural test if it had been in existence. For 2006 and 2009, the test showed that the share of such games among the games which were developed in the United Kingdom would have been around 27 %, while their share among all games released in the United Kingdom would have been between 3 % and 4 %.
- (30) The United Kingdom considers a 25,7 % pass rate to be within the range accepted by the Commission in the case of the French video games tax incentive ⁽⁸⁾. In that decision, the Commission found that the fact that close to 30 % of games are selected indicates that France has drawn up criteria guaranteeing that the content of video games eligible for the tax relief is truly cultural. Likewise, the United Kingdom considers the video games cultural test to be sufficiently restrictive to ensure the aid is targeted at culturally British/EEA video games.
- (31) The United Kingdom has furthermore agreed to notify the scheme as an initial pilot for four years, and will use this time to monitor the relief and ensure that it is being used as intended.

4. Subsidy race

- (32) Regarding the Commission's concern that the aid could fuel a subsidy race within the Union which would lead to undue distortions of competition, the United Kingdom observed that such a subsidy race would be evidenced by a large number of Member States operating schemes to increase the competitiveness of their domestic sectors. The United Kingdom does not consider this likely to be the case. Although tax advantages may be a determinant for decisions on where to locate a business, the aid is mainly an answer to Canadian, United States and South Korean tax relief. France is currently the only other Member State to offer a tax incentive for the production of culturally relevant video games.
- (33) Furthermore, a subsidy race would be purely focused on economic competition without any cultural restrictions. Two or more countries looking to protect the production of particular cultural products, according to an agreed cultural test, would not constitute a subsidy race.
- (34) The aim of the proposed aid is to protect the production of culturally British/European video games and, as such, the aid will provide relief for only a fraction of video games developed in the United Kingdom and in Europe and support only a small amount of overall video game development expenditure. Following discussions with industry,

⁽⁸⁾ Commission Decision 2008/354/EC of 11 December 2007 on State aid C 47/06 (ex N 648/05) — Tax credit introduced by France for the creation of video games (OJ L 118, 6.5.2008, p. 16).

the United Kingdom estimates that only around 10 % of those culturally British/European video games will have a budget above GBP 5 million. The majority of games development expenditure will be on considerably smaller projects.

V. ASSESSMENT OF THE AID MEASURE

1. Classification as State aid

- (35) According to Article 107(1) of the Treaty, concerning aid granted by Member States, any aid granted by a Member State or through State resources in any form whatsoever, which distorts or threatens to distort competition by favouring certain undertakings or the production of certain goods shall be incompatible with the internal market, in so far it affects trade between Member States.
- (36) The support for video game production, based on an approval by HMRC, accords a financial advantage by way of a tax relief to undertakings in the game production sector at the expense of the budget of HM Treasury. It is therefore granted through State resources and imputable to the State. The measure is designed to reduce the production costs of the benefiting undertakings and constitutes an economic advantage for them. It is limited to companies in the video game sector and is therefore selective. Finally, it has an effect on trade and competition between Member States, as games are also produced in other Member States and traded internationally. Accordingly, it constitutes State aid within the meaning of Article 107(1) of the Treaty.

2. Compatibility of the aid with the internal market

- (37) Regarding the general legality of the scheme, the Commission notes that the United Kingdom has withdrawn the territorialisation clause which the Commission found problematic in view of the internal market freedoms of movement of goods and provision of services. It agreed to limit the volume of subcontracting costs qualifying as eligible for aid to GBP 1 million.
- (38) The Commission takes the view that this limit is acceptable in this case in so far as, in practice, in view of the size of the production budgets, a ceiling of GBP 1 million for subcontracting expenditure does not appear likely to significantly hamper recourse to subcontracting. The United Kingdom expects that the majority of the video games covered by their cultural test will have a production budget of less than GBP 1 million. Only around 10 % of those video games would have a budget in excess of GBP 5 million. Depending on changes in the production budgets for video games in the United Kingdom, the Commission reserves the right to review this ceiling when the aid measure is re-notified within four years of its implementation, in line with the commitments entered into by the United Kingdom.
- (39) The United Kingdom intends to justify the support of game development as aid to promote culture. Accordingly, an assessment would have to take place under Article 107(3)(d) of the Treaty. The Commission has not developed guidelines for the application of this provision on aid to games. However, the Cinema communication refers to the possibility of granting aid to games. Paragraph 24 of that communication states that aid measures in support of games will continue to be addressed on a case-by-case basis. To the extent that the necessity of an aid scheme targeted at games which serve a cultural or educational purpose can be demonstrated, the Commission would apply the aid intensity criteria of the Cinema communication.
- (40) The Commission therefore has to assess the compatibility of the measure directly on the basis of Article 107(3)(d) of the Treaty. It will have to verify, whether it serves the promotion of culture and whether it does not affect trading conditions and competition in the Union to an extent contrary to the common interest. This means that it has to be the appropriate instrument to achieve this objective, in particular that without this support there would not be sufficient incentive for market actors to produce the desired kind of games. Regarding the proportionality of the aid, the maximum aid intensities established by the Cinema communication may be applied by analogy. The Commission assessed the cultural objective and the necessity of aid to certain video games in the two decisions regarding support to games in France, referred to in recitals 20 and 30.

(a) *Promotion of culture*

- (41) To be compatible with Article 107(3)(d) of the Treaty, the aid to games, as proposed by the United Kingdom, needs to serve the promotion of culture. On the basis of the changes to the scheme and the additional evidence submitted by the United Kingdom, the Commission is satisfied that the United Kingdom would apply a truly selective cultural test ensuring that aid is granted only for the promotion of culture in line with Article 107(3)(d) of the Treaty.
- (42) Firstly, the Commission takes note of the explanations given by the United Kingdom regarding the test used to determine the cultural quality of a game (recitals 27 to 29): the majority of points available within the proposed cultural test, up to 20 points out of 31, relate to the cultural content and contribution of the game. This is further strengthened by the application of a minimum cultural content rule, the 'golden points rule', which will ensure that only games with a sufficient number of cultural content points will pass the test.
- (43) This focus on content represents a constraint on the overall scope of the relief. Simulations of the cultural test on the basis of games released in earlier years revealed that 26 % to 27 % of the games produced in the United Kingdom would have passed the cultural test. Such a pass rate indicates that the criteria of the test ensure that the content of video games eligible for the tax relief is truly cultural and that the test is sufficiently restrictive to target the aid at culturally British/European video games. In comparison, in its decision of 2007 on the French video games tax incentive⁽⁹⁾, the Commission found that an eligibility of around 30 % of games indicated that the test was sufficiently selective.
- (44) Consequently, the doubts raised in the opening decision have been addressed. The fact that only around 27 % of games are selected indicates that the objective of the measure is not simply an industrial objective of providing support for a specific sector but a truly cultural objective. The aid measure thus meets a genuine objective of promoting culture.

(b) *Appropriateness, necessity and proportionality of the measure*

- (45) On the basis of Article 107(3)(d) of the Treaty, the video games tax relief should be an appropriate instrument for meeting the objective being pursued. State aid for other purposes which would not focus on this cultural objective is more likely to promote sector related industrial objectives. The Commission acknowledges that, as designed, the tax relief actually allows public support to be channelled to games with a cultural content and that it is therefore an appropriate tool for achieving the cultural objective being pursued.
- (46) In view of the very dynamic development and evolution of the games market, the United Kingdom authorities submitted data to substantiate that the aid is necessary to maintain a reasonable output of such games and that without aid for cultural games their production and market share would decrease considerably. The figures show a constant decline in the number of culturally British games and a sharp fall in their share of the market from 9 % of all games released in the United Kingdom in 2003 to 4 % in 2006, staying at 3 % from 2009 to 2012.
- (47) Culturally significant games may have production costs equal to global games but a significantly smaller market. Their production thus involves a higher economic risk. Thus video games with culturally British/European content are less commercially viable than those with more globalised content. Therefore the market places constant pressure on games developers in Europe not to emphasise the culturally European elements of their game in order to sell to a global audience. Developers of culturally European games find it more difficult to obtain private funding.
- (48) The proposed tax relief should promote the production of video games with a cultural content as opposed to games that are purely for entertainment in that it would reduce the former's production costs. There is, therefore, reason to conclude that the measure is likely to have a sufficient incentive effect relative to its objective.

⁽⁹⁾ Cf. footnote 8.

- (49) Furthermore the aid measure is proportionate as it limits the aid intensity to 25 % of production costs effectively incurred in the manufacture of eligible games. This is lower than the aid intensity of 50 % permitted for audiovisual production, according to paragraph 52(1) of the Cinema communication which applies by analogy as far as the permissible aid intensity is concerned.
- (50) Finally, in order not to affect trading conditions and competition in the Union to an extent contrary to the common interest, the distortions of competition and the effects on trade triggered by the measure should be offset by its positive effects.
- (51) According to the figures provided by the United Kingdom and representatives of the sector, in 2012 less than 10 % of United Kingdom released games were developed in the United Kingdom. The market shares of eligible games published in the United Kingdom is rather small (4-5 %). Also the proportion of eligible games among the video games manufactured in the United Kingdom is, at around 27 %, relatively small.
- (52) Furthermore, no potentially affected third party pointed to a possible adverse effect of the measure. On the contrary, the associations of video game manufacturers that submitted comments following the initiation of the procedure, TIGA and EGDF, underscored the small impact of the measure on their national industries and its overall impact in the face of competition mainly from North America and the Far East. Therefore a subsidy race among Member States would be rather unlikely.
- (53) In any case, it is useful that the United Kingdom is limiting the duration of the scheme to four years to allow an evaluation of its application and a reassessment of the criteria in view of the market developments.
- (54) The Commission consequently finds that the doubts raised in the opening decision have been addressed. The distortions of competition and the effect of the measure on trade between Member States are now limited so that they are not contrary to the common interest.

VI. CONCLUSION

- (55) The Commission therefore takes the view that the aid will not have the effect of unduly strengthening the market power of beneficiary firms or of hampering dynamic incentives for market operators but, on the contrary, it will increase the diversity of supply on the market. There are grounds, therefore, for concluding that the distortions of competition and the effects on trade that the measure will have are limited so that the overall aid assessment is positive. Accordingly, the tax relief for the creation of video games is compatible with the internal market on the basis of Article 107(3)(d) of the Treaty,

HAS ADOPTED THIS DECISION:

Article 1

The State aid measure which the United Kingdom is planning to implement for video games through an amendment of the Corporation Tax Act 2009 is compatible with the internal market within the meaning of Article 107(3)(d) of the Treaty on the Functioning of the European Union.

Implementation of the aid measure is accordingly authorised.

Article 2

This Decision is addressed to the United Kingdom of Great Britain and Northern Ireland.

Done at Brussels, 27 March 2014.

For the Commission
Joaquín ALMUNIA
Vice-President

COMMISSION DECISION**of 25 June 2014****on the State aid No SA.20949 (C 23/06) — Poland — Technologie Buczek***(notified under document C(2014) 4099)***(Only the Polish text is authentic)****(Text with EEA relevance)**

(2014/765/EU)

THE EUROPEAN COMMISSION,

Having regard to the Treaty on the Functioning of the European Union, and in particular the first subparagraph of Article 108(2) thereof,

Having regard to the Agreement on the European Economic Area, and in particular Article 62(1)(a) thereof,

Whereas:

1. PROCEDURE

- (1) By letter dated 7 June 2006, the Commission notified Poland of its decision to open a formal investigation procedure under Article 88(2) EC in the above State aid case.
- (2) On 23 October 2007, the Commission Decision 2008/344/EC ⁽¹⁾ ('the decision') was adopted in which the Commission concluded that State aid received by steel producer Technologie Buczek Group ('TB Group') was incompatible with the common market and ordered Poland to recover it from TB Group's constituent entities, i.e. the mother company Technologie Buczek S.A. ('TB') and its subsidiaries Huta Buczek sp. z o.o. ('HB') and Buczek Automotive sp. z o.o. ('BA') in proportion to the benefit actually obtained.
- (3) On 8 January 2008, BA applied to the General Court for the partial annulment of the decision. TB and HB submitted separate applications but later withdrew their actions.
- (4) By ruling of 17 May 2011 ⁽²⁾, the General Court annulled the decision in so far as BA is concerned (see detailed description below in recital 7). On 21 March 2013, the Court of Justice dismissed the appeal brought by the Commission against the judgment by the General Court ⁽³⁾.
- (5) As a result of the annulment of the decision in so far as BA is concerned, the formal investigation procedure C23/06 has not been closed, and the Commission had to resume that procedure from the point at which the illegality had occurred.
- (6) The Commission requested information from Poland on 22 April 2013, 12 June 2013 and 27 November 2013, to which Poland replied on 8 May 2013, 26 July 2013 and 10 February 2014.

2. ASSESSMENT

- (7) The Court annulled:

— Article 1 of the decision which declares the State aid in the amount of PLN 20 761 643 unlawfully granted to the TB Group to be incompatible with the common market,

⁽¹⁾ Commission Decision 2008/344/EC of 23 October 2007 on State aid C 23/06 (ex NN 35/06) which Poland has implemented for steel producer Technologie Buczek Group (OJ L 116, 30.4.2008, p. 26).

⁽²⁾ Case T-1/08, *Buczek Automotive sp. z o.o. v Commission*, ECLI:EU: T:2011:216.

⁽³⁾ Case C-405/11 P *Commission v Buczek Automotive sp. z o.o.*, ECLI:EU:C:2013:186.

- Article 3(1) and (3) of the decision, which lay down the amounts of aid to be recovered from HB and BA individually, in so far as those paragraphs relate to BA ⁽¹⁾,
- Articles 4 and 5 of the decision, which contain implementing provisions, in so far as those Articles relate to BA.
- (8) Since Article 1 of the decision refers to the TB Group as a whole, whereas the remaining annulled articles single out BA, the Commission considers it necessary to recall first to what extent the annulment of the decision affects the other members of the TB Group, i.e. TB and HB.
- (9) The Commission recalls the judgment in Case T-227/95 (*AssiDomän Kraft Products and Others v Commission* [1997] ECR II-01185, paragraphs 59 and 60), in which the Court held that, if an addressee [of a Commission Decision] decides to bring an action for annulment, the Community judicature has before it only the elements of the decision which relate to that addressee. The unchallenged elements of the decision relating to other addressees, on the other hand, do not form part of the subject-matter of the dispute which the Court is called on to resolve. In an action for annulment, the Court can give judgment only on the subject-matter of the dispute referred to it by the parties. A decision can be annulled only as regards the addressees who have been successful in their actions before the Court.
- (10) As mentioned above in recital 3, TB and HB withdrew their actions before the General Court and therefore the decision has become definitive in their regard, including the obligation of Poland to recover unlawful aid. The Polish authorities have confirmed that TB repaid PLN 13 963 560,74, which accounts for the full amount of the aid to be recovered from TB, as well as for part of the aid to be recovered from HB. HB was declared insolvent and all relevant public authorities registered their claims in the bankruptcy mass. The liquidation procedure is pending. The Polish authorities have confirmed that following the annulment, the aid repaid by TB has not been returned to it and claims against HB have not been erased from the bankruptcy mass.
- (11) For those reasons, the formal investigation procedure remains open only with regard to BA.
- (12) The Commission notes the information from Poland that BA was declared bankrupt on 28 September 2012 and was erased from the commercial register of companies on 16 November 2012.
- (13) Poland informed the Commission that the assets of BA, which formed its bankruptcy mass, were sold individually (not in bundles constituting whole business), in tender procedures ensuring the achievement of market prices. Neither the employees of BA, nor its suppliers or customers were transferred to any of the acquiring entities in the way which might indicate economic continuity of BA.
- (14) Poland also informed the Commission that in the course of the bankruptcy proceedings the administrator liquidated all the assets of BA. After closure of the proceedings there are no more assets of BA left that could conceivably be acquired by other undertakings.
- (15) On the basis of those elements, the Commission concludes that there are no undertakings that might be considered to be economic successors of BA.
- (16) The formal investigation procedure in the present case has therefore become devoid of purpose, as even if the aid was to be declared incompatible with the internal market, there would be no means of recovering the aid in question,

⁽¹⁾ Article 3(1) of the decision orders Poland to recover the aid referred to in Article 1 as follows: PLN 13 578 115 from HB and PLN 7 183 528 from BA. Article 3(3) ordered Poland to recover also the interest on these amounts.

HAS ADOPTED THIS DECISION:

Article 1

The formal investigation procedure under Article 108(2) of the Treaty on the Functioning of the European Union, initiated on 7 June 2006 and which remains open with regard to Buczek Automotive sp. z o.o. following General Court's judgment in case T-1/08 of 17 May 2011 as confirmed by the Court of Justice judgment in case C-405/11P of 21 March 2013, is hereby closed, because the procedure has become devoid of purpose following the liquidation of Buczek Automotive sp. z o.o.

Article 2

This Decision is addressed to the Republic of Poland.

Done at Brussels, 25 June 2014.

For the Commission

Joaquín ALMUNIA

Vice-President

COMMISSION DECISION**of 9 July 2014****on the aid scheme SA.18042 (2013/C) (ex MX 17/2009) (ex NN 61/2004)****implemented by Spain on excise duty exemption for biofuels***(notified under document C(2014) 4530)***(Only the Spanish text is authentic)****(Text with EEA relevance)**

(2014/766/EU)

THE EUROPEAN COMMISSION,

Having regard to the Treaty on the Functioning of the European Union, and in particular the first subparagraph of Article 108(2) thereof,

Having regard to the Agreement on the European Economic Area, and in particular Article 62(1)(a) thereof,

Having called on interested parties to submit their comments pursuant to the provisions cited above ⁽¹⁾ and having regard to their comments,

Whereas:

I. PROCEDURE

- (1) Since 2006, the Directorate-General for Competition has carried out each year an *ex-post* monitoring exercise of a sample of aid measures implemented by Member States. The Spanish excise duty exemption for biofuels scheme (case No NN 61/2004) was approved by the Commission by decision C(2006) 2293 of 6 June 2006. This scheme was included in the 2009/2010 monitoring exercise under reference MX 17/2009, in the context of which the Commission examined how Member States had implemented a sample of existing schemes in 2009.
- (2) The Commission decided to include this scheme again in the 2011/2012 monitoring exercise, in the context of which the Commission examined how Member States had implemented a sample of existing schemes during the period 2009-2010.
- (3) In the light of the information provided by Spain during the monitoring exercise, the Commission had doubts about the proper implementation of the scheme by the Spanish authorities. Consequently, it decided to initiate the procedure laid down in Article 108(2) of the Treaty on the Functioning of the European Union (TFEU). The Commission informed Spain of its decision by letter dated 17 July 2013.
- (4) Spain provided its observations on 20 September 2013.
- (5) The Commission decision to initiate the formal investigation procedure was published in the *Official Journal of the European Union* on 7 February 2014 ⁽²⁾. The Commission invited interested parties to submit their comments.
- (6) The Commission received comments from the biofuels section of the Spanish Association of Renewable Energy Producers (APPA Biocarburantes) on 5 March 2014. It forwarded them to Spain, which was given the opportunity to react. On 6 May 2014 the Spanish authorities indicated that they did not wish to comment on the observations received from third parties.

⁽¹⁾ OJ C 37, 7.2.2014, p. 44.

⁽²⁾ See footnote 1.

II. DETAILED DESCRIPTION OF THE MEASURE

- (7) The scheme NN 61/2004 Excise duty exemption for biofuels consists of a zero rate of the Spanish tax on hydrocarbons. It applies to ethyl alcohol produced from products of agricultural or vegetable origin (bioethanol) falling within CN Code 2207 20, methyl alcohol obtained from products of agricultural or vegetable origin falling within CN Code 2905 11 00 and products falling within CN Codes 1507, 1508, 1510, 1511, 1512, 1513, 1514, 1515 and 1518.
- (8) The zero rate of tax was applied to these products irrespective of whether they were used as such or after chemical modification. In cases where the biofuel was blended with other fuel, the reduced rate applied only to the biofuel part of the mixture. The reduced excise duty was applicable to biofuels of whatever geographical origin.
- (9) The scheme was approved by the Commission on 6 June 2006 and expired on 31 December 2012 ⁽³⁾.
- (10) The assessment of the information provided by the Spanish authorities during the monitoring exercise raised doubts as to whether the scheme had been implemented in compliance with the Commission decision in 2009 and 2010. Moreover, there were doubts that Spain may have overcompensated beneficiaries in 2010. The Commission's concerns were set out in recitals 13 to 29 of its decision of 17 July 2013.
- (11) The Commission requested Spain to:
 - (a) demonstrate that the scheme had been correctly implemented in 2009 and 2010;
 - (b) demonstrate that there had been no overcompensation for bioethanol in 2010, or, if there had been, to explain what measures were taken to avoid overcompensation in the following years;
 - (c) submit annual reports for the whole duration of the scheme.

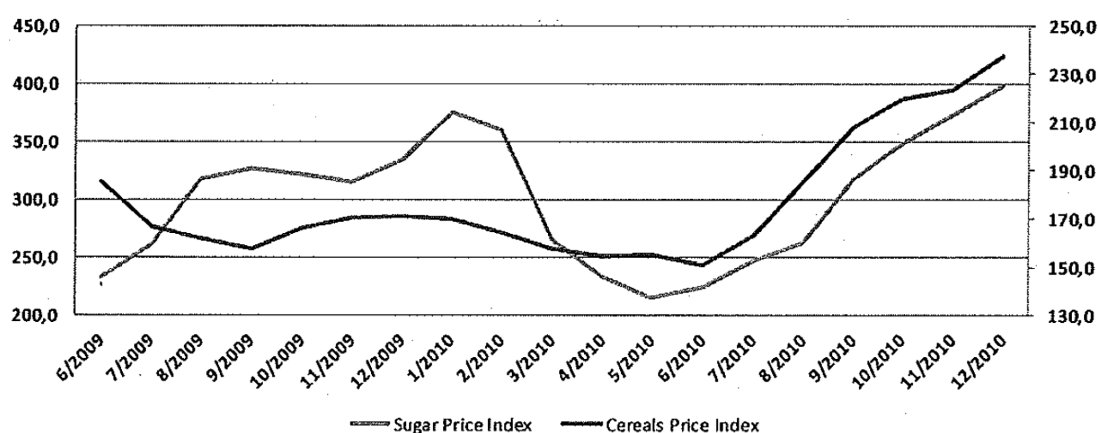
III. COMMENTS FROM INTERESTED PARTIES

- (12) The Commission received comments from APPA Biocarburantes on 5 March 2014. The comments were very similar to those of the Spanish authorities (see section IV). APPA Biocarburantes argued that the scheme had been correctly implemented.
- (13) When the costs of biofuels were compared with the pre-tax price of fossil fuels at the pump, both bioethanol and biodiesel seemed to have been undercompensated for the whole period, with the exception of 2010 for bioethanol and 2012 for biodiesel. APPA Biocarburantes argued that this methodology was incorrect, as the pre-tax price of fossil fuels at the pump included all fuel transport and distribution costs until the product reached the final consumer, while such logistical costs were not included in the cost of biofuels in this comparative analysis. In its view, it would be more appropriate to compare biofuel production costs with the internationally quoted prices of fossil fuels. Use of this methodology clearly showed an increased undercompensation for biofuels during the lifetime of the scheme and no instances of overcompensation.
- (14) Finally, APPA Biocarburantes argued that, even when the costs of biofuels were compared with the pre-tax price of fossil fuels at the pump, the two one-off situations of potential overcompensation were purely temporary and were caused by the very nature of the tax aid scheme for biofuels (with absolute quantities set *ex ante* and evaluations carried out *ex post*) and the highly volatile prices of the agricultural raw materials (the main component of biofuel production costs). No adjustment of the scheme was necessary – for bioethanol no sign of potential overcompensation could be seen in the following years (2011 and 2012) and for biodiesel the potential overcompensation occurred in the last year, 2012. Moreover, no adjustments would be possible for the future, as the scheme had expired.

⁽³⁾ OJ C 219, 12.9.2006, p. 3.

IV. COMMENTS FROM SPAIN

- (15) The Spanish authorities provided their comments on 20 September 2013. On 6 May 2014 they indicated that they did not wish to comment on the observations from third parties that had been forwarded to them.
- (16) In their letter of 20 September 2013, the Spanish authorities submitted information on the costs of production of bioethanol and biodiesel, together with data on the prices of fossil fuels during the period between 2004 and 2012. At the same time they provided tables comparing the costs of biofuels with the pre-tax price of fossil fuels at the pump. These tables are set out in the Annex.
- (17) The data and the analysis illustrated by the respective tables are based on the following assumptions:
- The starting point is the real data for annual production costs of Spanish plants, plus a production profit margin of 5 %. Adjustments are made due to the difference in energy content between the biofuel and the fossil fuel with which it is mixed using the data in Annex III to Directive 2009/28/EC of the European Parliament and of the Council ⁽⁴⁾, namely 1,52 and 1,09 for bioethanol and biodiesel, respectively.
 - These costs are compared with the price data for the fuel they are replacing, i.e. petrol and diesel. The price is the pre-tax pump price of this fuel and it therefore includes the gross commercial distribution margin. The difference between the production cost of the biofuel and the cost of the substitute fossil fuel is the maximum compensation margin.
 - The real compensation applied is equivalent to the excise duty on mineral oils that would correspond to bioethanol and biodiesel. Without the exemption, the rate applied to the products in question as excise duty on mineral oils would have been the rate for petrol and diesel, respectively ⁽⁵⁾.
- (18) Based on the corresponding data, Spain indicated that during the period 2004-2012 an accumulated undercompensation could be observed for both types of biofuel (EUR 455,96/1 000 l for biodiesel and EUR 897,22/1 000 l for bioethanol). When each year was considered separately, undercompensation could still be observed for all the years with only two exceptions: 2010 for bioethanol, and 2012 for biodiesel.
- (19) With regard to bioethanol, Spain explained that the apparent overcompensation observed in 2010 was the result of a one-off drop in commodity prices, in particular agricultural commodities, between January and June 2010. This was therefore a one-off, reversible and unforeseeable situation which furthermore automatically corrected itself the following year through the rise in raw material prices. Therefore there was no reason for the Spanish authorities to take any action. Detailed information about the evolution of raw material prices was provided, as well as a graph illustrating the trend in the sugar and cereals price index (2002-2004 base = 100).

Developments in raw material prices in the period 2009-2011 ⁽⁶⁾

Source: www.fao.org

⁽⁴⁾ Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC (OJ L 140, 5.6.2009, p. 16).

⁽⁵⁾ In the case of bioethanol, this amount was EUR 371,69/1 000 litres in the period 2004-2009 and EUR 400,69/1 000 litres in the period 2009-2012. As regards biodiesel, the rates applied were EUR 269,89/1 000 litres in the period 2004-2006, EUR 278/1 000 litres in the period 2007-2009 and EUR 307/1 000 litres in the period 2009-2012.

⁽⁶⁾ The Sugar Price Index starts from the bottom right, and the Cereals Price Index starts from the top right.

- (20) As for biodiesel, Spain explained that an instance of overcompensation apparently took place in 2012 but the scheme expired on 31 December of that year.
- (21) Spain argued that the price used as reference for substitute fuels in this methodology — the pre-tax pump price — was the most stringent of the options available, and a comparison with a value closer to the world prices for these products would be more appropriate. The Spanish authorities also provided tables comparing the costs of biofuels with the world price of the fossil fuels and underlined that in this case no overcompensation could be observed for biodiesel in any of the years considered, while for bioethanol the potential overcompensation was negligible (EUR 2/1 000 l, compared with EUR 142,13/1 000 l using the pre-tax pump price of fossil fuel as reference). The accumulated undercompensation would be several times higher than as compared with the previous methodology.
- (22) The Spanish authorities explained that they had reported on all companies that produced, processed, held, received and dispatched excise goods, in accordance with Council Directive 2008/118/EC (7).
- (23) In point 1 of Article 4 of that Directive 'authorised warehousekeeper' is defined as a natural or legal person who, in the course of his business, is authorised to produce, process, hold, receive or dispatch excise goods under a duty suspension arrangement in a tax warehouse. Article 8 of the Directive states that the authorised warehousekeeper is liable to pay the excise duty.
- (24) The Spanish authorities explained why they had provided tax details on only one of the two companies that had signed an agreement to operate on a subcontracting basis to produce fatty acid methyl esters (FAME) from soya and palm oil. As this contract dealt with products subject to excise duty on the holding, movement and monitoring of such products, it was governed by Directive 2008/118/EC. The Spanish authorities stated that the owner of the product did not fall within the definition of 'authorised warehousekeeper' as set out in point (1) of Article 4 of the Directive.

V. ASSESSMENT OF THE MEASURE

- (25) The Commission already concluded in its decision in case NN 61/2004 that the measure at issue involved aid within the meaning of Article 107 TFEU. The Commission assessed this aid scheme on the basis of the 2001 Community guidelines on State aid for environmental protection (8) and concluded that it was compatible with the internal market.
- (26) The Spanish authorities have now provided the Directorate-General for Competition with detailed information, including the relevant data on the production costs of bioethanol and biodiesel for the whole duration of the scheme. When the production costs of biofuels are compared with the pre-tax pump price of fossil fuels, as illustrated in the tables included in the Annex to this decision, there can be observed two situations of overcompensation: for bioethanol in 2010 and for biodiesel in 2012.
- (27) With regard to the alternative methodology proposed by Spain, which takes as reference the world prices of fossil fuels, the Commission observes that this methodology is different from that proposed by Spain and used by the Commission to assess the measure NN 61/2004. As the Commission is verifying whether Spain has implemented the aid scheme correctly in compliance with the decision by which it was approved in case NN 61/2004, the alternative methodology proposed cannot be accepted.
- (28) None the less, the Commission notes that there can be observed no trend of persistent overcompensation. Also, when the aid is considered for the whole duration of the scheme, there is no indication of overall overcompensation. The Commission takes note of the explanations provided by Spain (see recitals 18, 19, 20 and 22).
- (29) In the case of bioethanol, the Commission considers that it was not necessary to make adjustments to remedy the overcompensation. In this case, Spain was able to demonstrate that the overcompensation was remedied, mainly owing to the fact that raw material prices increased significantly after June 2010. Indeed, in 2011 and 2012 no overcompensation can be observed for bioethanol.

(7) Council Directive 2008/118/EC of 16 December 2008 concerning the general arrangements for excise duty and repealing Directive 92/12/EEC (OJ L 9, 14.1.2009, p. 12).

(8) OJ C 37, 3.2.2001, p. 3.

- (30) As for biodiesel, the Commission notes that a small overcompensation of EUR 41,85/1 000 l can be observed for 2012. This overcompensation occurred while the measure and in particular the support level was maintained unchanged. This situation was caused by factors extraneous to the scheme, specifically the big increase in the price of fossil diesel in Spain. The Commission notes that the price of diesel in 2012 was 8 % higher than in 2011, 36 % higher than in 2010 and 71 % higher than in 2009. In comparison, biodiesel production costs in 2012 were at the same level as in 2011, 16 % higher than those registered in 2010 and 25 % higher than in 2009. The Commission also notes that the scheme expired at the end of 2012, and therefore it was not possible to adapt the excise duty exemption to avoid future overcompensation, in accordance with recital 19 of the Commission decision in case NN 61/2004. The Commission notes as well that no aid was granted under the scheme in 2013 or any of the following years. Lastly, as explained in recital 28, if account is also taken of the data for 2012 no overcompensation can be observed for the whole duration of the scheme. This can consequently be considered a sign that Spain could rely on the *ex-ante* calculation method provided for under the scheme.
- (31) Having considered the additional information provided by Spain, the Commission is of the opinion that Spain has not failed to fulfil its obligations as set out in recital 19 of the Commission decision in case NN 61/2004.
- (32) Based on the explanations provided by Spain on the application of Directive 2008/118/EC, the Commission accepts that the Spanish authorities reported on all the appropriate companies.

VI. CONCLUSION

- (33) The Commission finds that Spain has implemented the aid scheme NN 61/2004 correctly, in compliance with the Commission decision approving it,

HAS ADOPTED THIS DECISION:

Article 1

The state aid scheme NN 61/2004 implemented by Spain is compatible with the internal market within the meaning of Article 107(3)(c) TFEU and has been correctly implemented, in compliance with the Commission decision in case NN 61/2004.

Article 2

This Decision is addressed to the Kingdom of Spain.

Done at Brussels, 9 July 2014.

For the Commission
Joaquín ALMUNIA
Vice-President

Table 1

Bioethanol production costs in Spain

		Bioethanol production costs in Spain									
EUR /1 000 litres		2004	2005	2006	2007	2008	2009		2010	2011	2012
Raw materials	(+)	[...] (*)	[...]	[...]	[...]	[...]	[...]		[...]	[...]	[...]
Labour	(+)	[...]	[...]	[...]	[...]	[...]	[...]		[...]	[...]	[...]
Depreciation	(+)										
Variable and financial costs	(+)	[...]	[...]	[...]	[...]	[...]	[...]		[...]	[...]	[...]
Transport and distribution	(+)	[...]	[...]	[...]	[...]	[...]	[...]		[...]	[...]	[...]
Revenues from by-products	(-)	[...]	[...]	[...]	[...]	[...]	[...]		[...]	[...]	[...]
Direct aid	(-)	[...]	[...]	[...]	[...]	[...]	[...]		[...]	[...]	[...]
Total production costs		603	692	672	582	602	581		510	688	763
Production margin (5 %)	(+)	30	35	34	29	30	29		26	34	38
Diff. energy content adjustment factor	(+)	329	378	367	318	329	317		278	376	417
Total bioethanol costs (before tax)	(B)	962	1 104	1 073	929	961	927		814	1 098	1 218
95 I.O. petrol costs (before tax)	(P)	351,8	427,0	483,3	497,0	560,8	436,7		555,4	674,6	741,0
Maximum compensation margin	(M)=(B)-(P)	610,6	677,4	589,2	431,9	400,0	490,6		258,6	423,4	476,7
Excise duty on mineral oils (IEH)	(IEH)	371,7	371,7	371,7	371,7	371,7	371,7	400,7	400,7	400,7	400,7
Under-compensation (I)	(I)=(M)-(IEH)	238,90	305,74	217,52	60,18	28,30	118,89	89,89	- 142,13	22,76	76,06

Source: Spanish authorities

(*) Business secret

Table 2

Biodiesel production costs in Spain

		Biodiesel production costs in Spain									
EUR /1 000 litres		2004	2005	2006	2007	2008	2009	2010	2011	2012	
Raw materials	(+)	[...] (*)	[...]	[...]	[...]	[...]	[...]	[...]	[...]	[...]	
Labour	(+)	[...]	[...]	[...]	[...]	[...]	[...]	[...]	[...]	[...]	
Depreciation	(+)	[...]	[...]	[...]	[...]	[...]	[...]	[...]	[...]	[...]	
Variable and financial costs	(+)	[...]	[...]	[...]	[...]	[...]	[...]	[...]	[...]	[...]	
Transport and distribution	(+)	[...]	[...]	[...]	[...]	[...]	[...]	[...]	[...]	[...]	
Revenues from by-products	(-)	[...]	[...]	[...]	[...]	[...]	[...]	[...]	[...]	[...]	
Direct aid	(-)	[...]	[...]	[...]	[...]	[...]	[...]	[...]	[...]	[...]	
Total production costs		553	744	710	762	992	733	791	917	918	
Production margin (5 %)	(+)	28	37	36	38	50	37	40	46	46	
Diff. energy content adjustment factor	(+)	52	70	67	72	94	69	75	87	87	
Total biodiesel costs (before tax)	(B)	633	852	813	872	1 135	839	905	1 050	1 051	
Gas oil A costs (before tax)	(P)	355,0	476,0	521,7	524,9	672,8	459,0	576,5	727,9	785,5	
Maximum compensation margin	(M)=(B)-(P)	277,9	375,5	290,9	347,2	462,5	379,9	379,9	328,8	321,6	265,2
Excise duty on mineral oils	(IEH)	269,86	269,86	269,86	278	278	278	307	307	307	307
Under-compensation (I)	(I)=(M)-(IEH)	8,05	105,65	21,04	69,21	184,54	101,92	72,92	21,80	14,61	- 41,85

Source: Spanish authorities

(*) Business secret

COMMISSION DECISION
of 23 July 2013
on the State aid SA.35062 (13/N-2) implemented by Portugal for Caixa Geral de Depósitos
(notified under document C(2013) 4801)
(Only the English text is authentic)
(Text with EEA relevance)
(2014/767/EU)

THE EUROPEAN COMMISSION,

Having regard to the Treaty on the Functioning of the European Union, and in particular the first subparagraph of Article 108(2) thereof,

Having regard to the Agreement on the European Economic Area, and in particular Article 62(1)(a) thereof,

Having called on Member States and other interested parties to submit their comments pursuant to those provisions ⁽¹⁾,

Whereas:

1. PROCEDURE

- (1) On 28 June 2012, the Portuguese Republic ('Portugal') notified recapitalisation measures to Caixa Geral de Depósitos, S.A ('CGD' or 'the bank').
- (2) On 18 July 2012, the Commission adopted a decision in case SA.35062 (12/NN) ('the Rescue Decision') ⁽²⁾ authorising the recapitalisation of CGD implemented on 29 June 2012 as rescue aid.
- (3) By electronic mail of 27 September 2012 Portugal informed the Commission that Caixa Geral Finance Limited ('CGDF'), an affiliate of CGD, would pay out dividends to the holders of perpetual non-cumulative preference shares the next day.
- (4) On 28 September 2012, CGDF executed the payment of dividends.
- (5) On 18 December 2012, the Commission adopted a decision in case SA.35062 (12/NN) ('the Opening Decision') ⁽³⁾ instigating the formal investigation procedure for misuse of rescue aid pursuant to Article 16 of Council Regulation (EC) No 659/1999 of 22 March 1999 laying down detailed rules for the application of Article 108 of the treaty on the functioning of the European Union ⁽⁴⁾.
- (6) By publishing that decision the Commission invited interested parties to comment on its preliminary conclusion that the dividend payment constituted a breach of the terms of the Rescue Decision, but has not received any related comments.
- (7) Portugal exceptionally accepts for reasons of urgency that the present decision be adopted in the English language.

⁽¹⁾ OJ C 116, 23.4.2013, p. 13.

⁽²⁾ http://ec.europa.eu/competition/state_aid/cases/247111/247111_1420908_83_2.pdf

⁽³⁾ See footnote 1.

⁽⁴⁾ OJ L 83, 27.3.1999, p. 1.

2. DESCRIPTION

2.1. The beneficiary

- (8) CGD is a banking group fully owned by Portugal. It holds total net assets (based on accounting perimeter)⁽⁵⁾ amounting to EUR 116,9 billion at 31 December 2012 and a total net loan book amounting to EUR 74,7 billion at 31 December 2012. The bank's activities comprise, inter alia, nationwide and international commercial banking (notably, in Spain, Lusophone Africa, Macao and Brazil), investment banking, asset management, specialised credit business, and insurance activities.
- (9) In 2012, the CGD group had a leading position in most of the business areas it operated in the domestic Portuguese market (in particular, loans and advances to customers, customer deposits, insurance, leasing, investment banking and asset management).

Table 1

CGD's main financial figures (based on accounting perimeter)

	31.12.2012
Total assets (billion EUR)	116,9
Loans to customers (billion EUR)	74,7
Retail deposits (billion EUR) (*)	71,4
Total wholesale funds (billion EUR) (**)	35,2
Employees, total Group	23 028
Number of branches, total Group	1 293
National Market share in deposits	28,1 %
National Market share in loans	21,3 %

(*) Liabilities to clients.

(**) Total liabilities less liabilities to either clients or the Central bank.

2.2. The events triggering the aid measures

- (10) Since the beginning of the sovereign crisis, CGD experienced difficulties in accessing the wholesale markets. The difficulties started in accessing the medium- and long-term capital markets and progressively extended to the short-term money markets.
- (11) As a result, CGD had to reduce its reliance on wholesale funding and activated its contingent liquidity plan in the first quarter of 2010, subsequently trying to (a) find alternative sources of funding, mainly through collateralized funding; (b) increase the pool of eligible collateral that would be acceptable for the ECB; (c) sell non-strategic assets; and (d) present its own credit credentials to investors and counterparties.

⁽⁵⁾ In this decision, the financial information related to CGD is generally based on prudential perimeters which CGD uses to present relevant financial information to Banco de Portugal as part of its regulatory obligations, and internally for financial projections which are periodically updated for each business unit. CGD has also used those prudential perimeters for all financial information in its restructuring plan, as well as for that in the Funding and Capital Plans which are regularly submitted to the International Monetary Fund (IMF), the European Central Bank (ECB), and the European Commission (the Troika).

However, CGD Group publishes its yearly accounts in the annual reports using accounting perimeters. Accounting perimeters include all subsidiaries independently of their inclusion in the Portuguese Central Bank regulatory scope. In case of CGD, the most relevant difference between the prudential perimeters and the accounting perimeters is related to Caixa Seguros e Saúde ('Caixa Seguros'), the holding company of the insurance and health business units, which in the prudential perimeters is included by the equity method. In order to better allow for a comparison with publically available data, some of the financial information in this decision is therefore provided based on accounting perimeters, in which case, however, it is always clearly marked as such.

- (12) Under the Economic and Financial Assistance Plan agreed upon between Portugal, the Commission, the ECB and the IMF, CGD was asked to submit a Funding and Capital Plan ('FCP') for the period 2011-15 which was to be subject to quarterly review. The first version of the FCP was submitted on 26 July 2011 and has been subject to revisions.
- (13) As regards solvency, the Core Tier 1 ('CT1') ratio of CGD, calculated in line with Basel II rules, was equal to 9,48 % as at 31 December 2011. The objective of the FCP was to achieve, inter alia, a 10 % CT1 ratio by 31 December 2012 under Basel II rules, in line with the requirements of the Memorandum of Understanding ('the MoU') signed between the Portuguese Government, on the one hand, and the IMF, the Commission and the ECB. Following a recommendation of the European Banking Authority ('EBA'), the FCP was updated regarding the level of capital to be held from 30 June 2012 onwards, in order to fulfil capital needs calculated based on the amount of sovereign and local municipality debt held by the bank ('sovereign buffer') and the capital need resulting from a stress test exercise conducted by EBA ('the EBA requirements').
- (14) According to the version of the FCP of May 2012, and following the recommendation of EBA, a need to increase its capital by EUR 1,650 billion was identified.

2.3. The aid measures

- (15) The recapitalisation measures carried out by Portugal as CGD's only shareholder consisted in
- (i) the subscription of newly issued ordinary shares ('the capital increase') in the amount of EUR 750 million and
 - (ii) the subscription of convertible instruments ('CoCos') issued by CGD in an amount of EUR 900 million which are eligible for solvency purposes under the EBA requirements as CT1.⁽¹⁶⁾
- A detailed description of the aid measures is provided in recitals 12 to 25 of the Rescue Decision.

2.4. The formal investigation procedure on the misuse of aid

- (17) As set out in recital 31 of the Rescue Decision, Portugal committed to ensure that CGD (as a group) applies behavioural restrictions equivalent to those applying to banks that are recapitalised under the New Recapitalisation Scheme for Credit Institutions in Portugal ⁽⁶⁾, including, inter alia:
- a dividend ban;
 - a ban on coupon and interest payments on hybrid instruments and subordinated debt which are not held by Portugal and where there is no legal obligation to proceed with such payment.
- (18) On 28 September 2012, CGDF, an affiliate of CGD, paid, without the Commission's authorisation, dividends on perpetual non-cumulative preference shares in the amount of EUR 405 415. That amount corresponds to 0,025 % of the capital that was injected on 29 June 2012.
- (19) In the Opening Decision the Commission preliminarily considered the dividend payments made by CGDF on 28 September 2012 to fall under the dividend ban which was applicable to CGD pursuant to the Rescue Decision and that the dividend payments constituted a misuse of the rescue aid granted.

3. RESTRUCTURING OF CGD

- (20) CGD submitted a restructuring plan that contains four main elements:
- Deleveraging the balance sheet of CGD group by selling the insurance arm and remaining non-strategic holdings as well as by the run-down of non-core assets;
 - increasing its operational efficiency;

⁽⁶⁾ Decision in case SA.34055 (11/N) of 30.5.2012, OJ C 249, 18.8.2012, p. 5.

- the restructuring of CGD's operations in Spain;
- the repayment of EUR 900 million of CoCos during the restructuring period.

Deleveraging

- (21) CGD had already made efforts to deleverage its balance sheet before the capital increase in June 2012. From December 2010 until June 2012 the bank reduced its balance sheet by approximately EUR 8,2 billion (accounting perimeter).
- (22) The restructuring plan sets out additional deleveraging efforts. It envisages the sale of the insurance arm, Caixa Seguros, and other non-strategic holdings as well as the run-down of non-core assets to enable CGD to better focus on its core retail banking operations, and release funds that subsequently will strengthen the core capital of the bank. CGD aims to further deleverage the group's balance sheet by EUR [10-20] billion of non-core assets, which – compared to the consolidated balance sheet in December 2012 (based on accounting parameters) – translates into a reduction of [10-20] %. The sale of the insurance business is an important element of the deleveraging exercise, contributing approximately EUR [...] (*) billion to the reduction. The sale of the remaining non-strategic holdings will contribute EUR [0-5] billion, the repayment of ex-Banco Português de Negócios (BPN) debt EUR [0-5] billion, and the run-off of non-core credit in Spain EUR [0-5] billion. Furthermore, approximately two-thirds of the non-core portfolio (EUR [10-20] billion) will be run-down by the end of 2017, while the remainder of the non-core portfolio will be run-down after 2017.
- (23) Caixa Seguros is the market leader in Portugal with total market shares in December 2012 of 31 % in life insurance and 26 % in non-life insurance respectively, including a multiline insurance entity for the life and non-life business as well as specialty insurance entities in particular for health and car insurances. As at 31 December 2012, Caixa Seguros represented 9,2 % of CGD's consolidated net assets and it generated a net income attributable to CGD's shareholders of EUR 89,7 million, based on a volume of direct insurance premiums that in 2012 amounted to EUR 3 195 million.
- (24) CGD will restructure Caixa Seguros in order to improve its marketability and facilitate the sales process. CGD may [...]. The sale process will allow all possible combinations which could vary from [...]. CGD's restructuring plan assumes that [...].
- (25) CGD will also sell all its remaining non-strategic holdings held in quoted Portuguese corporations by the [...], deleveraging its balance sheet approximately by an additional EUR [200-250] million. CGD has already sold the majority of its non-strategic holdings, which generated proceeds of approximately EUR 450 million.
- (26) CGD furthermore plans to gradually run off a portfolio of assets which stems from debt of the failed Banco Português de Negócios (BPN) (7) that has a nominal value of EUR [0-5] billion and a net asset value of approximately EUR [0-5] billion. According to the related repayment scheme, the value of the net assets will be reduced by [40-50] % to EUR [0-5] billion until the end of 2017.
- (27) Finally, CGD will run off a portfolio of non-core credits which were originated by its retail and wholesale banking operations in Spain. That portfolio amounts to approximately EUR [0-5] billion.

Operational efficiency

- (28) The second main element in the restructuring plan is an increase of the bank's operational efficiency. CGD had already taken measures in 2011 and 2012 to optimise its cost base and has, if compared to pre-crisis financial data, reduced both the labour costs and the selling, general and administrative costs of its domestic operations.
- (29) CGD will continue that optimization effort by further reducing operational costs during the restructuring period. A reduction of the bank's headcount and the renegotiation of contracted services are the main levers to achieve additional savings. According to the restructuring plan, CGD will continue to reduce its labour costs

(*) Confidential information.

(7) BPN was nationalised in 2008 and sold in 2011. Some of its assets have been transferred to CGD.

over the restructuring period, targeting a reduction of [5-10] % and projecting labour costs of EUR [500-550] million as of December 2013 and of EUR [450-500] million as of December 2017. In terms of headcount, the number of employees in Portugal will be reduced by [5-10] %. Whilst in December 2012 9 401 employees worked for the domestic retail banking activities CGD intends to reduce that number by December 2017 to [8 500 - 9 000].

- (30) The increase of CGD's operational efficiency will furthermore be achieved by an optimization of the branch network, reducing the domestic branch network by [5-10] % from 840 branches in June 2012 to [750-800] branches by [...]. The closure of [70-80] branches in Portugal from June 2012 until [...] forms part of a periodic optimization process to reevaluate and rationalize CGD's domestic retail footprint and is expected to result in yearly savings of EUR [0-5] million. 58 branches have already been closed or are currently in the process of being closed, the remaining [10-20] branches will be closed before [...].
- (31) Finally, CGD's operational efficiency will be improved by increasing the income from services and commissions, which in 2012 contributed approximately 25 % to the total net operating income, while the relevant share in the Portuguese banking sector was on average 29 %. CGD will introduce new fee structures in order to better align its sources income with that of its peers.

Restructuring of Spanish operations

- (32) The third main element of the restructuring plan concerns the restructuring of the banking operations in Spain. While in general CGD's international operations currently perform much better than the domestic operations and deliver important contributions to the bank's overall performance, CGD's operations in Spain are loss-making. CGD started its retail operations in Spain in 1991 by acquiring Banco de Extremadura and Chase Manhattan España, and then Banco Simeón in 1995. Those retail banking activities currently operate in Spain as a subsidiary of CGD under the name Banco Caixa Geral ('BCG'). In 2007, CGD also started wholesale banking operations which were carried out in a branch that CGD had set up in Spain and which focussed on real-estate projects, related project finance and syndicated loans. While CGD's retail operations in Spain hardly managed to break even over the last decade, the situation was even worse with regard to the wholesale operations. The wholesale operations, which were started just before the financial crisis, have a very poor track record and over a comparatively short period of time added significant losses amounting to approximately EUR 250 million by December 2012. The wholesale will be completely discontinued, and [...].
- (33) Nevertheless, CGD regards Spain as a key market in which it aims to stay present, in particular to support the export business of Portuguese small and medium-sized enterprises ('SMEs'). The retail operations in Spain will therefore be continued, albeit on a much smaller scale. In order to bring the operation back to profitability the number of branches will be reduced by [47-52] %, down from 209 branches in June 2012 to [100-110] branches as of [...]. The headcount of the operations in Spain will be reduced by [46-49] %, down from 974 employees in June 2012 to [500-523] employees as of [...].
- (34) In terms of geographical coverage, BCG will focus its retail operations on the regions of Galicia, Castilla y León, Asturias and Extremadura, keep only a reduced presence in the main cross-border trade centres (Madrid and Catalunya) and keep a very limited presence, with [0-5] branches in each region, in those areas that have relevant cross-border relations and serve as a relevant source of funding for the Spanish operations, namely País Vasco, Andalucía, Aragón and Valencia.

Repayment of CoCos

- (35) The fourth main element of the restructuring plan, the repayment of the EUR 900 million of CoCos during the restructuring period, aims to reduce CGD's average funding costs. The deleveraging of the balance sheet and the increase of the operational profitability should enable CGD to redeem the CoCos. In particular, the sale of the insurance arm should free regulatory capital and thereby allow for an early repayment.
- (36) In order to balance the objectives of lowering the average funding costs on the one hand and keeping a sufficient capital buffer on the other hand, the restructuring plan sets out that in the fiscal year 2014 CGD will use [50-60] % of its excess capital (i.e. the capital above the applicable minimum capital requirement under European and Portuguese law (including pillars 1 and 2) plus a capital buffer of [100-150] basis points) to repay CoCos., In the fiscal years 2015 and, if necessary, in the following years CGD will use [90-100] % of its excess capital for the repayment of CoCos.

(37) Table 2 presents the main financial projections, based on accounting perimeters, contained in the restructuring plan for CGD:

Table 2

CGD's key financial figures 2011 - 2017

P&L	2011		2012		2013		2014		2015		2016		2017		Evolution rate 2012→2017 (%)				
	Core	Total	Core	Total	Core	Total	Core	Total	Core	Total	Core	Total	Core	Total	Core	Total			
Profit before tax	-90	-545	-303	-367	(...)	(...)	(...)	(...)	(...)	(...)	(...)	(...)	(...)	(...)	[...]	[...]			
Cost of Income Ratio	57 %	54 %	52 %	52 %	[70-80] %	[60-70] %	[60-70] %	[60-70] %	[40-50] %	[40-50] %	[40-50] %	[40-50] %	[40-50] %	[40-50] %	[40-50] %	[40-50] %	- [20-30]	- [20-30]	
Employees	17 502	23 205	17 296	23 028	[1 000-20 000]	[1 000-20 000]	[1 000-20 000]	[1 000-20 000]	[1 000-20 000]	[1 000-20 000]	[1 000-20 000]	[1 000-20 000]	[1 000-20 000]	[1 000-20 000]	[1 000-20 000]	[1 000-20 000]	[0-5]	- [20-30]	
Branch	1 344	1 344	1 293	1 293	[1 000-1 500]	[1 000-1 500]	[1 000-1 500]	[1 000-1 500]	[1 000-1 500]	[1 000-1 500]	[1 000-1 500]	[1 000-1 500]	[1 000-1 500]	[1 000-1 500]	[1 000-1 500]	[1 000-1 500]	- [0-5]	- [0-5]	
ROE	-2,5 %	-7,4 %	-5,5 %	-6,3 %	[...]	[...]	[...]	[...]	[...]	[...]	[...]	[...]	[...]	[...]	[...]	[...]	[...]	[...]	[...]

Balance	2011			2012			2015			2017			Udvikling 2012-2017 (%)		
	Total	Core	Non-core	Total	Core	Non-core	Total	Core	Non-core	Total	Core	Non-core	Total	Core	Non-core
Loans to clients (net)	78 248	75 095	3 153	74 713	71 338	3 375	[70 000-75 000]	[65 000-70 000]	[1 500-2 000]	[70 000-75 000]	[70 000-75 000]	[1 000-1 500]	- [0-5] %	- [0-5]	- [60-70]
NPLs	4 800	4 727	72	6 551	6 427	124	[10 000-15 000]	[9 500-10 000]	[400-450]	[10 000-15 000]	[10 000-15 000]	[500-550]	[60-70] %	[60-70]	[300-350]
Total assets	120 642	103 262	17 380	116 857	100 333	16 523	[100 000-150 000]	[95 000-100 000]	[8 500-9 000]	[100 000-150 000]	[100 000-150 000]	[5 000-10 000]	- [5-10] %	[0-5]	- [60-70]
RWA	69 021	66 207	2 813	68 315	65 963	2 352	[65 000-70 000]	[60 000-65 000]	[1 000-1 500]	[65 000-70 000]	[65 000-70 000]	[1 000-1 500]	[0-5] %	[0-5]	- [50-60]

Liabilities	2011			2012			2015			2017			Evolution rate 2012-2017 (%)			
	Total	Core	Non-core	Total	Core	Non-core	Total	Core	Non-core	Total	Core	Non-core	Total	Core	Non-core	
Central bank	9 013	9 013	0	10 300	10 300	0	[5 000-10 000]	[5 000-10 000]	[0-5]	[2 000-2 500]	[2 000-2 500]	[0-5]	- [70-80] %	- [70-80]	-	
Liabilities to clients	70 587	64 030	6 557	71 404	65 545	5 859	[70 000-75 000]	[65 000-70 000]	[3 500-4 000]	[75 000-80 000]	[70 000-75 000]	[1 500-2 000]	[5-10] %	[10-20]	- [70-80]	
Total Liabilities	120 642	114 085	6 557	116 857	110 997	5 859	[100 000-150 000]	[100 000-150 000]	[3 500-4 000]	[100 000-150 000]	[100 000-150 000]	[1 500-2 000]	- [5-10] %	- [0-5]	- [70-80]	
LTD	122 %	117 %	n.a.	114 %	109 %	n.a.	[100-150] %	[100-150] %	n.v.t.	[90-100] %	[90-100] %	n.a.	- [10-20] %	- [10-20]	-	
EBA CT1	n.a.	n.a.	n.a.	9,5 %	9,6 %	9,5 %	[5-10] %	[10-20] %	[5-10] %	[10-20] %	[10-20] %	[5-10] %	[10-20] %	[10-20]	[10-20]	[0-5]

4. POSITION OF THE PORTUGUESE AUTHORITIES

4.1. Position of the Portuguese authorities on the restructuring plan

- (38) Portugal considers the capital increase to be State aid, in particular in view of the current market circumstances and of the fact that the capital increase was carried out simultaneously with the subscription of the CoCos.
- (39) Portugal acknowledges that the subscription of CoCos constitutes State aid, in view of the fact that the terms of their subscription were aligned with those provided for in the New Recapitalisation Scheme which constitutes State aid ⁽⁸⁾.
- (40) Portugal submits that CGD has systemic importance within the Portuguese financial system, that the measures were necessary to bring CGD's capital in line with the capital needs as established in the assessment of the Portuguese Central Bank, Banco de Portugal ('BdP') and the Troika and that the terms and conditions of the aid measures, together with the terms and conditions set out in the commitments for the restructuring of CGD, contain a sufficient range of safeguards against possible abuses and distortions of competition.

4.2. Position of the Portuguese authorities on the procedure on the misuse of aid

- (41) Portugal considers the payments made to the holders of the perpetual non-cumulative preference shares not to be dividends but coupon payments which may be paid if there is a legal obligation to do so.
- (42) Portugal states that according to the underlying terms of the perpetual non-cumulative preference shares, non-payment of dividends would prevent the bank from repurchasing or redeeming parity obligations or junior obligations until after the fourth consecutive following dividend payment date on which a dividend is paid in full. Portugal considers that the repurchase of the CoCos, for which it has received an explicit commitment by CGD, constitutes such a repurchase of parity obligations or junior obligations.
- (43) Portugal confirms that it gave its agreement to the payment of dividends in light of its assumptions that failure to pay them would have made it impossible for CGD to repurchase the CoCos during the following 12 months, and that if no dividends were paid during the five-year public investment period, CGD would not be able at all to repurchase CoCos without breaching its contractual obligations. From Portugal's point of view, such a delay was incompatible with the overriding obligation to minimize the amount and duration of State aid to CGD. Accordingly, Portugal considers that those circumstances de facto rendered the payment of dividends legally binding.

4.3. Commitments of the Portuguese authorities

- (44) Portugal has undertaken a number of commitments related to the implementation of the restructuring plan ('Commitments') which are annexed to this Decision.
- (45) Furthermore, in order to ensure that the various commitments are duly implemented, the Portuguese authorities commit to appoint a monitoring trustee ('the Monitoring Trustee') to monitor all commitments undertaken by the Portuguese authorities and CGD towards the Commission.

5. ASSESSMENT

5.1. Existence of State Aid

- (46) According to Article 107(1) of the Treaty, any aid granted by a Member State or through State resources in any form whatsoever which distorts or threatens to distort competition by favouring certain undertakings or the production of certain goods shall, in so far as it affects trade between Member States, be incompatible with the internal market
- (47) The qualification of a measure as State aid requires the following conditions to be met cumulatively: a) the measure must be financed through State resources; b) it must grant a selective advantage liable to favour certain undertakings or the production of certain goods; c) the measure must distort or threaten to distort competition and have the potential to affect trade between Member States.

⁽⁸⁾ See recital 25 of the decision on the New Recapitalisation Scheme for Credit Institutions in Portugal SA. 34055 (11/N) of 30.5.2012.

- (48) The Commission has already found, for the reasons set out in recitals (33) to (42) of the Rescue Decision, that the measures constitute State aid within the meaning of Article 107(1) of the Treaty. The recapitalisation measures, consisting of the subscription of new ordinary shares in the amount of EUR 750 million and the subscription of CoCos in the amount of EUR 900 million, were provided by Portugal and thus involve State resources. The measures conferred a selective advantage to CGD, enabling it to increase its capital at more favourable conditions than could have been found on the market. CGD is an internationally active bank, competing with other banks in Portugal and other countries. The advantage to it is therefore capable of affecting intra-Union trade and distorting competition.

5.2. Compatibility of the aid with the internal market

- (49) As regards the compatibility of the aid provided to CGD, the Commission must determine, first, whether the aid can be assessed under Article 107(3)(b) of the Treaty, i.e. whether the aid remedies a serious disturbance in the economy of Portugal. Subsequently, the Commission, using that legal basis, must assess whether the proposed measures are in line with the internal market.

5.2.1. Legal basis for the compatibility of the aid

- (50) Article 107(3)(b) of the Treaty empowers the Commission to find that aid is compatible with the internal market if it serves '*to remedy a serious disturbance in the economy of a Member State*'.

- (51) In respect of the Portuguese economy the presence of a serious disturbance has been confirmed in the Commission's various approvals of the measures undertaken by the Portuguese authorities to combat the financial crisis. In particular, the Commission has acknowledged in its last approval of the prolongation of the Portuguese Recapitalisation Scheme⁽⁹⁾ that there is an on-going threat of serious disturbance in the Portuguese economy and that State support of banks is suitable to remedy that disturbance. The Commission notes that the Portuguese banking system faced severe difficulties at the time the aid measures were granted, as a result of the fact that some of the Portuguese banks were highly leveraged, had high loan-to-deposit ratios, and had to cope with an increasing ratio of non-performing loans. The Commission furthermore notes that Portugal receives financial assistance from euro area Member States, part of which is earmarked for the support of Portuguese banks⁽¹⁰⁾.

- (52) Given the systemic importance of CGD – which is a leading bank in Portugal – and the significance of its lending activities for the Portuguese economy, the Commission accepts that its failure to satisfy strengthened capital requirements would have entailed serious consequences for the Portuguese economy.

- (53) In view of the current situation of the Portuguese economy and the widespread lack of banks' access to international and wholesale funding markets, the Commission considers that the requirements for State aid to be approved pursuant to Article 107(3)(b) of the Treaty are fulfilled.

5.2.2. Compatibility of the aid with the Restructuring and Prolongation Communication

- (54) All the measures identified as State aid have been provided in the context of the restructuring of CGD. The Commission communication on the return to viability and the assessment of restructuring measures in the financial sector in the current crisis under the State aid rules ('Restructuring Communication')⁽¹¹⁾ sets out the rules applicable to the granting of restructuring aid of financial institutions in the current crisis. According to the Restructuring Communication, in order to be compatible with the internal market under Article 107(3)(b) of the Treaty, the restructuring of a financial institution in the context of the current financial crisis has to (i) lead to the restoration of the viability of the bank, (ii) include sufficient own contribution by the beneficiary (burden-sharing) and ensure that the aid is limited to the minimum necessary and (iii) contain sufficient measures limiting the distortion of competition.

⁽⁹⁾ Decision of 17 December 2012, case SA. 35747 (12/N), OJ C 43, 15.2.2013, p. 21.

⁽¹⁰⁾ See press release 10191/11 of the Council of the European Union, 17.5.2011.

http://www.consilium.europa.eu/uedocs/cms_data/docs/pressdata/en/ecofin/122072.pdf

⁽¹¹⁾ OJ C 195, 19.8.2009, p. 9.

- (55) Notwithstanding the requirements set out in the Restructuring Communication, point 14 of the Communication from the Commission on the application, from 1 January 2012, of State aid rules to support measures in favour of banks in the context of the financial crisis ('the 2011 Prolongation Communication')⁽¹²⁾ specifies that the Commission will '*undertake a proportionate assessment of the long term viability of banks, taking full account of elements indicating that banks can be viable in the long term without the need for significant restructuring, in particular where the capital shortage is essentially linked to a confidence crisis on sovereign debt, the public capital injection is limited to the amount necessary to offset losses stemming from marking [European] sovereign bonds to market in banks which are otherwise viable, and the analysis shows that the banks in question did not take excessive risk in acquiring sovereign debt.*'
- (56) In that regard the Commission notes that the capital needs of CGD were essentially linked to a crisis of confidence regarding the sovereign debt of Portugal. Although they were not directly caused by the impact of marking sovereign bonds to market, the underlying reason was comparable, as EBA required banks to establish a capital buffer related to the amount of sovereign bonds held on the balance sheet (the so-called 'sovereign buffer') and as a consequence increased its minimum capital requirements.
- (57) Out of CGD's total capital buffer requirement of EUR 1 650 million as established by EBA, which led to the need for that amount of State aid, EUR 1 073 million (65 %) are due to exposure to Portuguese sovereign debt. The Commission's analysis has furthermore shown that CGD did not take excessive risk in acquiring sovereign debt. The sovereign debt portfolio was acquired by doing carry trade transactions (financed by ECB one-year funding). Whilst such transactions could under certain circumstances be considered as above-average risk-taking, the acquired bonds represented eligible collateral and the relevant rating notations were well above investment grade (AA- for Portugal).
- (58) For those reasons the Commission will undertake a proportionate assessment pursuant to point 14 of the 2011 Prolongation Communication.

Restoration of viability

- (59) As the Commission sets forth in its Restructuring Communication the Member State concerned needs to provide a comprehensive restructuring plan which shows how the long-term viability of the beneficiary will be restored without State aid within a reasonable period of time and within a maximum of five years. Long-term viability is achieved when a bank is able to compete in the marketplace for capital on its own merits in compliance with the relevant regulatory requirements. For a bank to do so, it must be able to cover all its costs and provide an appropriate return on equity, taking into account the risk profile of the bank. The return to viability should mainly derive from internal measures and be based on a credible restructuring plan.
- (60) Portugal has submitted a restructuring plan for CGD, with a five-year time horizon, going up to 2017 and showing a return to viability at the end of the restructuring period.
- (61) Point 10 of the Restructuring Communication requires that the proposed restructuring measures constitute a remedy to the beneficiary's weaknesses. In that regard, the Commission notes that the restructuring plan addresses the core weakness of CGD, namely the overall weak profitability of its domestic banking operations, which represent 80 % of its activities. The weak results of CGD's domestic activities can only partly be offset by the positive performance of CGD's international operations, although on average they have shown in the past and currently still show positive Returns on Capital Employed (ROCE). In 2012, for example, the banking activities in Angola achieved a ROCE of [50-60] %, those in Mozambique a ROCE of [20-30] %, in South Africa [20-30] %, and in Macau [20-30] %. In comparison, the banking activities of CGD in Portugal achieved a ROCE of -[10-20] % in 2012. As the international activities contribute positively to the overall economic situation of the CGD group, but only represent a small part of the activities, the restructuring plan focusses on improving the profitability of the domestic operations.

⁽¹²⁾ OJ C 356, 6.12.2011, p. 7.

- (62) The Commission positively notes that CGD had taken measures to reduce its labour and administrative costs before it received State aid. The current macroeconomic situation and the prospects of the domestic banking market, however, called for a more resolute approach, such as the optimization effort that is set out in the restructuring plan. The targeted reduction of the bank's headcount, reducing the number of employees in Portugal in the banking area from 9 401 to [8 500-9 000] over the restructuring period, thereby projecting a reduction of labour costs by [5-10] %, is an adequate means to achieve the required savings, in particular when taking into account that the budget for administrative costs will also be significantly cut down.
- (63) The Commission's analysis of CGD's branch network initially showed that room for improvement as regards the handling of branches that were clearly underperforming. However, the periodic revaluation process of branches which CGD has now established is an adequate approach to monitor the performance of the retail network so as to be able to adjust the domestic footprint if required. In the restructuring plan CGD has set out that it will reduce the domestic branch network by [5-10] %, closing [70-80] out of the 840 branches. From the Commission's point of view, the targeted downsizing appropriately adjusts CGD's domestic presence to the market requirements, while on the whole maintaining an adequate service level to clients.
- (64) The Commission furthermore notes that the improvement of CGD's operational efficiency will also be achieved by increasing the income from services and commissions, based on the introduction of new fee structures. That fee and commission income increase seems justified, considering both that the share of commissions in CGD's income statement is rather low compared to the average in the Portuguese banking sector on the one hand and that the bank has full control over the applicable fee structures on the other hand.
- (65) As regards the deleveraging of the balance sheet, the Commission notes that CGD's restructuring plan is well balanced and carefully avoids producing negative effects on the recovery of the Portuguese economy, even though in total the related measures add up to an amount of EUR [10-20] billion, equivalent to a balance sheet reduction of [10-20] %. If CGD as Portugal's largest bank had simply cut down the size of the credit budget it could have contributed to a credit crunch and hurt the real economy. That outcome was avoided by the fact that the main sources of CGD's deleveraging efforts are not linked to the amount of credit which may be provided to the Portuguese economy. CGD's lending capacity is unaffected by the sale of the insurance business, the sale of remaining non-strategic holdings, the repayment of ex-BPN debt, and the run-off of non-core credit in Spain. The deleveraging efforts are hence well targeted, as they enable CGD to focus on its core retail banking operations and release funds that can strengthen the core capital of the bank whilst avoiding the potential negative effects of deleveraging for the Portuguese economy.
- (66) In the same vein the Commission takes note of the commitment by CGD vis-à-vis the Portuguese Government to allocate EUR 30 million per year to a fund that will in turn invest in equity of SMEs and mid-cap corporates in order to secure financing to the real economy in Portugal. Such investments will not involve the acquisition of equity stakes in competing businesses, and the Commission also considers that they do not constitute market-distorting activities within the meaning of point 23 of the Restructuring Communication. There is nothing in that commitment which can give rise to an additional advantage to CGD, and therefore the Commission does not need to consider further the status of that commitment in the present decision.
- (67) As regards the sale of CGD's insurance activities, it is necessary to restructure Caixa Seguros in order to improve its marketability, as set out in CGD's restructuring plan. CGD has proposed a reasonable approach to achieve a sale of Caixa Seguros within the restructuring period.
- (68) The turnaround of CGD's banking operations in Spain constitutes a significant element in CGD's plan to achieve a positive overall profitability within a short timeframe. In particular in view of the fact that the operations in Spain have been unprofitable for some time already and were contributing negatively before the financial crisis started, a decisive approach is needed to tackle that problem.

- (69) In the restructuring plan, CGD has set out its preferred option to terminate the wholesale activities in Spain and to restructure and continue the retail activities on a smaller scale as well as alternatives, namely a full shut-down of the operation, divesting them by a sale or an asset swap, putting them into a progressive run-off, or looking for a joint venture partner. However, all of those alternatives had their specific downsides and were expected to result in capital losses of significant magnitude. CGD therefore came to the conclusion that restructuring the Spanish operations is the best option from an economic point of view.
- (70) The Commission reckons that the restructuring of the Spanish operations in the current macroeconomic context will be a difficult undertaking but at the same time acknowledges that the alternative approaches could be more costly. The Commission notes positively that the wholesale activities have been stopped and that BCG will in any case run-down a sizeable portfolio of non-core assets of its Spanish operations, significantly reduce its footprint in Spain by nearly [50-60] % and is exploring possibilities to save costs by using services available in the group.
- (71) From the Commission's point of view it is, however, necessary to reinforce the objective of achieving a turnaround of the operations in Spain as soon as possible. For that reason the Commission deems it essential that Portugal has given a commitment that BCG will either meet by the [...] the key performance indicators defined in section 4.2.7.3.1.5 of the commitments set out in the Annex with regard to the relevant thresholds for labour and administrative costs, cost-to-income ratio, funding, deposits, new credit, net margin, and non-performing loans, or – if it fails to achieve them – to stop new business in Spain and to run down all Spanish activities. In view of that safeguard and the lack of alternatives in the short run, the Commission accepts the plan to achieve a turnaround of the retail banking activities in Spain as an element of CGD's restructuring plan.
- (72) The Commission furthermore considers CGD's restructuring plan to be credible even if the current difficult economic situation of Portugal were to last longer assumed in the base case. CGD projects credit at risk to further increase over the restructuring period from an already high level of 12 % to [10-20] % at the end of 2017. The bank furthermore projects to increase provisioning of credit at risk to [50-60] %. Such a coverage ratio can be deemed to be in line with that of other Portuguese banks which have not received State capital, for example those of Banco Espírito Santo or Banco Santander Totta. CGD's coverage ratio has to be assessed in light of the fact that the bank traditionally has a strong foothold as mortgage provider in Portugal and hence has a large share of mortgages in its loan portfolio with an average loan-to-value ratio of around [70-80] %. Taking those factors into account, a coverage of credit at risk of [50-60] % appears to be adequate to cover for CGD's future loan losses over the restructuring period.
- (73) The Commission finally notes that all the measures set out in the restructuring plan are geared to restore CGD's viability and to result in a satisfactory level of profitability, as indicated by the Return on Equity ('ROE') of [5-10] % for CGD's banking activities in Portugal that is targeted for 31 December 2017, as well as the ROE of [5-10] % for the consolidated results of all activities of the CGD group as of 31 December 2017.

Aid limited to the minimum, own contribution and burden-sharing

- (74) The Restructuring Communication indicates that an appropriate contribution by the beneficiary is necessary in order to limit the aid to a minimum and to address distortions of competition and moral hazard. To that end, it provides that (i) both the restructuring costs and the amount of aid should be limited and (ii) a significant own contribution is necessary.
- (75) CGD's restructuring plan does not contain any elements that suggest that the aid exceeds the means required to restore long-term viability. As described in recital (13), the capital shortfall which needed to be covered was determined on the basis of the MoU as agreed between the Portuguese Government, on the one hand, and the IMF, the ECB and the Commission, on the other hand.

- (76) According to point 34 of the Restructuring Communication, adequate remuneration of any State intervention is one of the most appropriate limitations of distortions of competition. The Commission notes in that context that the capital provided in form of CoCos is adequately remunerated, in line with the guidelines of the Commission and the ECB ⁽¹³⁾. The remuneration of the CoCos starts at an initial 8,5 % for the first year and will with step-ups increase over time, resulting in an average annual remuneration rate of 9,2 % over the investment period. The step-up mechanism will encourage CGD to exit from the State intervention.
- (77) The Commission notes that according to the restructuring plan and the related commitments CGD will use its excess capital for the full repayment of the CoCos (see Section 5 of the Commitments).
- (78) CGD will in 2014 use [50-60] % of its excess capital and [90-100] % of excess capital in 2015 and in the following years to repay the EUR 900 million of CoCos. The repayment mechanism limits the buffer of capital that CGD can hold on its balance sheet and thereby ensures that the aid will over the restructuring period remain limited to the minimum necessary.
- (79) It is furthermore important to note that the sale of the insurance arm will free regulatory capital and hence make it more likely that CGD will have excess capital that can be used for the repayment of the CoCos, thus also contributing to the restructuring costs by its own means.
- (80) However, the Commission notes that CGD did not comply with the dividend ban but paid out dividends in the amount of EUR 405 415, in contravention of the commitment given by Portugal in the context of the Rescue Decision.
- (81) The aim of the dividend and coupon bans is to prevent the outflow of funds, thereby ensuring that the aid can be repaid and hence that State aid is limited to the minimum necessary. To that end, shareholders of the bank as well as holders of hybrid capital and subordinated debt should as far as possible be excluded from the potential benefit of the State aid.
- (82) As CGD was in a position to pay out dividends, it was demonstrated that the aid amount was not limited to the minimum necessary. The information that CGD provided in the course of the misuse investigation procedure has not changed the Commission's assessment in the Opening Decision that the payments qualified as dividend payments which fell under the dividend ban of the Rescue Decision or shown a legal obligation to make the payment which would have allowed for a payment of dividends under the Rescue Decision.
- (83) The Commission concludes that the aid measures in the amount of EUR 1 650 million were limited to the minimum necessary, with the exception of an amount of EUR 405 415 that was used for dividend payments. In that respect the Commission takes in particular note of the commitment by CGD to pay back to Portugal an amount equaling the dividend payment and therefore the amount by which the aid granted exceeded the minimum necessary. Given that commitment, the aid is deemed to have been limited to the minimum necessary.
- (84) In addition, the Commission notes that Portugal has committed to a ban on dividend, coupon and interest payments (see Section 6.7 of the Commitments).
- (85) Point 24 of the Restructuring Communication furthermore stipulates that an adequate remuneration of State capital is also a means of achieving burden-sharing. As established in recital (76), the Commission considers that the capital provided in form of CoCos is adequately remunerated.
- (86) Finally, the Commission notes that CGD has already carried out and will continue to implement cost-cutting measures by in particular reducing its headcount and branch network in Portugal, and thereby contributes to the restructuring costs through internal measures.
- (87) For those reasons, the Commission concludes that the restructuring plan ensures that the aid is limited to the minimum necessary and provides for an appropriate own contribution and burden-sharing.

⁽¹³⁾ ECB Governing Council recommendations on the pricing of recapitalisations of 20 November 2008.

Limiting distortions of competition

- (88) Finally, section 4 of the Restructuring Communication requires that the restructuring plan contains measures limiting distortions of competition. Such measures should be tailor-made to address the distortions on the markets where the beneficiary bank operates post-restructuring. The nature and form of such measures depend on two criteria: first, the amount of the aid and the conditions and circumstances under which it was granted and, second, the characteristics of the markets on which the beneficiary will operate. Furthermore, the Commission must take into account the extent of the beneficiary's own contribution and burden-sharing over the restructuring period.
- (89) The Commission recalls that CGD has received State aid in the form of capital injections and CoCos in the amount of EUR 1 650 million. The aid amount is equivalent to 2,3 % of CGD's Risk Weighted Assets (RWA) ⁽¹⁴⁾ which is comparatively low. As the CoCos are adequately remunerated, only moderate measures are necessary to limit potential distortions of competition.
- (90) The proportionate downsizing of CGD in terms of balance sheet size, geographical footprint and staff will contribute to limiting competition distortions. Whilst the divestment of Caixa Seguros and the downsizing and restructuring of the Spanish operation will contribute to the bank's restoration of viability, the remaining balance sheet reduction is considered appropriate compared to the distortions of competition stemming from the aid.
- (91) In addition to those structural measures, Portugal also committed to several behavioural constraints. The Commission takes note of those behavioural commitments set out in Section 6 of the Commitments, such as a ban on advertising State support and a ban on aggressive commercial practices, preventing CGD from using the aid for anti-competitive market conduct. It in particular welcomes an acquisition ban, which ensures that the State aid will not be used to take over competitors, but that it will instead serve its intended purpose, namely to restore CGD's viability.
- (92) In sum, the Commission considers that there are sufficient safeguards to limit potential distortions of competition, in particular in light of the application of point 14 of the 2011 Prolongation Communication as a consequence of the events leading to the necessity for State aid, namely the EBA sovereign buffer.

5.3. Monitoring

- (93) Pursuant to section 5 of the Restructuring Communication, regular reports are required to allow the Commission to verify that the restructuring plan is being implemented properly.
- (94) Moreover, the correct implementation of the Restructuring Plan and the full and correct implementation of all commitments contained in the Commitments will be continuously monitored by an independent, sufficiently qualified Monitoring Trustee.

CONCLUSION

In view of the commitments made by Portugal it is concluded that the restructuring aid is limited to the minimum necessary, that competition distortions are sufficiently addressed and that the submitted restructuring plan is apt to restore CGD's long-term viability. The restructuring aid should be found compatible with the internal market pursuant to Article 107(3)(b) of the Treaty,

HAS ADOPTED THIS DECISION:

Article 1

The State aid consisting of the subscription by Portugal of newly issued ordinary shares in the amount of EUR 750 million from CGD and the subscription by Portugal of convertible instruments issued by CGD in an amount of EUR 900 million is compatible with the internal market, in the light of the commitments set out in the Annex.

Article 2

Portugal shall ensure that the restructuring plan submitted on 15 October 2012 and complemented by the submission of 19 July 2013 is implemented in full, including the commitments set out in the Annex and in accordance with the schedule set out in that Annex.

⁽¹⁴⁾ As of the relevant reference date when the aid measure was granted.

Article 3

Portugal shall inform the Commission within two months of notification of this Decision of the measures taken to comply with it.

Article 4

This Decision is addressed to the the Portuguese Republic.

Done at Brussels, 23 July 2013.

For the Commission

Joaquín ALMUNIA

Vice-President

ANNEX

COMMITMENTS CAIXA GERAL DE DEPÓSITOS, S.A.

1. **Background**

This document sets out the terms (the 'Commitments') for the restructuring of Caixa Geral de Depósitos S.A. ('CGD' or 'the Bank'), which the Portuguese Republic and CGD have committed to implement.

2. **Definitions**

In this document, unless the context requires otherwise, the singular shall include the plural (and vice versa) and the capitalized terms used herein have the following meanings:

Term	Meaning
Asset management	means the development of specialized solutions to invest the savings of the retail (management of mutual and pension funds, and development of solutions tailored for individual investment needs) and institutional clients that include pension funds, Insurance Companies, Corporates and Public Institutions (management of investment portfolios based on customer requirements, either tracking a benchmark or following absolute return solutions)
Bancassurance	means a partnership between a bank and a third party insurance company whereby the Bank sells insurance company products through its retail network
BCG Spain	Banco Caixa Geral, S.A. (Spain) also referred to as the Spanish retail operation
Caixa Seguros	means CGD's main subsidiary active in insurance business
C/I ratio	means the ratio of operating expenses (labour and SG&A costs) to operating income (the sum of net interest income, commission income, revenues from capital instruments, revenues from financial operations, and any other income from operations)
Commitments	mean the undertakings related to the restructuring of CGD set out in this document
Corporate banking	means the banking services offered to corporations, either large corporations or SMEs
Coverage ratio of credit at risk	means the coverage ratio of credit at risk with accumulated loan loss provisions
Core Region	means the Domestic Core Region (Portugal) and the International Core Region (as set out in clause 4.2.2.1)
Credit at risk	as defined in instruction no 16/2004 (consolidated version as of the 31 May 2013 – includes the revision introduced by instruction 23/2011) of the Bank of Portugal, corresponding to the sum of the following elements: a) total value owed on the loans that have payments of principal or interest overdue for a period of at least 90 days. Current account loans that have not been previously contracted shall be considered as credit at risk when the overdraft has existed for 90 days;

Term	Meaning
	<p>b) total value of outstanding loans that have been restructured, after having been unsettled by a period not less than 90 days, without adequate collateral reinforcement (covering the full amount of principal and interest outstanding) or full payment by the borrower of all interest and other charges that were due;</p> <p>c) total value of credit with instalments of principal or interest overdue for less than 90 days, but on which there is evidence to justify its classification as credit at risk, including the bankruptcy or liquidation of the debtor. In case of insolvency of the debtor, the recoverable balances may cease to be considered at risk after approval by a court of law in the respective agreement under the Code of Insolvency and Corporate Recovery (<i>Código de Insolvência e Recuperação de Empresas</i>), if no doubts persist about the effective collectability of the amounts due.</p>
Decision	means the decision of 24 July 2013 of the European Commission on the restructuring of CGD in the context of which these Commitments are undertaken
Divestiture Trustee	one or more natural or legal person(s), independent from CGD, approved by the Commission and appointed by CGD and who has received from CGD the exclusive mandate to sell Caixa Seguros to a purchaser. The Divestiture Trustee shall protect the legitimate financial interests of CGD, subject to CGD's unconditional obligation to divest [...].
Employee	means any person that has a contract of employment with CGD
Factoring	means a financial transaction whereby a business sells its accounts receivable (i.e. invoices) to a third party (called a factor) at a discount. A composite product offering a mix of finance, credit insurance and financial management services (collections).
International Instrumental Activities	has the meaning set out in clause 4.2.2.2
Investment banking	means specialised financial services provided to corporate and institutional customers, including advisory in corporate mergers and acquisitions, project finance, corporate finance (acquisition finance, structured finance, bonds, commercial paper, securitisation, etc.), equity capital markets operations (IPOs, tender offers, equity-linked transactions, etc.) and market risk management (through hedging and structured finance solutions). Additionally, it also includes the provision of financial brokerage services and research reports to institutional and private individual investors, intermediation on fixed income securities and syndication of structured loans.
KPI	Key Performance Indicators
Leasing	means a contract by which an individual or a firm can obtain the use of certain fixed assets for which it must pay a series of contractual, periodic payments having the option to buy the asset at the end of the contract
LDR	means net loans to deposits ratio
Monitoring Trustee or Trustee	has the meaning set out in clause 6.10 and Appendix I herein

Term	Meaning
New Production	consists of all new contracted business with the exception of all previously contractually committed production or any new production which is strictly necessary to preserve the value of the loan collateral or which is otherwise related to minimising capital losses and/or enhancing the expected recovery value of a loan
Nonperforming loans (NPL) ratio on new credit	means new loans production that have payments of interest and/or principal that are past due by 90 days or more/total new credit portfolio
Proprietary trading	means the regular trading activities of CGD, unrelated to client business, using the Bank's own capital and balance sheet.
Restructuring Period	is the time period specified in clause 3.3
Renting	means an agreement where a payment is made for the temporary use of a good (in particular a vehicle) owned by a non-financial company, usually accompanied by the provision of a number of associated services
Restructuring Plan	means the plan submitted by CGD to the European Commission, via the Republic of Portugal, as last amended and supplemented by written communications on 19 July 2013
Remedial Actions	mean action(s) that will allow CGD to meet the identified target(s). The remedial actions shall be presented by CGD as described in clause 4.2.3.3. The Monitoring Trustee will analyse the remedial actions proposed and will report to the Commission on their adequacy to meet the targets in the Restructuring Plan
RWAs	means risk weighted assets that shall be calculated on a consolidated basis in accordance with relevant Portuguese regulations and as approved by Bank of Portugal at the date of the Decision
SME	means a Small & Medium Enterprise which has a turnover below or equal to EUR 50 million and credit exposure to CGD that does not exceed EUR 1 million
VAR	means Value At Risk, the portfolio risk measure as described in the 1996 amendment by the Basel Committee on Bank Supervision. For the purposes of the calculation, figures refer to a historical simulation methodology using a 10-day holding period, a 99 % confidence interval and 501 trading days of data (corresponding to a 2-year horizon)
Venture capital	means the act of providing financial capital to start-up companies, in particular those with high growth potential, in exchange for equity in the business

3. General

- 3.1. Portugal is to ensure that the Restructuring Plan for CGD is correctly and fully implemented.
- 3.2. Portugal is to ensure that the Commitments are fully observed during the implementation of the Restructuring Plan.
- 3.3. The Restructuring Period will end on 31 December 2017. The Commitments apply during the Restructuring Period, unless otherwise provided.

4. **Restructuring of cgd: split into core activities and non-core activities**

4.1. CGD will split its activities into two parts: the Core Activities and Non-Core Activities. The combined total balance sheet size ⁽¹⁾ of the Core Activities and Non-core Activities was EUR 120 642 million in December 2011. In June 2012 the balance sheet total was EUR 117 694 million, by end December 2012 the balance sheet total was EUR 116 857 million.

The split of CGD will be executed as follows:

4.2. The Core Activities

Assets allocated to the Core Activities

The Core Activities include the Domestic Core Activities (retail households, SMEs, corporate banking, Investment banking, Asset management, leasing, factoring, renting, bancassurance and Venture capital), the International Core Activities and the International Instrumental Activities.

4.2.1. The Domestic Core Activities include the net assets set out below (cut-off date 31 December 2012):

4.2.1.1. EUR [850-900] million Cash and balances with the central bank;

4.2.1.2. EUR [1 000-1 500] million Loans (/Receivables) to credit institutions;

4.2.1.3. EUR [2 500-3 000] million Financial assets held for trading;

4.2.1.4. EUR [10 000-15 000] million Available-for-sale financial assets;

4.2.1.5. EUR [0-5] million held-to-maturity financial assets;

4.2.1.6. EUR [60 000-65 000] million Loans to clients;

thereof:

4.2.1.6.1. Developers and construction EUR [8 000-8 500] million;

4.2.1.6.2. Residential mortgages EUR [30 000-35 000] million;

4.2.1.6.3. Large Corporate EUR [10 000-15 000] million;

4.2.1.6.4. SMEs EUR [3 000-3 500] million;

4.2.1.6.5. Consumer loans EUR [1 500-2 000] million;

4.2.1.6.6. Other EUR [4 000-4 500] million (includes other financial institutions and central and local government);

4.2.1.7. EUR [400-450] million Property, plant and equipment;

4.2.1.8. EUR [150-200] million Intangible assets;

4.2.1.9. EUR [4 000-4 500] million Other assets

thereof:

4.2.1.9.1. Investment properties EUR [80-90] million;

4.2.1.9.2. Hedging derivative instruments EUR [30-40] million;

4.2.1.9.3. Non-current assets held for sale EUR [500-550] million;

4.2.1.9.4. Current tax assets EUR [30-40] million;

4.2.1.9.5. Deferred tax assets EUR [1 000-1 500] million;

4.2.1.9.6. Other assets EUR [2 000-2 500] million;

⁽¹⁾ Accounting perimeter.

- 4.2.1.10. EUR [30-40] million net assets contribution arising from participations on other domestic business units (equity method) listed in Appendix II.
- 4.2.2. The International Core Activities and the International Instrumental Activities include the net assets contribution and the international areas set out below (cut-off date 31 December 2012).
- 4.2.2.1. International Core Activities includes all the international areas ('International Core Region') where CGD owns a significant retail banking presence either through a local branch or an affiliated unit, as set out below:
- 4.2.2.1.1. Spain – total net assets: EUR [4 000-4 500] million ⁽²⁾;
- 4.2.2.1.2. France – total net assets: EUR [4 000-4 500] million;
- 4.2.2.1.3. Macao (China) – total net assets: EUR [3 000-3 500] million;
- 4.2.2.1.4. Mozambique – total net assets: EUR [1 500-2 000] million;
- 4.2.2.1.5. Angola – total net assets: EUR [1 000-1 500] million;
- 4.2.2.1.6. South Africa – total net assets: EUR [600-650] million;
- 4.2.2.1.7. Brazil – total net assets: EUR [500-550] million;
- 4.2.2.1.8. Cape Verde – total net assets: EUR [750-800] million;
- 4.2.2.1.9. Timor – total net assets: EUR [50-60] million;
- 4.2.2.1.10. São Tomé – total net assets: EUR [0-5] million.
- 4.2.2.2. International Instrumental Activities are specialized operations that provide services to CGD Group (such as funding, access to institutional markets and products structuring). Instrumental Activities are performed by local specialized branches or affiliated units in key markets, as set out below:
- 4.2.2.2.1. Luxembourg – total net assets: EUR [100-150] million;
- 4.2.2.2.2. Cayman Islands – total net assets: EUR [600-650] million;
- 4.2.2.2.3. United Kingdom (London) – total net assets: EUR [400-450] million;
- 4.2.2.2.4. United States of America (New York) – total net assets: EUR [250-300] million;
- 4.2.2.2.5. China (Zhuhai) – total net assets: EUR [5-10] million.
- 4.2.3. Size
- 4.2.3.1. By end-December 2014 the balance sheet size of the Core Activities shall not be higher than EUR [100-150] billion ⁽³⁾, the RWAs shall not be higher than EUR [70-80] billion, the C/I shall not be higher than [70-80] %, the LDR shall not be higher than [120-130] %, and the coverage ratio of credit at risk shall not be lower than [50-60] %.
- 4.2.3.2. By end-December 2016, the balance sheet size of the Core Activities shall not be higher than EUR [100-150] billion ⁽⁴⁾, the RWAs shall not be higher than EUR [70-80] billion, the C/I shall not be higher than [50-60] %, the LDR shall not be higher than [120-130] %, and coverage ratio of credit at risk shall not be lower than [50-60] %.

⁽²⁾ Excluding Spanish branch and non-core assets to be transferred to the Spanish branch.

⁽³⁾ See footnote 1.

⁽⁴⁾ See footnote 1.

- 4.2.3.3. The total exposure on the consolidated balance sheet to [...] issuers shall not exceed EUR [10-20] billion during the Restructuring Period.
- 4.2.3.4. Should it become likely that the above balance sheet, RWA, C/I, LDR, and coverage of credit-at-risk targets will not be met, CGD shall on its own initiative, and in any case upon request by the Monitoring Trustee, present Remedial Actions within a month. The Monitoring Trustee will analyse the Remedial Actions proposed and will report to the Commission on their adequacy to meet the targets set out in the Restructuring Plan.
- 4.2.4. Branches and Employees
The Core Activities will reduce its current structure in Portugal as follows:
- 4.2.4.1. From 829 (31 December 2012) to [750-800] retail domestic branches ⁽⁵⁾ before the [...].
- 4.2.4.2. Branches may not be replaced by other entities or structures that essentially provide the same services and involve a meaningful amount of manpower. However, CGD may install automated points of service instead (e.g. ATM or the like).
- 4.2.4.3. From 11 904 domestic employees (without insurance business unit by 31 December 2012) to [10 000-15 000] employees by [...], to [10 000-15 000] employees by [...], to [10 000-15 000] employees by end of [...], to [10 000-15 000] employees by [...].
- 4.2.4.4. After the year [...] and until the end of the Restructuring Period the number of branches in Portugal shall not increase.
- 4.2.4.5. Should it become likely that above branch and employee targets are not met, CGD shall on its own initiative, and in any case upon request by the Monitoring Trustee, present Remedial Actions within a month from the request by the Monitoring Trustee. The Monitoring Trustee will analyse the Remedial Actions proposed and will report to the Commission on their adequacy to meet the targets set out in the Restructuring Plan.
- 4.2.5. Description of Core Activities
- 4.2.5.1. The Core Activities shall be those of a commercial retail bank, with a particular focus on households, SME and Corporate Banking, which also provides Investment banking, Asset management, Renting, Leasing and Factoring services, Bancassurance and Venture capital, primarily focused on the Domestic Core Region and on the International Core Region, as well as International Instrumental Activities.
- 4.2.5.2. Consequently, during the Restructuring Period CGD:
- 4.2.5.2.1. Shall not engage in any new production outside the Core Region and outside the International Instrumental Activities' areas defined in clauses 4.2.2. For the avoidance of doubt, CGD will still be allowed to engage new production with customers domiciled outside the Core Region when booked in the Core Region or in the International Instrumental Activities.
- 4.2.5.2.2. Shall ensure that the net assets of the International Instrumental Activities do not exceed [0-5]% of the Core Activities balance sheet size.
- 4.2.5.2.3. Shall not engage any new production in Portugal other than in the activities described in 4.2.

⁽⁵⁾ Excluding self-service branches and including corporate offices

4.2.6. Principles which apply to the International Core Activities and to the International Instrumental Activities

Until the end of the Restructuring Period, CGD will make its best efforts to decrease its exposure on capital and intra group funding to its International Core Activities. CGD shall not increase its exposure on capital and intra group funding to its International Core Activities and International Instrumental Activities except when this increase arises directly from previously existing (before this Decision) contractual obligations assumed with third parties or regulatory related obligations, or is required by a final and mandatory decision taken by a public authority on CGD. Before implementing the capital measure, CGD commits to promptly inform the Monitoring Trustee of any such decision and present a business plan for the entities which require additional capital or funding need to the Monitoring Trustee. The Monitoring Trustee will analyse the business plan and will report to the Commission on the adequacy of the measures taken.

4.2.7. Restructuring plan for BCG Spain

4.2.7.1. CGD shall restructure the business of BCG Spain, in order to ensure its long-term viability, autonomy from CGD in terms of funding and positive contribution to CGD's group profitability.

4.2.7.2. CGD commits to cease all activities in the Spanish operation that are not directly related to the core activities of the operation (retail banking ⁽⁶⁾, support to SMEs and to cross-border business). In particular CGD commits:

4.2.7.2.1. to stop new production in Project Finance operations;

4.2.7.2.2. to stop new production in Leverage Finance operations;

4.2.7.2.3. to stop new production in Acquisition Finance operations.

4.2.7.3. The restructuring of BCG Spain shall be carried out in two phases.

4.2.7.3.1. Phase 1

Until [...], CGD will:

4.2.7.3.1.1. Use CGD's Spanish branch as a vehicle to consolidate the legacy portfolio in Spain, separating core from non-core business activities and shielding the core operation. The non-core wholesale credit and mortgage portfolios of both BCG Spain and CGD's Spanish Branch (*Sucursal em Espanha*) will be consolidated in the Spanish Branch, which will stop any new production and manage the run-off of these portfolios (for a detailed list of EUR [1 000-1 500] million assets to be transferred out of BCG Spain see Appendix III);

4.2.7.3.1.2. Restructure the retail network of BCG Spain including EUR [5 000-5 500] million of assets as of 31 December 2012 (for a detailed list of EUR [5 000-5 500] million of assets see Appendix III), by re-focusing the operation on its core areas, focusing on cross border SME business and reducing the presence of branches with negative profitability, unsustainable LDR, insufficient customers;

4.2.7.3.1.3. The number of branches will be reduced from 173 branches in December 2012 to [100-110] by [...] (for a detailed list of branches see Appendix V) and will not be increased during the Restructuring Period;

4.2.7.3.1.4. The number of employees will be reduced from 797 in December 2012 to [500-523] by [...] and will not be increased during the Restructuring Period;

4.2.7.3.1.5. Key performance indicators (KPIs) to be met by [...]

Starting from October 2014, the Monitoring Trustee will start to assess whether the following KPIs for BCG Spain will be met by [...].

⁽⁶⁾ In traditional areas (Galicia, Extremadura, Castilla y León and Asturias) and in large urban cities and main cross border trade centers (Madrid, Barcelona, País Vasco, Andalucía, Aragón and Valencia).

4.2.7.3.1.5.1. Over the whole period of [...] the total of Labour costs and SG&A costs must be below or equal to EUR [50-60], and BCG Spain must achieve a C/I ratio of below or equal to [50-60] %;

4.2.7.3.1.5.2. BCG Spain must be entirely self-funded and sufficiently capitalised. No additional capital and net funding must have been provided in the period of end of 2012 to [...], and there must not be any need for additional capital and net funding until the end of the Restructuring Period.

4.2.7.3.1.5.3. The amount of new credit production (net), i.e. credit generated after end of 2012 and not having matured or been redeemed by [...], must be equal or above EUR [900-950]. The part of new credit production related to cross-border is equal or above [20-30] %.

4.2.7.3.1.5.4. The new credit production, as defined and referred to in the point 4.2.7.3.1.5.3, generates a weighted average net margin (spread) above reference rate (6 months Euribor) of at least [0-5] %.

4.2.7.3.1.5.5. The NPL ratio of the new credit production, as defined in the point 4.2.7.3.1.5.3, is equal to or below [0-5] %.

4.2.7.3.1.5.6. The total amount of deposits is equal or above EUR [0-5] billion ⁽⁷⁾. The weighted average cost of the deposits is not higher than [...] ⁽⁸⁾; the LDR is equal to or below [100-150] %.

4.2.7.3.2. Phase 2

4.2.7.3.2.1. Starting from [...], CGD will continue the implementation of the restructuring plan of BCG Spain until the end of the Restructuring Period if the KPIs are met by [...].

4.2.7.3.2.2. If the KPIs referred to above are not met by [...], or as soon as the Monitoring Trustee has finalised its assessment that there is sufficient evidence that those KPIs will not be met, BCG Spain will immediately stop engaging in any new production and begin to wind down its operation in Spain whereby CGD could maintain a small presence in order to facilitate the run-off of the Spanish operation.

4.3. The Non-Core Activities

All activities and assets that are not explicitly mentioned in section 4.2 are considered to be Non-Core. In order to restore viability and to focus on its core business, CGD shall dispose of its insurance and health business lines, sell all non-strategic holdings and shall put all Non-Core Activities into run-down mode as described below.

4.3.1. The sale of Caixa Seguros

4.3.1.1. CGD's main subsidiary active in the insurance business, Caixa Seguros, shall be sold until [...]. The sale of the insurance business unit shall [...];

4.3.1.1.1. [...]

4.3.1.1.2. To carry out this divestiture of the insurance business unit's assets (estimated EUR [...] billion), Portugal commits that CGD shall find a Purchaser and enter into a final binding sale and purchase agreement at the latest by [...]. If CGD has not entered into such an agreement by [...], CGD shall on [...] appoint a Divestiture Trustee and grant an exclusive mandate to sell the insurance business unit's assets (estimated EUR [...] billion) [...] until the [...] at the latest.

4.3.1.1.3. [...].

⁽⁷⁾ With a 10 % tolerance margin.

⁽⁸⁾ See footnote 7.

- 4.3.2. Assets allocated to the Non-Core Activities to be run-down
- 4.3.2.1. The Non-Core Activities include the assets set out below (cut-off date 31 December 2012):
 - 4.3.2.1.1. Run-off of the Ex-BPN assets that included as of 31 December 2012: Total EUR [4 000-4 500] million (Credit EUR [1 000-1 500] million and Debt held (available for sale) EUR [2 500-3 000] million)
 - 4.3.2.1.2. Sale of the non-strategic holdings: EUR [200-250] million to be sold until the [...] (projected value of sale)
 - 4.3.2.1.3. Run-off of the Spanish non-core credit portfolio worth as of 31 December 2012: EUR [1 500-2 000] million (detailed list in Appendix IV)
 - 4.3.2.1.4. Disposal of the Insurance business unit as defined in point 4.3.1 above.
- 4.3.2.2. By end-December 2014, the Non-Core Assets shall not be higher than EUR [10-20] billion.
- 4.3.2.3. By end-December 2016, the Non-Core Assets shall not be higher than EUR [5-10] billion.
- 4.3.2.4. Principles which apply to the Non-Core Activities
 - 4.3.2.4.1. Limitation on New Production
 - 4.3.2.4.1.1. Termination of any New Production with the exception of:
 - 4.3.2.4.1.2. Contractually committed but not yet paid-out amounts shall be limited to the strict minimum.
 - 4.3.2.4.1.3. No additional financing to existing customers which is not contractually committed except when it is strictly necessary to preserve the value of the loan collateral, or otherwise related to minimizing capital losses and/or enhancing the expected recovery value of a loan.
 - 4.3.2.4.1.4. Management of existing assets: The existing assets shall be managed in a way that maximizes Net Present Value of the assets. Specifically, if a client cannot respect the terms of his loan, the loan will only be restructured (deferral or partial waiver of repayments, conversion of (part of) the claim in capital, etc.) if such a restructuring would lead to enhancing the present value of the loan. This principle also applies to mortgage loans.
 - 4.3.2.4.2. Active winding down of the Non-Core Assets
 - 4.3.2.4.2.1. The Non-Core Assets shall be managed with the objective of being divested, liquidated or wound down, in an orderly manner but minimizing the cost. Any remaining assets at the end of the Restructuring Period should be wound down in an orderly manner once the assets mature. No new Non-Core Activity shall be undertaken, unless explicitly mentioned in the Commitments. To that end, the following actions may be undertaken:
 - 4.3.2.4.2.2. As a general rule, Non-Core Assets shall be sold as quickly as possible. CGD commits to sell such assets whenever the sale does not lead to having to book a loss, except if the sale price is unreasonable in view of a non-controversial valuation.

4.3.2.4.3. Sale of non-strategic shareholdings:

4.3.2.4.3.1. CGD commits to divest the following non-strategic equity holdings by [...]:

Company	Stake (%) (*)	Sale Value (EUR m) (**)	Date of Sale
[...]	[...]%	[200-250]	[...]
[...]	[...]%	[10-20]	[...]

(*) Valued at 31 December 2012

(**) BPN was nationalised in 2008 and sold in 2011. Some of its assets have been transferred to CGD.

4.3.2.4.3.2. The total value of the non-strategic shareholdings amounted to EUR 841 million at the start of the deleveraging effort. As of 31 December 2012, non-strategic holdings amount to EUR [200-250] million.

4.3.2.4.3.3. CGD will completely divest the equity holdings listed above by the [...]. If CGD has not completely divested the holdings described by [...], CGD shall on [...] appoint a Divestiture Trustee and grant an exclusive mandate to sell the remaining non-strategic holdings [...] until the [...] at the latest.

4.3.2.4.3.4. Until each of the above-referred non-strategic shareholdings is sold, CGD shall not increase its financial exposure (e.g. loans and guarantees) to such company in any case, except when it is (a) in the normal course of business under prevailing market conditions; or (b) strictly necessary to preserve the value of the relevant equity interest; or (c) otherwise related to minimizing capital losses and/or enhancing the expected recovery value of such exposures or interest. CGD will make its best efforts to decrease its financial exposure to such companies.

5. Repayment Mechanism of the AID

5.1. CGD undertakes to repay the EUR 900 million CoCos in the following tranches:

5.1.1. For the fiscal year 2014: [50-60] % of the excess capital above the applicable minimum capital requirement under European and Portuguese law (including pillar 1 and 2) plus a capital buffer of [100-150] bps.

5.1.2. For the fiscal years 2015 and following: [90-100] % of the excess capital above the applicable minimum capital requirement under European and Portuguese law (including pillar 1 and 2) plus a capital buffer of [100-150] bps.

5.2. Without prejudice to the competences of Bank of Portugal as banking supervisor of CGD, the CoCo repayment shall be, totally or partially, suspended if, on the basis of a reasoned request by CGD endorsed by the Monitoring Trustee, it is considered that it would endanger the solvency position of the Bank in the following years.

5.3. CGD undertakes to pay EUR 405,415 (equivalent amount to the coupon payment of 28 September 2012) to the Portuguese Republic by end of 2013.

6. Behavioural measures and corporate governance

6.1. Ban on acquisitions: CGD commits to refrain from making acquisitions. This applies to both the purchase of companies with their own legal structure, and shares in companies or asset bundles that represent a commercial transaction or a branch of activity. This does not apply to acquisitions that must be made in

- order to maintain financial and/or association related stability, or in the interests of effective competition, provided they have been approved beforehand by the Monitoring Trustee. This does not apply either to (1) acquisitions that belong, in terms of the management of existing obligations of customers in financial difficulty, to a bank's normal on-going business or (2) to Venture capital activity or (3) to acquisitions that fall under the exceptions foreseen in clause 4.2.6 and that comply with the procedure foreseen therein or (4) to acquisitions within the group or (5) to acquisitions of shares in Portuguese companies that are not credit institutions in which CGD already holds at least 50 % provided they have been approved beforehand by the Monitoring Trustee. The obligation is to apply until the Restructuring Period ends. CGD may acquire stakes in undertakings provided that the purchase price paid by CGD for any acquisition is less than [0-5] % of the balance sheet size of CGD on the last day of the month previous to the Decision and that the cumulative net purchase prices paid by CGD for all such acquisitions over the whole Restructuring Period is less than [0-5] % of the balance sheet size of CGD at that same date.
- 6.2. Ban on commercial aggressive practices: The beneficiary bank shall avoid engaging in aggressive commercial practices throughout the duration of the Restructuring Period.
- 6.3. Proprietary trading: Portugal will ensure that CGD will not engage in any proprietary trading beyond the minimum necessary for the normal functioning of the treasury. During the Restructuring Period, the total VAR limit of the financial assets held for trading will not exceed EUR [30-40] million.
- 6.4. Advertising: CGD must not use the granting of the aid measures or any advantages arising therefrom for advertising purposes.
- 6.5. Assurances regarding corporate governance
- 6.5.1. All members of the management bodies of CGD shall have the competences established in Articles 30 and 31 of the General Framework for Credit Institutions and Financial Companies, approved by Decree-Law 298/92, of 31 December, as amended, as well as in the EBA Guidelines on the assessment of the suitability of members of the management body and key function holders, of 22 November 2012 (EBA/GL/2012/06). There should be no more than 20 board members. CGD's shareholder will aim to reduce that number to 16 at the end of the present board's term of office.
- 6.5.2. Besides the committees established in CGD's Articles of Incorporation (being the Executive Committee and Audit Committee) and the Strategy, Governance and Assessment Committee established by the Board of Directors and composed of non-executive directors, CGD is to appoint only the internal bodies which are necessary to assist in the management of the company, which shall be composed of members of the Executive Committee and, when appropriate, of CGD employees holding senior management positions in the relevant areas.
- 6.5.3. All of CGD's decisions shall be taken on purely commercial grounds and all of Portugal's interactions with CGD shall be on arm's length terms.
- 6.5.4. Portugal commits not to exert any influence on the day-to-day operational management of CGD nor on CGD's internal rules regarding credit risk policies, pricing and lending. However, Portugal may issue guidelines regarding CGD's strategic focus and other issues on the basis of the general terms of corporate law and the law of public enterprises (Decree-Law 558/99, of 17 December, as amended). Portugal will not compromise the full independence of the Bank management with reference to credit risk and lending policies if consulted in relation to CGD's business plans and plans for lending to specific sectors of the economy.
- 6.5.5. The Credit Council, the Extended Credit Council, and the Audit Committee of CGD shall be put into a position to act fully independently, and all appointments to the Credit Council, the Extended Credit Council, and the Audit Committee respect that members of those bodies must be in a position to act independently and free of any conflict of interest.

- 6.5.6. CGD ensures that until 31 December 2013 at the latest its credit and risk policies will incorporate the principle that all customers are to be treated fairly through non-discriminatory procedures other than those related to credit risk and ability to pay, which is to be consistently applied within the group. The credit and risk policies will define the principles and thresholds above which the granting of loans must be approved by higher levels of management, the terms and conditions for the restructuring of loans, and the handling of claims and litigations.
- 6.5.7. CGD ensures that until 31 December 2013 at the latest a specific section within the credit and risk policies will be devoted to the rules governing relations with connected borrowers (including employees, shareholders, directors, managers, as well as their spouses, children and siblings and any legal entity directly or indirectly controlled by any of those).
- 6.5.8. In order to ensure CGD's compliance with principles set out in point 6.5.1 to 6.5.7 the Trustee will be allowed to:
- 6.5.8.1. receive copies of all reports emanating from internal control bodies including the minutes of the meetings, and be entitled to interview, at its sole discretion, any controller or auditor, no matter his/her managerial responsibilities. The Trustee shall ensure (i) that recommendations from permanent supervisors or periodic controllers/auditors are duly enforced and (ii) that action plans are implemented in order to correct any failure identified within the internal control framework.
- 6.5.8.2. regularly monitor CGD's commercial practices, with a focus on credit policy and deposit policy. The Trustee shall review CGD's policy toward the restructuring and provisioning of non-performing loans. CGD shall communicate to the Trustee any risk report communicated to the Executive Board, or any analysis/review aimed at assessing the credit exposure of CGD. The Trustee shall perform its own analysis and investigations, on the basis of the above-mentioned reports, interviews, and, if need be, the review of individual credit files. In that regard, a full access to credit files is to be granted to the Trustee, who is entitled to interview credit analysts and risk officers when deemed appropriate.
- 6.5.8.3. regularly monitor CGD's management of claims and litigations. The Trustee shall ensure that claims and litigations are managed according to the procedures defined in the internal control framework of CGD, and that CGD complies with the industry best practices. The Trustee will identify corrective actions to implement in case of deficiencies in the current process.
- 6.6. Remuneration of bodies and employees:
- 6.6.1. CGD shall verify the incentive effect and appropriateness of its remuneration systems and ensure that they do not result in exposure to undue risks, are oriented towards sustainable, long-term company objectives, and are transparent.
- 6.6.2. CGD as a financial institution shall establish and implement its policies on salary and compensation matters strictly in accordance with the rules set forth by the Portuguese Government in Decree-law 104/2007, of 3 April (which transposed the Directive 2006/48/EC of the European Parliament and of the Council of 14 June 2006 relating to the taking up and pursuit of the business of credit institutions) as amended by Decree-Law 88/2011, of 20 July, and with the rules established by the Portuguese Central Bank in *Aviso* 10/2011, of 29 December.
- 6.6.3. Furthermore, CGD's remuneration policy of the Board Members shall also be compliant with Decree-Law 71/2007 of 27 March, which establishes the regime of the statute of the Stated controlled companies' board members.
- 6.6.4. Likewise, CGD commits to ensure that the Bank complies with the rules and recommendations set out by the European Commission in this subject within the EU framework for State aid.
- 6.6.5. In particular, CGD undertakes to restrict the total remuneration to any member of staff, including board members and senior management, to an appropriate level, including all possible fixed and variable components, comprising pensions and in line with Articles 92 and 93 of Directive 2013/36/EU of the European Parliament and of the Council of 26 June 2013 on access to the activity of credit institutions and the prudential supervision of credit institutions and investment firms, amending Directive 2002/87/EC and repealing Directives 2006/48/EC and 2006/49/EC.

- 6.7. Ban on dividend, coupon and interest payments: CGD will not (and shall procure that none of its subsidiary undertakings shall) make any payments of dividends, coupons or interest to holders of preference shares and subordinated debt, in so far as those payments are not owed on the basis of contractual or legal obligations. However, CGD shall be allowed to make payments (or allow its subsidiary undertakings to make payments) of dividend, coupons or interest to holders of preference shares or subordinated debt if it can prove that non-payment would hinder or prevent the repayment of the CoCos (or payment of coupons on the CoCos) that is described in section 5.
- 6.8. Support of Portuguese SMEs: In view of securing financing to and deleveraging of the real economy, CGD has committed to the Portuguese Government to allocate EUR 30 million per year to a fund that will invest in equity of Portuguese SMEs and mid-cap corporates. The fund shall be managed according to international best practice by the Bank or a third party with sufficient expertise and awareness of investment opportunities. The investment in the fund shall be subject to prior approval by the Portuguese Ministry of Finance according to the criteria defined in the Ministerial Order setting the terms for the recapitalization under national law and will be held by CGD. Any funds not transferred to such fund within 12 months of commitment shall be transferred to the Portuguese Treasury. The fund shall not be used as a refinancing mechanism for existing loans. Any investment exceeding the above referred amount shall be subject to prior approval by the European Commission.
- 6.9. Other rules of conduct: CGD shall continue expansion of its risk monitoring operations and conduct a commercial policy that is prudent, sound and oriented towards sustainability.
- 6.10. Monitoring Trustee
- 6.10.1. Portugal shall ensure that the full and correct implementation of the Restructuring Plan and the full and correct implementation of all Commitments are continuously monitored by an independent, sufficiently qualified Monitoring Trustee.
- 6.10.2. The appointment, duties, obligations and discharge of the Monitoring Trustee must follow the procedures set out in Appendix I hereof.
- 6.10.3. Portugal and CGD shall ensure that, during the implementation of the Decision, the Commission or the Monitoring Trustee have unrestricted access to all information needed to monitor the implementation of the Decision. The Commission or the Monitoring Trustee may ask CGD for explanations and clarifications. Portugal and CGD are to cooperate fully with the Commission and the Monitoring Trustee with regard to all enquiries associated with monitoring of the implementation of the Decision.
- 6.10.4. CGD will report annually to the Commission on the evolution of the Non-Core Activities after the dismissal of the Monitoring Trustee at the end of the Restructuring Period.
- 6.11. Divestiture Trustee
- 6.11.1. Portugal shall ensure that CGD sells the insurance business unit's assets (estimated EUR [...] billion) of Caixa Seguros in due time. To that end, CGD shall appoint a Divestiture Trustee on [...] in the event that CGD has not entered into a final binding sale and purchase agreement at the latest by [...].
- 6.11.2. Portugal shall ensure that CGD sells its non-strategic holdings (stake in [...] corresponding to EUR [200-250] million). To that end, CGD shall appoint a Divestiture Trustee on [...] in the event that CGD has not completely divested at the latest by [...].
- 6.11.3. The Divestiture Trustee shall be independent of CGD and work on behalf and under instruction of DG COMP, possess the necessary qualifications to carry out its mandate (for example as an investment bank or consultant) and shall neither have nor become exposed to a conflict of interest. The Divestiture Trustee shall be remunerated by CGD in a way that does not impede the independent and effective fulfilment of its mandate.
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*Appendix I***THE MONITORING TRUSTEE****(A) Appointment of the Monitoring Trustee**

- (i) Portugal undertakes to ensure that CGD appoints a Monitoring Trustee who is to be subject to the duties and obligations set out in paragraph C of this Appendix. The mandate applies to the entire duration of the Restructuring Plan; i.e. until 31 December 2017. At the end of the mandate, the Trustee must submit a final report.
- (ii) The Trustee must be independent of CGD. The Trustee must possess, for example as an investment bank, consultant or auditor, the specialised knowledge that is required in order to carry out its mandate, and must at no time be exposed to any conflict of interest. The Trustee is to be remunerated by CGD in a way that must not impede the independent and effective fulfilment of its mandate.
- (iii) Portugal shall submit the names of two or more persons to the Commission for approval as monitoring Trustee no later than six weeks after notification of the Decision.
- (iv) These proposals must contain sufficient information about those persons to enable the Commission to verify whether the proposed Trustee fulfils the requirements set out in paragraph A(ii), and must in particular include the following:
 - (a) the full terms of the proposed mandate with all the provisions which are necessary to enable the Trustee to fulfil its duties; and
 - (b) the draft of a work plan describing how the Trustee intends to carry out its assigned duties.
- (v) The Commission has the discretion to approve or reject the proposed Trustees and to approve the proposed mandate subject to any modifications that it deems necessary in order to enable the Trustee to fulfil its obligations. If only one name is approved, CGD will appoint the person or institution concerned as Trustee or cause that person or institution to be appointed, in accordance with the mandate approved by the Commission. If more than one name is approved, CGD is free to decide which of the approved persons should be appointed as Trustee. The Trustee will be appointed within one week of the Commission's approval, in accordance with the mandate approved by the Commission.
- (vi) If all the proposed Trustees are rejected, Portugal shall submit the names of at least two further persons or institutions within two weeks of being informed of the rejection, in accordance with the requirements and procedure set out in paragraphs A(i) and A(iv).
- (vii) If all further proposed Trustees are also rejected by the Commission, the Commission will nominate a Trustee which CGD will appoint or cause to be appointed, in accordance with a Trustee mandate approved by the Commission.

(B) Appointment of the Divestiture Trustee

- (i) Portugal undertakes to ensure that CGD appoints a Divestiture Trustee following the appointment procedure as set out above for the Monitoring Trustee.
- (ii) Portugal shall submit the names of two or more persons to the Commission for approval as Divestiture Trustee no later than [...], in the event that CGD has until then not yet entered into a final binding sale and purchase agreement for Caixa Seguros.
- (iii) Portugal shall submit the names of two or more persons to the Commission for approval as Divestiture Trustee no later than [...], in the event that CGD has until then not yet entered into a final binding sale of the remaining non-strategic holdings ([...])

(C) General duties and obligations

The Trustee is to assist the Commission to ensure CGD's compliance with the Commitments and to assume the duties of a monitoring Trustee specified in the Commitments document. The Trustee is to carry out the duties under this mandate in accordance with the work plan, as well as revisions of the work plan that have been approved by the Commission. The Commission may, on its own initiative or at the request of the Trustee or CGD, issue orders or instructions to the Trustee in order to ensure compliance with the Commitments. CGD is not entitled to issue instructions to the Trustee. The Trustee shall be bound by legal confidentiality duties.

(D) Duties and obligations of the Monitoring Trustee and the Divestiture Trustee

(1) The duty of the Trustee is to guarantee full and correct compliance with the obligations set out in the Commitments, and full and correct implementation of CGD's Restructuring Plan. The Commission may, on its own initiative or at the request of the Trustee, issue any orders or instructions to the Trustee or CGD in order to ensure compliance with the Commitments attached to the Decision.

(2) The Trustee:

- i. is to propose to the Commission in its first report a detailed work plan describing how it intends to monitor compliance with the Commitments attached to the Decision;
- ii. is to monitor the full and correct implementation of CGD's Restructuring Plan, in particular:
 - (a) the reduction of the balance sheet total and the RWA;
 - (b) the restriction of business activities;
 - (c) the discontinuation of predefined business areas;
 - (d) the sales process for shares in the predefined business areas;
 - (e) the restructuring of the operations in Spain;
- iii. is to monitor that CGD follows the principles in the corporate governance section, actually has an efficient and adequate internal organisation in place, and actually applies proper commercial practices. The Trustee will hence:
 - (a) receive copies of all reports emanating from internal control bodies, and be entitled to interview, at its sole discretion, any controller or auditor, no matter his/her managerial responsibilities. The Trustee shall ensure (i) that recommendations from permanent supervisors or periodic controllers/auditors are duly enforced and (ii) that action plans are implemented in order to correct any failure identified within the internal control framework.
 - (b) regularly monitor CGD's commercial practices, with a focus on credit policy and deposit policy. The Trustee shall review CGD's policy toward the restructuring and provisioning of non-performing loans. CGD shall communicate to the Trustee any risk report communicated to the Executive Board, or any analysis/review aimed at assessing the credit exposure of CGD. The Trustee shall perform its own analysis and investigations, on the basis of the above-mentioned reports, interviews, and, if need be, the review of individual credit files. In that regard, a full access to credit files is to be granted to the Trustee, who is entitled to interview credit analysts and risk officers when deemed appropriate.
 - (c) regularly monitor CGD's management of claims and litigations. The Trustee shall ensure that claims and litigations are managed according to the procedures defined in the internal control framework of CGD, and that CGD complies with the industry best practices. The Trustee will identify corrective actions to implement in case of deficiencies in the current process.

- iv. is to monitor compliance with all other Commitments;
- v. is to assume the other functions assigned to the Trustee in the Commitments attached to the Decision;
- vi. is to propose measures to CGD that it considers necessary to ensure that CGD fulfils the Commitments attached to the Decision;
- vii. is to take into account any regulatory changes on solvency and liquidity when verifying the evolution of the actual financials with respect to the projections made in the Restructuring Plan; and
- viii. is to submit a draft written report to the Commission, Portugal and CGD within thirty days after the end of each six-month period. The Commission, Portugal and CGD can submit comments on the draft within five working days. Within five working days of receipt of the comments, the Trustee is to prepare a final report, incorporating the comments as far as possible and at its discretion, and submit it to the Commission and to Portugal. Only afterwards the Trustee is also to send a copy of the final report to CGD. If the draft report or the final report contains any information that may not be disclosed to CGD, only a non-confidential version of the draft report or the final report is to be sent to CGD. Under no circumstances is the Trustee to submit any version of the report to Portugal and/or CGD before submitting it to the Commission.

The report is to focus on the duties set out in the mandate by the Trustee and compliance with the obligations by CGD, thus enabling the Commission to assess whether CGD is being managed in accordance with the obligations. If necessary, the Commission may specify the scope of the report in more detail. In addition to these reports, the Trustee is to report promptly in writing to the Commission if it has reasons to suppose that CGD is failing to comply with these obligations, sending a non-confidential version to CGD at the same time.

- (3) The Divestiture Trustee shall sell the insurance business unit's assets (estimated EUR [0-5] billion) of Caixa Seguros [...] to a purchaser. The Divestiture Trustee shall include in the sale and purchase agreement such terms and conditions as it considers appropriate for an expedient sale before [...]. In particular, the Divestiture Trustee may include in the sale and purchase agreement such customary representations and warranties and indemnities as are reasonably required to effect the sale. The Divestiture Trustee shall protect the legitimate financial interests of CGD, subject to CGD's unconditional obligation to divest [...].
- (4) The Divestiture Trustee shall sell remaining non-strategic holdings (estimated sale price EUR [200-250] million) [...] to a purchaser. The Divestiture Trustee shall include in the sale and purchase agreement such terms and conditions as it considers appropriate for an expedient sale before [...]. The Divestiture Trustee shall protect the legitimate financial interests of CGD, subject to CGD's unconditional obligation to divest [...].

(E) Duties and obligations of CGD

- (1) CGD is to provide and to require its advisors to provide the Trustee with all such cooperation, assistance and information as the Trustee may reasonably require to perform its tasks under this mandate. The Trustee is to have unrestricted access to any books, records, documents, management or other personnel, facilities, sites and technical information of CGD or of the business to be sold that are necessary to fulfil its duties under the mandate. CGD is to make available to the Trustee one or more offices at its business premises and all employees of CGD are to be available for meetings with the Trustee in order to provide it with all the information it needs to perform its duties.
- (2) Subject to CGD's approval (this approval may not be unreasonably withheld or delayed) and at its expense, the Trustee may appoint advisors (in particular for corporate finance or legal advice), if the Trustee considers the appointment of such advisors necessary or appropriate for the performance of its duties and obligations under the mandate, provided that any costs and other expenses incurred by the Trustee are reasonable. Should CGD refuse to approve the advisors proposed by the Trustee, the Commission may approve their appointment instead, after hearing CGD's reasons. Only the Trustee is entitled to issue instructions to the advisors.

(F) Replacement, discharge and reappointment of the Trustee

- (1) If the Trustee terminates its functions under the Commitments or if there are any other significant grounds, such as a conflict of interest on the part of the Trustee:
 - (i) the Commission can, after hearing the Trustee, require CGD to replace it,

or
 - (ii) CGD, with the approval of the Commission, can replace the Trustee.
 - (2) If the Trustee is removed in accordance with paragraph F (1), it may be required to continue in its function until a new Trustee is in place to whom the Trustee has effected a full handover of all relevant information. The new Trustee is to be appointed in accordance with the procedure referred to in paragraphs A(iii) to A(vii).
 - (3) Besides removal in accordance with paragraph F(1), the Trustee is to cease its activities only after the Commission has discharged it from its duties. This discharge is to take place when all the obligations with which the Trustee has been entrusted have been implemented. However, the Commission may at any time require the reappointment of the Trustee if it is subsequently found that the relevant remedies have not been fully and properly implemented.
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Appendix II

NET ASSETS CONTRIBUTION ARISING FROM PARTICIPATIONS ON OTHER DOMESTIC BUSINESS UNITS
(EQUITY METHOD)

Values as of December 2012

Business Unit	Country	Stake (%)	Net asset Equity method (EUR million)	Activity
SIBS SGPS	Portugal	21,6	14,7	Holding company specialized in electronic payments and in the management of the Portuguese ATM system used by all banks present in Portugal. The company is participated by 26 banks that act in the Portuguese market.
Prado – Cartolinas da Lousã	Portugal	37,4	4,4	Industrial unit producer of cardboard and paper. [...].
Torre Ocidente	Portugal	25,0	4,1	Real estate company, owner of a single asset for commercial leasing. [...].
Locarent	Portugal	50,0	3,9	Provider of car renting services.
C ^a Papel do Prado	Portugal	37,4	1,3	Company that owns the real estate assets of the inactive factory [...].
TF Fundo Turismo	Portugal	33,5	1,3	Manager of real estate investment funds in the tourism sector, whose majority shareholder is the Portuguese State.
Yunit Serviços	Portugal	33,33	0,3	Company that develops e-commerce solutions for products and services of SMEs.
Bem Comum SCR	Portugal	32,0	0,1	Investment fund manager specialized in the promotion and support to the creation of new business by individual entrepreneurs and the unemployed.

Appendix III

DETAILED ASSETS OF BCG SPAIN (INCLUDING ASSETS THAT WILL BE TRANSFERRED TO THE SPANISH BRANCH)

[...]

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*Appendix IV***DETAILED ASSETS OF THE SPANISH BRANCH**

[...]

*Appendix V***LIST OF THE [...] SPANISH BRANCHES ([...])**

[...]

ACTS ADOPTED BY BODIES CREATED BY INTERNATIONAL AGREEMENTS

Only the original UN/ECE texts have legal effect under international public law. The status and date of entry into force of this Regulation should be checked in the latest version of the UN/ECE status document TRANS/WP.29/343, available at:
<http://www.unece.org/trans/main/wp29/wp29wgs/wp29gen/wp29fdocstts.html>

Regulation No 85 of the Economic Commission for Europe of the United Nations (UN/ECE) — Uniform provisions concerning the approval of internal combustion engines or electric drive trains intended for the propulsion of motor vehicles of categories M and N with regard to the measurement of net power and the maximum 30 minutes power of electric drive trains

Incorporating all valid text up to:

Supplement 6 to the original version of the Regulation — Date of entry into force: 15 July 2013

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9. Production definitively discontinued
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ANNEXES

1. Essential characteristics of the internal combustion engine and information concerning the conduct of tests
2. Essential characteristics of the electric drive train and information concerning the conduct of tests
- 3a Communication concerning the approval or extension or refusal or withdrawal of approval or production definitively discontinued of a drive train pursuant to Regulation No 85

3b Communication concerning the approval or extension or refusal or withdrawal of approval or production definitively discontinued of a vehicle type with regard to the drive train pursuant to Regulation No 85

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5. Method for measuring internal combustion engine net power

6. Method for measuring net power and the maximum 30 minutes power of electric drive trains

7. Checks on conformity of production

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1. SCOPE

1.1. This Regulation applies to the representation of the curve as a function of engine or motor speed of the power at full load indicated by the manufacturer for internal combustion engines or electric drive trains and the maximum 30 minutes power of electric drive trains intended for the propulsion of motor vehicles of categories M and N ⁽¹⁾.

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.

1.3. The electric drive trains are composed of controllers and motors and are used for propulsion of vehicles as the sole mode of propulsion.

2. DEFINITIONS

2.1. 'Approval of a drive train' means the approval of a drive train type with regard to its net power measured in accordance with the procedure specified in Annexes 5 or 6 to this Regulation;

2.2. 'Drive train type' means a category of an internal combustion engine or an electric drive train for installation in a motor vehicle which does not differ in such essential characteristics as those defined in Annexes 1 or 2 to this Regulation;

2.3. 'Net power' means the power obtained on a test bench at the end of the crankshaft or its equivalent at the corresponding engine or motor speed with the auxiliaries listed in Table 1 of Annex 5 or in Annex 6 to this Regulation, and determined under reference atmospheric condition;

2.4. 'Maximum net power' means the maximum value of the net power measured at full engine load;

⁽¹⁾ As defined in the Consolidated Resolution on the Construction of Vehicles (R.E.3.), document ECE/TRANS/WP.29/78/Rev.2, paragraph 2 — www.unece.org/trans/main/wp29/wp29wgs/wp29gen/wp29resolutions.html

- 2.5. 'Maximum 30 minutes power' means the maximum net power of an electric drive train at DC voltage as defined in paragraph 5.3.1 of this Regulation, which a drive train can deliver over a period of 30 minutes as an average;
- 2.6. 'Hybrid vehicles (HV)':
- 2.6.1. 'Hybrid vehicle (HV)' means a vehicle with at least two different energy converters and two different energy storage systems (on vehicle) for the purpose of vehicle propulsion;
- 2.6.2. 'Hybrid electric vehicle (HEV)' means a vehicle that, for the purpose of mechanical propulsion, draws energy from both of the following on-vehicle sources of stored energy/power:
- A consumable fuel;
 - An electrical energy/power storage device (e.g. battery, capacitor, flywheel/generator, etc.);
- 2.6.3. For a hybrid electric vehicle the 'power train' comprises a combination of two different drive train types:
- An internal combustion engine; and
 - One (or several) electric drive train(s);
- 2.7. 'Standard-production equipment' means equipment provided by the manufacturer for a particular application;
- 2.8. 'Dual-fuel engine' means an engine system type approved according to Regulation No 49 or mounted on a vehicle type approved with regards to its emissions according to Regulation No 49 and that is designed to simultaneously operate with diesel fuel and a gaseous fuel, both fuels being metered separately, where the consumed amount of one of the fuels relative to the other one may vary depending on the operation;
- 2.9. 'Dual-fuel vehicle' means a vehicle that is powered by a dual-fuel engine and that supplies the fuels used by the engine from separate on-board storage systems;
- 2.10. 'Dual-fuel mode' means the normal operating mode of a dual-fuel engine during which the engine simultaneously uses diesel fuel and a gaseous fuel at some engine operating conditions;
- 2.11. 'Diesel mode' means the normal operating mode of a dual-fuel engine during which the engine does not use any gaseous fuel for any engine operating condition.
3. APPLICATION FOR APPROVAL
- 3.1. The application for approval of a drive train type with regard to the measurement of the net power and the maximum 30 minutes power of electric drive trains shall be submitted by the drive train manufacturer, the vehicle manufacturer, or by his duly accredited representative.

- 3.2. It shall be accompanied by the description, in triplicate, of the drive train comprising all the relevant particulars referred to:
- In Annex 1 for vehicles powered by an internal combustion engine only, or
 - In Annex 2 for pure electric vehicles, or
 - In Annexes 1 and 2 for hybrid electric vehicles.
- 3.3. For hybrid electric vehicles (HEV), the tests shall be carried out separately on the internal combustion engine (according to Annex 5) and on the electric drive train(s) (according to Annex 6).
- 3.4. A drive train (or set of drive trains), representative of the (set of) drive train type(s) to be approved, shall, with the equipment prescribed in Annexes 5 and 6 to this Regulation, be submitted to the technical service conducting the approval tests.
4. APPROVAL
- 4.1. If the power of the drive train submitted for approval pursuant to this Regulation has been measured according to the specifications of paragraph 5 below, approval of the drive train type shall be granted.
- 4.2. An approval number shall be assigned to each drive train type approved. Its first two digits [(at present 00 for the Regulation in its original form)] shall indicate the series of amendments incorporating the most recent major technical amendments made to the Regulation at the time of issue of the approval. The same Contracting Party shall not assign the same number to another drive train type.
- 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.
- 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.
- 4.5. There shall be affixed, conspicuously and in a readily accessible place specified on the approval form, to every drive train conforming to a drive train type approved under this Regulation an international approval mark consisting of:
- 4.5.1. A circle surrounding the letter 'E' followed by the distinguishing number of the country which has granted approval⁽¹⁾;
 - 4.5.2. The number of this Regulation, followed by the letter 'R', a dash and the approval number to the right of the circle prescribed in paragraph 4.5.1.

⁽¹⁾ The distinguishing numbers of the Contracting Parties to the 1958 Agreement are reproduced in Annex 3 to the Consolidated Resolution on the Construction of Vehicles (R.E.3), document ECE/TRANS/WP.29/78/Rev.2/Amend.3 — www.unece.org/trans/main/wp29/wp29wgs/wp29gen/wp29resolutions.html

- 4.5.3. Alternatively, instead of affixing these approval marks and symbols to the drive train, the manufacturer may decide that each drive train type approved under this Regulation shall be accompanied by a document giving this information so that the approval marks and symbol can be attached to the vehicle.
- 4.6. If the drive train conforms to a type approved, under one or more other Regulations annexed to the Agreement, in the country which has granted approval under this Regulation, the symbol prescribed in paragraph 4.5.1 above need not be repeated; in such a case, the Regulation and approval numbers of all the Regulations under which approval has been granted in the country which has granted approval under this Regulation shall be placed in vertical columns to the right of the symbol prescribed in paragraph 4.5.1.
- 4.7. The approval mark shall be clearly legible and be indelible.
- 4.8. The approval mark shall be placed close to the drive train identification figures provided by the manufacturer.
- 4.9. Annex 4 to this Regulation gives examples of the arrangements of the approval mark.

5. SPECIFICATIONS AND TESTS

5.1. General

The components liable to affect the power of the drive train shall be so designed, constructed and assembled as to enable the drive train in normal use, despite the vibration to which it may be subjected, to comply with the provisions of this Regulation.

5.2. Description of tests for internal combustion engines

5.2.1. The net power test shall consist of a run at full throttle for positive ignition engines and at full-load for compression ignition engines and dual-fuel engines, the engine being equipped as specified in Table 1 of Annex 5 to this Regulation.

5.2.1.1. In case of a dual-fuel engine that has a diesel mode, the test shall consist of a run on the dual-fuel mode and of a run on the diesel mode of that same engine.

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.

5.2.3. The fuel used shall be the following:

5.2.3.1. For positive ignition engines fuelled with petrol:

The fuel used shall be the one available on the market. In any case of dispute, the fuel shall be one of the reference fuels defined by CEC ⁽¹⁾ for petrol fuelled engines, in CEC documents RF-01-A-84 and RF-01-A-85.

5.2.3.2. For positive ignition engines and dual-fuel engines fuelled with LPG:

⁽¹⁾ European Coordinating Council.

5.2.3.2.1. In the case of an engine with self-adaptive fuelling:

The fuel used shall be the one available on the market. In any case of dispute the fuel shall be one of the reference fuels specified in Annex 8;

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

The fuel used shall be the reference fuel specified in Annex 8 with the lowest C3-content, or

5.2.3.2.3. In the case of an engine labelled for one specific fuel composition:

The fuel used shall be the fuel for which the engine is labelled.

5.2.3.2.4. The fuel used shall be specified in the test report.

5.2.3.3. For positive ignition engines and dual-fuel engines fuelled with natural gas:

5.2.3.3.1. In the case of an engine with self-adaptive fuelling:

The fuel used shall be the one available on the market. In any case of dispute the fuel shall be one of the reference fuels specified in Annex 8;

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 $52,6 \text{ MJm}^{-3}$ (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

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 $52,6 \text{ MJm}^{-3}$ (4 °C, 101,3 kPa) if the engine is labelled for the H-range of gases, or at least $47,2 \text{ MJm}^{-3}$ (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

5.2.3.3.4. In the case of an engine labelled for one specific LNG fuel composition:

The fuel used shall be the fuel for which the engine is labelled or the reference fuel G20 specified in Annex 8 if the engine is labelled LNG20.

5.2.3.3.5. In the case of an engine labelled for one specific fuel composition:

The fuel used shall be the fuel for which the engine is labelled.

5.2.3.3.6. The fuel used shall be specified in the test report.

5.2.3.4. For compression ignition engines and dual-fuel engines:

The fuel used shall be the one available on the market. In any case of dispute, the fuel shall be the reference fuel defined by CEC for compression ignition engines, in CEC document RF-03-A-84.

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.

5.2.3.6. Dual-fuel engines or vehicles that have a diesel mode are to be tested with the fuels appropriate to each mode, in accordance with the provisions set in paragraphs 5.2.3.1 to 5.2.3.5.

5.2.4. Measurements shall be carried out according to the provisions of Annex 5 to this Regulation.

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.

5.3. Description of tests for measuring the net power and the maximum 30 minutes power of electric drive trains

The electric drive train shall be equipped as specified in Annex 6 to this Regulation. The electric drive train shall be supplied from a DC voltage source with a maximum voltage drop of 5 per cent depending on time and current (periods of less than 10 seconds excluded). The supply voltage of the test shall be given by the vehicle manufacturer.

Note: If the battery limits the maximum 30 minutes power, the maximum 30 minutes power of an electric vehicle can be less than the maximum 30 minutes power of the drive train of the vehicle according to this test.

5.3.1. Determination of the net power

5.3.1.1. The motor and its entire equipment assembly must be conditioned at a temperature of $25\text{ °C} \pm 5\text{ °C}$ for a minimum of two hours.

5.3.1.2. The net power test shall consist of a run at full setting of the power controller.

5.3.1.3. Just before beginning the test, the motor shall be run on the bench for three minutes delivering a power equal to 80 per cent of the maximum power at the speed recommended by the manufacturer.

5.3.1.4. Measurements shall be taken at a sufficient number of motor speeds to define correctly the power curve between zero and the highest motor speed recommended by the manufacturer. The whole test shall be completed within 5 minutes.

5.3.2. Determination of the maximum 30 minutes power

- 5.3.2.1. The motor and its entire equipment assembly must be conditioned at a temperature of $25\text{ °C} \pm 5\text{ °C}$ for a minimum of four hours.
- 5.3.2.2. The electric drive train shall run at the bench at a power which is the best estimate of the manufacturer for the maximum 30 minutes power. The speed must be in a speed range, which the net power is greater than 90 per cent of the maximum power as measured in paragraph 5.3.1. This speed shall be recommended by the manufacturer.
- 5.3.2.3. Speed and power shall be recorded. The power must be in a range of ± 5 per cent of the power value at the start of the test. The maximum 30 minutes power is the average of the power within the 30 minutes period.

5.4. Interpretation of results

The net power and the maximum 30 minutes power for electric drive trains indicated by the manufacturer for the type of drive train shall be accepted if it does not differ by more than ± 2 per cent for maximum power and more than ± 4 per cent at the other measurement points on the curve with a tolerance of ± 2 per cent for engine or motor speed, or within the engine or motor speed range ($X1\text{ min}^{-1} + 2$ per cent) to ($X2\text{ min}^{-1} - 2$ per cent) ($X1 < X2$) from the values measured by the technical service on the drive train submitted for testing.

In case of a dual-fuel engine, the net power indicated by the manufacturer shall be the one measured on the dual-fuel mode of that engine.

6. CONFORMITY OF PRODUCTION

The conformity of production procedures shall comply with those set out in the Agreement, Appendix 2 (E/ECE/324 — E/ECE/TRANS/505/Rev.2), with the following requirements:

- 6.1. Engines approved under this Regulation shall be so manufactured as to conform to the type approved.
- 6.2. The minimum requirements for conformity of production control procedures set forth in Annex 7 to this Regulation shall be complied with.

7. PENALTIES FOR NON-CONFORMITY OF PRODUCTION

- 7.1. The approval granted in respect of a drive train type pursuant to this Regulation may be withdrawn if the requirements set forth above are not met or if a drive train bearing the approval mark does not conform to the type approved.
- 7.2. If a Contracting Party to the 1958 Agreement applying this Regulation withdraws an approval it has previously granted, it shall forthwith so notify the other Contracting Parties applying this Regulation, by means of a communication form conforming to the model in Annex 3a or Annex 3b to this Regulation.

8. MODIFICATION AND EXTENSION OF APPROVAL OF DRIVE TRAIN TYPE

- 8.1. Every modification of a drive train within a drive train type with regard to the characteristics in Annex 1 or 2, shall be notified to the Type Approval Authority which approved the drive train type. The Type Approval Authority may then either:
 - 8.1.1. Consider that the modifications made are unlikely to have any appreciable adverse effect and that in any case the vehicle still complies with the requirements; or

- 8.1.2. Require a further test report from the Technical Service responsible for conducting the tests.
- 8.2. Confirmation or refusal of approval, specifying the alterations shall be communicated by the procedure specified in paragraph 4.3 above to the Parties to the Agreement applying this Regulation.
- 8.3. The Type Approval Authority issuing the extension of approval shall assign a series number for such an extension and inform thereof the other Parties to the 1958 Agreement applying this Regulation by means of a communication form conforming to the model in Annex 3 a or Annex 3b to this Regulation.
9. PRODUCTION DEFINITELY DISCONTINUED
- If the holder of an approval completely ceases to manufacture a drive train approved in accordance with this Regulation, he shall so inform the Type Approval Authority which granted the approval. Upon receiving the relevant communication that Authority shall inform thereof the other Parties to the 1958 Agreement applying this Regulation by means of a communication form conforming to the model in Annex 3a or Annex 3b to this Regulation.
10. NAMES AND ADDRESSES OF TECHNICAL SERVICES RESPONSIBLE FOR CONDUCTING APPROVAL TESTS, AND OF TYPE APPROVAL AUTHORITIES
- The Parties to the Agreement which apply this Regulation shall communicate to the United Nations Secretariat the names and addresses of the Technical Services responsible for conducting approval tests, and/or the Type Approval Authorities which grant approval, and to which forms certifying approval or extension or refusal of approval, issued in other countries, are to be sent.
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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 details.

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:
- 0.6. 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⁾:
- 1.3. Dual-fuel vehicle: Yes/No ⁽¹⁾
- 1.3.1. Dual-fuel engine having a diesel mode: Yes/No ⁽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 at min^{-1} (manufacturer's declared value)
- 3.0. Fuel: diesel oil/petrol/LPG/CNG/LNG ⁽¹⁾
- 3.0.1. When applicable, the additional character(s) in the approval marking required by Regulation No 49, the purpose of which is to distinguish the type of engine for which the approval has been granted (e.g. Hlt).
- 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⁾:
- 3.4. Gas and dual-fuel engines
- 3.4.1. Self-adaptive fuelling: Yes/No ⁽¹⁾
- 3.4.2. In case of an engine without self-adaptive fuelling: specific gas composition/range of gases for which the engine is calibrated.
- 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:
- 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 and dual-fuel 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:
- 17.5. Gas fuel used for the test: Reference fuel ⁽²⁾/other ⁽¹⁾
- 17.5.1. If the gas fuel used for the test is a reference fuel, label of that gas:
- 17.5.2. If the gas fuel used for the test is not a reference fuel, composition of that gas:
(Date, file)

⁽¹⁾ Delete where not applicable.

⁽²⁾ As specified in Annex 8 of this Regulation.

ANNEX 2

ESSENTIAL CHARACTERISTICS OF THE ELECTRIC DRIVE TRAIN AND INFORMATION CONCERNING THE CONDUCT OF TESTS

- 1. General
 - 1.1. Make:
 - 1.2. Type:
 - 1.3. Drive ⁽¹⁾: Monomotor/multimotors/(number)
 - 1.4. Transmission arrangement: parallel/transaxial/others, to precise:
 - 1.5. Test voltage: V
 - 1.6. Basic motor rotation: min⁻¹
 - 1.7. Motor crankshaft maximum speed: min⁻¹
 (or by default): reducer/gearbox outlet shaft ⁽²⁾ min⁻¹
 - 1.8. Maximum power speed ⁽³⁾ (specified by the manufacturer): min⁻¹
 - 1.9. Maximum power (specified by the manufacturer): kW
 - 1.10. Maximum 30 minutes power (specified by the manufacturer): kW
 - 1.11. Flexible range (where P ≥ 90 per cent of max. power):
 Speed at beginning of the range: min⁻¹
 Speed at the end of the range: min⁻¹
- 2. Motor
 - 2.1. Working principle
 - 2.1.1. Direct current (DC)/alternative current (AC) ⁽¹⁾ number of phases:
 - 2.1.2. Excitation/separate/series/compound ⁽¹⁾
 - 2.1.3. Synchron/asynchron ⁽¹⁾
 - 2.1.4. Rotor coiled/with permanent magnets/with housing ⁽¹⁾
 - 2.1.5. Number of poles of the motor:
 - 2.2. Inertia mass:
- 3. Power controller
 - 3.1. Make:
 - 3.2. Type:
 - 3.3. Control principle: vectorial/open loop/closed/other, to be specified:
 - 3.4. Maximum effective current supplied to the motor ⁽³⁾: A
 during seconds
 - 3.5. Voltage range use: V to V

4. Cooling system:
- Motor liquid/air ⁽¹⁾
- Controller liquid/air ⁽¹⁾
- 4.1. Liquid-cooling equipment characteristics
- 4.1.1. Nature of the liquid circulating pumps: Yes/No ⁽¹⁾
- 4.1.2. Characteristics or make(s) and type(s) of the pump:
- 4.1.3. Thermostat: setting:
- 4.1.4. Radiator: drawing(s) or make(s) and type(s):
- 4.1.5. Relief valve: pressure setting:
- 4.1.6. Fan: characteristics or make(s) and type(s):
- 4.1.7. Fan duct:
- 4.2. Air-cooling equipment characteristics
- 4.2.1. Blower: characteristics or make(s) and type(s):
- 4.2.2. Standard air ducting:
- 4.2.3. Temperature regulating system: Yes/No ⁽¹⁾
- 4.2.4. Brief description:
- 4.2.5. Air filter make(s) type(s)
- 4.3. Temperatures admitted by the manufacturer
- 4.3.1. Motor outlet: (max.) °C
- 4.3.2. Controller inlet: (max) °C
- 4.3.3. At motor reference point(s): (max.) °C
- 4.3.4. At controller reference point(s): (max.) °C
5. Insulating category:
6. International protection (IP)-code:
7. Lubrication system principle ⁽¹⁾
- Bearings: friction/ball
- Lubricant: grease/oil
- Seal: Yes/No
- Circulation: with/without

⁽¹⁾ Strike out what does not apply.

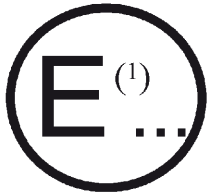
⁽²⁾ Gear engaged.

⁽³⁾ Specify tolerances.

ANNEX 3A

COMMUNICATION

(maximum format: A4 (210 × 297 mm))



issued by: Name of administration

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

- Concerning ⁽²⁾: Approval granted,
- Approval extended,
- Approval refused,
- Approval withdrawn,
- Production definitively 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:
4. Drive train or set of drive trains submitted for approval on:
5. Technical Service responsible for conducting approval tests:
6. Date of report issued by that Service:
7. Number of report issued by that Service:
8. Location of the approval mark:
9. Reason(s) for extension of approval (if applicable):
10. Internal combustion engine
 - 10.1. Declared figures
 - 10.1.1. Maximum net power: kW, at min⁻¹

- 10.1.2. Maximum net torque: Nm, at min⁻¹
- 10.2. 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⁾
- Dual-fuel engine: Yes with a diesel mode/Yes without a diesel mode/No ⁽²⁾
- 10.3. Engine fuel requirements: leaded petrol/unleaded petrol/diesel fuel/CNG/LNG/LPG ⁽²⁾:
11. Electric drive train(s):
- 11.1. Declared figures
- 11.1.1. Maximum net power: kW, at min⁻¹
- 11.1.2. Maximum net torque: Nm, at min⁻¹
- 11.1.3. Maximum net torque at zero speed: Nm
- 11.1.4. Maximum 30 minutes power: kW
- 11.2. Essential characteristics of the electric drive train
- 11.2.1. Test DC voltage: V
- 11.2.2. Working principle:
- 11.2.3. Cooling system:
- Motor: liquid/air ⁽²⁾
- Variator: liquid/air ⁽²⁾
12. Approval granted/extended/refused/withdrawn ⁽²⁾
13. Place:
14. Date:
15. Signature:
16. The documents filed with the request for approval or extension may be obtained on request.

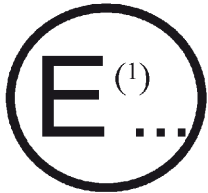
⁽¹⁾ Distinguishing number of the country which has granted/extended/refused/withdrawn approval (see approval provisions in the Regulation).

⁽²⁾ Strike out what does not apply.

ANNEX 3B

COMMUNICATION

(maximum format: A4 (210 × 297 mm))



issued by: Name of administration

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

- Concerning ⁽²⁾: Approval granted,
- Approval extended,
- Approval refused,
- Approval withdrawn,
- Production definitively 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):
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: cm³
 Fuel feed: carburettor/indirect injection/direct injection ⁽²⁾
 Pressure-charger device: Yes/No ⁽²⁾
 Exhaust gas cleaning device: Yes/No ⁽²⁾
 Dual-fuel engine: Yes with a diesel mode/Yes without a diesel mode/No ⁽²⁾
- 13.3. Engine fuel requirements: leaded petrol/unleaded petrol/diesel fuel/CNG/LNG/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).

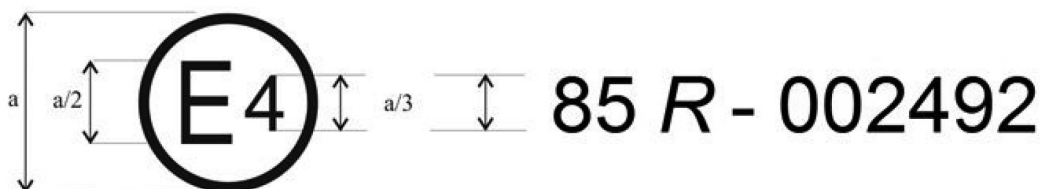
(²) Strike out what does not apply.

ANNEX 4

ARRANGEMENTS OF APPROVAL MARKS

Model A

(see paragraph 4.4 of this Regulation)

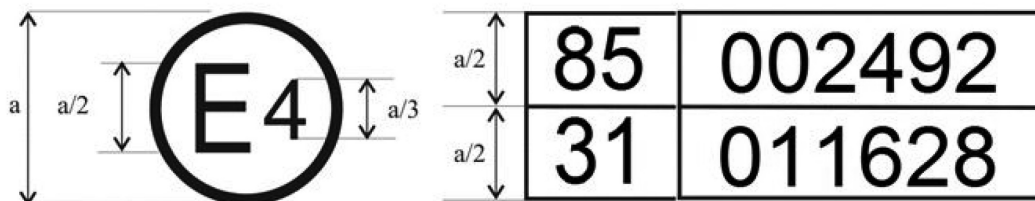


a = 8 mm min.

The above approval mark affixed to a drive train shows that the drive train type concerned has been approved in the Netherlands (E 4) with regard to the measurement of the net power, pursuant to Regulation No 85 and under the approval number 002492. The approval number indicates that the approval was granted in accordance with the requirements of Regulation No 85 in its original form.

Model B

(see paragraph 4.5 of this Regulation)



a = 8 mm min.

The above approval mark affixed to a vehicle shows that the vehicle type concerned has been approved in the Netherlands (E 4) pursuant to Regulations Nos 85 and 31⁽¹⁾. The first two digits of the approval numbers indicate that, at the dates when the respective approvals were granted, Regulation No 85 had not been modified, and Regulation No 31 already included the 01 series of amendments.

⁽¹⁾ The second number is given merely as an example.

ANNEX 5

METHOD FOR MEASURING INTERNAL COMBUSTION ENGINE NET POWER

1. THESE PROVISIONS APPLY TO THE METHOD FOR REPRESENTING THE POWER CURVE AT FULL LOAD OF AN INTERNAL COMBUSTION ENGINE AS A FUNCTION OF ENGINE SPEED
2. TEST CONDITIONS
 - 2.1. The engine shall have been run-in according to the manufacturer's recommendations.
 - 2.2. If the power measurement can be carried out only on an engine with the gear-box mounted, the efficiency of the gear-box shall be taken into account.
 - 2.3. Auxiliaries
 - 2.3.1. Auxiliaries to be fitted

During the test, the auxiliaries necessary for the engine operation in the intended application (as listed in Table 1) shall be installed on the test bench as far as possible in the same position as in the intended application.
 - 2.3.2. Auxiliaries to be removed

Certain vehicle accessories necessary only for operation of the vehicle and which may be mounted on the engine shall be removed for the test. The following non-exhaustive list is given as a sample:

Air compressor for brakes power steering compressor suspension compressor

Air-conditioning system

Where accessories cannot be removed, the power they absorb in the unloaded condition may be determined and added to the measured engine power.

Table 1

Auxiliaries to be fitted for the test to determine net power of engine

('Standard production equipment' means equipment provided by the manufacturer for a particular application)

No	Auxiliaries	Fitted for net power test
1	Intake system Intake manifold Crankcase emission control system Air filter Intake silencer Speed limiting device	Yes, standard production equipment Yes, standard production equipment ^(1a)
2	Induction heating device of intake manifold	Yes, standard production equipment. If possible, to be set in the most favourable position.
3	Exhaust system Exhaust purifier Exhaust manifold Supercharging device Connecting pipes ^(1b) Silencer ^(1b) Tail pipe ^(1b) Exhaust brake ⁽²⁾	Yes, standard production equipment
4	Fuel supply pump ⁽³⁾	Yes, standard production equipment

No	Auxiliaries	Fitted for net power test
5	Carburettor Electronic control system, air flow meter, etc. (if fitted) Pressure reducer Evaporator Mixer	Yes, standard production equipment Equipment for gas engines
6	Fuel injection equipment (petrol and diesel) Prefilter Filter Pump High pressure pipe Injector Air intake valve ⁽⁴⁾ , if fitted Electronic control system, air flow meter, etc., if fitted Governor/control system. Automatic full-load stop for the control rack depending on atmospheric conditions	Yes, standard production equipment
7	Liquid cooling equipment Engine bonnet Bonnet air outlet Radiator Fan ⁽⁵⁾ ⁽⁶⁾ Fan cowl Water pump Thermostat ⁽⁷⁾	No Yes ⁽⁵⁾ , standard production equipment
8	Air cooling Cowl Blower ⁽⁵⁾ ⁽⁶⁾ Temperature regulating device	Yes, standard production equipment Yes, standard production equipment
9	Electrical equipment	Yes ⁽⁸⁾ , standard production equipment
10	Supercharging equipment (if fitted) Compressor driven either directly by the engine, and/or by the exhaust gases Charge air cooler ⁽⁹⁾ Coolant pump or fan (engine driven) Coolant flow control devices (if fitted)	Yes, standard production equipment
11	Auxiliary test bench fan	Yes, if necessary
12	Anti-pollution devices ⁽¹⁰⁾	Yes, standard production equipment

^(1a) The complete intake system shall be fitted as provided for the intended application:

Where there is a risk of an appreciable effect on the engine power;

In the case of two-stroke and positive-ignition engines;

When the manufacturer requests that this should be done.

In other cases, an equivalent system may be used and a check should be made to ascertain that the intake pressure does not differ by more than 100 Pa from the limit specified by the manufacturer for a clean air filter.

^(1b) The complete exhaust system shall be fitted as provided for the intended application:

Where there is a risk of an appreciable effect on the engine power;

In the case of two-stroke and positive-ignition engines;

When the manufacturer requests that this should be done.

In other cases, an equivalent system may be installed provided the pressure measured at the exit of the engine exhaust system does not differ by more than 1000 Pa from that specified by the manufacturer.

The exit from the engine exhaust system is defined as a point 150 mm downstream from the termination of the part of the exhaust system mounted on the engine.

- (2) If an exhaust brake is incorporated in the engine, the throttle valve must be fixed in a fully open position.
- (3) The fuel feed pressure may be adjusted, if necessary, to reproduce the pressures existing in the particular engine application (particularly when a 'fuel return' system is used).
- (4) The air intake valve is the control valve for the pneumatic governor of the injection pump. The governor of the fuel injection equipment may contain other devices which may affect the amount of injected fuel.
- (5) The radiator, the fan, the fan cowl, the water pump and the thermostat shall be located on the test bench in the same relative positions as on the vehicle. The cooling liquid circulation shall be operated by the engine water pump only. Cooling of the liquid may be produced either by the engine radiator or by an external circuit, provided that the pressure loss of this circuit and the pressure at the pump inlet remain substantially the same as those of the engine cooling system. The radiator shutter, if incorporated, shall be in the open position.
Where the fan, radiator and cowl system cannot conveniently be fitted to the engine, the power absorbed by the fan when separately mounted in its correct position in relation to the radiator and cowl (if used), must be determined at the speeds corresponding to the engine speeds used for measurement of the engine power either by calculation from standard characteristics or by practical tests. This power, corrected to the standard atmospheric conditions (293,2 K (20 °C) and 101,3 kPa), should be deducted from the corrected power.
- (6) Where a disconnectable or progressive fan or blower is incorporated, the test shall be made with the disconnectable fan (or blower) disconnected or with the progressive fan or blower running at maximum slip.
- (7) The thermostat may be fixed in the fully open position.
- (8) Minimum power of the generator: the power of the generator shall be limited to that necessary for the operation of accessories which are indispensable for the operation of the engine. If the connection of a battery is necessary, a fully charged battery in good order must be used.
- (9) Charge air cooled engines shall be tested with charge air cooling, whether liquid or air cooled, but if the engine manufacturer prefers, a test bench system may replace the air cooled cooler. In either case, the measurement of power at each speed shall be made with the same pressure drop and temperature drop of the engine air across the charge air cooler on the test bench system as those specified by the manufacturer for the system on the complete vehicle.
- (10) They may include, for example, EGR (Exhaust gas recirculation) system, catalytic convertor, thermal reactor, secondary air supply system and fuel evaporation protecting system.

2.3.3. Compression-ignition engine starting auxiliaries

For the auxiliaries used in starting compression-ignition engines, the two following cases shall be considered:

- (a) Electric starting. A generator is fitted and supplies, where necessary, the auxiliaries essential for engine operation;
- (b) Starting other than by electrical means. If there are any electrically operated accessories essential for engine operation for which a generator is fitted. Otherwise, it is removed.

In either case, the system for producing and storing the energy necessary for starting is fitted and operates in the unloaded condition.

2.4. Setting conditions

The setting conditions for the test to determine the net power are indicated in Table 2.

Table 2

Setting conditions

1. Setting of carburettor(s)	In accordance with the manufacturer's production specifications and used without further alteration for the particular application
2. Setting of injection pump delivery system	
3. Ignition or injection timing (timing curve)	
4. Governor setting	
5. Emission control devices	

3. DATA TO BE RECORDED

- 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.

- 3.2. Data to be recorded are those indicated in paragraph 4 of the appendix to this annex. Performance data shall be obtained under stabilized operating conditions with an adequate fresh air supply to the engine. Combustion chambers may contain deposits, but in limited quantity. Test conditions, such as inlet air temperature, shall be selected as near to reference conditions (see paragraph 5.2 of this annex) as possible in order to minimize the magnitude of the correction factor.
- 3.3. The temperature of the inlet air to the engine (ambient air) shall be measured within 0,15 m upstream of the point of entry to the air cleaner, or, if no air cleaner is used, within 0,15 m of the air inlet horn. The thermometer or thermocouple shall be shielded from radiant heat and placed directly in the air stream. It shall also be shielded from fuel spray-back. A sufficient number of locations shall be used to give a representative average inlet temperature.
- 3.4. No data shall be taken until torque, speed and temperatures have been maintained substantially constant for at least one minute.
- 3.5. The engine speed during a run or reading shall not deviate from the selected speed by more than ± 1 per cent or $\pm 10 \text{ min}^{-1}$, whichever is greater.
- 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 per cent for the brake load and fuel consumption.
- 3.7. The temperature of the coolant at the outlet from the engine shall be kept at the value specified by the manufacturer. If no temperature is specified by the manufacturer, the temperature shall be $353 \text{ K} \pm 5 \text{ K}$. For air-cooled engines, the temperature at a point indicated by the manufacturer shall be kept within $\pm \frac{0}{20} \text{ K}$ of the maximum value specified by the manufacturer in the reference conditions.
- 3.8. The fuel temperature shall be measured at the inlet to the carburettor or at the fuel injection system and maintained within the limits established by the engine manufacturer.
- 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 of this annex.

4. ACCURACY OF MEASUREMENTS

- 4.1. Torque: ± 11 per cent of measured torque.

The torque measuring system shall be calibrated to take friction losses into account. The accuracy in the lower half of the measuring range of the dynamometer bench may be ± 2 per cent of measured torque.

- 4.2. 'Engine speed': The measurement shall be accurate to within $\pm 0,5$ per cent. Engine speed shall be measured preferably with an automatically synchronized revolution counter and chronometer (or counter-timer).
- 4.3. Fuel consumption: ± 1 per cent of measured consumption.
- 4.4. Fuel temperature: $\pm 2 \text{ K}$.
- 4.5. Engine inlet air temperature: $\pm 1 \text{ K}$.
- 4.6. Barometric pressure: $\pm 100 \text{ Pa}$.
- 4.7. Pressure in intake-duct: $\pm 50 \text{ Pa}$.
- 4.8. Pressure in exhaust duct: $\pm 200 \text{ Pa}$.

5. POWER CORRECTION FACTORS

5.1. Definition

The power correction factor is the coefficient L determine the engine power under the reference atmospheric conditions specified in paragraph 5.2 below.

Where

$$P_o = L \cdot P$$

P_o is the corrected power (i.e. power under reference atmospheric conditions)

L is the correction factor (L_a or L_d)

P is the measured power (test power)

5.2. Reference atmospheric conditions

5.2.1. Temperature (T_o): 298 K (25 °C)5.2.2. Dry pressure (P_{so}): 99 kPa

Note: The dry pressure is based on a total pressure of 100 kPa and a water vapour pressure of 1 kPa.

5.3. Test atmospheric conditions

The atmospheric conditions during the test shall be the following:

5.3.1. Temperature (T)

For positive-ignition engines $288 \text{ K} \leq T \leq 308 \text{ K}$

For diesel engines $283 \text{ K} \leq T \leq 313 \text{ K}$

5.3.2. Pressure (P_s)

$80 \text{ kPa} \leq P_s \leq 110 \text{ kPa}$

5.4. Determination of correction factor α_a and α_d ⁽¹⁾5.4.1. Naturally aspirated or pressure-charged positive-ignition engine factor α_a

The correction factor α_a is obtained by applying the formula:

$$\alpha_a = \left(\frac{99}{P_s} \right)^{1,2} \cdot \left(\frac{T}{298} \right)^{0,6} \quad (2)$$

Where

P_s is the total dry atmospheric pressure in kilopascals (kPa); that is to say, the total barometric pressure minus water vapour pressure

T is the absolute temperature in kelvins (K) of the air drawn in by the engine.

Conditions to be complied with in the laboratory

For a test to be valid, the correction factor α_a must be such that $0,93 \leq \alpha_a \leq 1,07$

If these limits are exceeded, the corrected value obtained shall be given and the test conditions (temperature and pressure) precisely stated in the test report.

⁽¹⁾ The tests may be carried out in air-conditioned test rooms where the atmospheric conditions may be controlled.

⁽²⁾ In the case of engines fitted with automatic air temperature control, if the device is such that at full load at 25 °C no heated air is added, the test shall be carried out with the device fully closed. If the device is still operating at 25 °C then the test is made with the device operating normally and the exponent of the temperature term in the correction factor shall be taken as zero (no temperature correction).

5.4.2. Diesel engines — Factor α_d

The power correction factor (α_d) for diesel engines at constant fuel rate is obtained by applying the formula:

Where $\alpha_d = (f_a) f_m$

f_a is the atmospheric factor

f_m is the characteristic parameter for each type of engine and adjustment

5.4.2.1. Atmospheric factor f_a

This factor indicates the effects of environmental conditions (pressure, temperature and humidity) on the air drawn in by the engine. The atmospheric factor formula differs according to the type of engine.

5.4.2.1.1. Naturally aspirated and mechanically supercharged engines

$$f_a = \left(\frac{99}{P_s}\right) \cdot \left(\frac{T}{298}\right)^{0,7}$$

5.4.2.1.2. Turbocharged engines with or without cooling of inlet air

$$f_a = \left(\frac{99}{P_s}\right)^{0,7} \cdot \left(\frac{T}{298}\right)^{1,5}$$

5.4.2.2. Engine factor f_m

f_m is a function of q_c (fuel flow corrected) as follows:

$$f_m = 0,036 q_c - 1,14$$

Where: $q_c = q/r$

Where:

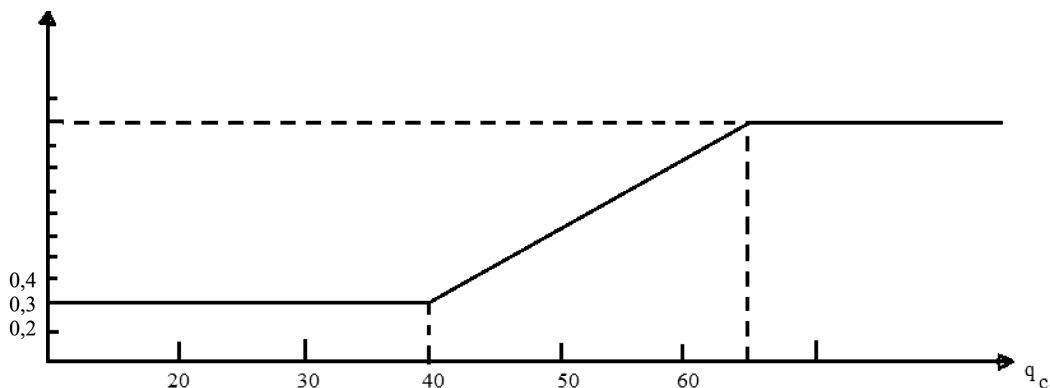
q is the fuel flow in milligram per cycle per litre of total swept volume (mg/(l.cycle))

r is the pressure ratio of compressor outlet and compressor inlet ($r = 1$ for naturally aspirated engines)

This formula is valid for a value interval of q_c included between 40 mg/(l.cycle) and 65 mg/(l.cycle.)

For q_c values lower than 40 mg/(l.cycle), a constant value of f_m equal to 0,3 ($f_m = 0,3$) will be taken.

For q_c values higher than 65 mg/(l.cycle), a constant value of f_m equal to 1,2 ($f_m = 1,2$) will be taken (see figure):



5.4.2.3. Conditions to be complied with in the laboratory

For a test to be valid; the correction factor α_d must be such that $0,9 \leq \alpha_d \leq 1,1$

If these limits are exceeded, the corrected value obtained shall be given and the test conditions (temperature and pressure) precisely stated in the test report.

Appendix

Results of tests for measuring net engine power

This form shall be completed by the laboratory performing the test.

1. Test conditions
 - 1.1. Pressures measured at maximum power
 - 1.1.1. Total barometric pressure: Pa
 - 1.1.2. Water vapour pressure: Pa
 - 1.1.3. Exhaust pressure: Pa
 - 1.2. Temperatures measured at maximum power
 - 1.2.1. Of the intake air: K
 - 1.2.2. At the outlet of the engine intercooler: K
 - 1.2.3. Of the cooling fluid
 - 1.2.3.1. At the engine cooling fluid outlet: K ⁽¹⁾
 - 1.2.3.2. At the reference point in the case of air cooling: K ⁽¹⁾
 - 1.2.4. Of the lubricating oil: K (indicate point of measurement)
 - 1.2.5. Of the fuel
 - 1.2.5.1. At the fuel pump inlet: K
 - 1.2.5.2. In the fuel consumption measuring device: K
 - 1.2.6. Of the exhaust measured at the point adjacent to the outlet flange(s) of the exhaust manifold(s): °C
 - 1.3. Engine speed when idling:min⁻¹
 - 1.4. Characteristics of the dynamometer
 - 1.4.1. Make:..... Model:
 - 1.4.2. Type:
 - 1.5. Characteristics of the opacimeter
 - 1.5.1. Make:
 - 1.5.2. Type:
2. Fuel
 - 2.1. For positive-ignition engines operating on liquid fuel
 - 2.1.1. Make:
 - 2.1.2. Specification:
 - 2.1.3. Anti-knock additive (lead etc.):
 - 2.1.3.1. Type:

⁽¹⁾ Delete as appropriate.

2.1.3.2. Content: mg/l

2.1.4. Octane number RON: (ASTM D 26 99-70)

2.1.4.1. MON No:

2.1.4.2. Specific density: g/cm³ at 288 K

2.1.4.3. Lower calorific value: kJ/kg

	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

2.2. For positive-ignition engines and dual-fuel engines operating on gaseous fuel

2.2.1. Make:

2.2.2. Specification:

2.2.3. Storage pressure: bar

2.2.4. Utilization pressure: bar

2.2.5. Lower calorific value: kJ/kg

2.3. For compression-ignition engines operating on gaseous fuels

2.3.1. Feed system: gas

2.3.2. Specification of gas used:

2.3.3. Fuel oil/gas proportion:

2.3.4. Lower calorific value:

2.4. For compression-ignition engines and dual-fuel engines operating on diesel fuel

2.4.1. Make:

2.4.2. Specification of fuel used:

2.4.3. Cetane number (ASTM D 976-71)

2.4.4. Specific density: g/cm³ at 288 K

2.4.5. Lower calorific value: kJ/kg

3. Lubricant

3.1. Make:

- 3.2. Specification:
- 3.3. SAE viscosity:
4. Detailed results of Measurements ⁽²⁾

Engine speed, min ⁻¹		
Measured torque, Nm		
Measured power, kW		
Measured fuel flow, g/h		
Barometric pressure, kPa		
Water vapour pressure, kPa		
Inlet air temperature, K		
Power to be added for No 1 auxiliaries in excess No 2 of table above, kW No 3		
Power correction factor		
Corrected brake power, kW (with/without ⁽¹⁾ fan)		
Power of fan, kW (to be subtracted if fan not fitted)		
Net power, kW		
Net torque, Nm		
Corrected specific fuel consumption g/(kWh) ⁽²⁾		
Cooling liquid temperature at outlet, K		
Lubricating oil temperature t measuring point, K		
Air temperature after pressure-charger, K ⁽³⁾		
Fuel temperature at injection pump inlet, K		
Air temperature after charge air cooler, K ⁽³⁾		
Pressure after pressure-charger, kPa ⁽³⁾		
Pressure after charge air cooler, kPa		

Notes:

⁽¹⁾ Delete as appropriate.

⁽²⁾ Calculated with the net power for compression-ignition and positive-ignition engines, in the latter case multiplied by the power correction factor.

⁽³⁾ Delete where inapplicable.

⁽²⁾ The characteristic curves of the net power and the net torque shall be drawn as a function of the engine speed.

ANNEX 6

METHOD FOR MEASURING NET POWER AND THE MAXIMUM 30 MINUTES POWER OF ELECTRIC DRIVE TRAINS

1. THESE REQUIREMENTS APPLY FOR MEASURING THE MAXIMUM NET POWER AND THE MAXIMUM 30 MINUTES POWER OF ELECTRIC DRIVE TRAINS USED FOR PROPELLING PURE ELECTRIC ROAD VEHICLES.

2. TEST CONDITIONS

2.1. The drive train shall have been run-in according to the manufacturer's recommendations.

2.2. Kann die Leistungsmessung nur mit eingebautem Getriebe oder Vorgelege durchgeführt werden, so ist dessen Wirkungsgrad zu berücksichtigen.

2.3. Auxiliaries

2.3.1. Auxiliaries to be fitted

During the test, the auxiliaries necessary for the drive train operation in the intended application (as listed in table 1 of this annex) shall be installed in the same position as in the vehicle.

2.3.2. Auxiliaries to be removed

The auxiliaries necessary for the proper operation of the vehicle, and which may be mounted on the motor shall be removed when performing the test. The following non-exhaustive list is given as an example:

Air compressor for brakes; Power steering compressor; Suspension system compressor; Air conditioner system, etc.

Where accessories cannot be removed, the power they absorb in the unloaded condition may be determined and added to the measured power.

Table 1

Auxiliaries to be fitted for the test to determine net power and the maximum 30 minutes power of electric drive trains

(*'Standard-production equipment'* means equipment provided by the manufacturer for a particular application).

No	Auxiliaries	Fitted for net power and the maximum 30 minutes power test
1	DC voltage source	Voltage drop during test less than 5 %
2	Speed variator and control device	Yes: Standard-production equipment
3	Liquid-cooling Motor bonnet Bonnet outlet Radiator ⁽¹⁾ ⁽²⁾ Fan Fan cowl Pump Thermostat ⁽³⁾	No Yes: Standard production equipment

No	Auxiliaries	Fitted for net power and the maximum 30 minutes power test
	Air cooling Air filter Cowl Blower Temperature adjustment system	Yes: Standard production equipment
4	Electric equipment	Yes: Standard production equipment
5	Bench test auxiliary fan	Yes, if necessary

- (¹) The radiator, the fan, the fan cowl, the water pump and the thermostat shall be located on the test bench in the same relative position as on the vehicle. The cooling-liquid circulation shall be activated by the drive train water pump only. Cooling of the liquid may be produced either by the drive train radiator, or by an external circuit, provided that the pressure loss of this circuit and the pressure at the pump inlet remain substantially the same as those of the drive train cooling system. The radiator shutter, if any, shall be in the open position. Where the fan, radiator and fan cowl cannot conveniently be fitted for the bench test, the power absorbed by the fan when separately mounted in its correct position in relation to the radiator and cowl (if used), shall be determined at the speed corresponding to the motor speeds used for measurement of the motor power either by calculation from standard characteristics or by practical tests. This power, corrected to the standard atmospheric conditions should be deducted from the correct power.
- (²) Where a disconnectable or progressive fan or blower is incorporated, the test should be carried out with the disconnectable fan (or blower) disconnected or at maximum slip condition.
- (³) The thermostat may be fixed in the fully open position.

2.4. Setting conditions

The setting conditions shall conform to the manufacturer's specifications for the production motor and be used without further alteration for the particular application.

2.5. Data to be recorded

2.5.1. The test for determining the net power shall be carried out with the accelerator control set at the maximum position.

2.5.2. The motor must have been run-in in accordance with the recommendations of the applicant for the approval.

2.5.3. Torque and speed data shall be recorded simultaneously.

2.5.4. If needed, the cooling liquid temperature recorded at the motor outlet must be maintained at ± 5 K of the thermostat temperature setting specified by the manufacturer.

For air cooling drive trains, the temperature at a point indicated by the manufacturer shall be kept within $+ 0/- 20$ K of the maximum value specified by the manufacturer.

2.5.5. The temperature of the lubricating oil measured in the oil sump or at the outlet from the oil temperature exchanger (if any) shall be maintained within the limits prescribed by the manufacturer.

2.5.6. An auxiliary regulating system may be used, if necessary, to maintain the temperature within the limits specified in paragraphs 2.5.4 and 2.5.5 above.

3. ACCURACY OF MEASUREMENTS

3.1. Torque: ± 1 per cent of measured torque.

The torque measuring system shall be calibrated to take friction losses into account. The accuracy in the lower half of the measuring range of the dynamometer bench may be ± 2 per cent of measured torque.

3.2. Motor speed: 0,5 per cent of measured speed.

3.3. Motor inlet air temperature: ± 2 K.

ANNEX 7

CHECKS ON CONFORMITY OF PRODUCTION

1. GENERAL

These requirements are consistent with tests to be held to check conformity of production, according to paragraph 6 and its subparagraphs.

2. TEST PROCEDURES

The methods of testing and measuring instruments shall be those described in Annexes 5 or 6 to this Regulation.

3. COLLECTION OF SAMPLES

One drive train has to be chosen. If after the test of paragraph 5.1 below, the drive train is not considered as conforming to the requirements of this Regulation, two more drive trains have to be tested.

4. MEASUREMENT CRITERIA

4.1. Net power of internal combustion engine

During the tests to verify conformity of production, the power shall be measured at two engine speeds S1 and S2, corresponding respectively to the measurement points of maximum power and maximum torque accepted for type approval. At these two engine speeds, which are subject to a tolerance of ± 5 per cent, the net power measured at least one point within the ranges $S1 \pm 5$ per cent and $S2 \pm 5$ per cent shall not differ by more than ± 5 per cent from the approval figure.

4.2. Net power and maximum 30 minutes power of electric drive trains

During the tests to verify conformity of production the power shall be measured at motor speed S1 corresponding to the measurement point of maximum power accepted for type approval. At this speed, the net power shall not differ by more than ± 5 per cent from the approval figure.

5. EVALUATION OF RESULTS

5.1. If the net power and the maximum 30 minutes power of the drive train tested pursuant to paragraph 2 above fulfils the requirement of paragraph 4 above, the production is considered to conform to the type approval.

5.2. If the requirements of paragraph 4 above are not fulfilled, two more drive trains are tested in the same way.

5.3. If the net power figure or the maximum 30 minutes power of the second and/or third drive train of paragraph 5.2 above does not fulfil the requirements of paragraph 4 above, the production shall be considered not to conform to the requirements of this Regulation and the provisions of paragraph 7.1 of this Regulation shall be put into effect.

ANNEX 8

REFERENCE FUELS

1. Technical data of the LPG reference fuels

		Fuel A	Fuel B	Test method
Composition:				ISO 7941
C3	% vol.	30 ± 2	85 ± 2	
C4	% vol.	balance	balance	
< C3, > C4	% vol.	max. 2 %	max. 2 %	
Olefines	% vol.	9 ± 3	12 ± 3	
Evaporative residue	ppm	max. 50	max. 50	NFM 41-015
Water content		none	none	visual inspection
Sulphur content	ppm mass (*)	max. 50	max. 50	EN 24260
Hydrogen sulphide		none	none	
Copper corrosion	rating	class 1	class 1	ISO 625 1 (**)
Odour		Characteristic	Characteristic	
MON		min. 89	min. 89	EN 589 Annex B

(*) Value to be determined at standard conditions (293,2 K (20 °C) and 101,3 kPa).

(**) This method may not accurately determine the presence of corrosive materials if the sample contains corrosion inhibitors or other chemicals which diminish the corrosivity of the sample to the copper strip. Therefore, the addition of such compounds for the sole purpose of biasing the test method is prohibited.

2. Technical data of NG reference fuels

		G20	G23	G25
Composition:				
CH ₄	% vol.	100	92,5	86
N ₂	% vol.	0	7,5	14
Wobbe Index (*)	MJ/m ³	53,6 ± 2 %	48,2 ± 2 %	43,9 ± 2 %

(*) Based on the gross calorific value and calculated for 0 °C.

The constituting gases of the mixtures shall have at least the following purities:

N₂: 99 %

CH₄: 95 % with a total content of hydrogen, carbon monoxide and oxygen below 1 per cent and a total content of nitrogen and carbon dioxide below 2 per cent.

The Wobbe Index is the ratio of the calorific value of a gas per unit volume and the square root of its relative density under the same reference conditions:

$$\text{Wobbe Index} = H_{\text{gas}} \frac{\sqrt{\rho_{\text{air}}}}{\sqrt{\rho_{\text{gas}}}}$$

with

H_{gas} = calorific value of the fuel in MJ/m³

ρ_{air} = density of air at 0 °C

ρ_{gas} = density of fuel at 0 °C at 0 °C

The Wobbe Index is said to be gross or net according to whether the calorific value uses is the gross or net calorific value.

Only the original UN/ECE texts have legal effect under international public law. The status and date of entry into force of this Regulation should be checked in the latest version of the UN/ECE status document TRANS/WP.29/343, available at: <http://www.unece.org/trans/main/wp29/wp29wgs/wp29gen/wp29fdocsts.html>

**Regulation No 115 of the Economic Commission for Europe of the United Nations (UN/ECE)
Uniform provisions concerning the approval of:**

- I. specific LPG (liquefied petroleum gases) retrofit systems to be installed in motor vehicles for the use of LPG in their propulsion system;**
- II. specific CNG (compressed natural gas) retrofit systems to be installed in motor vehicles for the use of CNG in their propulsion system**

Incorporating all valid text up to:

Supplement 6 to the original version of the Regulation — Date of entry into force: 10 June 2014

REGULATION

1. Scope
2. Definitions
3. Application for approval
4. Markings
5. Approval
6. Specifications regarding the retrofit systems
7. Instruction manuals
8. Modification and extension of approval of a retrofit system type
9. Conformity of production
10. Penalties for non-conformity of production
11. Production definitively discontinued
12. Names and addresses of Technical Services responsible for conducting approval tests, and of Type-Approval Authorities

ANNEXES

- 1A Communication concerning the approval or extension or refusal or withdrawal of approval or production definitively discontinued of a type of LPG retrofit equipment pursuant to Regulation No 115

- 1B Communication concerning the approval or extension or refusal or withdrawal of approval or production definitively discontinued of a type of CNG retrofit equipment pursuant to Regulation No 115
- 2A Arrangement of the LPG retrofit system type-approval mark
- 2B Arrangement of the CNG retrofit system type-approval mark
- 3A Complete list of information for the purpose of type-approval of a LPG retrofit system installed on a vehicle
- 3B Complete list of information for the purpose of type-approval of a CNG retrofit system installed on a vehicle
- 4. Description of the leakage test procedures for CNG/LPG systems installed on vehicles
- 5. Prescriptions concerning the fixation of LPG and CNG container(s)
- 6A Bi-fuel vehicles with petrol direct injection engines — Calculation of LPG energy ratio
- 6B Bi-fuel vehicles with petrol direct injection engines — Calculation of CNG energy ratio

1. SCOPE

This Regulation applies to:

- 1.1. Part I: Specific LPG retrofit systems to be installed in motor vehicles for the use of LPG in the propulsion system.

Part II: Specific CNG retrofit systems to be installed in motor vehicles for the use of CNG in the propulsion system.
- 1.2. This Regulation applies when the retrofit systems manufacturer keep the initial characteristics of the whole system, for the specific vehicle family for which the approval has been granted.
- 1.3. This Regulation does not apply to the procedures, checks and inspections aimed at verifying the correct installation of the retrofit systems on vehicles, since this matter relies on the competence of the Contracting Party where the vehicle is registered.
- 1.4. This Regulation applies to retrofit systems intended to be fitted on vehicles of categories M and N ⁽¹⁾, with the exception of:
 - (a) Vehicles type-approved pursuant to Regulation No 83, series of amendments 00 or 01 or 02 or 03 or 04 series,
 - (b) Vehicles type-approved pursuant to Regulation No 49, series of amendments 00 or 01 or 02 or 03 series,
 - (c) Vehicles type-approved pursuant to Council Directive 70/220/EEC ⁽²⁾ up to and including the amending Directive 96/69/EC of the European Parliament and if the Council ⁽³⁾,
 - (d) Vehicles type-approved pursuant to Council Directive 88/77/EEC ⁽⁴⁾ up to and including the amending Directive 96/1/EC of the European Parliament and of the Council ⁽⁵⁾.

⁽¹⁾ As defined in the Consolidated Resolution on the Construction of Vehicles (R.E.3), document ECE/TRANS/WP.29/78/Rev.2, para. 2. — www.unece.org/trans/main/wp29/wp29wgs/wp29gen/wp29resolutions.html

⁽²⁾ OJ L 76, 6.4.1970, p. 1.

⁽³⁾ OJ L 282, 1.11.1996, p. 64.

⁽⁴⁾ OJ L 36, 9.2.1988, p. 33.

⁽⁵⁾ OJ L 40, 17.2.1996, p. 1.

1.5. The requirements for the different categories (M₁, N₁ or others) are defined in paragraphs 2 to 7 ⁽⁶⁾.

Once the retrofit system is installed in the vehicle, the modified vehicle shall fulfil all the provisions of the Regulation for which the type-approval has been initially granted.

2. DEFINITIONS

2.1. 'Approval of an LPG or CNG retrofit system' means the approval of the type of retrofit system to be installed in motor vehicles for the use of LPG or CNG.

2.1.1. Specific LPG retrofit system of an approved type may consist of several components as classified and approved according to Regulation No 67, 01 series of amendments, Part I and the specific vehicle instruction manual.

2.1.2. Specific CNG retrofit system of an approved type may consist of several components as classified and approved according to Regulation No 110, Part I and the specific vehicle instruction manual.

2.1.3. 'A vehicle is considered mono-fuel', when, after the retrofit operation, it is designed primarily for permanent running on LPG or CNG, but may still have a petrol system for emergency purposes, where the capacity of the petrol tank does not exceed 15 litres.

2.1.4. 'A vehicle is considered bi-fuel', when after the retrofit operation, it is equipped with a gas storage and a separate petrol storage with a capacity exceeding 15 litres, and is designed to run on only one fuel at a time. The simultaneous use of both fuels is limited in amount or duration.

2.1.5. 'Master-slave system' means a retrofit system in which the LPG Electronic Control Unit (ECU) or CNG ECU is able to translate the petrol ECU control strategy in LPG or CNG operation.

2.1.6. 'Original vehicle' means a vehicle before the installation of the retrofit system.

2.2. 'Specific LPG or CNG retrofit system of an approved type' means systems, which do not differ in such respect as:

2.2.1. Retrofit system manufacturer (responsible for retrofit approval application);

2.2.2. Pressure regulator/vaporiser type by the same manufacturer;

2.2.3. Gas fuelling system type by the same manufacturer (i.e. induction mixer, injector device, vapour or liquid, single or multi-point injection system);

2.2.4. Sensors and actuators set types;

2.2.5. The fuel container type (i.e. LPG liquid take off/vapour pressure, LPG vapour take off, LPG liquid take off/pressurised by pump, pressurised CNG take off), the safety devices and fuel container accessories, as required by Regulation No 67, 01 series of amendments, or Regulation No 110, where applicable (i.e. relief valve);

2.2.6. Fuel container fitting devices;

Note: With respect to paragraphs 2.2.4, 2.2.5 and 2.2.6 above, the manufacturer of the retrofit can insert in his installation manual other components, included in the approval, as interchangeable items (see para. 7).

2.2.7. ECU type by the same manufacturer;

2.2.8. Basic software principles and control strategy;

2.2.9. Installation manual (see para. 7);

2.2.10. End-user manual (see para. 7).

⁽⁶⁾ Regarding safety requirements, it is recommended that the minimum requirements of Regulation No 67, 01 series of amendments and Regulation No 110 shall apply to all retrofitted vehicles.

2.3. 'System manufacturer' means an organisation which can assume technical responsibility for the manufacturing of LPG and CNG retrofit systems and can demonstrate that it possesses the features required and the necessary means to achieve quality assessment and conformity of production of the retrofit system.

2.4. 'Installer' means an organisation which can assume technical responsibility for the correct and safe installation of the approved LPG and CNG retrofit system, in conformity with respectively paragraphs 6.1.1.3 and 6.2.1.3 of this Regulation (7).

2.5. For the purposes of this Regulation, 'the parent vehicle', with regard both to LPG system and to CNG system, means a vehicle that is selected to act as the vehicle, on which the requirements of this Regulation are going to be demonstrated, and to which the members of a family refer.

2.5.1. According to this Regulation, 'a member of the family' is a vehicle sharing the following essential characteristics with its parent vehicle:

The family definition is based on the original vehicle characteristics.

2.5.1.1. (a) It is produced by the same vehicle manufacturer.

(b) It is classified in the same category M₁ or M₂ or M₃ or N₁ or N₂ or N₃. Vehicles of category M₁ and N₁ class I may belong to the same family.

(c) It is subject to the same emission limits or those specified in earlier series of amendments of the applicable Regulation.

(d) If the gas fuelling system has a central metering for the whole engine: it has an approved power output between 0,7 and 1,15 times that of the engine of the parent vehicle. If the gas fuelling system has an individual metering per cylinder: it has an approved power output per cylinder between 0,7 and 1,15 times that of the engine of the parent vehicle.

(e) Fuel feed and combustion process (injection: direct or indirect, single-point or multi-point).

(f) It has the same pollution control system:

(i) Same type of catalyst if fitted (three-way, oxidation, DeNO_x)

(ii) Air injection (with or without)

(iii) Exhaust gas recirculation (EGR) (with or without)

If the tested vehicle was not equipped with air-injection or EGR, engines with these devices are allowed.

2.5.1.2. With regard to the requirement of paragraph 2.5.1.1(a), the vehicle family can also cover vehicles produced by other vehicle manufacturers if it can be demonstrated to the Type-Approval Authority that the same engine type and emission strategy is used.

2.5.1.3. With regard to requirement of paragraph 2.5.1.1(d):

(a) In the case of a central metering for the whole vehicle where a demonstration shows that two gas fuelled vehicles could be members of the same family with the exception of their approved power output, respectively P1 and P2 (P1 < P2), and both are tested as if they were parent vehicles, the family relation will be considered valid for any vehicle with an approved power output between 0,7*P1 and 1,15*P2;

(7) In the bounds of the legislative power of the Contracting Party, as stated in paragraph 1.3 of this Regulation, in order to ensure a proper qualification of the installer, it is recommended to require valid certificates, issued by the system manufacturer and/or by skilled organisations, attesting the personnel's necessary expertise and the workshop's suitability to carry out retrofit system's installation.

- (b) In the case of an individual metering per cylinder where a demonstration shows two gas fuelled vehicles could be members of the same family with the exception of their approved power output, respectively P1 and P2 ($P1 < P2$), and both are tested as if they were parent vehicles, the family relation will be considered valid for any vehicle with an approved power output between $0,7*P1$ and $1,15*P2$.
- 2.5.1.4. With regard to the requirement of paragraph 2.5.1.1(f) in case of a 'master-slave' system, as defined in paragraph 2.1.6, the family relation will be considered valid regardless of the presence of the air injection or the EGR.
- 2.6. For definitions of the components of LPG retrofit systems refer to Regulation No 67, 01 series of amendments.
- 2.7. For definitions of the components of CNG retrofit systems refer to Regulation No 110.
3. APPLICATION FOR APPROVAL
- 3.1. The application for approval of a specific retrofit system shall be submitted by the manufacturer or by his duly accredited representative.
- 3.2. It shall be accompanied by the under-mentioned documents in triplicate and by the following details:
- 3.2.1. Description of the retrofit system comprising all the relevant details, included the approval numbers of each component referred to in Annex 3A to this Regulation for LPG system and Annex 3B to this Regulation for CNG system;
- 3.2.2. Description of the parent vehicle(s) on which the requirements of this Regulation are going to be tested;
- 3.2.3. Description of all modifications applied to the original parent vehicle, only in case of bi-fuel configuration;
- 3.2.4. Verification of compliance with the specifications prescribed in paragraph 6 of this Regulation;
- 3.2.5. If needed for the purpose of paragraph 5.2 below, notice of approval of the retrofit system for a parent vehicle which is different from those the approval is applied for, certifying that the retrofit system has been approved as a 'master-slave' system, as defined in paragraph 2.1.5 above.
- 3.3. Installation manual(s) for the retrofit system installation on the parent vehicle(s).
- 3.4. End-user manual.
- 3.5. A sample of the specific retrofit system, properly installed in the parent vehicle(s).
4. MARKINGS
- 4.1. The sample(s) of a specific retrofit system submitted to type-approval shall be accompanied by a plate with the trade name or mark of the retrofit manufacturer and the type, as indicated in Annexes 2A and 2B.
- 4.2. All retrofit systems, installed in the vehicle belonging to the family, as defined in paragraph 2 of this Regulation, shall be identified by a plate, in which the approval number, and the technical specifications, as required in Annexes 2A and 2B shall be placed. This plate has to be permanently fixed to the structure of the vehicle and shall be clearly readable and indelible.
5. APPROVAL
- 5.1. If the retrofit system sample submitted for approval meets the requirements of paragraph 6 of this Regulation, the type-approval of the retrofit system shall be granted.
- 5.2. Retrofit systems, which have already been approved as 'master-slave' systems on at least one parent vehicle, do not need to comply with paragraph 6.1.4.4.2.1 or 6.2.4.4.2.1 of this Regulation.

- 5.3. An approval number shall be assigned to each type of the retrofit system approved. Its first two digits (at present 00 according to the Regulation in its original form) shall indicate the series of amendments incorporating the most recent major technical amendments made to the Regulation at the time of issue of the approval. The same Contracting Party shall not assign the same type-approval number to another type of retrofit system.
- 5.4. Notice of approval or of refusal or of extension of approval of a retrofit system type/part pursuant to this Regulation shall be communicated to the Parties to the Agreement applying this Regulation, by means of a form conforming to the model in Annexes 1A and 1B to this Regulation.
- 5.5. An international approval mark shall be affixed in the plate as indicated in Annexes 2A and 2B, to all retrofit systems, conforming to a type approved under this Regulation, in addition to the mark prescribed in this paragraph 4.1. This approval mark shall consist of:
- 5.5.1. A circle surrounding the letter 'E' followed by the distinguishing number of the country which has granted the approval ⁽⁸⁾;
- 5.5.2. The number of this Regulation, followed by the letter 'R', a dash and the approval number to the right of the circle defined in paragraph 5.5.1 above. The approval number consists of the retrofit system type-approval number, which appears in the communication form for this type (see paragraph 5.2 above and Annexes 1A and 1B) preceded by two figures indicating the latest series of amendments to this Regulation.
- 5.6. The approval mark shall be clearly readable and be indelible.
- 5.7. Annexes 2A and 2B to this Regulation give examples of the arrangement of the aforesaid plate with approval mark.
6. SPECIFICATIONS REGARDING THE RETROFIT SYSTEMS
- 6.1. Part I — LPG retrofit system specifications:
- 6.1.1. Requirements for the installation of specific equipment for the use of LPG in the propulsion system of a vehicle
- 6.1.1.1. An LPG retrofit system shall consist at least of the following components:
- 6.1.1.1.1. Components indicated in Regulation No 67, 01 series of amendments and defined as necessary;
- 6.1.1.1.2. Installation manual;
- 6.1.1.1.3. End-user manual.
- 6.1.1.2. The LPG retrofit system may also include components indicated as optional in Regulation No 67, 01 series of amendments.
- 6.1.1.3. The LPG retrofit system installed in the vehicle, in a proper way as defined in the above installation manual, shall comply with the installation requirements of Regulation No 67, 01 series of amendments. Concerning the fixation of the fuel container, the requirements of Regulation No 67, 01 series of amendments shall be deemed to be met if the requirements of Annex 5 to the present Regulation are satisfied.
- 6.1.2. Pollutants emissions and CO₂ emissions (for categories M₁ and N₁ vehicles only)
- 6.1.2.1. One LPG retrofit system sample, as described in paragraph 2.2 of this Regulation, installed into the parent vehicle(s), as described in paragraph 2.5 of this Regulation, shall be submitted to the test procedures described in Regulations No 83 ⁽⁹⁾ and No 101, or No 49 ⁽¹⁰⁾, where applicable, in the limits of the requirements of paragraphs 6.1.2.4 and 6.1.2.5 below. The vehicles and/or the engines are also submitted to a maximum power comparison test, as described in Regulation No 85 for engines, or defined in paragraph 6.1.3 below for vehicles.

⁽⁸⁾ The distinguishing numbers of the Contracting Parties to the 1958 Agreement are reproduced in Annex 3 to the Consolidated Resolution on the Construction of Vehicles (R.E.3), document ECE/TRANS/WP.29/78/Rev.2/Amend.3 — www.unece.org/trans/main/wp29/wp29wgs/wp29gen/wp29resolutions.html

⁽⁹⁾ According to Regulation No 83, the series of amendments in force during the initial type-approval of the engine.

⁽¹⁰⁾ According to Regulation No 49, the series of amendments in force during the initial type-approval of the engine.

- 6.1.2.2. Fuel requirements by the engine: the type of fuel normally used by the engine could be:
- (a) LPG only (LPG mode) in case of mono-fuel⁽⁹⁾;
 - (b) Either unleaded petrol (petrol mode) or LPG (LPG mode) in case of bi-fuel;
 - (c) Both diesel fuel or diesel fuel and LPG (dual fuel).
(Provisions for dual fuel have still to be defined).
- 6.1.2.3. 'Pollutants' means:
- (a) Carbon monoxide
 - (b) Hydrocarbons assuming a ratio:
 - CH_{1,85} for petrol,
 - CH_{1,86} for diesel fuel,
 - CH_{2,52} for LPG,
 - CH (to be defined) for dual fuel;
 - (c) Oxides of nitrogen, the latter being expressed in nitrogen dioxide (NO₂) equivalent.
 - (d) Particulates, etc.
- 6.1.2.4. Exhaust emissions and CO₂ emissions (M₁ and N₁ categories of vehicles):
- 6.1.2.4.1. Specific requirements on the Type I test (verifying the average exhaust emissions after a cold start):
- 6.1.2.4.1.1. Measurements of tailpipe emissions shall be performed after a cold start with each fuel:
- (a) Reference petrol,
 - (b) Reference LPG A,
 - (c) Reference LPG B.
- The emissions of CO, HC, and NO_x are calculated according Regulation No 83⁽⁹⁾.
- 6.1.2.4.1.2. Setting of the dynamometer
- With the agreement of the Type-Approval Authority, one of the following methods may be used:
- 6.1.2.4.1.2.1. Using of coast-down factors/coefficients of the original vehicle:
- In case coast-down coefficients of the original vehicle used during the type-approval are used, the following conditions shall apply:
- (a) The parent vehicle mass shall be measured with the retrofit system installed on the vehicle including the LPG tank fully filled up or shall be calculated as the sum of the original vehicle reference mass and the mass of the retrofit system with the LPG tank fully filled up;
 - (b) The inertia mass of the parent vehicle shall be determined according to the mass of the retrofitted vehicle;
 - (c) The rolling resistance of the parent vehicle shall correspond to the original vehicle value proportionally adjusted to the parent vehicle mass measured or calculated as above:

$$F0' = f0 + (\text{abs}(f0)) * (p/m)$$

Where:

F0 = rolling resistance of the parent vehicle

f_0 = rolling resistance of the original vehicle

m = reference mass of the original vehicle

p = retrofit system mass;

- (d) The other coefficients of the resistance of the parent vehicle shall be equal to that of the original vehicle.

6.1.2.4.1.2.2. Using of the table values:

- (a) The parent vehicle mass shall be measured with the retrofit system installed on the vehicle including the LPG tank fully filled up or shall be calculated as the sum of the original vehicle reference mass and the mass of the retrofit system with the LPG tank fully filled up;
- (b) The inertia mass of the parent vehicle shall be determined according to the mass of the retrofitted vehicle;
- (c) The coefficient a shall be the one corresponding to the reference mass of the retrofitted vehicle;
- (d) The coefficient b shall be the one corresponding to the reference mass of the original vehicle.

6.1.2.4.1.3. Exhaust emissions test in petrol mode

Subject to the requirements of paragraph 6.1.2.4.1.5 below, the tests shall be conducted three times using reference petrol. The parent vehicle(s), equipped with the retrofit system, shall comply with the limit values according to the type-approval of the original vehicle(s) including the deterioration factors applied during the type-approval of the original vehicle(s).

- 6.1.2.4.1.4. Notwithstanding the requirements of paragraph 6.1.2.4.1.3 above, for each pollutant or combination of pollutants, one of the three test results may exceed, by not more than 10 %, the limit prescribed, provided that the arithmetical mean of the three results is below the prescribed limit. Where the prescribed limits are exceeded for more than one pollutant, it is immaterial whether this occurs in the same test or in different tests.

- 6.1.2.4.1.5. The number of emission tests prescribed in paragraph 6.1.2.4.1.3 may be reduced under the following conditions:

- (a) One test is required if the result obtained for each pollutant subject to limitation is less than or equal to 0,7 the emission limit

(i.e. $V_1 \leq 0,70 G$);

- (b) Two tests are required if, for each pollutant subject to limitation the following requirements are met:

$$V_1 \leq 0,85 G \text{ and } V_1 + V_2 \leq 1,70 G \text{ and } V_2 \leq G$$

Where:

V_1 value of the emission of one pollutant obtained from the first test of the Type I performed;

V_2 value of the emission of one pollutant obtained from the second test of the Type I performed;

G limit value of the emissions of one pollutant ($CO/HC/NO_x$) according to the type-approval of the vehicle(s) divided by the deterioration factors.

6.1.2.4.1.6. Exhaust emissions test in LPG mode

Subject to the requirements of paragraph 6.1.2.4.1.8 below, the tests shall be conducted three times with each reference LPG. The parent vehicle, equipped with the retrofit system, shall comply with the limit values according to the type-approval of the original vehicle(s) including the deterioration factors applied during the type-approval of the original vehicle(s).

If the parent vehicle complies with Regulation No 83, 05 series of amendments, or with Directive 98/69/EC of the European Parliament and of the Council ⁽¹¹⁾, or with Regulation No 49, 04 series of amendments, or with Directive 1999/96/EC of the European parliament and of the Council ⁽¹²⁾, the vehicle shall not use petrol for more than a maximum of 90 seconds during each test.

For vehicles complying with later series of amendments to Regulations Nos 83 and 49, or later amending Directives or European Regulations, this period shall not exceed 60 seconds.

6.1.2.4.1.6.1. Engine starting-up

It is permissible that the engine is started on petrol and switched to LPG after a predetermined period of time which cannot be changed by the driver.

6.1.2.4.1.6.2. Use of petrol

If the parent vehicle complies with Regulation No 83, 05 series of amendments, or with Directive 98/69/EC, or with Regulation No 49, 04 series of amendments, or with Directive 1999/96/EC, the vehicle shall not use petrol for more than a maximum of 90 seconds during each test.

For vehicles complying with later series of amendments to Regulations Nos 83 and 49, or later amending Directives or European Regulations, this period shall not exceed 60 seconds.

6.1.2.4.1.6.3. Special provisions for petrol direct injection engines

Notwithstanding the paragraph 6.1.2.4.1.6.2 above, in case of vehicles with petrol direct injection engines, it is permissible to use petrol only or simultaneously with LPG during the entire test cycle provided that the energy consumption of gas is higher than 80 % of the total amount of energy consumed during the test.

This percentage shall be calculated in accordance with the method set out in Annex 6A.

6.1.2.4.1.7. Notwithstanding the requirements of paragraph 6.1.2.4.1.6 above, for each pollutant or combination of pollutants, one of the three test results may exceed, by not more than 10 %, the limit prescribed, provided that the arithmetical mean of the three results is below the prescribed limit. In this case the prescribed limits may be exceeded for more than one pollutant in the same test or in different tests.

6.1.2.4.1.8. The number of emission tests prescribed in paragraph 6.1.2.4.1.6 above on each LPG reference fuel may be reduced under the following conditions:

- (a) One test is required if the result obtained for each pollutant or for the combined emission of two pollutants subject to limitation is less than or equal to 0,7 the emission limit (i.e. $M_1 \leq 0,70 G$);
- (b) Two tests are required if, for each pollutant or for the combined emission of two pollutants subject to limitation the following requirements are met:

$$M_1 \leq 0,85 G \text{ and } M_1 + M_2 \leq 1,70 G \text{ and } M_2 \leq G$$

Where:

M_1 value of the emission of one pollutant obtained from the first test of the Type I performed;

M_2 value of the emission of one pollutant obtained from the second test of the Type I performed;

G limit value of the emissions of one pollutant (CO/HC/NO_x) or the sum of two pollutants (HC + NO_x) according to the type-approval of the vehicle(s) divided by the deterioration factors.

6.1.2.4.2. Specific requirements on the Type II test (carbon monoxide emission test at idling speed) for vehicles having a maximum mass exceeding 3 500 kg:

⁽¹¹⁾ OJ L 350, 28.12.1998, p. 1.

⁽¹²⁾ OJ L 44, 16.2.2000, p. 1.

- 6.1.2.4.2.1. One LPG retrofit system sample, as described in paragraph 2.2 of this Regulation, installed into the parent vehicle, as described in paragraph 2.5 of this Regulation, shall be submitted to the Type II test procedures described in Regulation No 83 ⁽⁹⁾.
- 6.1.2.4.2.2. Notwithstanding the provisions of Regulation No 83 ⁽⁹⁾, the Type II test shall be performed at the request of the system manufacturer with only one LPG reference fuel chosen at the discretion of the Technical Service responsible for the test.
- 6.1.2.4.3. The LPG retrofit system, as described in paragraph 2.2 of this Regulation, installed into the parent vehicle(s), shall comply with the requirements and tests of Regulation No 83 ⁽⁹⁾ on both petrol and LPG modes.
- 6.1.2.4.3.1. The emissions of CO₂ are calculated according to Regulation No 101 for each parent vehicle, if applicable.

The mean of CO₂ emissions shall be calculated as follows:

$$CO_{2LPG} = 1/n \sum_{i=1}^n (CO_{2Ai} + CO_{2Bi})/2$$

$$CO_{2petrol} = 1/n \sum_{i=1}^n CO_{2petrol.i}$$

Where:

- i* number of parent vehicles (*i* = 1 to *n*)
- CO_{2Ai} mean value of the emissions of CO₂ obtained from the three Type I tests with the retrofit system and with LPG A for vehicle No *i*,
- CO_{2Bi} mean value of the emissions of CO₂ obtained from the three Type I tests with the retrofit system and with LPG B for vehicle No *i*;
- CO_{2petrol.i} mean value of the emissions of CO₂ obtained from the three Type I tests with reference petrol for vehicle No *i*.

- 6.1.2.4.3.2. The mean fuel consumption shall be calculated in the same way as for the mean of CO₂ emissions, as defined in paragraph 6.1.2.4.3.1.
- 6.1.2.4.3.3. The ratios of CO₂ emissions and fuel consumption shall be calculated as follows:

$$K_{CO_2} = CO_{2LPG}/CO_{2petrol}$$

$$K_{Cons} = Cons_{LPG}/Cons_{petrol}$$

For each vehicle of the family, the official values of CO₂ emissions are multiplied by the above ratios.

- 6.1.2.5. Exhaust emissions (M₂, M₃, N₂ and N₃ categories of vehicles)
This paragraph is reserved for the specific requirements for emissions of diesel engines approved according to Regulation No 49 and equipped with a retrofit LPG system (dual fuel) if required.
- 6.1.3. Power requirements
The parent vehicle(s) or engine(s) are submitted to the tests as follows:

6.1.3.1. One LPG retrofit system sample as described in paragraph 2.2 of this Regulation, installed in the parent vehicle(s) or on the parent engine(s) shall be submitted to the test procedures of paragraph 6.1.3.2 or 6.1.3.3 below. The measured power with LPG shall be lower than that measured with petrol + 5 %.

6.1.3.2. Chassis dynamometer method

The maximum power at the wheels is measured on a chassis dynamometer on each parent vehicle with the following fuels:

- (a) Reference petrol;
- (b) Reference LPG A or B.

The mean of power measurements shall be calculated as follows:

$$\text{Power}_{\text{petrol}} = 1/n \sum_{i=1}^n \text{Power}_{\text{petrol},i}$$

$$\text{Power}_{\text{LPG}} = 1/n \sum_{i=1}^n \text{Power}_{\text{LPG},i}$$

The ratio of engine power shall be calculated as follows:

$$K_{\text{power}} = \text{Power}_{\text{LPG}} / \text{Power}_{\text{petrol}}$$

For each vehicle of the family, the official values of engine power are multiplied by the above ratio.

6.1.3.3. Engine dynamometer method

The maximum power at the crankshaft is measured on an engine dynamometer according to Regulation No 85 for each parent vehicle(s) with the following fuels:

- (a) Commercial petrol or diesel fuel;
- (b) Commercial LPG.

The mean of power measurements shall be calculated as follows:

$$\text{Power}_{\text{petrol}} = 1/n \sum_{i=1}^n \text{Power}_{\text{petrol},i}$$

$$\text{Power}_{\text{LPG}} = 1/n \sum_{i=1}^n \text{Power}_{\text{LPG},i}$$

The ratio of engine power shall be calculated as follows:

$$K_{\text{power}} = \text{Power}_{\text{LPG}} / \text{Power}_{\text{petrol}}$$

For each vehicle of the family, the official values of engine power are multiplied by the above ratio.

6.1.4. On-board Diagnostic System (OBD) requirements and tests for vehicles retrofitted with LPG retrofit system.

- 6.1.4.1. For the purposes of this paragraph, the following definitions apply:
- 6.1.4.1.1. 'Original emission-related component' means any component in the air inlet, exhaust or evaporative system which supplies an input to or receives an output from the petrol controller.
- 6.1.4.1.2. 'LPG emission-related component' means any component in the air inlet or in the exhaust system which supplies an input to or receives an output from the LPG controller.
- 6.1.4.2. In the case that there is a need, to fit properly the LPG retrofit system in the vehicle, it is allowed to simulate the right operation of the original emission-related components which are not in use on LPG mode.
- 6.1.4.3. The LPG retrofit system, as described in paragraph 2.2. of this Regulation, installed into the parent vehicle(s), shall comply with the requirements and tests of Annex 11 of Regulation No 83, 05 series of amendments on both petrol and LPG modes.
- 6.1.4.4. Specific OBD requirements and tests for 'master-slave' retrofit system:
- 6.1.4.4.1. Notwithstanding the requirements of the paragraph 6.1.4.3. above, a 'master-slave' retrofit system shall fulfil the following requirements:
- (a) The petrol ECU shall remain activated for engine management in both petrol and LPG modes;
 - (b) During petrol operations the petrol OBD system shall remain the only on-board diagnostic system of the vehicle;
 - (c) During LPG operations the petrol OBD system shall continue to monitor original emission related components with the exception of those which are not in use;
 - (d) During LPG operations the LPG ECU shall only monitor for the LPG emission-related components as well as their electrical connections;
- 6.1.4.4.2. Notwithstanding the requirements of paragraph 6.1.4.3. above, the LPG retrofit system shall be submitted to the following tests which, in the case of Type I tests, shall be performed according to Regulation No 83 (°).
- 6.1.4.4.2.1. The following tests shall be carried out on one parent vehicle, equipped with the LPG retrofit system:
- (a) The LPG ECU shall follow the petrol ECU on fuel strategies (e.g. injection). This can be demonstrated by a monitoring (diagnostic) programme, while modifying the signal of one of the petrol system's sensors with an impact on the injection time;
 - (b) During a Type I test on petrol the original malfunction indicator (MI) shall activate due to the electrical disconnection of any original emission-related component;
 - (c) During a Type I test on LPG the original MI shall activate due to the electrical disconnection of any original emission-related component, which is in use during LPG operations.
- 6.1.4.4.2.2. The following tests shall be carried out on the parent vehicle(s), equipped with the LPG retrofit system, only on LPG operating mode:
- (a) During a Type I test, electrical disconnection of one LPG emission-related component;
 - (b) During a Type I, test replacement of one LPG emission-related component with a deteriorated and defective one or electronic simulation of such a failure.

The original MI or automatic switch from LPG mode to petrol mode shall activate before the end of the tests under any of the conditions above.

- 6.1.4.4.2.3. Fault codes due to malfunctions of the LPG emission-related components and their electrical connections shall be stored in the LPG ECU.
- 6.1.4.4.2.4. The system manufacturer shall provide specific instructions as to read out the LPG fault codes referred to in paragraph 6.1.4.4.2.3 above.
- 6.2. Part II — CNG retrofit system specifications
- 6.2.1. Requirements for the installation of specific equipment for the use of compressed natural gas (CNG) in the propulsion system of a vehicle
- 6.2.1.1. A CNG retrofit system shall consist at least of the following components:
- 6.2.1.1.1. Components indicated in Regulation No 110 and defined as necessary;
- 6.2.1.1.2. Installation manual;
- 6.2.1.1.3. End-user manual.
- 6.2.1.2. The CNG retrofit system may also include components indicated as optional in Regulation No 110.
- 6.2.1.3. The CNG retrofit system installed in the vehicle, in a proper way as defined in the above installation manual, shall comply with the installation requirements of Regulation No 110. Concerning the fixation of the fuel container, the requirements of Regulation No 110 shall be deemed to be met if the requirements of Annex 5 to the present Regulation are satisfied.
- 6.2.2. Pollutants emissions and CO₂ emissions (for categories M₁ and N₁ vehicles only)
- 6.2.2.1. One CNG retrofit system sample, as described in paragraph 2.2 of this Regulation, installed into the parent vehicle as described in paragraph 2.5 of this Regulation, shall be submitted to the test procedures described in Regulations Nos 83 ⁽⁹⁾ and No 101, or No 49 ⁽¹⁰⁾, where applicable, in the limits of the requirements of paragraphs 6.2.2.5 and 6.2.2.6 below.
- The vehicles and/or the engines are also submitted to a maximum power comparison test, as described in Regulation No 85 for engines or defined in paragraph 6.2.3 below for vehicles.
- 6.2.2.2. Fuel requirements by the engine, the type of fuels normally used by the engine:
- (a) CNG only (CNG mode) in case of mono-fuel ⁽⁹⁾;
- (b) Either unleaded petrol (petrol mode) or CNG (CNG mode) in case of bi-fuel;
- (c) Both diesel fuel or diesel fuel and CNG (dual fuel).
- (Provisions for dual fuel have still to be defined).
- 6.2.2.3. 'Pollutants' means:
- (a) Carbon monoxide;
- (b) Hydrocarbons assuming a ratio:
- CH_{1,85} for petrol;
- CH_{1,86} for diesel fuel;
- CH₄ for CNG;
- CH (to be defined) for dual fuel;
- (c) Oxides of nitrogen, the latter being expressed in nitrogen dioxide (NO₂) equivalent;
- (d) Particulates, etc.

6.2.2.4. Exhaust emissions (M_1 and N_1 categories of vehicles and CO_2 emissions M_1 category vehicles):

6.2.2.4.1. Specific requirements on the Type I test (verifying the average exhaust emissions after a cold start):

6.2.2.4.1.1. Measurements of tailpipe emissions shall be performed after a cold start with each fuel:

- (a) Reference petrol;
- (b) Reference G20 fuel;
- (c) Reference G25 fuel.

The emissions of CO, HC, and NO_x are calculated according Regulation No 83 ⁽⁹⁾.

6.2.2.4.1.2. Setting of the dynamometer

With the agreement of the type-approval authority, one of the following methods may be used:

6.2.2.4.1.2.1. Using of coast-down factors/coefficients of the original vehicle:

In case coast-down coefficients of the original vehicle used during the type-approval are used, the following conditions shall apply:

- (a) The parent vehicle mass shall be measured with the retrofit system installed on the vehicle including the CNG tank fully filled up or shall be calculated as the sum of the original vehicle reference mass and the mass of the retrofit system with the CNG tank fully filled up;
- (b) The inertia mass of the parent vehicle shall be determined according to the mass of the retrofitted vehicle;
- (c) The rolling resistance of the parent vehicle shall correspond to the original vehicle value proportionally adjusted to the parent vehicle mass measured or calculated as above:

$$F_0' = f_0 + (\text{abs}(f_0)) * (p/m)$$

Where:

f_0' = rolling resistance of the parent vehicle

f_0 = rolling resistance of the original vehicle

m = reference mass of the original vehicle

p = retrofit system mass;

- (d) The other coefficients of the resistance of the parent vehicle shall be equal to that of the original vehicle.

6.2.2.4.1.2.2. Using of the table values:

- (a) The parent vehicle mass shall be measured with the retrofit system installed on the vehicle including the CNG tank fully filled up or shall be calculated as the sum of the original vehicle reference mass and the mass of the retrofit system with the CNG tank fully filled up;
- (b) The inertia mass of the parent vehicle shall be determined according to the mass of the retrofitted vehicle;
- (c) The coefficient a shall be the one corresponding to the reference mass of the retrofitted vehicle;
- (d) The coefficient b shall be the one corresponding to the reference mass of the original vehicle.

6.2.2.4.1.3. Exhaust emissions test in petrol mode

Subject to the requirements of paragraph 6.2.2.4.1.5 below the tests shall be conducted three times using reference petrol. The parent vehicle(s), equipped with the retrofit system, shall comply with the limit values according to the type-approval of the original vehicle(s) including the deterioration factors applied during the type-approval of the original vehicle(s).

6.2.2.4.1.4. Notwithstanding the requirements of paragraph 6.2.2.4.1.3 above, for each pollutant or combination of pollutants, one of the three test results may exceed, by not more than 10 %, the limit prescribed, provided that the arithmetical mean of the three results is below the prescribed limit. In this case the prescribed limits may be exceeded for more than one pollutant in the same test or in different tests.

6.2.2.4.1.5. The number of emission tests prescribed in paragraph 6.2.2.4.1.3 above may be reduced under the following conditions:

(a) One test is required if the result obtained for each pollutant subject to limitation is less than or equal to 0,7 the emission limit

(i.e. $V1 \leq 0,70 G$);

(b) Two tests are required if, for each pollutant subject to limitation the following requirements are met:

$V1 \leq 0,85 G$ and $V1 + V2 \leq 1,70 G$ and $V2 \leq G$

Where:

V1 value of the emission of one pollutant obtained from the first test of the Type I performed;

V2 value of the emission of one pollutant obtained from the second test of the Type I performed;

G limit value of the emissions of one pollutant (CO/HC/NO_x) according to the type-approval of the vehicle(s) divided by the deterioration factors.

6.2.2.4.1.6. Exhaust emissions test in CNG mode

Subject to the requirements of paragraph 6.2.2.4.1.8 below, the tests shall be conducted three times with each reference CNG. The parent vehicle(s), equipped with the retrofit system, shall comply with the limit values according to the type-approval of the original vehicle(s) including the deterioration factors applied during the type-approval of the original vehicle(s).

If the parent vehicle(s) complies with Regulation No 83, 05 series of amendments, or with Directive 98/69/EC, or with Regulation No 49, 04 series of amendments, or with Directive 1999/96/EC, the vehicle shall not use petrol for more than a maximum of 90 seconds during each test.

For vehicles complying with later series of amendments to Regulations Nos 83 and 49, or later amending Directives or European Regulations, this period shall not exceed 60 seconds.

6.2.2.4.1.6.1. Engine starting-up

It is permissible that the engine is started on petrol and switched to CNG after a predetermined period of time which cannot be changed by the driver.

6.2.2.4.1.6.2. Use of petrol

If the parent vehicle complies with Regulation No 83, 05 series of amendments, or with Directive 98/69/EC, or with Regulation No 49, 04 series of amendments, or with Directive 1999/96/EC, the vehicle shall not use petrol for more than a maximum of 90 seconds during each test.

For vehicles complying with later series of amendments to Regulations Nos 83 and 49, or later amending Directives or European Regulations, this period shall not exceed 60 seconds.

6.2.2.4.1.6.3. Special provisions for petrol direct injection engines

Notwithstanding the paragraph 6.2.2.4.1.6.2 above, in case of vehicles with direct injection petrol engines, it is permissible to use petrol only or simultaneously with CNG during the entire test cycle provided that the energy consumption of gas is higher than 80 % of the total amount of energy consumed during the test.

This percentage shall be calculated in accordance with the method set out in Annex 6B.

6.2.2.4.1.7. Notwithstanding the requirements of paragraph 6.2.2.4.1.6 above, for each pollutant or combination of pollutants, one of the three test results may exceed, by not more than 10 %, the limit prescribed, provided that the arithmetical mean of the three results is below the prescribed limit. In this case the prescribed limits may be exceeded for more than one pollutant in the same test or in different tests.

6.2.2.4.1.8. The number of emission tests prescribed in paragraph 6.2.2.4.1.6 above on each CNG reference fuel may be reduced under the following conditions:

(a) One test is required if the result obtained for each pollutant subject to limitation is less than or equal to 0,7 the emission limit

(i.e. $M_1 \leq 0,70 G$),

(b) Two tests are required if, for each pollutant subject to limitation the following requirements are met:

$M_1 \leq 0,85 G$ and $M_1 + M_2 \leq 1,70 G$ and $M_2 \leq G$

Where:

M_1 value of the emission of one pollutant obtained from the first test of the Type I performed;

M_2 value of the emission of one pollutant obtained from the second test of the Type I performed;

G limit value of the emissions of one pollutant (CO/HC/NOx) according to the type-approval of the vehicle(s) divided by the deterioration factors.

6.2.2.4.2. Specific requirements on the Type II test (carbon monoxide emission test at idling speed) for vehicles having a maximum mass exceeding 3 500 kg:

6.2.2.4.2.1. One CNG retrofit system sample, as described in paragraph 2.2 of this Regulation, installed into the parent vehicle, as described in paragraph 2.5 of this Regulation, shall be submitted to the type II test procedures described in Regulation No 83 (9).

6.2.2.4.2.2. Notwithstanding the provisions of Regulation No 83 (9), the Type II test shall be performed at the request of the system manufacturer with only one CNG reference fuel chosen at the discretion of the Technical Service responsible for the test.

6.2.2.4.3. Calculation of the CO₂ emissions and fuel consumption (for M₁ and N₁ categories of vehicles)

6.2.2.4.3.1. The emissions of CO₂ are calculated according to Regulation No 101 for each parent vehicle, if applicable.

The mean of CO₂ emissions shall be calculated as follows:

$$CO_{2CNG} = 1/n \sum_{i=1}^n (CO_{2G20i} + CO_{2G25i})/2$$

$$CO_{2petrol} = 1/n \sum_{i=1}^n CO_{2petrol.i}$$

Where:

i number of parent vehicles ($i = 1$ to n)

CO_{2G20} mean value of the emissions of CO₂ obtained from the three Type I tests with the retrofit system and with CNG G20 for vehicle No. i ;

CO_{2G25} mean value of the emissions of CO₂ obtained from the three Type I tests with the retrofit system and with CNG G25 for vehicle No. i ;

$CO_{2\text{petrol},i}$ mean value of the emissions of CO_2 obtained from the three Type I tests with reference petrol for vehicle No. i.

6.2.2.4.3.2. The mean fuel consumption shall be calculated in the same way as for the mean of CO_2 emissions, as defined in paragraph 6.2.2.4.3.1. above.

6.2.2.4.3.3. The ratios of CO_2 emissions and fuel consumption shall be calculated as follows:

$$K_{CO_2} = CO_{2CNG}/CO_{2\text{petrol}}$$

$$K_{\text{Cons}} = \text{Cons}_{CNG}/\text{Cons}_{\text{petrol}}$$

For each vehicle of the family, the official values of CO_2 emissions and fuel consumption are multiplied by the above ratios.

6.2.2.5. Exhaust emissions (M_2 , M_3 , N_2 and N_3 categories of vehicles)

6.2.2.6. This paragraph is reserved for the specific requirements for emissions of diesel engines approved according to Regulation No 49 and equipped with a retrofit CNG system (dual fuel) if required.

6.2.3. Power requirements

The parent vehicle(s) or engine(s) are submitted to the tests as follows:

6.2.3.1. One CNG retrofit system sample as described in paragraph 2.2 of this Regulation, installed in the parent vehicle(s) or on the parent engine(s) shall be submitted to the test procedures of paragraph 6.2.3.2 or 6.2.3.3 below. The measured power with CNG shall be lower than that measured with petrol + 5 %.

6.2.3.2. Chassis dynamometer method

The maximum power at the wheels is measured on a chassis dynamometer on each parent vehicle with the following fuels:

(a) Reference petrol;

(b) Reference fuel G20 or G25.

The mean of power measurements shall be calculated as follows:

$$\text{Power}_{\text{petrol}} = 1/n \sum_{i=1}^n \text{Power}_{\text{petrol},i}$$

$$\text{Power}_{CNG} = 1/n \sum_{i=1}^n \text{Power}_{CNG,i}$$

The ratio of engine power shall be calculated as follows:

$$K_{\text{power}} = \text{Power}_{CNG}/\text{Power}_{\text{petrol}}$$

For each vehicle of the family, the official values of engine power are multiplied by the above ratio.

6.2.3.3. Engine dynamometer method

The maximum power at the crankshaft is measured on an engine dynamometer according to Regulation No 85 for each parent vehicle(s) with the following fuels:

- (a) Commercial petrol or diesel fuel;
- (b) Commercial CNG.

The mean of power measurements shall be calculated as follows:

$$\text{Power}_{\text{petrol}} = 1/n \sum_{i=1}^n \text{Power}_{\text{petrol},i}$$

$$\text{Power}_{\text{CNG}} = 1/n \sum_{i=1}^n \text{Power}_{\text{CNG},i}$$

The ratio of engine power shall be calculated as follows:

$$K_{\text{power}} = \text{Power}_{\text{CNG}} / \text{Power}_{\text{petrol}}$$

For each vehicle of the family, the official values of engine power are multiplied by the above ratio.

6.2.4. OBD requirements and tests for vehicles retrofitted with CNG retrofit system.

6.2.4.1. For the purposes of this paragraph, the following definitions apply:

6.2.4.1.1. 'Original emission-related component' means any component in the air inlet, exhaust or evaporative system which supplies an input to or receives an output from the petrol controller;

6.2.4.1.2. 'CNG emission-related component' means any component in the air inlet or in the exhaust system which supplies an input to or receives an output from the CNG controller.

6.2.4.2. In the case that there is a need, to fit properly the CNG retrofit system in the vehicle, it is allowed to simulate the right operation of the original emission-related components which are not in use on CNG mode.

6.2.4.3. The CNG retrofit system, as described in paragraph 2.2 of this Regulation, installed into the parent vehicle(s), shall comply with the requirements and tests of Regulation No 83 ⁽⁹⁾ on both petrol and CNG modes.

6.2.4.4. Specific OBD requirements and tests for 'master-slave' retrofit system:

6.2.4.4.1. Notwithstanding the requirements of paragraph 6.2.4.3. above, a 'master-slave' retrofit system shall fulfil the following requirements:

- (a) The petrol ECU shall remain activated for engine management in both petrol and CNG modes;
- (b) During petrol operations the petrol OBD system shall remain the only on-board diagnostic system of the vehicle;
- (c) During CNG operations the petrol OBD system shall continue to monitor the original emission related components with the exception of those which are not in use;
- (d) During CNG operations the CNG ECU shall only monitor for the CNG emission-related components as well as their electrical connections.

6.2.4.4.2. Notwithstanding the requirements of paragraph 6.2.4.3. above, the CNG retrofit system shall be submitted to the following tests, which, in the case of Type I tests, shall be performed according to Regulation No 83 ⁽⁹⁾.

6.2.4.4.2.1. The following tests shall be carried out on one parent vehicle, equipped with the CNG retrofit system:

- (a) The CNG ECU shall follow the petrol ECU on fuel strategies (e.g. injection and ignition strategies (e.g. spark plug advance)). This can be demonstrated by a monitoring (diagnostic) programme, while modifying the signal of one of the petrol system's sensors with an impact on the injection time and on ignition spark plug advance;
- (b) During a Type I test on petrol the original MI shall activate due to the electrical disconnection of any original emission-related component;
- (c) During a Type I test on CNG the original MI shall activate due to the electrical disconnection of any original emission-related component, which is in use during CNG operations.

6.2.4.4.2.2. The following tests shall be carried out on the parent vehicle(s), equipped with the CNG retrofit system, only on CNG operating mode:

- (a) During a Type I test, electrical disconnection of one CNG emission-related component;
- (b) During a Type I, test replacement of one CNG emission-related component with a deteriorated and defective one or electronic simulation of such a failure.

The original MI or automatic switch from CNG mode to petrol mode shall activate before the end of the tests under any of the conditions above.

6.2.4.4.2.3. Fault codes due to malfunctions of the CNG emission-related components and their electrical connections shall be stored in the CNG ECU.

6.2.4.4.2.4. The system manufacturer shall provide specific instructions as to read out the CNG fault codes referred to in paragraph 6.2.4.4.2.3 above.

7. INSTRUCTION MANUALS

7.1. Installation manual for the retrofit installation on the vehicle

7.1.1. Scope

The scope of this paragraph is to list the minimum requirements which shall be contained in the installation manual.

7.1.2. List of reference standards

7.1.3. General requirements:

7.1.3.1. The installation manual has the purpose to guide the installer through the correct procedures which shall be observed while assembling the LPG/CNG systems.

7.1.3.2. The installation manual shall be prepared by the retrofit system manufacturer.

7.1.3.3. The installation manual is part of the retrofit system and shall therefore be provided for each conversion kit.

7.1.3.4. The installation manual shall be written in the language of the country to which the conversion retrofit will be delivered, or at least in English.

7.1.3.5. The installation manual can be divided in two parts:

Part I: (a) Part containing the description of the sample of the retrofit system;

(b) Part containing the list of components indicated by the retrofit manufacturer as alternatives.

Part II: Part containing installation instructions for the specific vehicle.

7.1.3.6. Installation manual of the parent vehicle(s) has to be submitted to the Type Approval Authority that grants the type-approval.

- 7.1.3.7. Installation manual of the vehicles belonging to the family has to be filed by the retrofit system manufacturer for a time to be determined in accordance with the Type Approval Authority that grants the type-approval.
- 7.1.4. Contents of Part I, section (a) of installation manual
 - 7.1.4.1. Retrofit system description:
 - 7.1.4.1.1. Operational principles of the retrofit system.
 - 7.1.4.1.2. Operational principles of each component of the retrofit system.
 - 7.1.4.2. Proper assembly check
 - 7.1.4.2.1. The installation manual shall contain the detailed procedures and actions which shall be taken by the installer to check whether the system has been assembled in order to safely perform and to abide by the installation instructions.
 - 7.1.4.3. Start-up procedures
 - 7.1.4.3.1. The installation manual shall contain the start-up operations which shall be performed by the installer.
 - 7.1.4.4. Service instructions
 - 7.1.4.4.1. The installation manual shall contain the maintenance schedule in which all the ordinary service (type) which the single components as well as the system shall undergo through their working life (time and km covered by the vehicle) will be specified.
 - 7.1.4.4.2. The installation manual shall specify the expertise necessary for the installation/service of the system.
 - 7.1.4.5. System malfunction
 - 7.1.4.5.1. The installation manual shall contain the actions which shall be taken in case the system malfunctions.
 - 7.1.4.6. Diagnosis
 - 7.1.4.6.1. If a diagnosis system is included in the conversion kit, the installation manual shall contain a detailed description of such a system together with the corrective actions which may be taken in case of malfunctioning.
- 7.1.5. Contents of Part II of installation manual
 - 7.1.5.1. Retrofit system identification:
 - 7.1.5.1.1. Retrofit system approval number;
 - 7.1.5.1.2. Vehicle manufacturer;
 - 7.1.5.1.3. Vehicle category;
 - 7.1.5.1.4. Vehicle type;
 - 7.1.5.1.5. Engine type;
 - 7.1.5.1.6. Engine displacement;
 - 7.1.5.1.7. Transmission type;
 - 7.1.5.1.8. Vehicle model;
 - 7.1.5.1.9. Type of conversion retrofit (LPG or CNG);
 - 7.1.5.1.10. Assembly instruction number;
 - 7.1.5.1.11. General scheme of the retrofit system containing the following information of each component:

- (a) Identification number;
 - (b) Manufacturer's code;
 - (c) Type approval, if it exists;
 - (d) For the containers: capacity/manufacturer/type/date of expiry or replacement date, if it exists.
- 7.1.5.1.12. Description (including drawings, if applicable) of the fitting devices of the container installation on the vehicle.
- 7.1.5.2. Installation instructions:
- 7.1.5.2.1. Assembly instructions of all components together with diagrams or photographs showing clearly the layout of the single components within the engine compartment.
- 7.1.5.2.2. Diagram or photograph showing the exact position where the installer shall place the retrofit system type-approval plate (contained in the conversion kit).
- 7.1.5.2.3. Clear wiring diagram of the electrical system containing the mechanical components to which the wires shall be connected.
- 7.2. End-user Manual
- 7.2.1. Scope
- To specify the minimum requirements of the end-user manual for LPG/CNG systems maintenance.
- 7.2.2. General requirements:
- 7.2.2.1. The user manual has the purpose to inform the end-user about the characteristics and safety features of the installed LPG/CNG systems.
- 7.2.2.2. The user manual shall be prepared by the manufacturer of the retrofit system.
- 7.2.2.3. The manufacturer of the system shall include all the necessary information that is needed for correct use and safe operation of the LPG/CNG systems.
- 7.2.2.4. The user manual shall be considered as an integral part of the system and therefore be delivered with the LPG/CNG systems.
- 7.2.2.5. The user manual shall be written in the language of the country to which the system is delivered.
- 7.2.2.6. The user manual shall indicate reference to the product type and version and production year for which it is applicable.
- 7.2.2.7. Information shall be given for relevant extreme ambient conditions.
- 7.2.3. Contents of the end-user manual:
- 7.2.3.1. Technical specifications
- The user manual shall contain at least the following information:
- (a) Operating characteristics;
 - (b) Performance under normal operating conditions;
 - (c) Extreme ambient conditions.
- 7.2.3.2. Safety instructions
- The user manual shall give warning for dangers to health and safety categorised in the following way:
- (a) SUGGESTIONS for optimal use of the system;
 - (b) ATTENTION for possible problems due to misuse;

(c) WARNING for damage to persons or goods when procedures are not followed.

If and when safety symbols are used, they shall be in accordance with the international system, SI and their purpose shall be clearly specified in the user manual.

The user manual shall indicate proper actions to be taken in case the vehicle is repainted and put in a hot drying cabin.

7.2.3.3. LPG/CNG systems description

All the components of the LPG/CNG systems shall be clearly described for their purpose, use and function.

7.2.3.4. First use and adjustment of the LPG/CNG systems

The user manual shall contain all the necessary information to the end user about initial running in and or adjustment of the system when needed.

7.2.3.5. Operating of the LPG/CNG systems

7.2.3.5.1. Filling of the LPG/CNG systems

The user manual shall indicate the sequence of operations needed to fill up the LPG/CNG containers. Particular attention shall be paid to the maximum filling level of the 80 % in case of LPG.

7.2.3.5.2. Switch-over procedure

The user manual shall clearly describe the method of switching over from one to the other alternative fuel by giving the sequence of operations.

7.2.3.5.3. Opening/closing of manual valves

When fitted, the user manual shall indicate the proper procedure to operate the manual valves.

7.2.3.5.4. Level indicator

The user manual shall state the location of the level indicator, for example at the dashboard or at the container. Its read-out has to be clearly explained to the user, giving particular attention to the 80 % filling level in case of LPG.

7.2.3.5.5. Maintenance

If maintenance is required, the user manual shall state the frequency and type of maintenance to be carried out.

7.2.3.5.6. Defects and repair

The user manual shall indicate which actions have to be taken in the case of a defect of the system.

When the system is equipped with a diagnosis system the user manual shall describe this system and indicate proper actions to be taken.

7.2.3.5.7. Scrapping of the product

The user manual shall give proper indication about precautions to be taken when the system has to be removed from the vehicle.

8. MODIFICATION AND EXTENSION OF APPROVAL OF A RETROFIT SYSTEM TYPE

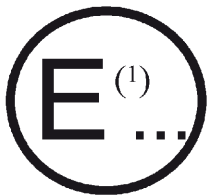
8.1. Every modification of the installation of the specific equipment for the use of LPG or CNG in the propulsion system of the vehicle shall be notified to the Type-Approval Authority, which granted the retrofit system type-approval. The Authority may then either:

- 8.1.1. Consider that the modifications made are unlikely to have an appreciably adverse effect and that in any case the retrofit system still complies with the requirements, or
- 8.1.2. Require a further test report from the technical service responsible for conducting the tests.
- 8.2. In both cases described in paragraphs 8.1.1 and 8.1.2 above, the Authority shall be presented in the updated installation manual.
- 8.3. Confirmation or refusal of approval, specifying the alteration, shall be communicated by the procedure specified in paragraph 5.4 above to the Parties to the 1958 Agreement applying this Regulation.
- 8.4. The Type-Approval Authority issuing the extension of approval shall assign a series number for such an extension and inform thereof the other Parties to the 1958 Agreement applying to this Regulation by means of a communication form conforming to the model in Annexes 1A and/or 1B to this Regulation.
9. CONFORMITY OF PRODUCTION
- The conformity of production procedures shall comply with those set out in the Agreement, Appendix 2 (E/ECE/324/Rev.2 — E/ECE/TRANS/505/Rev.2).
10. PENALTIES FOR NON-CONFORMITY OF PRODUCTION
- 10.1. The approval granted in respect of a type of retrofit system pursuant to this Regulation may be withdrawn if the requirements laid down in paragraph 9 above are not complied with.
- 10.2. If a Party to the Agreement applying this Regulation withdraws an approval it has previously granted, it shall forthwith so notify the other Contracting Parties applying this Regulation, by means of a communication form conforming to the models in Annexes 1A and/or 1B to this Regulation.
11. PRODUCTION DEFINITELY DISCONTINUED
- 11.1. If the holder of the approval completely ceases to manufacture a type of retrofit system approved in accordance with this Regulation, he shall so inform the Type Approval Authority which granted the approval. Upon receiving the relevant communication, that Authority shall inform thereof the other Parties to the 1958 Agreement applying this Regulation by means of a communication form conforming to the model in Annexes 1A and/or 1B to this Regulation.
12. NAMES AND ADDRESSES OF TECHNICAL SERVICES RESPONSIBLE FOR CONDUCTING APPROVAL TESTS, AND OF TYPE-APPROVAL AUTHORITIES
- 12.1. The Parties to the Agreement applying this Regulation shall communicate to the United Nations Secretariat the names and addresses of the Technical Services responsible for conducting approval tests and of the Type-Approval Authorities which grant approval and to which forms certifying approval or extension or refusal or withdrawal of approval, issued in other countries, are to be sent.
-

ANNEX 1A

COMMUNICATION

(Maximum format: A4 (210 × 297 mm))



issued by: Name of administration

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

- Concerning ⁽²⁾: Approval granted
- Approval extended
- Approval refused
- Approval withdrawn
- Production definitively discontinued

of a type of LPG retrofit equipment pursuant to Regulation No 115

Approval No: Extension No:

1. LPG retrofit equipment considered:

Container

Accessories fitted to the container ⁽²⁾

80 % stop valve

Level indicator

Pressure relief valve (discharge valve)

Pressure relief device

Remote controlled service valve with excess flow valve

With/without LPG fuel pump ⁽²⁾

Multivalve, including the following accessories:

Ventilation housing

Power supply bushing (pump/actuators) ⁽²⁾

Fuel pump ⁽²⁾

Vaporiser/pressure regulator ⁽²⁾

Shut-off valve ⁽²⁾

Non-return valve ⁽²⁾

Gas tube pressure relief valve ⁽²⁾

Service coupling ⁽²⁾

Flexible hose ⁽²⁾

Remote filling point ⁽²⁾

- Gas injection device or injector ⁽²⁾
- Gas dosage unit ⁽²⁾
- Gas mixing piece ⁽²⁾
- Electronic control unit ⁽²⁾
- Pressure/temperature sensor ⁽²⁾
- LPG filter unit ⁽²⁾
2. Trade name or mark
3. Manufacturer's name and address
4. Name and address of manufacturer's representative, if applicable
5. Submitted for approval on
6. Technical Service responsible for conducting approval tests
-
7. Date of report issued by that Service
8. No of report issued by that Service
9. Approval granted/refused/extended/withdrawn ⁽²⁾
10. Reason(s) of extension (if applicable)
11. Vehicle types in which the retrofit system can be installed (M1 and N1 categories), or vehicle types in which the retrofit system can be installed (other categories of vehicles) and, if applicable, CO₂ and power ratios (see Addendum to this annex)
- 11.1. Emission requirements:
- Regulation No 83, series of amendments ⁽³⁾
- Regulation No 49, series of amendments ⁽³⁾
- 11.2. OBD requirements:
- Has the retrofit system demonstrated to be 'master-slave': Yes/No ⁽²⁾
12. Place
13. Date
14. Signature
15. The documents filed with the application or extension of approval can be obtained upon 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.

⁽³⁾ Amendment in force at the time of the initial type-approval of the vehicle or engine.

Addendum

Addendum to the communication concerning a type of LPG retrofit equipment pursuant to Regulation No 115

(Approval No Extension No)

1. Vehicles on which the retrofit equipment has been tested:

Vehicle No.	1	2	n
Make:			
Type:			
Category:			
Emission limits:			
Power:			
Pollution control system type:			

2. Test results:

Ratio $CO_{2LPG}/CO_{2petrol}$ ⁽²⁾:Ratio $Power_{LPG}/Power_{petrol}$ (or diesel):

3. Vehicles type(s) for which the retrofit equipment type is qualified:

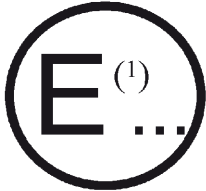
Fuel		Petrol (or diesel) ⁽¹⁾					LPG				
Vehicle type	Engine type	Power (kW)	CO ⁽³⁾ (g/km)	HC ⁽³⁾ (g/km)	NO _x ⁽³⁾ (g/km)	CO ₂ ⁽²⁾ (g/km)	Power (kW)	CO ⁽³⁾ (g/km)	HC ⁽³⁾ (g/km)	NO _x ⁽³⁾ (g/km)	CO ₂ ⁽²⁾ (g/km)

⁽¹⁾ Strike out what does not apply.⁽²⁾ Applicable to vehicles of categories M₁ and N₁ only.⁽³⁾ Applicable only to parent vehicle(s).

ANNEX 1B

COMMUNICATION

(Maximum format: A4 (210 × 297 mm))



issued by: Name of administration

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

- Concerning ⁽²⁾: Approval granted
- Approval extended
- Approval refused
- Approval withdrawn
- Production definitively discontinued

of a type of CNG retrofit equipment pursuant to Regulation No 115

Approval No Extension No

1. CNG equipment comprising:
 - Container
 - Accessories fitted to the container ⁽²⁾
 - Level or pressure indicator
 - Pressure relief valve (discharge valve)
 - Remote-controlled automatic valve with excess flow valve
 - Pressure relief device
 - Gas-tight housing
 - Pressure regulator ⁽²⁾
 - Automatic valve ⁽²⁾
 - Check valve ⁽²⁾
 - Flexible fuel line or hose ⁽²⁾
 - Filling unit ⁽²⁾
 - Gas/air mixer (injector)
 - Gas flow adjuster
 - Gas/air mixer (carburettor)
 - Electronic control unit ⁽²⁾
 - Pressure/temperature sensor ⁽²⁾
 - CNG filter ⁽²⁾
2. Trade name or mark
3. Manufacturer's name and address
4. Name and address of manufacturer's representative, if applicable

5. Submitted for approval on
6. Technical Service responsible for conducting approval tests
7. Date of report issued by that Service
8. No. of report issued by that Service
9. Approval granted/refused/extended/withdrawn ⁽²⁾
10. Reason(s) of extension (if applicable)
11. Vehicle types in which the retrofit system can be installed (M₁ and N₁ categories), or vehicle types in which the retrofit system can be installed (other categories of vehicles) and, if applicable, CO₂ and power ratios (see Addendum to this annex)
- 11.1. Emission requirements:
Regulation No 83, ... series of amendments ⁽³⁾
Regulation No 49, ... series of amendments ⁽³⁾
- 11.2. OBD requirements:
Has the retrofit system demonstrated to be 'master-slave': Yes/No ⁽²⁾
12. Place:
13. Date:
14. Signature:
15. The documents filed with the application or extension of approval can be obtained upon 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.

⁽³⁾ Amendment in force at the time of the initial type-approval of the vehicle or engine.

Addendum

Addendum to the communication concerning a type of CNG retrofit equipment pursuant to Regulation No 115

(Approval No Extension No)

1. Vehicles on which the retrofit equipment has been tested:

Vehicle No	1	2	n
Make:			
Type:			
Category:			
Emission limits:			
Power:			
Pollution control system type:			

2. Test results:

Ratio $CO_{2CNG}/CO_{2\text{ petrol}}$ ⁽²⁾:Ratio $Power_{CNG}/Power_{\text{petrol (or diesel)}}$:

3. Vehicles type(s) for which the retrofit equipment type is qualified:

Fuel		Petrol (or diesel) ⁽¹⁾					CNG				
Vehicle type	Engine type	Power (kW)	CO ⁽³⁾ (g/km)	HC ⁽³⁾ (g/km)	NOx ⁽³⁾ (g/km)	CO ₂ ⁽²⁾ (g/km)	Power (kW)	CO ⁽³⁾ (g/km)	HC ⁽³⁾ (g/km)	NOx ⁽³⁾ (g/km)	CO ₂ ⁽²⁾ (g/km)

⁽¹⁾ Strike out what does not apply.⁽²⁾ Applicable to vehicles of categories M₁ and N₁ only.⁽³⁾ Applicable only to parent vehicle(s).

ANNEX 2A

ARRANGEMENT OF THE LPG RETROFIT SYSTEM TYPE-APPROVAL MARK



a = 8 mm min.

The above approval mark affixed to the plate of LPG retrofit system, shows that it has been approved in Italy (E 3), pursuant to Regulation No 115 under approval number 000000. The symbol ‘#’ indicates the LPG retrofit system, the first two digits of the approval number indicate that approval was granted in accordance to the requirement of Regulation No 115 in its original form.

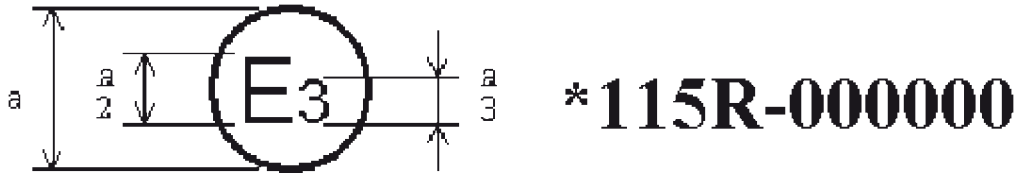
#115R-000000	
NAME OR TRADE MARK:	
TYPE: LPG/CNG	Date:
— VAPORIZER/REGULATOR	
— GAZ FUELLING SYSTEM	
— SAFETY DEVICE	
— CONTAINER	
— — —	

The above plate, with approval mark and some technical information on the retrofit system, has to be fixed permanently on the body of the vehicle.

—

ANNEX 2B

ARRANGEMENT OF THE CNG RETROFIT SYSTEM TYPE-APPROVAL MARK



a = 8 mm min

The above approval mark affixed to the plate of CNG retrofit system, shows that it has been approved in Italy (E 3), pursuant to Regulation No 115, under approval number 000000. The symbol "*" indicates the CNG retrofit system, the first two digits of the approval number indicate that approval was granted in accordance to the requirement of Regulation No 115 in its original form.

*115R-000000	
NAME OR TRADE MARK:	
TYPE: LPG/CNG	Date:
<input type="checkbox"/> VAPORIZER/REGULATOR	
<input type="checkbox"/> GAZ FUELLING SYSTEM	
<input type="checkbox"/> SAFETY DEVICE	
<input type="checkbox"/> CONTAINER	
<input type="checkbox"/>	
<input type="checkbox"/>	
<input type="checkbox"/>	

The above plate, with approval mark and some technical information on the retrofit system, has to be fixed permanently on the body of the vehicle.



ANNEX 3A

COMPLETE LIST OF INFORMATION FOR THE PURPOSE OF TYPE-APPROVAL OF A LPG RETROFIT SYSTEM INSTALLED ON A VEHICLE

1. Description of the parent vehicle
 - 1.1. Name and address of the manufacturer
 - 1.2. Category and identification type
 - 1.3. Chassis identification number
 - 1.4. Certification number
 - 1.5. Internal combustion engine identification type
 - 1.5.1. Working principle and thermodynamic cycle
 - 1.5.2. Naturally aspirated or pressure charged
 - 1.5.3. Displacement
 - 1.5.4. Catalyst system type
 - 1.5.5. Ignition system type
2. Description of the LPG retrofit system
 - 2.1. Trade name or mark holder
 - 2.2. Identification type
 - 2.3. Drawing/flow-charts of the installation in the vehicle
 - 2.4. 'Master-slave' system: Yes/No ⁽¹⁾
 - 2.5. Vaporiser/pressure regulator(s)
 - 2.5.1. Make(s)
 - 2.5.2. Type(s)
 - 2.5.3. Certification number
 - 2.5.4. Identification
 - 2.5.5. Drawings
 - 2.5.6. Number of main adjustment points
 - 2.5.7. Description of principle of adjustment through main adjustment points

⁽¹⁾ Strike out what does not apply.

- 2.5.8. Number of idle adjustment points
- 2.5.9. Description of principle of adjustment through idle adjustment points
- 2.5.10. Other adjustment possibilities: if so and which (description and drawings)
- 2.5.11. Operating pressure(s) ⁽²⁾:kPa
- 2.6. Mixing piece: Yes/No ⁽¹⁾
- 2.6.1. Number
- 2.6.2. Make(s)
- 2.6.3. Type(s)
- 2.6.4. Drawings
- 2.6.5. Place of installation (include drawing(s))
- 2.6.6. Adjustment possibilities
- 2.6.7. Operating pressure(s) ⁽²⁾:kPa
- 2.7. Gas dosage unit: Yes/No ⁽¹⁾
- 2.7.1. Number
- 2.7.2. Make(s)
- 2.7.3. Type(s)
- 2.7.4. Drawings
- 2.7.5. Place of installation (include drawing(s))
- 2.7.6. Adjustment possibilities
- 2.7.7. Operating pressure(s) ⁽²⁾:kPa
- 2.8. Gas injection device(s) or injector(s): Yes/No ⁽¹⁾
- 2.8.1. Make(s)
- 2.8.2. Type(s)
- 2.8.3. Identification
- 2.8.4. Operating pressure(s) ⁽²⁾:kPa
- 2.8.5. Drawings of installation
- 2.9. Electronic control unit
- 2.9.1. Make(s)

⁽²⁾ Specify the tolerance.

- 2.9.2. Type(s)
- 2.9.3. Place of installation
- 2.9.4. Adjustment possibilities
- 2.10. LPG container
- 2.10.1. Make(s)
- 2.10.2. Type(s) (include drawings)
- 2.10.3. Number of containers
- 2.10.4. Capacity litres
- 2.10.5. LPG fuel pump in container: Yes/No ⁽¹⁾
- 2.10.6. Certification number
- 2.10.7. Drawings of the installation of the container
- 2.11. LPG container accessories
- 2.11.1. 80 % stop valve:
- 2.11.1.1. Make(s)
- 2.11.1.2. Type(s)
- 2.11.1.3. Operating principle: float/other ⁽¹⁾ (include description or drawings)
- 2.11.2. Level indicator:
- 2.11.2.1. Make(s)
- 2.11.2.2. Type(s)
- 2.11.2.3. Operating principle: float/other ⁽¹⁾ (include description or drawings)
- 2.11.3. Pressure relief valve (discharge valve):
- 2.11.3.1. Make(s)
- 2.11.3.2. Type(s)
- 2.11.4. Pressure relief device:
- 2.11.4.1. Make(s)
- 2.11.4.2. Type(s)

2.11.5. Remote-controlled service valve with excess flow valve:

2.11.5.1. Make(s)

2.11.5.2. Type(s)

2.11.6. Multi-valve: Yes/No ⁽¹⁾

2.11.6.1. Make(s)

2.11.6.2. Type(s)

2.11.6.3. Multi-valve description (include drawings)

2.11.7. Ventilation housing:

2.11.7.1. Make(s)

2.11.7.2. Type(s)

2.11.8. Power supply bushing (fuel pump/actuators):

2.11.8.1. Make(s)

2.11.8.2. Type(s)

2.11.8.3. Drawings

2.12. Fuel pump (LPG): Yes/No ⁽¹⁾

2.12.1. Make(s)

2.12.2. Type(s)

2.12.3. Pump mounted in LPG container: Yes/No ⁽¹⁾

2.12.4. Operating pressure(s) ⁽²⁾:kPa

2.13. Shut-off valve/non-return valve/gas tube pressure relief valve: Yes/No ⁽¹⁾

2.13.1. Make(s)

2.13.2. Type(s)

2.13.3. Description and drawings

2.13.4. Operating pressure(s) ⁽²⁾:kPa

2.14. Filling point ⁽¹⁾:

2.14.1. Make(s)

2.14.2. Type(s)

- 2.14.3. Description and drawings
- 2.15. Flexible fuel hose(s)/pipes:
 - 2.15.1. Make(s)
 - 2.15.2. Type(s)
 - 2.15.3. Description
 - 2.15.4. Operating pressure(s) ⁽²⁾:kPa
- 2.16. Pressure and temperature sensor(s) ⁽¹⁾:
 - 2.16.1. Make(s)
 - 2.16.2. Type(s)
 - 2.16.3. Description
 - 2.16.4. Operating pressure(s) ⁽²⁾:kPa
- 2.17. LPG filter unit(s) ⁽¹⁾:
 - 2.17.1. Make(s)
 - 2.17.2. Type(s)
 - 2.17.3. Description
 - 2.17.4. Operating pressure(s) ⁽²⁾:kPa
- 2.18. Service coupling(s) (mono-fuel vehicle without limp-home system) ⁽¹⁾:
 - 2.18.1. Make(s)
 - 2.18.2. Type(s)
 - 2.18.3. Description and drawings installation
- 2.19. Connection to LPG system for heating system (allowed for M₂ and M₃ categories of vehicles): Yes/No ⁽¹⁾
 - 2.19.1. Make(s)
 - 2.19.2. Type(s)
 - 2.19.3. Description and drawings of installation
- 2.20. Further documentation

-
- 2.20.1. Description of the LPG equipment and the physical safeguarding of the catalyst at switch-over from petrol to LPG or back.
 - 2.20.2. System lay-out (electrical connections, vacuum connections compensation hoses, etc.)
 - 2.20.3. Drawing of the symbol
 - 2.20.4. Adjustment data
 - 2.21. Cooling system: (liquid/air) (1)
 - 2.21.1. System description/drawings with regard to the LPG equipment
-

ANNEX 3B

COMPLETE LIST OF INFORMATION FOR THE PURPOSE OF TYPE-APPROVAL OF A CNG RETROFIT SYSTEM INSTALLED ON A VEHICLE

1. Description of the parent vehicle
 - 1.1. Name and address of the manufacturer
 - 1.2. Category and identification type
 - 1.3. Chassis identification number
 - 1.4. Certification number
 - 1.5. Internal combustion engine identification type
 - 1.5.1. Working principle and thermodynamic cycle
 - 1.5.2. Naturally aspirated or pressure charged
 - 1.5.3. Displacement
 - 1.5.4. Catalyst system type
 - 1.5.5. Ignition system type
2. Description of the CNG retrofit system
 - 2.1. Trade name or mark holder
 - 2.2. Identification type
 - 2.3. Drawing/flow-charts of the installation in the vehicle
 - 2.4. 'Master-slave' system: Yes/No ⁽¹⁾
 - 2.5. Pressure regulator(s)
 - 2.5.1. Make(s)
 - 2.5.2. Type(s)
 - 2.5.3. Certification number
 - 2.5.4. Identification
 - 2.5.5. Drawings

⁽¹⁾ Strike out what does not apply.

- 2.5.6. Number of main adjustment points
- 2.5.7. Description of principle of adjustment through main adjustment points
- 2.5.8. Number of idle adjustment points
- 2.5.9. Description of principle of adjustment through idle adjustment points
- 2.5.10. Other adjustment possibilities: if so which (description and drawings)
- 2.5.11. Operating pressure(s) ⁽²⁾:kPa
- 2.6. Gas/air mixer (carburettor): Yes/No ⁽¹⁾
- 2.6.1. Number
- 2.6.2. Make(s)
- 2.6.3. Type(s)
- 2.6.4. Drawings
- 2.6.5. Place of installation (include drawing(s))
- 2.6.6. Adjustment possibilities
- 2.6.7. Operating pressure(s) ⁽²⁾:kPa
- 2.7. Gas flow adjuster: Yes/No ⁽¹⁾
- 2.7.1. Number
- 2.7.2. Make(s)
- 2.7.3. Type(s)
- 2.7.4. Drawings
- 2.7.5. Place of installation (include drawing(s))
- 2.7.6. Adjustment possibilities
- 2.7.7. Operating pressure(s) ⁽²⁾:kPa
- 2.8. Gas/air mixer (injector): Yes/No ⁽¹⁾

⁽²⁾ Specify the tolerance.

- 2.8.1. Make(s)
- 2.8.2. Type(s)
- 2.8.3. Identification
- 2.8.4. Operating pressure(s) ⁽²⁾:kPa
- 2.8.5. Drawings of installation
- 2.9. Electronic control unit
- 2.9.1. Make(s)
- 2.9.2. Type(s)
- 2.9.3. Place of installation
- 2.9.4. Adjustment possibilities
- 2.10. CNG container
- 2.10.1. Make(s)
- 2.10.2. Type(s) (include drawings)
- 2.10.3. Number of containers
- 2.10.4. Total capacitylitres
- 2.10.5. Certification number
- 2.10.6. Drawings of the installation of the container
- 2.11. CNG container accessories
- 2.11.1. Level or pressure indicator:
- 2.11.1.1. Make(s)
- 2.11.1.2. Type(s)
- 2.11.2. Pressure relief valve (discharge valve) ⁽¹⁾:
- 2.11.2.1. Make(s)
- 2.11.2.2. Type(s)
- 2.11.3. Pressure relief device:

2.11.3.1. Make(s)

2.11.3.2. Type(s)

2.11.4. Remote controlled automatic valve with excess flow valve:

2.11.4.1. Make(s)

2.11.4.2. Type(s)

2.11.5. Gas-tight housing:

2.11.5.1. Make(s)

2.11.5.2. Type(s)

2.12. Automatic valve/check valve: Yes/No ⁽¹⁾

2.12.1. Make(s)

2.12.2. Type(s)

2.12.3. Description and drawings

2.12.4. Operating pressure(s) ⁽²⁾:kPa

2.13. Filling unit ⁽¹⁾:

2.13.1. Make(s)

2.13.2. Type(s)

2.13.3. Description and drawings

2.14. Flexible fuel lines or hose(s):

2.14.1. Make(s)

2.14.2. Type(s)

2.14.3. Description

2.14.4. Operating pressure(s) ⁽²⁾:kPa

2.15. Pressure and temperature sensor(s) ⁽¹⁾:

- 2.15.1. Make(s)
- 2.15.2. Type(s)
- 2.15.3. Description
- 2.15.4. Operating pressure(s) ⁽²⁾:kPa
- 2.16. CNG filter ⁽¹⁾:
- 2.16.1. Make(s)
- 2.16.2. Type(s)
- 2.16.3. Description
- 2.16.4. Operating pressure(s) ⁽²⁾:kPa
- 2.17. Service coupling(s) (mono-fuel vehicle without limp-home system) ⁽¹⁾:
- 2.17.1. Make(s)
- 2.17.2. Type(s)
- 2.17.3. Description and drawings installation
- 2.18. Connection to CNG system for heating system (allowed for M₂ and M₃ category of vehicles only): Yes/No ⁽¹⁾
- 2.18.1. Make(s)
- 2.18.2. Type(s)
- 2.18.3. Description and drawings installation
- 2.19. Further documentation
- 2.19.1. Description of the CNG equipment and the physical safeguarding of the catalyst at switch-over from petrol to CNG or back.
- 2.19.2. System lay-out (electrical connections, vacuum connections compensation hoses, etc.)
- 2.19.3. Drawing of the symbol
- 2.19.4. Adjustment data
- 2.20. Cooling system: (liquid/air) ⁽¹⁾
- 2.20.1. System description/drawings with regard to the CNG equipment
-

ANNEX 4

DESCRIPTION OF THE LEAKAGE TEST PROCEDURES FOR CNG/LPG SYSTEMS INSTALLED ON VEHICLES

1. SCOPE

To describe the procedures to be undertaken by the installer to verify the gas-tightness of the system.

2. The installation of the system shall be done in accordance with the installation manual provided by the retrofit system manufacturer, Parts I and II.

3. LEAKAGE TEST PROCEDURE FOR LPG SYSTEMS

- 3.1. When the installation has been completed, the installer shall follow the proper assembly check, paragraph 7.1.4.2 of this Regulation and the start-up procedures described in paragraph 7.1.4.3 of this Regulation. After that the system has been filled-up with LPG; it is necessary to check with a gas detector or a leakage fluid detector all the fittings and connections of the system. The solenoid valves shall be in open position in order to subject all the components of the system to the service pressure. No evidence of leakage is permitted.

4. LEAKAGE TEST PROCEDURES FOR CNG SYSTEMS

- 4.1. When the installation has been completed, the installer shall follow the proper assembly check, paragraph 7.1.4.2 and the start-up procedures described in paragraph 7.1.4.3 of this Regulation. After that the system has been filled-up with CNG, at the service pressure; it is necessary to check with a gas detector or a leakage fluid detector all the fittings and connections of the system. The solenoid valves shall be in open position in order to subject all the components of the system to the service pressure. No evidence of leakage is permitted.

ANNEX 5

PRESCRIPTIONS CONCERNING THE FIXATION OF LPG AND CNG CONTAINER(S)

1. The requirements of Regulation No 67, 01 series of amendments, concerning the fixation of LPG container(s) or those of Regulation No 110 concerning the fixation of CNG container(s) shall be deemed to be met if the container is secured to the motor vehicle by at least:
 - 1.1. Two straps per container;
 - 1.2. Four bolts; and
 - 1.3. Appropriate washers or plates if the body panels at that location are single thickness.

Assuming that the material grade is Fe 370, the fixing bolts shall be of class 8.8, and have the dimensions specified in the table below:

Container content (litres)	Minimum dimensions of the washers or plates (mm)	Minimum dimensions of the container straps (mm)	Minimum diameter of bolts (mm)
Up to 85	round: 30 × 1,5 round: 25 × 2,5	20 × 3 30 × 1,5	8
85 - 100	round: 30 × 1,5 round: 25 × 2,5	30 × 3 20 × 3 (*)	10 8 (*)
100 - 150	round: 50 × 2 round: 30 × 3	50 × 6 50 × 3 (**)	12 10 (**)
More than 150	shall meet the provisions of Regulation No 67, 01 series of amendments, for LPG containers, or Regulation No 110 for CNG containers		

(*) In this case the container shall be secured by at least three container straps.

(**) In this case the container shall be secured by at least four container straps.

2. If the container is installed behind a seat, a total clearance of at least 100 mm, in the longitudinal direction of the vehicle, shall be provided. This clearance may be divided between the container and the rear panel of the vehicle and between the seat and the container.
3. If the container straps also carry the mass of the fuel container, at least three container straps shall be provided.
4. The container straps shall ensure that the fuel container will not slide, rotate or be dislodged.
5. A protective material such as felt, leather or plastic shall be interposed between the fuel container and the container straps. However, at the location of the fixation of the washers or plates to the vehicle body no compressible material should be present.

6. CONTAINER FRAME

- 6.1. If the container is secured to the motor vehicle by a container frame, the container frame, the container straps, washers, or plates and bolts used shall meet the provisions of paragraphs 1 to 5 above.
- 6.2. If the cylindrical container is installed longitudinally to the vehicle, a transverse connection shall be present at the front of the container frame to prevent slipping of the container. This transverse connection shall be:
- 6.2.1. At least of the same thickness as the container frame;
- 6.2.2. At least 30 mm high and its top is at least 30 mm above the bottom of the container;
- 6.2.3. As close as possible, or even within, the domed end of the container.

By '*installed longitudinally*' it is meant that the axis of the cylindrical fuel container makes an angle of no more than 30 degrees with the longitudinal centre plane of the vehicle.

ANNEX 6A

BI-FUEL VEHICLES WITH PETROL DIRECT INJECTION ENGINES — CALCULATION OF LPG ENERGY RATIO**1. MEASUREMENT OF THE LPG MASS CONSUMED DURING THE CYCLE**

Measurement of the LPG mass consumed during the Type I test cycle shall be done by a fuel weighing system capable of measuring the weight of the LPG storage container during the test in accordance with the following:

An accuracy of $\pm 2\%$ of the difference between the readings at the beginning and at the end of the test or better.

Precautions shall be taken to avoid measurement errors.

Such precautions shall, at least, include the careful installation of the device according to the instrument manufacturers' recommendations and to good engineering practice.

Other measurement methods are permitted if an equivalent accuracy can be demonstrated.

2. CALCULATION OF THE LPG ENERGY RATIO

The fuel consumption value shall be calculated from the emissions of hydrocarbons, carbon monoxide, and carbon dioxide determined from the measurement results assuming that only LPG is burned during the test.

The LPG ratio of the energy consumed in the cycle is then determined as follows:

$$G_{\text{LPG}} = M_{\text{LPG}} * 10\,000 / (FC_{\text{norm}} * \text{dist} * d)$$

Where:

G_{LPG} : the LPG energy ratio (%);

M_{LPG} : the LPG mass consumed during the cycle (kg);

FC_{norm} : the fuel consumption (l/100 km) calculated in accordance with paragraph 1.4.3(b) of Annex 6 to Regulation No 101. If applicable, the correction factor cf in the equation used to determine FC_{norm} shall be calculated using the H/C ratio of the gaseous fuel;

dist: distance travelled during the cycle (km);

d: density $d = 0,538$ kg/liter.

ANNEX 6B

BI-FUEL VEHICLES WITH PETROL DIRECT INJECTION ENGINES — CALCULATION OF CNG ENERGY RATIO**1. MEASUREMENT OF THE CNG MASS CONSUMED DURING THE CYCLE**

Measurement of the CNG mass consumed during the Type I test cycle shall be done by a fuel weighing system capable of measuring the weight of the CNG storage container during the test in accordance with the following:

An accuracy of $\pm 2\%$ of the difference between the readings at the beginning and at the end of the test or better.

Precautions shall be taken to avoid measurement errors.

Such precautions shall, at least, include the careful installation of the device according to the instrument manufacturers' recommendations and to good engineering practice.

Other measurement methods are permitted if an equivalent accuracy can be demonstrated.

2. CALCULATION OF THE CNG ENERGY RATIO

The fuel consumption value shall be calculated from the emissions of hydrocarbons, carbon monoxide, and carbon dioxide determined from the measurement results assuming that only CNG is burned during the test.

The CNG ratio of the energy consumed in the cycle is then determined as follows:

$$G_{\text{CNG}} = M_{\text{CNG}} * cf * 10\,000 / (FC_{\text{norm}} * \text{dist} * d)$$

Where:

G_{CNG} : the CNG energy ratio (%);

M_{CNG} : the CNG mass consumed during the cycle (kg);

FC_{norm} : the fuel consumption ($\text{m}^3/100\text{ km}$) calculated in accordance with paragraph 1.4.3(c) of Annex 6 to Regulation No 101;

dist: distance travelled during the cycle (km);

d: density $d = 0,654\text{ kg/m}^3$;

cf: correction factor, assuming the following values:

cf = 1 in case of G20 reference fuel;

cf = 0,78 in case of G25 reference fuel.

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