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Acts whose titles are printed in light type are those relating to day-to-day management of agricultural matters, and are generally valid for a limited period.

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## II

(Non-legislative acts)

## DECISIONS

## COMMISSION DECISION

of 27 April 2011

**determining transitional Union-wide rules for harmonised free allocation of emission allowances pursuant to Article 10a of Directive 2003/87/EC of the European Parliament and of the Council**

(notified under document C(2011) 2772)

(2011/278/EU)

THE EUROPEAN COMMISSION,

Having regard to the Treaty of the Functioning of the European Union,

Having regard to Directive 2003/87/EC of the European Parliament and of the Council of 13 October 2003 establishing a scheme for greenhouse gas emission allowance trading within the Community and amending Council Directive 96/61/EC<sup>(1)</sup>, and in particular Article 10a thereof,

Whereas:

- (1) Article 10a of the Directive requires that the Community-wide and fully-harmonised implementing measures for the allocation of free emission allowances should, to the extent feasible, determine *ex-ante* benchmarks so as to ensure that the free allocation of emission allowances takes place in a manner that provides incentives for reductions in greenhouse gas emissions and energy efficient techniques, by taking account of the most efficient techniques, substitutes, alternative production processes, high efficiency cogeneration, efficient energy recovery of waste gases, use of biomass and capture and storage of carbon dioxide, where such facilities are available, and should not provide incentives to increase emissions. Allocations must be fixed prior to the trading period so as to enable the market to function properly.
- (2) In defining the principles for setting *ex-ante* benchmarks in individual sectors or sub-sectors, the starting point should be the average performance of the 10 % most efficient installations in a sector or sub-sector in the

EU in the years 2007-2008. The benchmarks should be calculated for products rather than for inputs, in order to maximise greenhouse gas emissions reductions and energy efficiency savings throughout each production process of the sector or the sub-sector concerned.

- (3) In order to establish the benchmarks, the Commission has consulted the relevant stakeholders, including the sectors and sub-sectors concerned. Information necessary for setting the benchmarks, installation data on the production, emissions and energy use, was collected as of February 2009 from industry associations, Member States, publicly and commercially available sources and through a survey asking installations to participate.
- (4) To the extent feasible, the Commission has developed benchmarks for products, as well as intermediate products that are traded between installations, produced from activities listed in Annex I to Directive 2003/87/EC. In principle, for each product one benchmark should be defined. Where a product is a direct substitute of another product, both should be covered by the same product benchmark and the related product definition.
- (5) The Commission considered that setting a benchmark for a product was feasible where, taking into account the complexity of the production processes, product definitions and classifications were available that allow for verification of production data and a uniform application of the product benchmark across the Union for the purposes of allocating emission allowances. No differentiation was made on the basis of geography or on the basis of technologies, raw materials or fuels used, so as not to distort comparative advantages in carbon efficiency across the Union economy, and to enhance harmonisation of the transitional free allocation of emission allowances.

<sup>(1)</sup> OJ L 275, 25.10.2003, p. 32.

- (6) The benchmark values should cover all production-related direct emissions, including emissions related to the production of measurable heat used for production, regardless of whether the measurable heat was produced on-site or by another installation. Emissions related to the production of electricity and to the export of measurable heat, including avoided emissions of alternative heat or electricity production in cases of exothermic processes or the production of electricity without direct emissions, were deducted when setting the benchmark values. In case the deduction of emissions related to the export of measurable heat was not feasible, this heat should not be eligible for the free allocation of emission allowances.
- (7) In order to ensure that benchmarks lead to reductions in greenhouse gas emissions, for some production processes in which direct emissions eligible for the free allocation of emission allowances and indirect emissions from electricity production not eligible for free allocation on the basis of Directive 2003/87/EC are to a certain extent interchangeable, the total emissions including indirect emissions related to the production of electricity have been considered for the determination of the benchmark values to ensure a level playing field for fuel and electro-intensive installations. For the purpose of the allocation of emission allowances on the basis of the benchmarks concerned, only the share of the direct emissions in the total emissions should be taken into account in order to avoid providing free allocation of emission allowances for emissions related to electricity.
- (8) For the determination of benchmark values, the Commission has used as a starting point the arithmetic average of the greenhouse gas performance of the 10 % most greenhouse gas efficient installations in 2007 and 2008 for which data has been collected. In addition, the Commission has in accordance with Article 10a(1) of Directive 2003/87/EC analysed for all sectors for which a product benchmark is provided for in Annex I, on the basis of additional information received from several sources and on the basis of a dedicated study analysing most efficient techniques and reduction potentials at European and international level, whether these starting points sufficiently reflect the most efficient techniques, substitutes, alternative production processes, high efficiency cogeneration, efficient energy recovery of waste gases, use of biomass and capture and storage of carbon dioxide, where such facilities are available. Data used for determining the benchmark values has been collected from a wide range of sources in order to cover a maximum of installations producing a benchmarked product in the years 2007 and 2008. First, data on the greenhouse gas performance of ETS installations producing benchmarked products has been collected by or on behalf of the respective European sector associations based on defined rules, so-called 'sector rule books'. As reference for these rule books, the Commission provided guidance on quality and verification criteria for benchmarking data for the EU-ETS. Second, to complement the data collection by European sector associations, consultants on behalf of the European Commission collected data from installations not covered by industry's data and also competent authorities of Member States provided data and analyses.
- (9) To ensure that the benchmark values are based on correct and compliant data, the Commission, supported by consultants, carried out in-depth compliance checks of the sector rule books as well as plausibility checks of the starting point values derived from the data. As indicated in the guidance on quality and verification, data has been verified to the extent necessary by independent verifiers.
- (10) Where several products are produced in one installation and an assignment of emissions to the individual products has not been regarded feasible, only single product installations have been covered by the data collection and included in the benchmark setting. This concerns the product benchmarks for lime, dolime, bottles and jars of colourless glass, bottles and jars of coloured glass, facing bricks, pavers, spray-dried powder, uncoated fine paper, tissue, testliner and fluting, uncoated carton board as well as coated carton board. To increase the significance and check the plausibility of the results, the values for the average performance of the 10 % most efficient installations have been compared against literature on most efficient techniques.
- (11) In case no data or no data collected in compliance with the benchmarking methodology has been available, information on present levels of emissions and consumptions and on most efficient techniques, mainly derived from the Reference Documents on Best Available Techniques (BREF) established in accordance with Directive 2008/1/EC of the European Parliament and of the Council of 15 January 2008 concerning integrated pollution prevention and control<sup>(1)</sup> has been used to derive benchmark values. In particular, due to a lack of data on the treatment of waste gases, heat exports and electricity production, the values for the product benchmarks for coke and hot metal have been derived from calculations of direct and indirect emissions based on information on relevant energy flows provided by the relevant BREF and default emission factors set out in Commission Decision 2007/589/EC of 18 July 2007 establishing guidelines for the monitoring and reporting of greenhouse gas emissions pursuant to Directive 2003/87/EC of the European Parliament and of the Council<sup>(2)</sup>. For the product benchmark for sintered ore,

<sup>(1)</sup> OJ L 24, 29.1.2008, p. 8.

<sup>(2)</sup> OJ L 229, 31.8.2007, p. 1.

data has also been corrected based on relevant energy flows provided by the relevant BREF, taking into account the combustion of waste gases in the sector.

- (12) Where deriving a product benchmark was not feasible, but greenhouse gases eligible for the free allocation of emission allowances occur, those allowances should be allocated on the basis of generic fallback approaches. A hierarchy of three fallback approaches has been developed in order to maximise greenhouse gas emission reductions and energy savings for at least parts of the production processes concerned. The heat benchmark is applicable for heat consumption processes where a measurable heat carrier is used. The fuel benchmark is applicable where non-measurable heat is consumed. The heat and fuel benchmark values have been derived based upon the principles of transparency and simplicity, using the reference efficiency of a widely available fuel that can be regarded as second-best in terms of greenhouse gas efficiency, considering energy efficient techniques. For process emissions, emission allowances should be allocated on the basis of historical emissions. In order to ensure that the free allocation of emission allowances for such emissions provides sufficient incentives for reductions in greenhouse gas emissions and to avoid any difference in treatment of process emissions that are allocated on the basis of historical emissions and those within the system boundaries of a product benchmark, the historical activity level of each installation should be multiplied by a factor equal to 0,9700 to determine the number of free emission allowances.
- (13) From 2013 onwards, all free allocations pursuant to Article 10a of Directive 2003/87/EC should be done in accordance with these rules. To give effect to the transitional system provided for by Article 10a(11) of Directive 2003/87/EC, according to which the free allocation of emission allowances should decrease from 80 % of the amount that corresponded to the allowances to be allocated in 2013 to 30 % of this amount in 2020 with a view to reaching no free allocation in 2027, the factors set out in Annex VI apply. Where a sector or sub-sector has been put on the list determined by Commission Decision 2010/2/EU of 24 December 2009 determining, pursuant to Directive 2003/87/EC of the European Parliament and of the Council, a list of sectors and subsectors which are deemed to be exposed to a significant risk of carbon leakage<sup>(1)</sup>, these factors do not apply. Allocations under this Decision will be taken into account in determining future lists of sectors or sub-sectors deemed to be exposed to a significant risk of carbon leakage.
- (14) To facilitate the data collection from operators and the calculation of the emission allowances to be allocated by Member States, each installation should be divided into sub-installations where required. Member States should ensure that emissions are correctly attributed to the relevant sub-installations and that there are no overlaps between sub-installations.
- (15) Member States should ensure that data collected from the operators and used for allocation purposes is complete, consistent and presents the highest achievable accuracy. It should be verified by an independent verifier so as to ensure that the free allocation of emission allowances is based on solid and reliable data. This decision should provide for specific minimum requirements for data collection and verification to facilitate a harmonised and consistent application of the allocation rules.
- (16) The amount of allowances to be allocated free of charge to incumbent installations should be based on historical production data. In order to ensure that the reference period is as far as possible representative of industry cycles, covers a relevant period where good quality data is available and reduces the impact of special circumstances, such as temporary closure of installations, the historical activity levels have been based on the median production during the period from 1 January 2005 to 31 December 2008, or, where it is higher, on the median production during the period from 1 January 2009 to 31 December 2010. It is also appropriate to take account of any significant capacity change that has taken place in the relevant period. For new entrants, the determination of activity levels should be based on standard capacity utilisation based on sector-specific information or on installation-specific capacity utilisation.
- (17) The information collected by Member States should facilitate the application of this Decision by competent authorities and by the Commission.
- (18) In order to avoid any distortion of competition and to ensure an orderly functioning of the carbon market, Member States should ensure that when determining the allocation of individual installations no double counting and no double allocation takes place. In this context, Member States should pay particular attention to cases where a benchmarked product is produced in more than one installation, where more than one benchmarked product is produced in the same installation or where intermediate products are exchanged across installation boundaries.

<sup>(1)</sup> OJ L 1, 5.1.2010, p. 10.

- (19) To ensure that the emissions trading system delivers reductions over time, Directive 2003/87/EC provides for the Union-wide quantity of allowances to decrease in a linear manner. As this decreasing Union-wide quantity is taken into account for determining the maximum annual amount of allowances pursuant to Article 10a(5) of Directive 2003/87/EC, all free emission allowances allocated on the basis of this Decision to installations not covered by this maximum annual amount referred to in Article 10a(5) should be adjusted in the same linear manner as the Union-wide quantity of allowances, using the year 2013 as a reference.
- (20) The uniform cross-sectoral correction factor that is applicable in each year of the period from 2013 to 2020 to installations that are not identified as electricity generators, and that are not new entrants, pursuant to Article 10a(5) of Directive 2003/87/EC, should be determined on the basis of the preliminary total annual amount of emission allowances allocated free of charge over the period from 2013 to 2020 calculated for these installations pursuant to this Decision, including the installations that might be excluded according to Article 27 of that Directive. This amount of free emission allowances allocated in each year of the period should be compared with the annual amount of allowances that is calculated in accordance with Article 10a(5) of Directive 2003/87/EC for installations that are not electricity generator or new entrants, taking into account the relevant share of the annual Community-wide total quantity, as determined pursuant to Article 9 of that Directive, and the relevant amount of emissions that are only included in the Union scheme from 2013 onwards.
- (21) Where measurable heat is exchanged between two or more installations, the free allocation of emission allowances should be based on the heat consumption of an installation and take account of the risk of carbon leakage. Thus, to ensure that the number of free emission allowances to be allocated is independent from the heat supply structure, emission allowances should be allocated to the heat consumer.
- (22) To enhance the significance of the available data on the greenhouse gas performance of the installations covered by the Union scheme, the product benchmarks for sulphite pulp, thermo-mechanical pulp and mechanical pulp as well as for recovered paper are based on BREF information on most efficient techniques reflecting the use of fossil start-up fuels, the use of fossil fuels (for sulphite pulp, thermo-mechanical and mechanical pulp) and of thermal energy (for recovered paper). The product benchmark for newsprint has also been based on most efficient techniques reflecting the use of thermal energy to derive a significant benchmark value.
- (23) In order to take account of additional greenhouse gas emissions not reflected in the data for determining the benchmark values for some installations, in particular methane emissions, and to ensure that the allocation of free emission allowances on the basis of the product benchmark takes into account the greenhouse gas efficiency of the processes and does not provide incentives to increase emissions, the individual data points of the installations on the benchmark curve for nitric acid have been corrected on the basis of information on the average of these emissions provided by industry and of information derived from the BREF. The product benchmark for nitric acid reflects this correction.
- (24) In order to take into account differences in refinery configurations, the product benchmark for the refinery sector should be based on the 'CO<sub>2</sub> weighted tonne' (hereinafter 'CWT') approach. Thereby the single product of the refinery is the CWT and its production has been calculated on the basis of defined generic process units each of which has been weighted with an emission factor relative to crude distillation, denoted as the CWT factor and representative of the CO<sub>2</sub> emission intensity at an average level of energy efficiency, for the same standard fuel type for each process unit for combustion, and for average process emissions of the process unit. On this basis, the data points used for setting the product benchmark have been derived by comparing the actual emissions to the total CWT of each refinery. The free allocation of emission allowances to refineries is then corrected to exclude electricity use and production in order to be consistent with Article 10a(1) of Directive 2003/87/EC.
- (25) Given the wide range of product qualities that can be achieved, the product benchmarks for lime and dolime refer to a standard composition concerning calcium oxide and magnesium oxide. Regarding combustion emissions data for specific combustion emissions of the production of these standard products has been used based on Decision 2007/589/EC.
- (26) Whereas several product benchmarks, such as the ammonia and soda ash benchmarks, assume that all CO<sub>2</sub> resulting from the production processes is emitted to the atmosphere, emissions should be monitored and reported in accordance with the regulation for the monitoring and reporting of emissions from the activities listed in Annex I, to be adopted by 31 December 2011 pursuant to Article 14(1) of Directive 2003/87/EC, assuming that all CO<sub>2</sub> produced during these production processes was emitted to the atmosphere, irrespective of any potential use of the CO<sub>2</sub> as feedstock in chemical production processes.

- (27) The steam cracking benchmark does not cover the so-called supplemental feed, high value chemicals that are not produced in the main process as well as the related emissions, but, where applicable, supplemental feed should be considered for the free allocation of emission allowances using specific emission factors.
- (28) In order to ensure a level playing field for the production of aromatics in refineries and in chemical plants, the free allocation of emission allowances for aromatics should be based on the CWT approach and the benchmark value of the refineries product benchmark should be applied.
- (29) Considering that in the production of vinyl chloride monomer, hydrogen is used to some extent as fuel substituting conventional fuels such as natural gas, thus reducing the direct emissions of the combusting process, but considering also that the use of hydrogen as a feedstock is preferable in terms of total greenhouse gas efficiency, the vinyl chloride monomer benchmark accounts for the fuel use of hydrogen as if it was natural gas.
- (30) In order to ensure a level playing field for the production of hydrogen and synthesis gas in refineries and in chemical plants, the benchmark for these products should be based on the CWT approach and the benchmark value of the refineries benchmark. Both product benchmarks refer to a defined volumetric concentration of hydrogen.
- (31) Given that full auctioning should be the rule from 2013 onwards for the power sector, taking into account its ability to pass on the increased cost of carbon dioxide, and that no free allocation should be made in respect of any electricity production, except for transitional free allocation for the modernisation of electricity generation and electricity produced from waste gases, this Decision should not cover the free allocation of emission allowances related to the production or consumption of electricity. Nevertheless, according to Article 10a(6) of Directive 2003/87/EC, sectors or subsectors deemed to be exposed to a significant risk of carbon leakage may be compensated for costs related to greenhouse gas emissions passed on in electricity prices by financial measures adopted by Member States in accordance with state aid rules applicable and to be adopted by the Commission in this area.
- (32) It is also appropriate that the product benchmarks take account of the efficient energy recovery of waste gases and emissions related to their use. To this end, for the determination of the benchmark values for products of which the production generates waste gases, the carbon content of these waste gases has been taken into account to a large extent. Where waste gases are exported from the production process outside the system boundaries of the relevant product benchmark and combusted for the production of heat outside the system boundaries of a benchmarked process as defined in Annex I, related emissions should be taken into account by means of allocating additional emission allowances on the basis of the heat or fuel benchmark. In the light of the general principle that no emission allowances should be allocated for free in respect of any electricity production, to avoid undue distortions of competition on the markets for electricity supplied to industrial installations and taking into account the inherent carbon price in electricity, it is appropriate that, where waste gases are exported from the production process outside the system boundaries of the relevant product benchmark and combusted for the production of electricity, no additional allowances are allocated beyond the share of the carbon content of the waste gas accounted for in the relevant product benchmark.
- (33) The product benchmarks also take account of the historical emissions from flaring of waste gases related to the production of a given product and fuel used for safety flaring should be considered fuel used for the production of non-measurable heat in order to take account of the compulsory nature of these flares.
- (34) Substantial investment efforts are necessary to combat climate change and to reduce the carbon intensity of economies. This Decision should therefore be applied in a manner to foster investment in clean technologies in each sector and sub-sector. In accordance with Directive 2003/87/EC, other policies and measures may in the future supplement this goal and encourage the effective use of allowances in order to generate substantial investments in more energy-efficient technologies. In particular, if the final annual amount of allowances allocated free of charge for all incumbent installations determined in accordance with this Decision falls significantly below the maximum annual amount of allowances referred to in Article 10a(5) of Directive 2003/87/EC, an amendment to this Decision could provide incentives for further reductions in greenhouse gas emissions in accordance with Article 10a(1) of Directive 2003/87/EC by allocating allowances to installations capable of implementing innovative technologies that further reduce greenhouse gas emissions.
- (35) Investments in significant capacity extensions giving access to the reserve for new entrants provided for in Article 10a(7) of Directive 2003/87/EC should be unambiguous and of a certain scale in order to avoid an early depletion of the reserve of emission allowances created for new entrants, to avoid distortions of competition, to avoid any undue administrative burden and to ensure equal treatment of installations across Member States. It is therefore appropriate to define the threshold for a significant capacity change by 10 % of the installation's installed capacity and require that the change in the installed capacity triggers a significantly higher or lower activity level of the installation concerned. However,

incremental capacity extensions or reductions should be taken into account when assessing whether this threshold is reached.

- (36) Considering the limited number of allowances in the reserve for new entrants, it is appropriate to assess, when a considerable amount of these allowances is issued to new entrants, whether a fair and equitable access to the remaining allowances in this reserve is guaranteed. In the light of the outcome of this assessment, the possibility for a queuing system may be provided. The design and the definition of the eligibility criteria of such a system should take account of different permitting practices in Member States, avoid any misuse and not provide incentives to reserve allowances over an unreasonable period of time.
- (37) To ensure that no emission allowances are allocated free of charge to an installation that has ceased its operations, this Decision should provide for measures defining such installations and prohibiting the issuance of allowances, unless it can be established that the installation will resume its operations within a specified and reasonable amount of time.
- (38) In order to adapt the number of emission allowances to be allocated to an installation having partially ceased operations, specific thresholds comparing the reduced activity level to the initial activity level have been defined. The number of emission allowances to be allocated should then be adjusted accordingly as of the year following the year during which the installation partially ceased operations. Where such an installation again reaches an activity level above the thresholds, the initial number of emission allowances to be allocated should be partly or even fully be reinstated depending of the installation's level of operation.
- (39) Where applicable, account has been taken of the guidance on interpretation of Annex I to Directive 2003/87/EC.
- (40) The measures provided for in this Decision are in accordance with the opinion of the Climate Change Committee,

HAS ADOPTED THIS DECISION:

#### CHAPTER I

### GENERAL PROVISIONS

#### Article 1

#### Subject matter

This Decision lays down transitional Union-wide rules for the harmonised free allocation of emission allowances under Directive 2003/87/EC from 2013 onwards.

#### Article 2

#### Scope

This Decision shall apply to the free allocation of emission allowances under Chapter III (stationary installations) of Directive 2003/87/EC in trading periods from 2013 with the

exception of transitional free allocation of emission allowances for the modernisation of electricity generation pursuant to Article 10c of Directive 2003/87/EC.

#### Article 3

### Definitions

For the purposes of this Decision, the following definitions shall apply:

- (a) 'incumbent installation' means any installation carrying out one or more activities listed in Annex I to Directive 2003/87/EC or an activity included in the Union scheme for the first time in accordance with Article 24 of that Directive which:
- (i) obtained a greenhouse gas emission permit before 30 June 2011; or
  - (ii) is in fact operating, obtained all relevant environmental permits, including a permit provided for in Directive 2008/1/EC where applicable, by 30 June 2011 and fulfilled by 30 June 2011 all other criteria defined in the national legal order of the Member State concerned on the basis of which the installation would have been entitled to receive the greenhouse gas permit;
- (b) 'product benchmark sub-installation' means inputs, outputs and corresponding emissions relating to the production of a product for which a benchmark has been set in Annex I;
- (c) 'heat benchmark sub-installation' means inputs, outputs and corresponding emissions not covered by a product benchmark sub-installation relating to the production, the import from an installation or other entity covered by the Union scheme, or both, of measurable heat which is:
- consumed within the installation's boundaries for the production of products, for the production of mechanical energy other than used for the production of electricity, for heating or cooling with the exception of the consumption for the production of electricity, or
  - exported to an installation or other entity not covered by the Union scheme with the exception of the export for the production of electricity;
- (d) 'fuel benchmark sub-installation' means inputs, outputs and corresponding emissions not covered by a product benchmark sub-installation relating to the production of non-measurable heat by fuel combustion consumed for the production of products, for the production of mechanical energy other than used for the production of electricity, for heating or cooling with the exception of the consumption for the production of electricity, including safety flaring;
- (e) 'measurable heat' means a net heat flow transported through identifiable pipelines or ducts using a heat transfer medium, such as, in particular, steam, hot air, water, oil, liquid metals and salts, for which a heat meter is or could be installed;



- (f) 'heat meter' means a heat meter within the meaning of Annex MI-004 to Directive 2004/22/EC of the European Parliament and of the Council<sup>(1)</sup> or any other device to measure and record the amount of heat energy produced based upon flow volumes and temperatures;
- (g) 'non-measurable heat' means all heat other than measurable heat;
- (h) 'process emissions sub-installation' means greenhouse gas emissions listed in Annex I to Directive 2003/87/EC other than carbon dioxide, which occur outside the system boundaries of a product benchmark listed in Annex I, or carbon dioxide emissions, which occur outside the system boundaries of a product benchmark listed in Annex I, as a result of any of the following activities and emissions stemming from the combustion of incompletely oxidised carbon produced as a result of the following activities for the purpose of the production of measurable heat, non-measurable heat or electricity provided that emissions that would have occurred from the combustion of an amount of natural gas, equivalent to the technically usable energy content of the combusted incompletely oxidised carbon, are subtracted:
- (i) the chemical or electrolytic reduction of metal compounds in ores, concentrates and secondary materials;
  - (ii) the removal of impurities from metals and metal compounds;
  - (iii) the decomposition of carbonates, excluding those for flue gas scrubbing;
  - (iv) chemical syntheses where the carbon bearing material participates in the reaction, for a primary purpose other than the generation of heat;
  - (v) the use of carbon containing additives or raw materials for a primary purpose other than the generation of heat;
  - (vi) the chemical or electrolytic reduction of metalloids oxides or non-metal oxides such as silicon oxides and phosphates;
- (i) 'significant capacity extension' means a significant increase in a sub-installation's initial installed capacity whereby all of the following occur:
- (i) one or more identifiable physical changes relating to its technical configuration and functioning other than the mere replacement of an existing production line take place; and
  - (ii) the sub-installation can be operated at a capacity that is at least 10 % higher compared to the initial installed capacity of the sub-installation before the change; or
  - (iii) the sub-installation to which the physical changes relate has a significantly higher activity level resulting in an additional allocation of emission allowances of more than 50 000 allowances per year representing at least 5 % of the preliminary annual number of emission allowances allocated free of charge for this sub -installation before the change;
- (j) 'significant capacity reduction' means one or more identifiable physical changes leading to a significant decrease in a sub-installation's initial installed capacity and its activity level of the magnitude considered to constitute a significant capacity extension;
- (k) 'significant capacity change' means either a significant capacity extension or a significant capacity reduction;
- (l) 'added capacity' means the difference between the initial installed capacity of a sub-installation and the installed capacity of that same sub-installation after having had a significant extension determined on the basis of the average of the 2 highest monthly production volumes within the first 6 months following the start of changed operation;
- (m) 'reduced capacity' means the difference between the initial installed capacity of a sub-installation and the installed capacity of that same sub-installation after having had a significant capacity reduction determined on the basis of the average of the 2 highest monthly production volumes within the first 6 months following the start of changed operation;
- (n) 'start of normal operation' means the verified and approved first day of a continuous 90-day period, or, where the usual production cycle in the sector concerned does not foresee continuous production, the first day of a 90-day period split in sector-specific production cycles, during which the installation operates at least at 40 % of the capacity that the equipment is designed to accommodate taking into account, where appropriate, the installation-specific operating conditions;
- (o) 'start of changed operation' means the verified and approved first day of a continuous 90-day period, or, where the usual production cycle in the sector concerned does not foresee continuous production, the first day of a 90-day period split in sector-specific production cycles, during which the changed sub-installation operates at least at 40 % of the capacity that the equipment is designed to accommodate taking into account, where appropriate, the sub-installation-specific operating conditions;
- (p) 'safety flaring' means the combustion of pilot fuels and highly fluctuating amounts of process or residual gases in a unit open to atmospheric disturbances which is explicitly required for safety reasons by relevant permits for the installation;

<sup>(1)</sup> OJ L 135, 30.4.2004, p. 1.

- (q) 'private household' means a residential unit in which persons make arrangements, individually or in groups, for providing themselves with measurable heat;
- (r) 'verifier' means a competent, independent, person or verification body with responsibility for performing and reporting on the verification process, in accordance with the detailed requirements established by the Member State pursuant to Annex V to Directive 2003/87/EC;
- (s) 'reasonable assurance' means a high but not absolute level of assurance, expressed positively in the verification opinion, whether the data subject to verification is free from material misstatement;
- (t) 'level of assurance' means the degree to which the verifier is confident in the verification conclusions that it has been proved whether or not the data submitted for an installation is free from material misstatement;
- (u) 'material misstatement' means a substantial misstatement (omissions, misrepresentations and errors, not considering the permissible uncertainty) in the data submitted that, according to the professional judgment of the verifier, could affect subsequent use of the data by the competent authority in the calculation of the allocation of emission allowances.

#### Article 4

##### Competent authority and rounding

- Member States shall make the appropriate administrative arrangements, including designation of the competent authority or authorities in accordance with Article 18 of Directive 2003/87/EC, for the implementation of the rules of this Decision.
- All calculations relating to a number of allowances carried out in accordance with this Decision shall be rounded up to the nearest allowance.

#### CHAPTER II

##### INCUMBENT INSTALLATIONS

#### Article 5

##### Identification of installations

- Each Member State shall identify all installations in its territory and eligible for free allocation under Article 10a of Directive 2003/87/EC.
- Each Member State shall also identify all heat producing electricity generators and small installations, which may be excluded from the Union scheme pursuant to Article 27 of Directive 2003/87/EC.

#### Article 6

##### Division into sub-installations

1. For the purposes of this Decision, Member States shall divide each installation eligible for the free allocation of emission allowances under Article 10a of Directive 2003/87/EC into one or more of the following sub-installations, as required:

- a product benchmark sub-installation;
- a heat benchmark sub-installation;
- a fuel benchmark sub-installation;
- a process emissions sub-installation.

Sub-installations shall correspond, to the extent possible, to physical parts of the installation.

For heat benchmark sub-installations, fuel benchmark sub-installations and process emissions sub-installations, Member States shall clearly distinguish on the basis of NACE and Prodcom codes between whether or not the relevant process serves a sector or subsector deemed to be exposed to a significant risk of carbon leakage as determined by Decision 2010/2/EU.

Where an installation included in the Union scheme has produced and exported measurable heat to an installation or other entity not included in the Union scheme, Member States shall consider that the relevant process of the heat benchmark sub-installation for this heat does not serve a sector or subsector deemed to be exposed to a significant risk of carbon leakage as determined by Decision 2010/2/EU unless the competent authority is satisfied that the consumer of the measurable heat belongs to a sector or subsector deemed to be exposed to a significant risk of carbon leakage as determined by Decision 2010/2/EU.

- The sum of the inputs, outputs and emissions of each sub-installation shall not exceed the inputs, outputs and total emissions of the installation.

#### Article 7

##### Baseline data collection

1. For each incumbent installation eligible for the free allocation of emission allowances under Article 10a of Directive 2003/87/EC, including installations that are operated only occasionally, in particular, installations that are kept in reserve or on standby and installations operating on a seasonal schedule, Member States shall, for all years of the period from 1 January 2005 to 31 December 2008, or 1 January 2009 to 31 December 2010 where applicable, during which the installation has been operating, collect from the operator all relevant information and data regarding each parameter listed in Annex IV.

2. Member States shall collect data for each sub-installation separately. If necessary, Member States may require the operator to submit more data.

Where 95 % of the inputs, outputs and corresponding emissions of the heat benchmark sub-installation, of the fuel benchmark sub-installation or of the process emissions sub-installation, serve sectors or subsectors deemed to be exposed to a significant risk of carbon leakage as determined by Decision 2010/2/EU or where 95 % of the inputs, outputs and corresponding emissions of the heat benchmark sub-installation, of the fuel benchmark sub-installation or of the process emissions sub-installation serve sectors or subsectors not deemed to be exposed to a significant risk of carbon leakage, Member States may exempt the operator from providing data allowing for the distinction in terms of carbon leakage exposure.

3. Member States shall require the operator to submit the initial installed capacity of each product benchmark sub-installation, determined as follows:

- (a) in principle, the initial installed capacity shall be the average of the 2 highest monthly production volumes in the period from 1 January 2005 to 31 December 2008 assuming that the sub-installation has been operating at this load 720 hours per month for 12 months per year;
- (b) Where it is not possible to determine the initial installed capacity according to point (a), an experimental verification of the sub-installation's capacity under the supervision of a verifier shall take place in order to ensure that the parameters used are typical for the sector concerned and that the results of the experimental verification are representative.

4. Where a sub-installation has had a significant capacity change between 1 January 2005 and 30 June 2011, Member States shall require the operator to submit in addition to the initial installed capacity of that sub-installation, determined in accordance with paragraph 3, until the start of changed operation, the added or, where applicable, the reduced capacity as well as the installed capacity of the sub-installation after having had a significant capacity change determined on the basis of the average of the 2 highest monthly production volumes within the first 6 months following the start of changed operation. Member States shall consider this installed capacity of the sub-installation after having had a significant capacity change as the sub-installation's initial installed capacity when assessing any further significant capacity change.

5. Member States shall obtain, record and document data in a manner that enables an appropriate use of it by the competent authority.

Member States may require the operator to use an electronic template or specify a file format for submission of the data. However, Member States shall accept an operator's use of any electronic template or file format specification published by the Commission for the purpose of data collection under this Article, unless the Member State's template or file format specification requires at least input of the same data.

6. Inputs, outputs and corresponding emissions for which only data for the installation as a whole is available, shall be proportionally attributed to the relevant sub-installations, as follows:

- (a) where different products are produced one after the other in the same production line, inputs, outputs and corresponding emissions shall be attributed sequentially based on the usage time per year for each sub-installation;
- (b) where it is not possible to attribute inputs, outputs and corresponding emissions according to point (a), they shall be attributed based on the mass or volume of individual products produced or estimates based on the ratio of free reaction enthalpies of the chemical reactions involved or based on another suitable distribution key that is corroborated by a sound scientific methodology.

7. Member States shall require operators to submit complete and consistent data and to ensure that there are no overlaps between sub-installations and no double counting. Member States shall, in particular, ensure that operators exercise due diligence and submit data that presents highest achievable accuracy so as to enable reasonable assurance of the integrity of data.

To this end, Member States shall ensure that each operator also submits a methodology report containing, in particular, a description of the installation, the compilation methodology applied, different data sources, calculation steps and, where applicable, assumptions made and the methodology applied to attribute emissions to the relevant sub-installations in accordance with paragraph 6. Member States may order the operator to demonstrate the accuracy and completeness of the data provided.

8. Where data is missing, Member States shall require the operator to duly justify any lack of data.

Member States shall require the operator to substitute all missing data with conservative estimates, in particular, based on best industry practice, recent scientific and technical knowledge before or, at the latest, during verification by the verifier.

Where data are partly available, conservative estimate means that the value extrapolated shall be not more than 90 % of the value obtained by using the data available.

Where no data on measurable heat flows for the heat benchmark sub-installation is available, a proxy value may be derived from the corresponding energy input multiplied by the measured efficiency of the heat production as verified by a verifier. In case no such efficiency data is available, a reference efficiency of 70 % shall be applied on the corresponding energy input of the production of measurable heat.

9. Upon request, each Member State shall make the data collected on the basis of paragraph 1 to 6 available to the Commission.

#### Article 8

#### Verification

1. In the process of collecting data in accordance with Article 7, Member States shall only accept data that has been verified as satisfactory by a verifier. The verification process shall relate to the methodology report and the reported parameters referred to in Article 7 and Annex IV. The verification shall address the reliability, credibility and accuracy of the data provided by the operator and shall come to a verification opinion that states with reasonable assurance whether the data submitted is free from material misstatements.

2. Member States shall ensure that the verifier is independent of the operator, carries out his activities in a sound and objective professional manner, and understands each of the following:

- (a) the provisions of this Decision, as well as relevant standards and guidance;
- (b) the legislative, regulatory, and administrative requirements relevant to the activities being verified;
- (c) the generation of all information related to each parameter or source of emissions in the installation, in particular, relating to the collection, measurement, calculation and reporting of the data.

3. In addition to the requirements set out in Decision 2007/589/EC, Member States shall ensure that all of the following minimum requirements are met:

- (a) the verifier has planned and performed the verification with an attitude of professional scepticism recognising that circumstances may exist that cause the information and data submitted to be materially misstated;
- (b) the verifier has only validated reported parameters determined with a high degree of certainty. A high degree of certainty requires the operator to show that:

- (i) the reported parameters are free of inconsistencies;
  - (ii) the collection of the parameters has been carried out in accordance with applicable standards or guidance;
  - (iii) the relevant records of the installation are complete and consistent;
- (c) the verifier has commenced the verification process with a strategic analysis of all relevant activities carried out in the installation and has an overview of all the activities and their significance for allocation purposes;
  - (d) the verifier has taken account of the information contained in the greenhouse gas emissions permit or other relevant environmental permits, such as the permit provided for in Directive 2008/1/EC, in particular when assessing the initial installed capacity of sub-installations;
  - (e) the verifier has analysed the inherent risks and control risks related to the scope and complexity of the operator's activities and related to allocation parameters, which could lead to material misstatements and has drawn up a verification plan following this risk analysis;
  - (f) the verifier has conducted a site visit, when appropriate, to inspect the operation of meters and monitoring systems, conduct interviews, and collect sufficient information and evidence. If the verifier has deemed a site visit is not appropriate, he should be able to fully justify his decision to an appropriate authority;
  - (g) the verifier has carried out the verification plan by gathering data in accordance with the defined sampling methods, walkthrough tests, document reviews, analytical procedures and data review procedures, including any relevant additional evidence, upon which the verifier's verification opinion will be based;
  - (h) the verifier has requested the operator to provide any missing data or complete missing sections of audit trails, explain variations in parameters or emissions data, or revise calculations, or adjust reported data;
  - (i) the verifier has prepared an internal verification report. The verification report shall record evidence showing that the strategic analysis, the risk analysis and the verification plan has been performed in full, and provide sufficient information to support verification opinions. The internal verification report shall as well facilitate a potential evaluation of the audit by the competent authority, and accreditation body;

(j) the verifier has made a judgment with respect to whether the reported parameters contain any material misstatement and whether there are other issues relevant for the verification opinion based on the findings contained in the internal verification report;

(k) the verifier has presented the verification methodology, his findings and verification opinion in a verification report, addressed to the operator, to be submitted by the operator with the methodology report and the reported parameters to the competent authority.

4. Member States shall not allocate emission allowances free of charge to an installation where data relating to this installation has not been verified as satisfactory.

Member States may only decide to allocate emission allowances free of charge to an installation where data relating to this installation has not been verified as satisfactory, if they are satisfied that the data gaps leading to the verifier's judgment are due to exceptional and unforeseeable circumstances that could not have been avoided even if all due care had been exercised and that are beyond the control of the operator of the installation concerned, in particular because of circumstances such as natural disasters, war, threats of war, terrorist acts, revolution, riot, sabotage or acts of vandalism.

5. Upon verification, Member States shall, in particular, ensure that there are no overlaps between sub-installations and no double counting.

#### Article 9

##### Historical activity level

1. For incumbent installations, Member States shall determine historical activity levels of each installation for the baseline period from 1 January 2005 to 31 December 2008, or, where they are higher, for the baseline period from 1 January 2009 to 31 December 2010, on the basis of the data collected under Article 7.

2. The product-related historical activity level shall, for each product for which a product benchmark has been determined as referred to in Annex I, refer to the median annual historical production of this product in the installation concerned during the baseline period.

3. The heat-related historical activity level shall refer to the median annual historical import from an installation covered by the Union scheme, production, or both, during the baseline period, of measurable heat consumed within the installation's boundaries for the production of products, for the production of mechanical energy other than used for the production of electricity, for heating or cooling with the exception of the consumption for the production of electricity, or exported to installations or other entity not covered by the Union scheme with the exception of the export for the production of electricity expressed as terajoule per year.

4. The fuel-related historical activity level shall refer to the median annual historical consumption of fuels used for the production of non-measurable heat consumed for the production of products, for the production of mechanical energy other than used for the production of electricity, for heating or cooling with the exception of the consumption for the production of electricity, including safety flaring, during the baseline period expressed as terajoule per year.

5. For process emissions, which occurred in relation with the production of products in the installation concerned during the baseline period referred to in paragraph 1, the process-related historical activity level shall refer to the median annual historical process emissions expressed as tonnes of carbon dioxide equivalent.

6. For the purposes of the determination of the median values referred to in paragraphs 1 to 5 only calendar years during which the installation has been operating for at least 1 day shall be taken into account.

If the installation has been operating less than 2 calendar years during the relevant baseline period, the historical activity levels shall be calculated on the basis of the initial installed capacity determined in accordance with the methodology set out in Article 7(3) of each sub-installation multiplied by the relevant capacity utilisation factor determined in accordance with Article 18(2).

7. By way of derogation from paragraph 2, Member States shall determine the product-related historical activity level for products to which the product benchmarks referred to in Annex III apply on the basis of the median annual historical production according to the formulas set out in this same Annex.

8. Incumbent installations that are operated only occasionally, including, in particular, installations that are kept in reserve or on standby and installations operating on a seasonal schedule and that have not been operating for at least 1 day in a given calendar year during the baseline period, shall be taken into account when determining the median values referred to in paragraph 1, where all of the following conditions are met:

- (a) it is clearly demonstrated that the installation is used occasionally, in particular, operated regularly as standby or reserve capacity or operated regularly following a seasonal schedule;
- (b) the installation is covered by a greenhouse gas emissions permit and by all other relevant permits required in the national legal order of the Member State to operate the installation;
- (c) it is technically possible to start operation on short notice and maintenance is carried out on a regular basis.

9. Where an incumbent installation has had a significant capacity extension or a significant reduction of capacity between 1 January 2005 and 30 June 2011, the historical activity levels of the installation concerned shall be the sum of the median values determined in accordance with paragraph 1 without the significant capacity change and the historical activity levels of the added or reduced capacity.

The historical activity levels of the added or reduced capacity shall be the difference between the initial installed capacities of each sub-installation having had a significant capacity change determined in accordance with Article 7(3) until the start of changed operation and the installed capacity after the significant capacity change determined in accordance with Article 7(4) multiplied by the average historical capacity utilisation of the installation concerned of the years prior to the start of changed operation.

#### Article 10

##### Allocation at installation level

1. Based on the data collected in accordance with Article 7, Member States shall, for each year, calculate the number of emission allowances allocated free of charge from 2013 onwards to each incumbent installation on their territory in accordance with paragraphs 2 to 8.

2. For the purpose of this calculation, Member States shall first determine the preliminary annual number of emission allowances allocated free of charge for each sub-installation separately as follows:

(a) for each product benchmark sub-installation, the preliminary annual number of emission allowances allocated free of charge for a given year shall correspond to the value of this product benchmark as referred to in Annex I multiplied by the relevant product-related historical activity level;

(b) for:

(i) the heat benchmark sub-installation, the preliminary annual number of emission allowances allocated free of charge for a given year shall correspond to the value of the heat benchmark for measurable heat as referred to in Annex I multiplied by the heat-related historical activity level for the consumption of measurable heat;

(ii) the fuel benchmark sub-installation, the preliminary annual number of emission allowances allocated free of charge for a given year shall correspond to the value of the fuel benchmark as referred to in Annex I multiplied by the fuel-related historical activity level for the fuel consumed;

(iii) the process emissions sub-installation, the preliminary annual number of emission allowances allocated free of charge for a given year shall correspond to the process-related historical activity level multiplied by 0,9700.

3. To the extent that measurable heat is exported to private households and the preliminary annual number of emission allowances determined in accordance with paragraph 2(b), point (i), for 2013 is lower than the median annual historical emissions related to the production of measurable heat exported to private households by that sub-installation in the period from 1 January 2005 to 31 December 2008, the preliminary annual number of emission allowances for 2013 shall be adjusted by the difference. In each of the years 2014 to 2020, the preliminary annual number of emission allowances determined in accordance with paragraph 2(b), point (i), shall be adjusted to the extent that the preliminary annual number of emission allowances for that year is lower than a percentage of the abovementioned median annual historical emissions. This percentage shall be 90 % in 2014 and decline by 10 percentage points each subsequent year.

4. For the purpose of implementing Article 10a(11) of Directive 2003/87/EC, the factors referred to in Annex VI shall be applied to the preliminary annual number of emission allowances allocated free of charge determined for each sub-installation pursuant to paragraph 2 of this Article for the year concerned where the processes in those sub-installations serve sectors or subsectors deemed not to be exposed to a significant risk of carbon leakage as determined by Decision 2010/2/EU.

Where the processes in those sub-installations serve sectors or subsectors deemed to be exposed to a significant risk of carbon leakage as determined by Decision 2010/2/EU, the factor to be applied for the years 2013 and 2014 shall be 1. The sectors or subsectors for which the factor is 1 for the years 2015 to 2020 shall be determined pursuant to Article 10a(13) of Directive 2003/87/EC.

5. Where at least 95 % of the historical activity level of the heat benchmark sub-installation, of the fuel benchmark sub-installation or of the process emissions sub-installation serve sectors or subsectors deemed to be exposed to a significant risk of carbon leakage as determined by Decision 2010/2/EU, the sub-installation as a whole is deemed to be exposed to a significant risk of carbon leakage.

Where at least 95 % of the historical activity level of the heat benchmark sub-installation, of the fuel benchmark sub-installation or of the process emissions sub-installation serve sectors or subsectors not deemed to be exposed to a significant risk of carbon leakage as determined by Decision 2010/2/EU, the sub-installation as a whole is not deemed to be exposed to a significant risk carbon leakage.

6. The preliminary annual number of emission allowances allocated free of charge for sub-installations that received measurable heat from sub-installations producing products covered by the nitric acid benchmarks referred to in Annex I shall be reduced by the annual historical consumption of that heat during the baseline period referred to in Article 9(1) multiplied by the value of the heat benchmark for this measurable heat as referred to in Annex I.

7. The preliminary total annual amount of emission allowances allocated free of charge for each installation shall be the sum of all sub-installations' preliminary annual numbers of emission allowances allocated free of charge calculated in accordance with paragraphs 2, 3, 4, 5 and 6.

Where an installation encompasses sub-installations producing pulp (short fibre kraft pulp, long fibre kraft pulp, thermo-mechanical pulp and mechanical pulp, sulphite pulp or other pulp not covered by a product benchmark) exporting measurable heat to other technically connected sub-installations, the preliminary total amount of emission allowances allocated free of charge shall, without prejudice to the preliminary annual numbers of emission allowances allocated free of charge for other sub-installations of the installation concerned, only take into account the preliminary annual number of emission allowances allocated free of charge to the extent that pulp products produced by this sub-installation are placed on the market and not processed into paper in the same or other technically connected installations.

8. When determining the preliminary total annual amount of emission allowances allocated free of charge for each installation, Member States shall ensure that emissions are not double counted and that the allocation is not negative. In particular, where an intermediate product that is covered by a product benchmark according to the definition of the respective system boundaries set out in Annex I is imported by an installation, emissions shall not be double counted when determining the preliminary total annual amount of emission allowances allocated free of charge for both installations concerned.

9. The final total annual amount of emission allowances allocated free of charge for each incumbent installation, except for installations covered by Article 10a(3) of Directive 2003/87/EC, shall be the preliminary total annual amount of emission allowances allocated free of charge for each installation determined in accordance with paragraph 7 multiplied by the cross-sectoral correction factor as determined in accordance with Article 15(3).

For installations covered by Article 10a(3) of Directive 2003/87/EC and eligible for the allocation of free emission allowances, the final total annual amount of emission allowances allocated free of charge shall correspond to the preliminary total annual amount of emission allowances allocated free of charge for each installation determined in accordance with paragraph 7 annually adjusted by the linear factor referred to in Article 10a(4) of Directive 2003/87/EC, using the preliminary total annual amount of emission allowances allocated free of charge for the installation concerned for 2013 as a reference.

#### Article 11

##### Allocation in respect of steam cracking

By way of derogation from Article 10(2)(a), the preliminary annual number of emission allowances allocated free of charge for a product benchmark sub-installation relating to the production of high value chemicals (hereinafter 'HVC') shall correspond to the value of the steam cracking product benchmark referred to in Annex I multiplied by the historical activity level determined in accordance with Annex III and multiplied by the quotient of the total direct emissions including emissions from net imported heat over the baseline period referred to in Article 9(1) of this Decision expressed as tonnes of carbon dioxide equivalent and the sum of these total direct emissions and the relevant indirect emissions over the baseline period referred to in Article 9(1) of this Decision calculated in accordance with Article 14(2). To the result of this calculation, 1,78 tonnes of carbon dioxide per ton of hydrogen times the median historical production of hydrogen from supplemental feed expressed in tons of hydrogen, 0,24 tonnes of carbon dioxide per ton of ethylene times the median historical production of ethylene from supplemental feed expressed in tons of ethylene and 0,16 tonnes of carbon dioxide per ton of HVC times the median historical production of other high value chemicals than hydrogen and ethylene from supplemental feed expressed in tons of HVC shall be added.

#### Article 12

##### Allocation in respect of vinyl chloride monomer

By way of derogation from Article 10(2)(a), the preliminary annual number of emission allowances allocated free of charge for a sub-installation relating to the production of vinyl chloride monomer (hereinafter 'VCM') shall correspond to the value of the VCM benchmark multiplied by the historical activity level for VCM production expressed as tonnes and multiplied by the quotient of the direct emissions for the production of VCM including emissions from net imported heat over the baseline period referred to in Article 9(1) of this Decision, calculated in accordance with Article 14(2), expressed as tonnes of carbon dioxide equivalent and the sum of these direct emissions and the hydrogen-related emissions for the production of VCM over the baseline period referred to in Article 9(1) of this Decision expressed as tonnes of carbon dioxide equivalent calculated on the basis of the historical heat consumption stemming from hydrogen combustion expressed as terajoules (TJ) times 56,1 tonnes of carbon dioxide per TJ.

#### Article 13

##### Heat flows between installations

Where a product-benchmark sub-installation encompasses measurable heat imported from an installation or other entity not included in the Union scheme, the preliminary annual number of emission allowances allocated free of charge for the product benchmark sub-installation concerned determined pursuant to Article 10(2)(a) shall be reduced by the amount of heat historically imported from an installation or other entity not included in the Union scheme in the year concerned multiplied by the value of the heat benchmark for measurable heat set out in Annex I.

#### Article 14

##### Exchangeability of fuel and electricity

1. For each product benchmark sub-installation referred to in Annex I with consideration of exchangeability of fuel and electricity, the preliminary annual number of emission allowances allocated free of charge shall correspond to the value of the relevant product benchmark set out in Annex I multiplied by the product-related historical activity level and multiplied by the quotient of the total direct emissions including emissions from net imported heat over the baseline period referred to in Article 9(1) of this Decision expressed as tonnes of carbon dioxide equivalent and the sum of these total direct emissions and the relevant indirect emissions over the baseline period referred to in Article 9(1) of this Decision.

2. For the purposes of the calculation pursuant to paragraph 1, the relevant indirect emissions refer to the relevant electricity consumption as specified in the definition of processes and emissions covered in Annex I during the baseline period referred to in Article 9(1) of this Decision expressed in megawatt-hours for the production of the product concerned times 0,465 tonnes of carbon dioxide per megawatt-hour and expressed as tonnes of carbon dioxide.

For the purposes of the calculation pursuant to paragraph 1, the emissions from net imported heat refer to the amount of measurable heat for the production of the product concerned imported from installations covered by the Union scheme during the baseline period referred to in Article 9(1) of this Decision multiplied by the value of the heat benchmark as referred to in Annex I.

#### CHAPTER III

##### ALLOCATION DECISIONS

#### Article 15

##### National Implementation measures

1. In accordance with Article 11(1) of Directive 2003/87/EC, Member States shall submit to the Commission by 30 September 2011 a list of installations covered by Directive 2003/87/EC in their territory, including installations identified pursuant to Article 5, using an electronic template provided by the Commission.

2. The list referred to in paragraph 1 shall for each incumbent installation contain, in particular:

- (a) an identification of the installation and its boundaries using the installation identification code in the CITL;
- (b) an identification of each sub-installation of an installation;

- (c) for each product benchmark sub-installation the initial installed capacity together with the annual production volumes of the product concerned in the period 1 January 2005 to 31 December 2008;
- (d) for each installation and sub-installation information on whether or not it belongs to a sector or subsector deemed to be exposed to a significant risk of carbon leakage as determined by Decision 2010/2/EU;
- (e) for each sub-installation the preliminary annual number of emission allowances allocated free of charge over the period from 2013 to 2020 as determined in accordance with Article 10(2);
- (f) in addition to point (d), for sub-installations not serving a sector or subsector deemed to be exposed to a significant risk of carbon leakage as determined by Decision 2010/2/EU, the preliminary annual numbers of emission allowances allocated free of charge over the period from 2013 to 2020 decreasing by equal amounts from 80 % of the quantity in 2013 to 30 % in 2020 as determined in accordance with Article 10(4);
- (g) for each installation the preliminary total annual amounts of emission allowances allocated free of charge over the period from 2013 to 2020 as determined in accordance with Article 10(6).

The list shall also identify all heat producing electricity generators, and small installations that may be excluded from the Union scheme pursuant to Article 27 of Directive 2003/87/EC.

3. Upon receipt of the list referred to in paragraph 1 of this Article, the Commission shall assess the inclusion of each installation in the list and the related preliminary total annual amounts of emission allowances allocated free of charge.

After notification by all Member States of the preliminary total annual amounts of emission allowances allocated free of charge over the period from 2013 to 2020, the Commission shall determine the uniform cross-sectoral correction factor as referred to in Article 10a(5) of Directive 2003/87/EC. It shall be determined by comparing the sum of the preliminary total annual amounts of emission allowances allocated free of charge to installations that are not electricity generators in each year over the period from 2013 to 2020 without application of the factors referred to in Annex VI with the annual amount of allowances that is calculated in accordance with Article 10a(5) of Directive 2003/87/EC for installations that are not electricity generator or new entrants, taking into account the relevant share of the annual Union-wide total quantity, as determined pursuant to Article 9 of that Directive, and the relevant amount of emissions which are only included in the Union scheme from 2013 onwards.



4. If the Commission does not reject an installation's inscription on this list, including the corresponding preliminary total annual amounts of emission allowances allocated free of charge for this installation, the Member State concerned shall proceed to the determination of the final annual amount of emission allowances allocated free of charge for each year over the period from 2013 to 2020 in accordance with Article 10(9) of this Decision.

5. After determination of the final annual amount for all incumbent installations in their territory, Member States shall submit to the Commission a list of the final annual amounts of emission allowances allocated free of charge over the period from 2013 to 2020 as determined in accordance with Article 10(9).

#### Article 16

##### Changes to carbon leakage exposure

Within 3 months of the adoption of the list referred to in Article 10a(13) of Directive 2003/87/EC for the years 2015 to 2020 or of the adoption of any addition to the list determined by Commission Decision 2010/2/EU for the years 2013 and 2014, each Member State shall revise the list referred to in Article 15(1) of this Decision clearly indicating the changes to the deemed carbon leakage exposure of installations and sub-installations and the related preliminary annual amount of free allocation where applicable and submit that list to the Commission.

#### CHAPTER IV

#### NEW ENTRANTS AND CLOSURES

#### Article 17

##### Application for free allocation

1. Upon application by a new entrant, Member States shall determine on the basis of the present rules the amount of allowances to be allocated free of charge once the installation concerned has started normal operation and its initial installed capacity has been determined.

2. Member States shall only accept applications that are submitted to the competent authority within 1 year following the start of normal operation of the installation or sub-installation concerned.

3. Member States shall divide the installation concerned in sub-installations in accordance with Article 6 of this Decision and shall require the operator to submit together with the application referred to in paragraph 1 all relevant information and data regarding each parameter listed in Annex V for each sub-installation separately to the competent authority. If necessary, Member States may require the operator to submit more disaggregated data.

4. For installations referred to in Article 3(h) of Directive 2003/87/EC, with the exception of installations that have had a significant extension after 30 June 2011, Member States shall require the operator to determine the initial installed capacity for each sub-installation according to the methodology set out in Article 7(3) using the continuous 90-day period on the basis of which the start of normal operation is determined as a reference. Member States shall approve this initial installed capacity of each sub-installation before calculating the allocation to the installation.

5. Member States shall only accept data submitted pursuant to this Article that has been verified as satisfactory by a verifier, in accordance with the requirements set out in Article 8, to ensure that reliable and correct data is reported.

#### Article 18

##### Activity levels

1. For installations referred to in Article 3(h) of Directive 2003/87/EC, with the exception of installations that have had a significant extension after 30 June 2011, Member States shall determine activity levels of each installation as follows:

- (a) the product-related activity level shall, for each product for which a product benchmark has been determined as referred to in Annex I, be the initial installed capacity for the production of this product of the installation concerned multiplied by the standard capacity utilisation factor;
- (b) the heat-related activity level shall be the initial installed capacity for the import from installations covered by the Union scheme, production, or both, of measurable heat consumed within the installation's boundaries for the production of products, for the production of mechanical energy other than used for the production of electricity, for heating or cooling with the exception of the consumption for the production of electricity, or exported to an installation or other entity not covered by the Union scheme with the exception of the export for the production of electricity multiplied by the relevant capacity utilisation factor;
- (c) the fuel-related activity level shall be the initial installed capacity for the consumption of fuels used for the production of non-measurable heat consumed for the production of products, for the production of mechanical energy other than used for the production of electricity, for heating or cooling with the exception of the consumption for the production of electricity, including safety flaring, of the installation concerned multiplied by the relevant capacity utilisation factor;
- (d) the process emissions-related activity level shall be the initial installed capacity for the production of process emissions of the process unit multiplied by the relevant capacity utilisation factor.

2. The standard capacity utilisation factor referred to in paragraph 1(a) shall be determined and published by the Commission on the basis of the data collection carried out by Member States in accordance with Article 7 of this Decision. For each product benchmark set out in Annex I, it shall be the 80-percentile of the average annual capacity utilisation factors of all installations producing the product concerned. The average annual capacity utilisation factor of each installation producing the product concerned shall correspond to the average annual production of the period 2005 to 2008 divided by the initial installed capacity.

The relevant capacity utilisation factor referred to in paragraphs 1(b) to (d) shall be determined by Member States on the basis of duly substantiated and independently verified information on the installation's intended normal operation, maintenance, common production cycle, energy efficient techniques and typical capacity utilisation in the sector concerned compared to sector-specific information.

When determining the relevant capacity utilisation factor referred to in paragraph 1(d) in accordance with the previous sentence, Member States shall also take account of duly substantiated and independently verified information on the emission intensity of the input and greenhouse gas efficient techniques.

3. For installations which had a significant capacity extension after 30 June 2011, Member States shall determine in accordance with paragraph 1 the activity levels only for the added capacity of the sub-installations to which the significant capacity extension relates.

For installations which had a significant capacity reduction after 30 June 2011, Member States shall determine in accordance with paragraph 1 the activity levels only for the reduced capacity of the sub-installations to which the significant capacity reduction relates.

#### Article 19

##### Allocation to new entrants

1. For the purposes of the allocation of emission allowances to new entrants, with the exception of allocations to installations referred to in the third indent of Article 3(h) of Directive 2003/87/EC, Member States shall calculate the preliminary annual number of emission allowances allocated free of charge as of the start of normal operation of the installation for each sub-installation separately, as follows:

- (a) for each product benchmark sub-installation, the preliminary annual number of emission allowances allocated free of charge for a given year shall correspond to the value of that product benchmark multiplied by the product-related activity level;
- (b) for each heat benchmark sub-installation, the preliminary annual number of emission allowances allocated free of

charge shall correspond to the value of the heat benchmark for this measurable heat as referred to in Annex I multiplied by the heat-related activity level;

- (c) for each fuel benchmark sub-installation, the preliminary annual number of emission allowances allocated free of charge shall correspond to the value of the fuel benchmark as referred to in Annex I multiplied by the fuel-related activity level;
- (d) for each process emissions sub-installation, the preliminary annual number of emission allowances allocated free of charge for a given year shall correspond to the process-related activity level multiplied by 0,9700.

Articles 10(4) to (6) and (8), 11, 12, 13 and 14 of this Decision shall apply *mutatis mutandis* to the calculation of the preliminary annual number of emission allowances allocated free of charge.

2. For independently verified emissions of the new entrant which occurred prior to the start of normal operation, additional allowances shall be allocated on the basis of historic emissions expressed as tonnes of carbon dioxide equivalent.

3. The preliminary total annual amount of emission allowances allocated free of charge shall be the sum of all sub-installations' preliminary annual numbers of emission allowances allocated free of charge calculated in accordance with paragraph 1 and the additional allowances referred to in paragraph 2. The second sentence of Article 10(7) shall apply.

4. Member States shall notify to the Commission without delay the preliminary total annual amount of emission allowances allocated free of charge. Emission allowances from the new entrants reserve created pursuant to Article 10a(7) of Directive 2003/87/EC shall be allocated on a first come, first served basis with regard to the receipt of this notification.

The Commission may reject the preliminary total annual amount of emission allowances allocated free of charge for the installation concerned. If the Commission does not reject this preliminary total annual amount of emission allowances allocated free of charge, the Member State concerned shall proceed to the determination of the final annual amount of emission allowances allocated free of charge.

5. The final annual amount of emission allowances allocated free of charge shall correspond to the preliminary total annual amount of emission allowances allocated free of charge for each installation determined in accordance with paragraph 3 of this Article annually adjusted by the linear reduction factor referred to in Article 10a(7) of Directive 2003/87/EC, using the preliminary total annual amount of emission allowances allocated free of charge for the installation concerned for 2013 as a reference.

6. When half of the amount of allowances set aside for new entrants pursuant to Article 10a(7) of Directive 2003/87/EC, notwithstanding the amount of allowances available pursuant to Article 10a(8) of Directive 2003/87/EC, is issued or to be issued until 2020 to new entrants, the Commission shall assess whether a queuing system should be put in place to ensure that access to the reserve is managed in a fair way.

#### Article 20

##### **Allocation as new entrant following a significant capacity extension**

1. Where an installation has had a significant capacity extension after 30 June 2011, Member States shall, upon application by the operator and without prejudice to the allocation to an installation pursuant to Article 10, determine on the basis of the methodology set out in Article 19 the number of free emission allowances to be allocated, in so far as the extension is concerned.

2. Member States shall require the operator to submit together with the application evidence demonstrating that the criteria for a significant capacity extension have been met and to provide the information referred to in Article 17(3) to support any allocation decision. In particular, Member States shall require the operator to submit the added capacity and the installed capacity of the sub-installation after having had a significant capacity extension verified as satisfactory by a verifier, in accordance with the requirements set out in Article 8. Member States shall consider this installed capacity of the sub-installation after having had a significant capacity extension as the sub-installation's initial installed capacity when assessing any subsequent significant capacity change.

#### Article 21

##### **Significant capacity reduction**

1. Where an installation has had a significant capacity reduction after 30 June 2011, Member States shall determine the amount by which the number of allowances to be allocated for free is reduced, in so far as this reduction is concerned. To this end, the Member States shall require the operator to submit the reduced capacity and the installed capacity of the sub-installation after having had a significant capacity reduction verified as satisfactory by a verifier, in accordance with the requirements set out in Article 8. Member States shall consider this installed capacity of the sub-installation after having had a significant capacity reduction as the sub-installation's initial installed capacity when assessing any subsequent significant capacity change.

2. Member States shall reduce the preliminary annual number of emission allowances allocated free of charge for each sub-installation by the preliminary annual number of

emission allowances allocated free of charge for the sub-installation concerned calculated in accordance with Article 19(1) in so far as the significant capacity reduction is concerned.

Member States shall then determine the preliminary total annual amount of the installation concerned according to the methodology applied to determine the preliminary total annual amount prior to the significant capacity reduction and the final total annual amount of emission allowances allocated free of charge to the installation concerned in accordance with Article 10(9).

3. The allocation to the installation shall be adjusted accordingly as of the year following the one during which the capacity reduction took place or as of 2013, if the significant capacity reduction took place before 1 January 2013.

#### Article 22

##### **Cessation of operations of an installation**

1. An installation is deemed to have ceased operations, where any of the following conditions is met:

- (a) the greenhouse gas emissions permit, the permit in force in accordance with Directive 2008/1/EC or any other relevant environmental permit has expired;
- (b) the permits referred to under point (a) have been withdrawn;
- (c) operation of the installation is technically impossible;
- (d) the installation is not operating, but has been operating before and it is technically impossible to resume operation;
- (e) the installation is not operating, but has been operating before and the operator cannot establish that this installation will resume operation at the latest within 6 months after having ceased operations. Member States may extend this period up to a maximum of 18 months if the operator can establish that the installation cannot resume operation within 6 months due to exceptional and unforeseeable circumstances that could not have been avoided even if all due care had been exercised and that are beyond the control of the operator of the installation concerned, in particular because of circumstances such as natural disasters, war, threats of war, terrorist acts, revolution, riot, sabotage or acts of vandalism.

2. Paragraph 1(e) shall not apply to installations that are kept in reserve or standby and installations that are operated on a seasonal schedule, where all of the following conditions are fulfilled:

- (a) the operator holds a greenhouse gas emissions permit and all other relevant permits;

- (b) it is technically possible to start operations without making physical changes to the installation;
- (c) regular maintenance is carried out.

3. Where an installation has ceased operation, the Member State concerned shall not issue emission allowances to this installation as of the year following the cessation of operations.

4. Member States may suspend the issuance of the emission allowances to installations referred to in paragraph 1(e) as long as it is not established that the installation will resume operations.

#### Article 23

##### Partial cessation of operations of an installation

1. An installation is deemed to have partially ceased operations, provided that one sub-installation, which contributes to at least 30 % of the installation's final annual amount of emission allowances allocated free of charge or to the allocation of more than 50 000 allowances, reduces its activity level in a given calendar year by at least 50 % compared to the activity level used for calculating the sub-installation's allocation in accordance with Article 9 or, where applicable, with Article 18 (hereinafter 'initial activity level').

2. The allocation of emission allowances to an installation that partially ceases operations shall be adjusted as of the year following the year during which it partially ceased operations or as of 2013, if the partial cessation took place before 1 January 2013, as follows:

if the activity level of the sub-installation referred to in paragraph 1 is reduced by 50 % to 75 % compared to the initial activity level, the sub-installation shall only receive half of the initially allocated allowances;

if the activity level of the sub-installation referred to in paragraph 1 is reduced by 75 % to 90 % compared to the initial activity level, the sub-installation shall only receive 25 % of the initially allocated allowances;

if the activity level of the sub-installation referred to in paragraph 1 is reduced by 90 % or more compared to the initial activity level, no allowances shall be allocated free of charge in respect of the sub-installation concerned.

3. If the activity level of the sub-installation referred to in paragraph 1 reaches an activity level of more than 50 % compared to the initial activity level, the installation having partially ceased operations shall receive the allowances initially allocated to it as of the year following the calendar year during which the activity level exceeded the threshold of 50 %.

4. If the activity level of the sub-installation referred to in paragraph 1 reaches an activity level of more than 25 % compared to the initial activity level, the installation having partially ceased operations shall receive half of the allowances initially allocated to it as of the year following the calendar year during which the activity level exceeded the threshold of 25 %.

#### Article 24

##### Changes to the operation of an installation

1. Member States shall ensure that all relevant information about any planned or effective changes to the capacity, activity level and operation of an installation is submitted by the operator to the competent authority by 31 December of each year.

2. Where there is a change to an installation's capacity, activity level or operation which has an impact on the installation's allocation, Member States shall submit, using an electronic template provided by the Commission, all relevant information, including the revised preliminary total annual amount of emission allowances allocated free of charge for the installation concerned determined in accordance with this Decision, to the Commission before determining the final total annual amount of emission allowances allocated free of charge. The Commission may reject the revised preliminary total annual amount of emission allowances allocated free of charge for the installation concerned.

#### CHAPTER V

##### FINAL PROVISION

#### Article 25

##### Addressees

This Decision is addressed to the Member States.

Done at Brussels, 27 April 2011.

*For the Commission*  
Connie HEDEGAARD  
*Member of the Commission*

## ANNEX I

## PRODUCT BENCHMARKS

## 1. Definition of product benchmarks and system boundaries without consideration of exchangeability of fuel and electricity

Product benchmark	Definition of products covered	Definition of processes and emissions covered (system boundaries)	Carbon leakage exposure as determined by Decision 2010/2/EU for the years 2013 and 2014	Benchmark value (allowances/t)
Coke	Coke-oven coke (obtained from the carbonisation of coking coal, at high temperature) or gas-works coke (by-product of gas-works plants) expressed as tons of dry coke. Lignite coke is not covered by this benchmark	All processes directly or indirectly linked to the process units coke ovens, H <sub>2</sub> S/NH <sub>3</sub> incineration, coal preheating (defreezing), coke gas extractor, desulphurisation unit, distillation unit, steam generation plant, pressure control in batteries, biological water treatment, miscellaneous heating of by-products and hydrogen separator are included. Coke oven gas cleaning is included	yes	0,286
Sintered ore	Agglomerated iron-bearing product containing iron ore fines, fluxes and iron-containing recycling materials with the chemical and physical properties such as the level of basicity, mechanical strength and permeability required to deliver iron and necessary flux materials into iron ore reduction processes	All processes directly or indirectly linked to the process units sinter strand, ignition, feedstock preparation units, hot screening unit, sinter cooling unit, cold screening unit and steam generation unit are included	yes	0,171
Hot metal	Liquid iron saturated with carbon for further processing	All processes directly or indirectly linked to the process units blast furnace, hot metal treatment units, blast furnace blowers, blast furnace hot stoves, basic oxygen furnace, secondary metallurgy units, vacuum ladles, casting units (including cutting), slag treatment unit, burden preparation, BF gas treatment unit, dedusting units, scrap pre-heating, coal drying for PCI, vessels preheating stands, casting ingots preheating stands, compressed air production, dust treatment unit (briquetting), sludge treatment unit (briquetting), steam injection in BF unit, steam generation plant, converter BOF gas cooling and miscellaneous are included	yes	1,328

Product benchmark	Definition of products covered	Definition of processes and emissions covered (system boundaries)	Carbon leakage exposure as determined by Decision 2010/2/EU for the years 2013 and 2014	Benchmark value (allowances/t)
Pre-bake anode	Anodes for aluminium electrolysis use consisting of petrol coke, pitch and normally recycled anodes, which are formed to shape specifically intended for a particular smelter and baked in anode baking ovens to a temperature of around 1 150 °C	All processes directly or indirectly linked to the production of pre-bake anodes are included	yes	0,324
Aluminium	unwrought non-alloy liquid aluminium from electrolysis	All processes directly or indirectly linked to the production step electrolysis are included	yes	1,514
Grey cement clinker	Grey cement clinker as total clinker produced	All processes directly or indirectly linked to the production of grey cement clinker are included	yes	0,766
White cement clinker	White cement clinker for use as main binding component in the formulation of materials such as joint fillers, ceramic tile adhesives, insulation, and anchorage mortars, industrial floor mortars, ready mixed plaster, repair mortars, and water-tight coatings with maximum average contents of 0,4 mass-% Fe <sub>2</sub> O <sub>3</sub> , 0,003 mass-% Cr <sub>2</sub> O <sub>3</sub> and 0,03 mass-% Mn <sub>2</sub> O <sub>3</sub>	All processes directly or indirectly linked to the production of white cement clinker are included	yes	0,987
Lime	Quicklime: calcium oxide (CaO) produced by the decarbonation of limestone (CaCO <sub>3</sub> ) as 'standard pure' lime with a free CaO content of 94,5 %. Lime produced and consumed in the same installation for purification processes is not covered by this product benchmark	All processes directly or indirectly linked to the production of lime are included	yes	0,954

Product benchmark	Definition of products covered	Definition of processes and emissions covered (system boundaries)	Carbon leakage exposure as determined by Decision 2010/2/EU for the years 2013 and 2014	Benchmark value (allowances/t)
Dolime	<p>Dolime or calcined dolomite as mixture of calcium and magnesium oxides produced by the decarbonation of dolomite (<math>\text{CaCO}_3</math>, <math>\text{MgCO}_3</math>) with a residual <math>\text{CO}_2</math> exceeding 0,25 %, a free MgO content between 25 % and 40 % and a bulk density of the commercial product below <math>3,05 \text{ g/cm}^3</math>.</p> <p>Dolime shall be expressed as 'standard pure dolime' quality with a free CaO content of 57,4 % and a free MgO content of 38,0 %</p>	All processes directly or indirectly linked to the production of dolime are included	yes	1,072
Sintered dolime	Mixture of calcium and magnesium oxides used solely for the production of refractory bricks and other refractory products with a minimum bulk density of $3,05 \text{ g/cm}^3$	All processes directly or indirectly linked to the production of sintered dolime are included	yes	1,449
Float glass	Float/ground/polish glass (as tons of glass exiting the lehr)	All processes directly or indirectly linked to the production steps melter, refiner, working end, bath and lehr are included	yes	0,453
Bottles and jars of colourless glass	Bottles of colourless glass of a nominal capacity < 2,5 litres, for beverages and foodstuffs (excluding bottles covered with leather or composition leather; infant's feeding bottles) except extra-white flint products with an iron oxide content expressed as percent $\text{Fe}_2\text{O}_3$ by weight lower than 0,03 % and colour coordinates of L in the range 100 to 87, of a in the range 0 to - 5 and of b in the range 0 to 3 (using the CIELAB advocated by the Commission internationale d'éclairage) expressed as tons of packed product	All processes directly or indirectly linked to the production steps materials handling, melting, forming, downstream processing, packaging and ancillary processes are included	yes	0,382

Product benchmark	Definition of products covered	Definition of processes and emissions covered (system boundaries)	Carbon leakage exposure as determined by Decision 2010/2/EU for the years 2013 and 2014	Benchmark value (allowances/t)
Bottles and jars of coloured glass	Bottles of coloured glass of a nominal capacity < 2,5 litres, for beverages and foodstuffs (excluding bottles covered with leather or composition leather; infant's feeding bottles) expressed as tons of packed product	All processes directly or indirectly linked to the production steps materials handling, melting, forming, downstream processing, packaging and ancillary processes are included	yes	0,306
Continuous filament glass fibre products	Melted glass for the production of continuous filament glass fibre products namely chopped strands, rovings, yarns and staple glass fibre and mats (expressed as tons of melted glass exiting the foreheath). Mineral wool products for thermal, acoustic and fire insulation are not included	All processes directly or indirectly linked to the production processes glass melting in the furnaces and glass refining in the foreheaths are included. Downstream processes to convert the fibres into sellable products are not included in this product benchmark	yes	0,406
Facing bricks	Facing bricks with a density > 1 000 kg/m <sup>3</sup> used for masonry based on EN 771-1, excluding pavers, clinker bricks and blue braised facing bricks	All processes directly or indirectly linked to the production processes raw material preparation, component mixing, forming and shaping of ware, drying of ware, firing of ware, product finishing and flue gas cleaning are included	no	0,139
Pavers	Clay bricks used for flooring according to EN 1344	All processes directly or indirectly linked to the production processes raw material preparation, component mixing, forming and shaping of ware, drying of ware, firing of ware, product finishing and flue gas cleaning are included	no	0,192
Roof tiles	Clay roofing tiles as defined in EN 1304:2005 excluding blue braised roof tiles and accessories	All processes directly or indirectly linked to the production processes raw material preparation, component mixing, forming and shaping of ware, drying of ware, firing of ware, product finishing and flue gas cleaning are included	no	0,144



Product benchmark	Definition of products covered	Definition of processes and emissions covered (system boundaries)	Carbon leakage exposure as determined by Decision 2010/2/EU for the years 2013 and 2014	Benchmark value (allowances/t)
Spray-dried powder	Spray-dried powder for the production of dry-pressed wall and floor tiles in tonnes of powder produced	All processes directly or indirectly linked to the production of spray-dried powder are included	yes	0,076
Plaster	Plasters consisting of calcined gypsum or calcium sulphate (including for use in building, for use in dressing woven fabrics or surfacing paper, for use in dentistry, for use in land remediation), in tonnes of stucco.  Alpha plaster is not covered by this product benchmark	All processes directly or indirectly linked to the production steps milling, drying and calcining are included	no	0,048
Dried secondary gypsum	Dried secondary gypsum (synthetic gypsum produced as a recycled by-product of the power industry or recycled material from construction waste and demolition) expressed as tons of product	All processes directly or indirectly linked to the drying of secondary gypsum are included	no	0,017
Short fibre kraft pulp	Short fibre kraft pulp is a wood pulp produced by the sulphate chemical process using cooking liquor, characterised by fibre lengths of 1-1,5 mm, which is mainly used for products which require specific smoothness and bulk, as tissue and printing paper, expressed as net saleable production in Adt (Air Dried Tonnes)	All processes which are part of the pulp production process (in particular the pulp mill, recovery boiler, pulp drying section and lime kiln and connected energy conversion units (boiler/CHP)) are included. Other activities on site that are not part of this process such as sawmilling activities, woodworking activities, production of chemicals for sale, waste treatment (treating waste onsite instead of offsite (drying, pelletising, incinerating, landfilling), PCC (precipitated calcium carbonate) production, treatment of odorous gases, and district heating are not included	yes	0,12

Product benchmark	Definition of products covered	Definition of processes and emissions covered (system boundaries)	Carbon leakage exposure as determined by Decision 2010/2/EU for the years 2013 and 2014	Benchmark value (allowances/t)
Long fibre kraft pulp	Long fibre kraft pulp is a wood pulp produced by the sulphate chemical process using cooking liquor, characterised by fibre lengths of 3-3,5 mm, which is mainly used for products for which strength is important, as packaging paper, expressed as net saleable production in Adt (Air Dried Tonnes)	All processes which are part of the pulp production process (in particular the pulp mill, recovery boiler, pulp drying section and lime kiln and connected energy conversion units (boiler/CHP)) are included. Other activities on site that are not part of this process such as sawmilling activities, woodworking activities, production of chemicals for sale, waste treatment (treating waste onsite instead of offsite (drying, pelletising, incinerating, landfilling), PCC (precipitated calcium carbonate) production, treatment of odorous gases, and district heating are not included	yes	0,06
Sulphite pulp, thermo-mechanical and mechanical pulp	Sulphite pulp produced by a specific pulp making process, e.g. pulp produced by cooking wood chips in a pressure vessel in the presence of bisulphite liquor expressed as net saleable production in Adt. Sulphite pulp can be either bleached or unbleached.  Mechanical pulp grades: TMP (thermomechanical pulp) and groundwood as net saleable production in Adt. Mechanical pulp can be either bleached or unbleached.  Not covered by this group are the smaller subgroups of semi-chemical pulp CTMP — chemithermomechanical pulp and dissolving pulp	All processes which are part of the pulp production process (in particular the pulp mill, recovery boiler, pulp drying section and lime kiln and connected energy conversion units (boiler/CHP)) are included. Other activities on site that are not part of this process such as sawmilling activities, woodworking activities, production of chemicals for sale, waste treatment (treating waste onsite instead of offsite (drying, pelletising, incinerating, landfilling), PCC (precipitated calcium carbonate) production, treatment of odorous gases, and district heating are not included	yes	0,02
Recovered paper pulp	Pulps of fibres derived from recovered (waste and scrap) paper or paperboard or of other fibrous cellulosic material expressed as net saleable production in Adt	All processes which are part of the production of pulp from recovered paper and connected energy conversion units (boiler/CHP)) are included. Other activities on site that are not part of this process such as sawmilling activities, woodworking activities, production of chemicals for sale, waste treatment (treating waste onsite instead of offsite (drying, pelletising, incinerating, landfilling), PCC (precipitated calcium carbonate) production, treatment of odorous gases, and district heating are not included	yes	0,039

Product benchmark	Definition of products covered	Definition of processes and emissions covered (system boundaries)	Carbon leakage exposure as determined by Decision 2010/2/EU for the years 2013 and 2014	Benchmark value (allowances/t)
Newsprint	<p>Specific paper grade (in rolls or sheets) expressed as net saleable production in Adt used for printing newspapers produced from groundwood and/or mechanical pulp or recycled fibres or any percentage of combinations of these two. Weights usually range from 40 to 52 g/m<sup>2</sup> but can be as high as 65 g/m<sup>2</sup>. Newsprint is machine-finished or slightly calendered, white or slightly coloured and is used in reels for letterpress, offset or flexo-printing</p>	<p>All processes which are part of the paper production process (in particular paper or board machine and connected energy conversion units (boiler/CHP) and direct process fuel use) are included. Other activities on site that are not part of this process such as sawmilling activities, woodworking activities, production of chemicals for sale, waste treatment (treating waste onsite instead of offsite (drying, pelletising, incinerating, landfilling), PCC (precipitated calcium carbonate) production, treatment of odorous gases, and district heating are not included</p>	yes	0,298
Uncoated fine paper	<p>Uncoated fine paper, covering both uncoated mechanical and uncoated woodfree expressed as net saleable production in Adt:</p> <ol style="list-style-type: none"> <li>1. Uncoated woodfree papers suitable for printing or other graphic purposes made from a variety of mainly virgin fibre furnishes, with variable levels of mineral filler and a range of finishing processes. This grade includes most office papers, such as business forms, copier, computer, stationery and book papers.</li> <li>2. Uncoated mechanical papers cover the specific paper grades made from mechanical pulp, used for packaging or graphic purposes/magazines</li> </ol>	<p>All processes which are part of the paper production process (in particular paper or board machine and connected energy conversion units (boiler/CHP) and direct process fuel use) are included. Other activities on site that are not part of this process such as sawmilling activities, woodworking activities, production of chemicals for sale, waste treatment (treating waste onsite instead of offsite (drying, pelletising, incinerating, landfilling), PCC (precipitated calcium carbonate) production, treatment of odorous gases, and district heating are not included</p>	yes	0,318
Coated fine paper	<p>Coated fine paper covering both coated mechanical and coated woodfree papers expressed as net saleable production in Adt:</p> <ol style="list-style-type: none"> <li>1. Coated woodfree papers made of fibres produced mainly by a chemical pulping process which are coated in process for different applications and</li> </ol>	<p>All processes which are part of the paper production process (in particular paper or board machine and connected energy conversion units (boiler/CHP) and direct process fuel use) are included. Other activities on site that are not part of this process such as sawmilling activities, woodworking activities, production of chemicals for sale, waste treatment (treating waste onsite instead of offsite (drying, pelletising, incinerating, landfilling), PCC</p>	yes	0,318

Product benchmark	Definition of products covered	Definition of processes and emissions covered (system boundaries)	Carbon leakage exposure as determined by Decision 2010/2/EU for the years 2013 and 2014	Benchmark value (allowances/t)
	<p>are also known as coated freesheet. This group focuses mainly on publication papers.</p> <p>2. Coated mechanical papers made from mechanical pulp, used for graphic purposes/magazines. The group is also known as coated groundwood</p>	(precipitated calcium carbonate) production, treatment of odorous gases, and district heating are not included		
Tissue	Tissue papers expressed as net saleable production of parent reel cover a wide range of tissue and other hygienic papers for use in households or commercial and industrial premises such as toilet paper and facial tissues, kitchen towels, hand towels and industrial wipes, the manufacture of baby nappies, sanitary towels, etc. TAD — Through Air Dried Tissue is not part of this group	All processes which are part of the paper production process (in particular paper or board machine and connected energy conversion units (boiler/CHP) and direct process fuel use) are included. Other activities on site that are not part of this process such as sawmilling activities, woodworking activities, production of chemicals for sale, waste treatment (treating waste onsite instead of offsite (drying, pelletising, incinerating, landfilling), PCC (precipitated calcium carbonate) production, treatment of odorous gases, and district heating are not included. The conversion of parent reel weight to finished products is not part of this product benchmark	yes	0,334
Testliner and fluting	<p>Testliner and fluting expressed as net saleable production in Adt:</p> <p>1. Testliner covers types of paperboard that meet specific tests adopted by the packaging industry to qualify for use as the outer facing layer for corrugated board, from which shipping containers are made. Testliner is made primarily from fibres obtained from recycled fibres.</p> <p>2. Fluting refers to the centre segment of corrugated shipping containers, being faced with linerboard (testliner/kraftliner) on both sides. Fluting covers</p>	All processes which are part of the paper production process (in particular paper or board machine and connected energy conversion units (boiler/CHP) and direct process fuel use) are included. Other activities on site that are not part of this process such as sawmilling activities, woodworking activities, production of chemicals for sale, waste treatment (treating waste onsite instead of offsite (drying, pelletising, incinerating, landfilling), PCC (precipitated calcium carbonate) production, treatment of odorous gases, and district heating are not included	yes	0,248

Product benchmark	Definition of products covered	Definition of processes and emissions covered (system boundaries)	Carbon leakage exposure as determined by Decision 2010/2/EU for the years 2013 and 2014	Benchmark value (allowances/t)
	mainly papers made from recycled fibre but this group also holds paperboard that is made from chemical and semi-chemical pulp			
Uncoated carton board	This benchmark covers a wide range of uncoated products (expressed as net saleable production in Adt) which may be single or multiply. Uncoated carton board is mainly used for packaging applications which the main needed characteristic is strength and stiffness, and for which the commercial aspects as information carrier are of a second order of importance. Carton board is made from virgin and/or recovered fibres, has good folding properties, stiffness and scoring ability. It is mainly used in cartons for consumer products such as frozen food, cosmetics and for liquid containers; also known as solid board, folding box board, boxboard or carrier board or core board	All processes which are part of the paper production process (in particular paper or board machine and connected energy conversion units (boiler/CHP) and direct process fuel use) are included. Other activities on site that are not part of this process such as sawmilling activities, woodworking activities, production of chemicals for sale, waste treatment (treating waste onsite instead of offsite (drying, pelletising, incinerating, landfilling), PCC (precipitated calcium carbonate) production, treatment of odorous gases, and district heating are not included	yes	0,237
Coated carton board	This benchmark covers a wide range of coated products (expressed as net saleable production in Adt) which may be single or multiply. Coated carton board is mainly used for commercial applications that need to bring commercial information printed on the packaging to the shelf in the store in applications such as food, pharma, cosmetics, and other. Carton board is made from virgin and/or recovered fibres, and has good folding properties, stiffness and scoring ability. It is mainly	All processes which are part of the paper production process (in particular paper or board machine and connected energy conversion units (boiler/CHP) and direct process fuel use) are included. Other activities on site that are not part of this process such as sawmilling activities, woodworking activities, production of chemicals for sale, waste treatment (treating waste onsite instead of offsite (drying, pelletising, incinerating, landfilling), PCC (precipitated calcium carbonate) production, treatment of odorous gases, and district heating are not included	yes	0,273

Product benchmark	Definition of products covered	Definition of processes and emissions covered (system boundaries)	Carbon leakage exposure as determined by Decision 2010/2/EU for the years 2013 and 2014	Benchmark value (allowances/t)
	used in cartons for consumer products such as frozen food, cosmetics and for liquid containers; also known as solid board, folding box board, boxboard or carrier board or core board			
Nitric acid	Nitric acid (HNO <sub>3</sub> ), to be recorded in tons HNO <sub>3</sub> (100 %)	All processes directly or indirectly linked to the production of the benchmarked product as well as the N <sub>2</sub> O destruction process are included except the production of ammonia	yes	0,302
Adipic acid	Adipic acid to be recorded in tons of dry purified adipic acid stored in silos or packed in (big)bags	All processes directly or indirectly linked to the production of the benchmarked product as well as the N <sub>2</sub> O destruction process are included	yes	2,79
Vinyl chloride monomer (VCM)	Vinyl chloride (chloroethylene)	All processes directly or indirectly linked to the production steps direct chlorination, oxychlorination and EDC cracking to VCM are included	yes	0,204
Phenol/acetone	Sum of phenol, acetone and the by-product alpha-methyl styrene as total production	All processes directly or indirectly linked to the production of phenol and acetone are included, in particular air compression, hydroperoxidation, cumene recovery from spent air, concentration and cleavage, production fractionation and purification, tar cracking, acetophenone recovery and purification, AMS recovery for export, AMS hydrogenation for ISB recycle, initial waste water purification (first waste water stripper), cooling water generation (e.g. cooling towers), cooling water utilisation (circulation pumps), flare and incinerators (even if physically located OSB) as well as any support fuel consumption	yes	0,266
S-PVC	Polyvinyl chloride; not mixed with any other substances consisting of PVC particles with a mean size between 50 and 200 µm	All processes directly or indirectly linked to the production of S-PVC are included except the production of VCM	yes	0,085
E-PVC	Polyvinyl chloride; not mixed with any other substances consisting of PVC particles with a mean size between 0,1 and 3 µm	All processes directly or indirectly linked to the production of E-PVC are included except the production of VCM	yes	0,238

Product benchmark	Definition of products covered	Definition of processes and emissions covered (system boundaries)	Carbon leakage exposure as determined by Decision 2010/2/EU for the years 2013 and 2014	Benchmark value (allowances/t)
Soda ash	Disodium carbonate as total gross production except dense soda ash obtained as by-product in a caprolactam production network	All processes directly or indirectly linked to the process units brine purification, limestone calcination and milk of lime production, absorption of ammonia, precipitation of NaHCO <sub>3</sub> , filtration or Separation of NaHCO <sub>3</sub> crystals from mother liquor, decomposition of NaHCO <sub>3</sub> to Na <sub>2</sub> CO <sub>3</sub> , recovery of ammonia and densification or production of dense soda ash are included	yes	0,843

If no other reference is given, all product benchmarks refer to 1 ton of product produced expressed as saleable (net) production and to 100 % purity of the substance concerned.

All definitions of processes and emissions covered (system boundaries) include flares where they occur.

The carbon leakage exposure of the benchmarked products is based on Decision 2010/2/EU and is valid for 2013 and 2014. In respect of 2013 and 2014, further sectors might be added to this list by Commission Decision.

## 2. Definition of product benchmarks and system boundaries with consideration of exchangeability of fuel and electricity

Product benchmark	Definition of products covered	Definition of processes and emissions covered (system boundaries)	Carbon leakage exposure as determined by Decision 2010/2/EU for the years 2013 and 2014	Benchmark value (allowances/t)
Refinery products	Mix of refinery products with more than 40 % light products (motor spirit (gasoline) including aviation spirit, spirit type (gasoline type) jet fuel, other light petroleum oils/light preparations, kerosene including kerosene type jet fuel, gas oils) expressed as CO <sub>2</sub> weighted tonne (CWT)	All processes of a refinery matching the definition of one of the CWT process units as well as ancillary non-process facilities operating inside the refinery fence-line such as tankage, blending, effluent treatment, etc. are included.  For the determination of indirect emissions, the total electricity consumption within the system boundaries shall be considered	yes	0,0295
EAF carbon steel	Steel containing less than 8 % metallic alloying elements and tramp elements to such levels limiting the use to those applications where no high surface quality and processability is required	All processes directly or indirectly linked to the process units electric arc furnace, secondary metallurgy, casting and cutting, post-combustion unit, dedusting unit, vessels heating stands, casting ingots preheating stands, scrap drying and scrap preheating are included.  For the determination of indirect emissions, the total electricity consumption within the system boundaries shall be considered	yes	0,283

Product benchmark	Definition of products covered	Definition of processes and emissions covered (system boundaries)	Carbon leakage exposure as determined by Decision 2010/2/EU for the years 2013 and 2014	Benchmark value (allowances/t)
EAF high alloy steel	Steel containing 8 % or more metallic alloying elements or where high surface quality and processability is required	All processes directly or indirectly linked to the process units electric arc furnace, secondary metallurgy, casting and cutting, post-combustion unit, dedusting unit, vessels heating stands, casting ingots preheating stands, slow cooling pit, scrap drying and scrap preheating are included. The process units FeCr converter and cryogenic storage of industrial gases are not included.  For the determination of indirect emissions, the total electricity consumption within the system boundaries shall be considered	yes	0,352
Iron casting	Casted iron expressed as tons of liquid iron ready alloyed, skinned, and ready for casting	All processes directly or indirectly linked to the process steps melting shop, casting shop, core shop and finishing are included.  For the determination of indirect emissions, only the electricity consumption of melting processes within the system boundaries shall be considered	yes	0,325
Mineral wool	Mineral wool insulation products for thermal, acoustic and fire applications manufactured using glass, rock or slag	All processes directly or indirectly linked to the production steps melting, fibreising and injection of binders, curing and drying and forming are included.  For the determination of indirect emissions, the total electricity consumption within the system boundaries shall be considered	no	0,682
Plasterboard	The benchmark covers boards, sheets, panels, tiles, similar articles of plaster/compositions based on plaster, (not) faced/reinforced with paper/paperboard only, excluding articles agglomerated with plaster, ornamented (in tonnes of stucco).  High-density gypsum fibreboards not covered by this product benchmark	All processes directly or indirectly linked to the production steps milling, drying, calcining and board drying are included.  For the determination of indirect emissions, only the electricity consumption of heat pumps applied in the drying stage shall be considered	no	0,131



Product benchmark	Definition of products covered	Definition of processes and emissions covered (system boundaries)	Carbon leakage exposure as determined by Decision 2010/2/EU for the years 2013 and 2014	Benchmark value (allowances/t)
Carbon black	Furnace carbon black. Gas- and lamp black products are not covered by this benchmark	All processes directly or indirectly linked to the production of furnace carbon black as well as finishing, packaging and flaring are included.  For the determination of indirect emissions, the total electricity consumption within the system boundaries shall be considered	yes	1,954
Ammonia	Ammonia (NH <sub>3</sub> ), to be recorded in tons produced	All processes directly or indirectly linked to the production of the ammonia and the intermediate product hydrogen are included.  For the determination of indirect emissions, the total electricity consumption within the system boundaries shall be considered	yes	1,619
Steam cracking	Mix of high value chemicals (HVC) expressed as total mass of acetylene, ethylene, propylene, butadiene, benzene and hydrogen excluding HVC from supplemental feed (hydrogen, ethylene, other HVC) with an ethylene content in the total product mix of at least 30 mass-percent and a content of HVC, fuel gas, butenes and liquid hydrocarbons of together at least 50 mass-percent of the total product mix	All processes directly or indirectly linked to the production of high value chemicals as purified product or intermediate product with concentrated content of the respective HVC in the lowest tradable form (raw C4, unhydrogenated pygas) are included except C4 extraction (butadiene plant), C4-hydrogenation, hydrotreating of pyrolysis gasoline and aromatics extraction and logistics/storage for daily operation.  For the determination of indirect emissions, the total electricity consumption within the system boundaries shall be considered	yes	0,702
Aromatics	Mix of aromatics expressed as CO <sub>2</sub> weighted tonne (CWT)	All processes directly or indirectly linked to the aromatics sub-units pygas hydro-treater, benzene/toluene/xylene (BTX) extraction, TDP, HDA, xylene isomerisation, P-xylene units, cumene production and Cyclo-hexane production are included.  For the determination of indirect emissions, the total electricity consumption within the system boundaries shall be considered	yes	0,0295

Product benchmark	Definition of products covered	Definition of processes and emissions covered (system boundaries)	Carbon leakage exposure as determined by Decision 2010/2/EU for the years 2013 and 2014	Benchmark value (allowances/t)
Styrene	Styrene monomer (vinyl benzene, CAS number: 100-42-5)	<p>All processes directly or indirectly linked to the production of styrene as well as the intermediate product ethylbenzene (with the amount used as feed for the styrene production) are included.</p> <p>For the determination of indirect emissions, the total electricity consumption within the system boundaries shall be considered</p>	yes	0,527
Hydrogen	Pure hydrogen and mixtures of hydrogen and carbon monoxide having a hydrogen content $\geq 60$ % mole fraction of total contained hydrogen plus carbon monoxide based on the aggregation of all hydrogen- and carbon-monoxide-containing product streams exported from the sub-installation concerned expressed as 100 % hydrogen	<p>All relevant process elements directly or indirectly linked to the production of hydrogen and the separation of hydrogen and carbon monoxide are included. These elements lie between:</p> <p>(a) the point(s) of entry of hydrocarbon feedstock(s) and, if separate, fuel(s);</p> <p>(b) the points of exit of all product streams containing hydrogen and/or carbon monoxide;</p> <p>(c) the point(s) of entry or exit of import or export heat.</p> <p>For the determination of indirect emissions, the total electricity consumption within the system boundaries shall be considered</p>	yes	8,85
Synthesis gas	Mixtures of hydrogen and carbon monoxide having a hydrogen content $< 60$ % mole fraction of total contained hydrogen plus carbon monoxide based on the aggregation of all hydrogen- and carbon-monoxide-containing product streams exported from the sub-installation concerned referred to 47 volume-percent hydrogen	<p>All relevant process elements directly or indirectly linked to the production of syngas and the separation of hydrogen and carbon monoxide are included. These elements lie between:</p> <p>(a) the point(s) of entry of hydrocarbon feedstock(s) and, if separate, fuel(s);</p> <p>(b) the points of exit of all product streams containing hydrogen and/or carbon monoxide1;</p> <p>(c) the point(s) of entry or exit of import or export heat.</p> <p>For the determination of indirect emissions, the total electricity consumption within the system boundaries shall be considered</p>	yes	0,242

Product benchmark	Definition of products covered	Definition of processes and emissions covered (system boundaries)	Carbon leakage exposure as determined by Decision 2010/2/EU for the years 2013 and 2014	Benchmark value (allowances/t)
Ethylene oxide/ethylene glycols	<p>The ethylene oxide/ethylene glycol benchmark covers the products ethylene oxide (EO, high purity), monoethylene glycol (MEG, standard grade + fibre grade (high purity)), diethylene glycol (DEG), triethylene glycol (TEG).</p> <p>The total amount of products is expressed in terms of EO-equivalents (EOE), which are defined as the amount of EO (in mass) that is embedded in one mass unit of the specific glycol</p>	<p>All processes directly or indirectly linked to the process units EO production, EO purification and glycol section are included.</p> <p>The total electricity consumption (and the related indirect emissions) within the system boundaries is covered by this product benchmark</p>	yes	0,512

If no other reference is given, all product benchmarks refer to 1 ton of product produced expressed as saleable (net) production and to 100 % purity of the substance concerned.

All definitions of processes and emissions covered (system boundaries) include flares where they occur.

The carbon leakage exposure status of the benchmarked products is based on Decision 2010/2/EU and is valid for 2013 and 2014. Further sectors might be added to this list by Commission Decision.

### 3. Heat and fuel benchmarks

Benchmark	Benchmark value (allowances/TJ)
Heat benchmark	62,3
Fuel benchmark	56,1

## ANNEX II

## SPECIFIC PRODUCT BENCHMARKS

## 1. Refineries benchmark: CWT functions

CWT function	Description	Basis (kt/a)	CWT factor
Atmospheric Crude Distillation	Mild Crude Unit, Standard Crude Unit	F	1,00
Vacuum Distillation	Mild Vacuum Fractionation, Standard Vacuum Column, Vacuum Fractionating Column  Vacuum distillation factor also includes average energy and emissions for Heavy Feed Vacuum (HFV) unit. Since this is always in series with the MVU, HFV capacity is not counted separately	F	0,85
Solvent Deasphalting	Conventional Solvent, Supercritical Solvent	F	2,45
Visbreaking	Atmospheric Residuum (w/o a Soaker Drum), Atmospheric Residuum (with a Soaker Drum), Vacuum Bottoms Feed (w/o a Soaker Drum), Vacuum Bottoms Feed (with a Soaker Drum)  Visbreaking factor also includes average energy and emissions for Vacuum Flasher Column (VAC VFL) but capacity is not counted separately	F	1,40
Thermal Cracking	Thermal cracking factor also includes average energy and emissions for Vacuum Flasher Column (VAC VFL) but capacity is not counted separately	F	2,70
Delayed Coking	Delayed Coking	F	2,20
Fluid Coking	Fluid Coking	F	7,60
Flexicoking	Flexicoking	F	16,60
Coke Calcining	Vertical-Axis Hearth, Horizontal-Axis Rotary Kiln	P	12,75
Fluid Catalytic Cracking	Fluid Catalytic Cracking, Mild Residuum Catalytic Cracking, Residual Catalytic Cracking	F	5,50
Other Catalytic Cracking	Houdry Catalytic Cracking, Thermoform Catalytic Cracking	F	4,10
Distillate/Gasoline Hydrocracking	Mild Hydrocracking, Severe Hydrocracking, Naphtha Hydrocracking	F	2,85
Residual Hydrocracking	H-Oil, LC-Fining™ and Hycon	F	3,75
Naphtha/Gasoline Hydrotreating	Benzene Saturation, Desulphurisation of C4–C6 Feeds, Conventional Naphtha H/T, Diolefin to Olefin Saturation, Diolefin to Olefin Saturation of Alkylation Feed, FCC Gasoline hydro-treating with minimum octane loss, Olefinic Alkylation of Thio S, S-Zorb™ Process, Selective H/T of Pygas/Naphtha, Pygas/Naphtha Desulphurisation, Selective H/T of Pygas/Naphtha  Naphtha hydrotreating factor includes energy and emissions for Reactor for Selective H/T (NHYT/RXST) but capacity is not counted separately	F	1,10

CWT function	Description	Basis (kt/a)	CWT factor
Kerosene/Diesel Hydrotreating	Aromatic Saturation, Conventional H/T, Solvent aromatics hydrogenation, Conventional Distillate H/T, High Severity Distillate H/T, Ultra-High Severity H/T, Middle Distillate Dewaxing, S-Zorb™ Process, Selective Hydrotreating of Distillates	F	0,90
Residual Hydro-treating	Desulphurisation of Atmospheric Residuum Desulphurisation of Vacuum Residuum	F	1,55
VGO Hydrotreating	Hydrodesulphurisation/denitrification, Hydrodesulphurisation	F	0,90
Hydrogen Production	Steam Methane Reforming, Steam Naphtha Reforming, Partial Oxidation Units of Light Feeds Factor for hydrogen production includes energy and emissions for purification (H <sub>2</sub> PURE), but capacity is not counted separately	P	300,00
Catalytic Reforming	Continuous Regeneration, Cyclic, Semi-Regenerative, AROMAX	F	4,95
Alkylation	Alkylation with HF Acid, Alkylation with Sulfuric Acid, Polymerisation C3 Olefin Feed, Polymerisation C3/C4 Feed, Dimersol Factor for alkylation/polymerisation includes energy and emissions for acid regeneration (ACID), but capacity is not counted separately	P	7,25
C4 Isomerisation	C4 Isomerisation Factor also includes energy and emissions related to average EU-27 special fractionation (DIB) correlated with C4 isomerisation	R	3,25
C5/C6 Isomerisation	C5/C6 Isomerisation Factor also includes energy and emissions related to average EU-27 special fractionation (DIH) correlated with C5 isomerisation	R	2,85
Oxygenate Production	MBTE Distillation Units, MTBE Extractive Units, ETBE, TAME, Isooctene Production	P	5,60
Propylene Production	Chemical Grade, Polymer grade	F	3,45
Asphalt Manufacture	Asphalt and Bitumen Manufacture Production figure should include Polymer-Modified Asphalt. CWT factor includes blowing	P	2,10
Polymer-Modified Asphalt Blending	Polymer-Modified Asphalt Blending	P	0,55
Sulphur Recovery	Sulphur Recovery Factor for sulfur recovery includes energy and emissions for tail gas recovery (TRU) and H <sub>2</sub> S Springer Unit (U32), but capacity is not counted separately	P	18,60
Aromatic Solvent Extraction	ASE: Extraction Distillation, ASE: Liquid/Liquid Extraction, ASE: Liq/Liq w/Extr. Distillation CWT factor cover all feeds including Pygas after hydro-treatment. Pygas hydrotreating should be accounted under naphtha hydrotreatment	F	5,25
Hydrodealkylation	Hydrodealkylation	F	2,45

CWT function	Description	Basis (kt/a)	CWT factor
TDP/TDA	Toluene Disproportionation/Dealkylation	F	1,85
Cyclohexane production	Cyclohexane production	P	3,00
Xylene Isomerisation	Xylene Isomerisation	F	1,85
Paraxylene production	Paraxylene Adsorption, Paraxylene Crystallisation Factor also includes energy and emissions for Xylene Splitter and Orthoxylene Rerun Column	P	6,40
Metaxylene production	Metaxylene production	P	11,10
Phtalic anhydride production	Phtalic anhydride production	P	14,40
Maleic anhydride production	Maleic anhydride production	P	20,80
Ethylbenzene production	Ethylbenzene production Factor also includes energy and emissions for Ethylbenzene distillation	P	1,55
Cumene production	Cumene production	P	5,00
Phenol production	Phenol production	P	1,15
Lube solvent extraction	Lube solvent extraction: Solvent is Furfural, Solvent is NMP, Solvent is Phenol, Solvent is SO <sub>2</sub>	F	2,10
Lube solvent dewaxing	Lube solvent dewaxing: Solvent is Chlorocarbon, Solvent is MEK/Toluene, Solvent is MEK/MIBK, Solvent is propane	F	4,55
Catalytic Wax Isomerisation	Catalytic Wax Isomerisation and Dewaxing, Selective Wax Cracking	F	1,60
Lube Hydrocracker	Lube Hydrocracker w/Multi-Fraction Distillation, Lube Hydrocracker w/Vacuum Stripper	F	2,50
Wax Deoiling	Wax Deoiling: Solvent is Chlorocarbon, Solvent is MEK/Toluene, Solvent is MEK/MIBK, Solvent is Propane	P	12,00
Lube/Wax Hydrotreating	Lube H/F w/Vacuum Stripper, Lube H/T w/Multi-Fraction Distillation, Lube H/T w/Vacuum Stripper, Wax H/F w/Vacuum Stripper, Wax H/T w/Multi-Fraction Distillation, Wax H/T w/Vacuum Stripper	F	1,15
Solvent Hydrotreating	Solvent Hydrotreating	F	1,25
Solvent Fractionation	Solvent Fractionation	F	0,90
Mol sieve for C10 + paraffins	Mol sieve for C10 + paraffins	P	1,85

CWT function	Description	Basis (kt/a)	CWT factor
Partial Oxidation of Residual Feeds (POX) for Fuel	POX Syngas for Fuel	SG	8,20
Partial Oxidation of Residual Feeds (POX) for Hydrogen or Methanol	POX Syngas for Hydrogen or Methanol, POX Syngas for Methanol Factor includes energy and emissions for CO Shift and H <sub>2</sub> Purification (U71) but capacity is not counted separately	SG	44,00
Methanol from syngas	Methanol	P	- 36,20
Air Separation	Air Separation	P (MNm <sup>3</sup> O <sub>2</sub> )	8,80
Fractionation of purchased NGL	Fractionation of purchased NGL	F	1,00
Flue gas treatment	DeSO <sub>x</sub> and deNO <sub>x</sub>	F (MNm <sup>3</sup> )	0,10
Treatment and Compression of Fuel Gas for Sales	Treatment and Compression of Fuel Gas for Sales	kW	0,15
Seawater Desalination	Seawater Desalination	P	1,15

Basis for CWT factors: Net fresh feed (F), Reactor feed (R, includes recycle), Product feed (P), Synthesis gas production for POX units (SG).

## 2. Aromatics benchmark: CWT functions

CWT function	Description	Basis (kt/a)	CWT factor
Naphtha/gasoline hydrotreater	Benzene Saturation, Desulphurisation of C4–C6 Feeds, Conventional Naphtha H/T, Diolefin to Olefin Saturation, Diolefin to Olefin Saturation of Alkylation Feed, FCC Gasoline hydro-treating with minimum octane loss, Olefinic Alkylation of Thio S, S-Zorb™ Process, Selective H/T of Pygas/Naphtha, Pygas/Naphtha Desulphurisation, Selective H/T of Pygas/Naphtha Naphtha hydrotreating factor includes energy and emissions for Reactor for Selective H/T (NHYT/RXST) but capacity is not counted separately	F	1,10
Aromatic solvent extraction	ASE: Extraction Distillation, ASE: Liquid/Liquid Extraction, ASE: Liq/Liq w/Extr. Distillation CWT factor cover all feeds including Pygas after hydro-treatment. Pygas hydrotreating should be accounted under naphtha hydrotreatment	F	5,25
TDP/TDA	Toluene Disproportionation/Dealkylation	F	1,85
Hydrodealkylation	Hydrodealkylation	F	2,45

CWT function	Description	Basis (kt/a)	CWT factor
Xylene isomerisation	Xylene Isomerisation	F	1,85
Paraxylene production	Paraxylene Adsorption, Paraxylene Crystallisation Factor also includes energy and emissions for Xylene Splitter and Orthoxylene Rerun Column	P	6,40
Cyclohexane production	Cyclohexane production	P	3,00
Cumene production	Cumene production	P	5,00

Basis for CWT factors: Net fresh feed (F), Product feed (P).

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## ANNEX III

**HISTORICAL ACTIVITY LEVEL FOR SPECIFIC PRODUCT BENCHMARKS AS REFERRED TO IN ARTICLE 9(7)**

1. Member States shall determine the product-related historical activity level for the baseline period for products to which the refinery benchmark as referred to in Annex I applies on the basis of the different CWT functions, their definitions, the basis for throughput as well as the CWT factors as listed in Annex II according to the following formula:

$$HAL_{CWT} = \text{MEDIAN} \left( 1,0183 \cdot \sum_{i=1}^n (TP_{i,k} \times CWT_i) + 298 + 0,315 \cdot TP_{AD,k} \right)$$

with:

$HAL_{CWT}$ : historical activity level expressed as CWT

$TP_{i,k}$ : throughput of the CWT function  $i$  in year  $k$  of the baseline period

$CWT_i$ : CWT factor of the CWT function  $i$

$TP_{AD,k}$ : throughput of the CWT function 'Atmospheric Crude Distillation' in year  $k$  of the baseline period

2. Member States shall determine the product-related historical activity level for the baseline period for products to which the lime product benchmark as referred to in Annex I applies according to the following formula:

$$HAL_{lime,standard} = \text{MEDIAN} \left( \frac{785 \cdot m_{CaO,k} + 1\,092 \cdot m_{MgO,k}}{751,7} \cdot HAL_{lime,uncorrected,k} \right)$$

with:

$HAL_{lime,standard}$ : historical activity level for lime production expressed in tons of standard pure lime

$m_{CaO,k}$ : content of free CaO in the produced lime in year  $k$  of the baseline period expressed as mass-%

In case no data on the content of free CaO is available, a conservative estimate not lower than 85 % shall be applied

$m_{MgO,k}$ : content of free MgO in the produced lime in year  $k$  of the baseline period expressed as mass-%

In case no data on the content of free MgO is available, a conservative estimate not lower than 0,5 % shall be applied

$HAL_{lime,uncorrected,k}$ : uncorrected historical activity level for lime production in year  $k$  of the baseline period expressed in tons of lime

3. Member States shall determine the product-related historical activity level for the baseline period for products to which the dolime product benchmark as referred to in Annex I applies according to the following formula:

$$HAL_{dolime,standard} = \text{MEDIAN} \left( \frac{785 \cdot m_{CaO,k} + 1\,092 \cdot m_{MgO,k}}{865,6} \cdot HAL_{dolime,uncorrected,k} \right)$$

with:

$HAL_{dolime,standard}$ : historical activity level for dolime production expressed in tons of standard pure dolime

$m_{CaO,k}$ : content of free CaO in the produced dolime in year  $k$  of the baseline period expressed as mass-%

In case no data on the content of free CaO is available, a conservative estimate not lower than 52 % shall be applied

$m_{\text{MgO},k}$ : content of free MgO in the produced dolime in year k of the baseline period expressed as mass-%

In case no data on the content of free MgO is available, a conservative estimate not lower than 33 % shall be applied

$\text{HAL}_{\text{dolime,uncorrected},k}$ : uncorrected historical activity level for dolime production in year k of the baseline period expressed in tons of lime

4. Member States shall determine the product-related historical activity level for the baseline period for products to which the steam cracking product benchmark as referred to in Annex I applies according to the following formula:

$$\text{HAL}_{\text{HVC,net}} = \text{MEDIAN} \left( \text{HAL}_{\text{HVC,total},k} - \text{HSF}_{\text{H},k} - \text{HSF}_{\text{E},k} - \text{HSF}_{\text{O},k} \right)$$

with:

$\text{HAL}_{\text{HVC,net}}$ : historical activity level for high value chemicals net of high value chemicals produced from supplemental feed expressed in tons of HVC

$\text{HAL}_{\text{HVC,total},k}$ : historical activity level for total high value chemicals production in year k of the baseline period expressed in tons of HVC

$\text{HSF}_{\text{H},k}$ : historical supplemental feed of hydrogen in year k of the baseline period expressed in tons of hydrogen

$\text{HSF}_{\text{E},k}$ : historical supplemental feed of ethylene in year k of the baseline period expressed in tons of ethylene

$\text{HSF}_{\text{O},k}$ : historical supplemental feed of other high value chemicals than hydrogen and ethylene in year k of the baseline period expressed in tons of HVC

5. Member States shall determine the product-related historical activity level for the baseline period for products to which the aromatics product benchmark as referred to in Annex I applies on the basis of the different CWT functions, their definitions, the basis for throughput as well as the CWT factors as listed in Annex II according to the following formula:

$$\text{HAL}_{\text{CWT}} = \text{MEDIAN} \left( \sum_{i=1}^n (\text{TP}_{i,k} \times \text{CWT}_i) \right)$$

with:

$\text{HAL}_{\text{CWT}}$ : historical activity level expressed as CWT

$\text{TP}_{i,k}$ : throughput of the CWT function i in year k of the baseline period

$\text{CWT}_i$ : CWT factor of the CWT function i

6. Member States shall determine the product-related historical activity level for the baseline period for products to which the hydrogen product benchmark as referred to in Annex I applies according to the following formula:

$$\text{HAL}_{\text{H}_2} = \text{MEDIAN} \left( \text{HAL}_{\text{H}_2 + \text{CO},k} \cdot \left( 1 - \frac{1 - \text{VF}_{\text{H}_2,k}}{0,4027} \right) \cdot 0,00008987 \frac{\text{t}}{\text{Nm}^3} \right)$$

with:

$\text{HAL}_{\text{H}_2}$ : historical activity level for hydrogen production referred to 100 % hydrogen

$\text{VF}_{\text{H}_2,k}$ : historical production volume fraction of pure hydrogen in year k of the baseline period

$\text{HAL}_{\text{H}_2 + \text{CO},k}$ : historical activity level for hydrogen production referred to historical hydrogen content expressed as norm cubic meters per year referring to 0 °C and 101,325 kPa in year k of the baseline period

7. Member States shall determine the product-related historical activity level for the baseline period for products to which the synthesis gas (syngas) product benchmark as referred to in Annex I applies according to the following formula:

$$HAL_{\text{syngas}} = \text{MEDIAN} \left( HAL_{\text{H}_2 + \text{CO},k} \cdot \left( 1 - \frac{0,47 - VF_{\text{H}_2,k}}{0,0863} \right) \cdot 0,0007047 \frac{\text{t}}{\text{Nm}^3} \right)$$

with:

$HAL_{\text{syngas}}$ : historical activity level for synthesis gas production referred to 47 % hydrogen

$VF_{\text{H}_2,k}$ : historical production volume fraction of pure hydrogen in year k of the baseline period

$HAL_{\text{H}_2 + \text{CO},k}$ : historical activity level for synthesis gas production referred to historical hydrogen content expressed as norm cubic meters per year referring to 0 °C and 101,325 kPa in year k of the baseline period

8. Member States shall determine the product-related historical activity level for the baseline period for products to which the ethylene oxide/ethylene glycols product benchmark as referred to in Annex I applies according to the following formula:

$$HAL_{\text{EO/EG}} = \text{MEDIAN} \left( \sum_{i=1}^n (HAL_{i,k} \times CF_{\text{EOE},i}) \right)$$

with:

$HAL_{\text{EO/EG}}$ : historical activity level for ethylene oxide/ethylene glycols production expressed in tons of ethylene oxide equivalents

$HAL_{i,k}$ : historical activity level for the production of the ethylene oxide or glycol i in year k of the baseline period expressed in tons

$CF_{\text{EOE},i}$ : conversion factor for the ethylene oxide or glycol i relative to ethylene oxide

Following conversion factors shall be applied:

Ethylene oxide: 1,000

Monoethylene glycol: 0,710

Diethylene glycol: 0,830

Triethylene glycol: 0,880

## ANNEX IV

## PARAMETERS FOR BASELINE DATA COLLECTION FOR INCUMBENT INSTALLATIONS

For the purposes of the baseline data collection referred to in Article 7(1), Member States shall require the operator to submit at least the following data at installation and sub-installation level for all calendar years of the baseline period chosen in accordance with Article 9(1) (2005-2008 or 2009-2010). In accordance with Article 7(2), Member States may request additional data if necessary:

Parameter	Remarks
Initial installed capacity	Only for each product benchmark sub-installation, expressed in the unit defined for the product concerned in Annex I
The added or reduced capacity as well as the installed capacity of the sub-installation after having had a significant capacity change in case of a significant capacity change between 1 January 2009 and 30 June 2011	Capacities shall be expressed: <ol style="list-style-type: none"> <li>(1) for the product benchmark sub-installation in the unit defined for the product concerned in Annex I;</li> <li>(2) for the heat benchmark sub-installation as terajoule of measurable heat consumed for the production of products or the production of mechanical energy other than the production of electricity, heating or cooling within the installation's boundaries per year;</li> <li>(3) for the fuel benchmark sub-installation as terajoule of fuel input per year;</li> <li>(4) for the production of process emissions as tonnes of carbon dioxide equivalent emitted per year</li> </ol>
Name of product(s)	
NACE code of activity	
PRODCOM codes of product(s)	
Identification as electricity generator	
Historical activity levels	According to type of sub-installation; including for product benchmark sub-installations all annual production volumes on the basis of which the median has been determined
Throughput of all relevant CWT functions	For refinery and aromatics product benchmarks only
Data used for the calculation of the historical activity levels	At least for the lime, dolime, steam cracking, hydrogen and synthesis gas product benchmarks
Total greenhouse gas emissions	Direct emissions only; only if not all emissions in the installation stem from benchmarked products
Greenhouse gas emissions from fuels	Direct emissions only; only if not all emissions in the installation stem from benchmarked products
Greenhouse gas emissions from processes	Only if not all emissions in the installation stem from benchmarked products
Total energy input from fuels within the installation	Only if not all emissions in the installation stem from benchmarked products
Energy input from fuels within the installation not used for production of measurable heat	Only if not all emissions in the installation stem from benchmarked products
Energy input from fuels within the installation used for production of measurable heat	Only if not all emissions in the installation stem from benchmarked products

Parameter	Remarks
Measurable heat consumed	Only if not all emissions in the installation stem from benchmarked products
Measurable heat imported	
Greenhouse gas emissions related to heat production exported to private households	
Measurable heat exported	Only to consumers not covered by the Union scheme, clearly indicating whether or not the consumer is a private household
Electricity consumed in accordance with the relevant system boundary definition (Annex I)	Only for sub-installations belonging to a benchmark where the exchangeability of heat and electricity is relevant
Hydrogen used as fuel for the production of vinyl chloride monomer	Only for sub-installations belonging to the vinyl chloride monomer benchmark

## ANNEX V

## Parameters for data collection for new entrants

Parameter	Remarks
Name of product(s)	
NACE code of activity	
PRODCOM codes of product(s)	
Initial installed capacity before the significant extension	Only for sub-installations which claim a significant extension of capacity
Added capacity (in case of significant extension)	Only for sub-installations which claim a significant extension of capacity
Installed capacity after the significant extension	Only for sub-installations which claim a significant extension of capacity
Initial installed capacity	<p>Only for new entrants carrying out one or more of the activities indicated in Annex I to Directive 2003/87/EC, which have obtained a greenhouse gas emissions permit for the first time after 30 June 2011, or carrying out an activity which is included in the Community scheme pursuant to Article 24(1) or (2) for the first time;</p> <p>expressed:</p> <p>(1) for the product benchmark sub-installation in the unit defined for the product concerned in Annex I;</p> <p>(2) for the heat benchmark sub-installation as terajoule of measurable heat consumed for the production of products or the production of mechanical energy other than for the production of electricity, heating or cooling within the installation's boundaries per year;</p> <p>(3) for the fuel benchmark sub-installation as terajoule of fuel input per year;</p> <p>(4) for the production of process emissions as tonnes of carbon dioxide equivalent emitted per year</p>
Relevant Capacity Utilisation Factor (RCUF)	For sub-installations other than product benchmark sub-installations
Projected measurable heat imported	
Projected electricity consumed in accordance with the relevant system boundary definition (Annex I)	Only for sub-installations belonging to a benchmark where the exchangeability of heat and electricity is relevant
Projected hydrogen used as fuel for the production of vinyl chloride monomer	Only for sub-installations belonging to the vinyl chloride monomer benchmark
Start of normal operation	Expressed in a date
Date of start-up	
Greenhouse gas emissions	Prior to the start of normal operation expressed in t CO <sub>2</sub> eq

## ANNEX VI

**FACTOR ENSURING THE TRANSITIONAL SYSTEM LEADING TO A DECREASE OF FREE ALLOCATION  
PURSUANT TO ARTICLE 10a(11) OF DIRECTIVE 2003/87/EC**

Year	Value of the factor
2013	0,8000
2014	0,7286
2015	0,6571
2016	0,5857
2017	0,5143
2018	0,4429
2019	0,3714
2020	0,3000











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