

Rules for the Validation of CO_{2e} Index Calculation

Effective from 1 November 2015

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GENERAL CONDITIONS

Definitions:

Administration" means the Government of the State whose flag the ship is entitled to fly or under whose authority the ship is authorized to operate in the specific case.

"IACS" means the International Association of Classification Societies.

"Interested Party" means the party, other than the Society, having an interest in or responsibility for the Ship, product, plant or system subject to classification or certification (such as the owner of the Ship and his representatives, the shipbuilder, the engine builder or the supplier of parts to be tested) who requests the Services or on whose behalf the Services are requested.

"Owner" means the registered owner, the shipowner, the manager or any other party with the responsibility, legally or contractually, to keep the ship seaworthy or in service, having particular regard to the provisions relating to the maintenance of class laid down in Part A, Chapter 2 of the Rules for the Classification of Ships or in the corresponding rules indicated in the Specific Rules.

"Rules" in these General Conditions means the documents below issued by the Society:

(i) Rules for the Classification of Ships or other special units.

(ii) Complementary Rules containing the requirements for product, plant, system and other certification or containing the requirements for the assignment of additional class notations;

(iii) Rules for the application of statutory rules, containing the rules to perform the duties delegated by Administrations.

(iv) Guides to carry out particular activities connected with Services;

(v) Any other technical document, for example, rule variations or interpretations.

"Services" means the activities described in paragraph 1 below, rendered by the Society upon request made by or on behalf of the Interested Party.

"Ship" means ships, boats, craft and other special units, for example, offshore structures, floating units and underwater craft.

"Society" or "TASNEEF" means TASNEEF Maritime

"Surveyor" means technical staff acting on behalf of the Society in performing the Services.

"Force Majeure" means damage to the ship; unforeseen inability of the Society to attend the ship due to government restrictions on right of access or movement of personnel; unforeseeable delays in port or inability to discharge cargo due to unusually lengthy periods of severe weather, strikes or civil strife; acts of war; or other force majeure.

1. Society Roles

1.1. The purpose of the Society is, among others, the classification and certification of ships and the certification of their parts and components. In particular, the Society:

- (i) sets forth and develops Rules.
- (ii) publishes the Register of Ships.
- (iii) Issues certificates, statements and reports based on its survey activities.
- 1.2. The Society also takes part in the implementation of national and international rules and standards as delegated by various Governments.
- 1.3. The Society carries out technical assistance activities on request and provides special services outside the scope of classification, which is regulated by these general conditions unless expressly excluded in the particular contract.

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2. Rule Development, Implementation and Selection of Surveyor

2.1. The Rules developed by the Society reflect the level of its technical knowledge at the time they are published therefore, the Society, although also committed through its research and development services to continuous updating of the Rules, does not guarantee the Rules meet state-of-the-art science and technology at the time of publication or that they meet the Society's or others' subsequent technical developments.

2.2. The Interested Party is required to know the Rules based on which the Services are provided. With particular reference to Classification Services, special attention is to be given to the Rules concerning class suspension, withdrawal and reinstatement. In case of doubt or inaccuracy, the Interested Party is to promptly contact the Society for clarification. The Rules for Classification of Ships are published on the Society's website: www.tasneef.ae.

2.3. Society exercises due care and skill:

(i) In the selection of its Surveyors

(ii)In the performance of its Services, taking into account the level of its technical knowledge at the time the Services are performed.

2.4. Surveys conducted by the Society include, but are not limited to, visual inspection and non-destructive testing. Unless otherwise required, surveys are conducted through sampling techniques and do not consist of comprehensive verification or monitoring of the Ship or the items subject to certification. The surveys and checks made by the Society on board ship do not necessarily require the constant and continuous presence of the Surveyor. The Society may also commission laboratory testing, underwater inspection and other checks carried out by and under the responsibility of qualified service suppliers. Survey practices and procedures are selected by the Society based on its experience and knowledge and according to generally accepted technical standards in the sector.

3. Class Report & Interested Parties Obligation

3.1. The class assigned to a Ship, like the reports, statements, certificates or any other document or information issued by the Society, reflects the opinion of the Society concerning compliance, at the time the Service is provided, of the Ship or product subject to certification, with the applicable Rules (given the intended use and within the relevant time frame). The Society is under no obligation to make statements or provide information about elements or facts which are not part of the specific scope of the Service requested by the Interested Party or on its behalf.

3.2. No report, statement, notation on a plan, review, Certificate of Classification, document or information issued or given as part of the Services provided by the Society shall have any legal effect or implication other than a representation that, on the basis of the checks made by the Society, the Ship, structure, materials, equipment, machinery or any other item covered by such document or information meet the Rules. Any such document is issued solely for the use of the Society, its committees and clients or other duly authorized bodies and no other purpose. Therefore, the Society cannot be held liable for any act made or document issued by other parties based on the statements or information given by the Society. The validity, application, meaning and interpretation of a Certificate of Classification, or any other document or information issued by the Society in connection with its Services, is governed by the Rules of the Society, which is the sole subject entitled to make such interpretation. Any disagreement on technical matters between the Interested Party and the Surveyor in the carrying out of his functions shall be raised in writing as soon as possible with the Society, which will settle any divergence of opinion or dispute.

3.3. The classification of a Ship or the issuance of a certificate or other document connected with classification or certification and in general with the performance of Services by the Society shall have the validity conferred upon it by the Rules of the Society at the time of the assignment of class or issuance of the certificate; in no case shall it amount to a statement or warranty of seaworthiness, structural integrity, quality or fitness for a particular purpose or service of any Ship, structure, material, equipment or machinery inspected or tested by the Society.

3.4. Any document issued by the Society about its activities reflects the condition of the Ship or the subject of certification or other activity at the time of the check.

3.5. The Rules, surveys and activities performed by the Society, reports, certificates and other documents issued by the Society are in no way intended to replace the duties and responsibilities of other parties such as Governments, designers, shipbuilders, manufacturers, repairers, suppliers, contractors or sub-contractors, Owners, operators, charterers, underwriters, sellers or intended buyers of a Ship or other product or system surveyed.

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These documents and activities do not relieve such parties from any fulfilment, warranty, responsibility, duty or obligation (also of a contractual nature) expressed or implied or in any case incumbent on them, nor do they confer on such parties any right, claim or cause of action against the Society. With particular regard to the duties of the ship Owner, the Services undertaken by the Society do not relieve the Owner of his duty to ensure proper maintenance of the Ship and ensure seaworthiness at all times. Likewise, the Rules, surveys performed, reports, certificates and other documents issued by the Society are intended neither to guarantee the buyers of the Ship, its components or any other surveyed or certified item, nor to relieve the seller of the duties arising out of the law or the contract, regarding the quality, commercial value or characteristics of the item which is the subject of transaction.

In no case, therefore, shall the Society assume the obligations incumbent upon the above-mentioned parties, even when it is consulted in connection with matters not covered by its Rules or other documents.

In consideration of the above, the Interested Party undertakes to relieve and hold harmless the Society from any thirdparty claim, as well as from any liability about the latter concerning the Services rendered.

Insofar as they are not expressly provided for in these General Conditions, the duties and responsibilities of the Owner and Interested Parties concerning the services rendered by the Society are described in the Rules applicable to the specific service rendered.

4. Service Request & Contract Management

4.1. Any request for the Society's Services shall be submitted in writing and signed by or on behalf of the Interested Party. Such a request will be considered irrevocable as soon as received by the Society and shall entail acceptance by the applicant of all relevant requirements of the Rules, including these General Conditions. Upon acceptance of the written request by the Society, a contract between the Society and the Interested Party is entered into, which is regulated by the present General Conditions.

4.2 In consideration of the Services rendered by the Society, the Interested Party and the person requesting the service shall be jointly liable for the payment of the relevant fees, even if the service is not concluded for any cause not pertaining to the Society. In the latter case, the Society shall not be held liable for non-fulfilment or partial fulfilment of the Services requested.

4.3 The contractor for the classification of a ship or for the services may be terminated and any certificates revoked at the request of one of the parties, subject to at least 30/60/90 days' notice, to be given in writing. Failure to pay, even in part, the fees due for services carried out by the society will entitled the society to immediately terminate the contract and suspend the service.

For every termination of the contract, the fees for the activities performed until the time of the termination shall be owned to the society as well as the expenses incurred in view of activities already programmed, this is without prejudice to the right to compensation due to the society as a consequence of the termination.

With particular reference to ship classification and certification, unless decided otherwise by the society, termination of the contract implies that the assignment of class to a ship is withheld or, if already assigned, that it is suspended or withdrawn, any statutory certificates issued by society will be withdrawn in those cases where provided for by agreements between the society and the flag state.

5. Service Accuracy

5.1. In providing the Services, as well as other correlated information or advice, the Society, its Surveyors, servants or agents operate with due diligence for the proper execution of the activity. However, considering the nature of the activities performed (see **Rule Development, Implementation and Selection of Surveyor** 2.4), it is not possible to guarantee absolute accuracy, correctness and completeness of any information or advice supplied. Express and implied warranties are specifically disclaimed.



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6. Confidentiality & Document sharing

6.1. All plans, specifications, documents and information provided by, issued by, or made known to the Society, in connection with the performance of its Services, will be treated as confidential and will not be made available to any other party other than the Owner without authorization of the Interested Party, except as provided for or required by any applicable international, European or domestic legislation, Charter or other IACS resolutions, or order from a competent authority. Information about the status and validity of class and statutory certificates, including transfers, changes, suspensions, withdrawals of class, recommendations/conditions of class, operating conditions or restrictions issued against classed ships and other related information, as may be required, may be published on the website or released by other means, without the prior consent of the Interested Party.

Information about the status and validity of other certificates and statements may also be published on the website or released by other means, without the prior consent of the Interested Party.

6.2. Notwithstanding the general duty of confidentiality owed by the Society to its clients in clause 7.1 below, the Society's clients hereby accept that the Society may participate in the IACS Early Warning System which requires each Classification Society to provide other involved Classification Societies with relevant technical information on serious hull structural and engineering systems failures, as defined in the IACS Early Warning System (but not including any drawings relating to the ship which may be the specific property of another party), to enable such useful information to be shared and used to facilitate the proper working of the IACS Early Warning System. The Society will provide its clients with written details of such information sent to the involved Classification Societies.

6.3. In the event of transfer of class, addition of a second class or withdrawal from a double/dual-class, the Interested Party undertakes to provide or to permit the Society to provide the other Classification Society with all building plans and drawings, certificates, documents and information relevant to the classed unit, including its history file, as the other Classification Society may require for classification in compliance with the applicable legislation and relative IACS Procedure. It is the Owner's duty to ensure that, whenever required, the consent of the builder is obtained about the provision of plans and drawings to the new Society, either by way of the appropriate stipulation in the building contract or by other agreement.

In the event that the ownership of the ship, product or system subject to certification is transferred to a new subject, the latter shall have the right to access all pertinent drawings, specifications, documents or information issued by the Society or which has come to the knowledge of the Society while carrying out its Services, even if related to a period prior to transfer of ownership.

7. Health, Safety & Environment

7.1. The clients such as the designers, shipbuilders, manufacturers, repairers, suppliers, contractors or sub-contractors, or other product or system surveyed who have a registered office in ABU Dhabi; should have an approved OSHAD as per Abu Dhabi OHS Centre, or, if they do not need to have an approved OSHAD, they shall comply with TASNEEF standards and have procedures in place to manage the risks from their undertakings.

7.2. For the survey, audit and inspection activities onboard the ship, the ship's owner, the owner representative or the shipyard must follow TASNEEF rules regarding the safety aspects.

8. Validity of General Conditions

8.1. Should any part of these General Conditions be declared invalid, this will not affect the validity of the remaining provisions.



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9. Force Majeure

9.1 Neither Party shall be responsible to the other party for any delay or failure to carry out their respective obligations insofar as such delay and failure derives, directly or indirectly, and at any time, from force majeure of any type whatsoever that lies outside the control of either Party.

9.2 The Party that is unable to fulfil the agreement due to Force Majeure shall inform the other party without delay and in all cases within 7 days from when such force majeure arose.

9.3 It is understood that if such force majeure continues for more than 30 days, the Party not affected by the event may terminate this agreement by registered letter. The rights matured until the day in which the force majeure occurred remain unaffected.

10. Governing Law and Jurisdiction

This Agreement shall be governed by and construed in accordance with the laws of Abu Dhabi and the applicable Federal Laws of the UAE.

Any dispute arising out of or in accordance with this Agreement shall be subject to the exclusive jurisdiction of the Abu Dhabi courts.

11. Code of Business conduct

The **CLIENT** declares to be aware of the laws in force about the responsibility of the legal persons for crimes committed in their interest or to their own advantage by persons who act on their behalf or cooperate with them, such as directors, employees or agents.

In this respect, the **CLIENT** declares to have read and fully understood the "**Ethical Code**" published by **TASNEEF** and available in the **TASNEEF** Web site.

The **CLIENT**, in the relationships with **TASNEEF**, guarantees to refrain from any behaviour that may incur risk of entry in legal proceedings for crimes or offences, whose commission may lead to the enforcement of the laws above.

The **CLIENT** also acknowledges, in case of non-fulfilment of the previous, the right of **TASNEEF** to unilaterally withdraw from the contract/agreement even if there would be a work in progress situation or too early terminate the contract/agreement. It's up to **TASNEEF** to choose between the two above mentioned alternatives, and in both cases a registered letter will be sent with a brief sum-up of the circumstances or of the legal procedures proving the failure in following the requirements of the above-mentioned legislation.

In light of the above, it is forbidden to all employees and co-operators to:

- receive any commission, percentage or benefits of any possible kind;

- Start and maintaining any business relationship with **Clients** that could cause conflict of interests with their task and function covered on behalf of **TASNEEF**.

- Receive gifts, travel tickets or any other kind of benefits different from monetary compensation, that could exceed the ordinary business politeness.

Violation of the above-mentioned principles allows **TASNEEF** to early terminate the contract and to be entitled to claim compensation for losses if any.



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1 GENERAL

1.1

These Rules set out the procedures applied by Tasneef for the validation of the ship CO_2 index calculation.

These CO_2 indexes are a measure of CO_2 emission from ships in term of emitted mass of CO_{2e} per nautical mile or Km sailed and cargo carried (freight and passengers).

The goal of the rules is to validate indexes for making the comparison of the mass of CO_{2e} emitted by a ship and the mass of CO_{2e} emitted by a road vehicle with the same point of departure and destination.

1.2

The validation activities detailed in these rules are two: the validation of the calculation procedure and the validation of both calculation procedure and data.

1.3

The validation of the indexes calculation is voluntary and does not absolve ship-owners and shipmanagers from compliance with any requirement issued by the ships' flag Administrations and any other applicable requirements issued by international, national or local Authorities.

1.4

Tasneef reserves the right to carry out additional verifications as deemed necessary in pursuance of its internal Quality System or as required by external organisations.

2 APPLICATION

2.1

These Rules apply to ro-ro cargo and ro-ro passenger ships. The indexes are validated per ship and per specific line and are based on data relevant to a predefined reference period. The reference period is indicated in the statement.

2.2

The comparison of the mass of CO_{2e} emitted by a ship and the mass of CO_{2e} emitted by a road vehicle is calculated only if a road route option exists, i.e. in case of leg from/to an island the comparison is not applicable.

The road vehicles considered are cars and trucks.

3 DEFINITIONS

3.1 Carbon dioxide equivalent (CO_{2e}): unit per comparing the radiative forcing of a GHG to carbon dioxide.

Greenhouse gas (GHG): gaseous constituent of the atmosphere, both natural and anthropogenic, that adsorbs and emits radiation at specific wavelengths within the spectrum of infrared radiation emitted by the earth's surface, the atmosphere and the clouds.
In these rules, the GHG emissions is limited to: carbon dioxide (CO₂), methane (CH₄), nitrous price (UCC₂)

oxide (N_2O) , hydrofluorocarbons (HCFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF₆). Leg: section of the route taken or to be taken

- Leg: section of the route taken or to be taken within which the cargo or the passenger is carried
- Line: composition of one or more legs
- Load factor: ratio of the actual load and the maximum authorized load of one means of transport
- Road vehicle: commercial vehicle, semi-trailer road, road train, articulated road train or a combination of vehicles
- Route: path (to be) taken to get from one point to another point
- Validation: systematic, independent and documented process for the evaluation of CO₂ index against the criteria described in these rules

For any definitions not included above, the definitions reported in EN 16258:2012 "Methodology for the calculation and declaration of energy consumption and GHG emissions of transport services (freight and passengers)" and in Tasneef rules apply.

4 NORMATIVE REFERENCE

- EN 16258:2012 "Methodology for the calculation and declaration of energy consumption and GHG emissions of transport services (freight and passengers)"
- Tasneef rules for the classification of ships

5 DOCUMENTS

5.1 Certification request

The certification request is to include:

- Number and name of ships
- Number of lines and relevant legs for every ship to be evaluated
- Validation type: calculation procedure or both calculation procedure and data
- any other documentation considered necessary

5.2 Documents to be submitted

The following documentation is to be submitted for each ship:

- General arrangement or deck drawings detailing the dimensions of different area (passenger area, garage, etc)
- Documentation including description of the process, input data retrieval, CO_{2e} calculation and the relevant hypothesis (if any)
- Sample of the document issued to state the CO_{2e} emission

Tasneef reserves the right to request the submission of additional documents if it is deemed necessary.

6 CO_{2e} EMISSION

6.1 Calculation methodology for ro-ro passenger ship

6.1.1 CO_{2e} emission of the ship

The total CO_{2e} in the reference period and for a specific ship line, expressed in [t CO_{2e}], is to be calculated in accordance with the following Formula 1.

$$CO_{2e} = \sum_{i} (Fi \times Gi)$$

Formula 1: CO_{2e} emission of the ship

Where

"i" is the fuel type burned in the reference period and for the specific line

"F_i" is the quantity in [t] of fuels burned onboard in the main, auxiliary engines and boilers

" G_i " is a non-dimensional GHG emission factor between the consumption of fuel "i" and CO_{2e} emission. The values of G, listed in the following Table 1, are in accordance with annex A of EN 16258:2012 (tank to wheels GHG emission):

Table	1:	GHG	emission	factor
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Type of fuel (i)	Density [kg/l]	G _i [t CO _{2e} / t fuel]	G _i [t CO _{2e} / kl fuel]
Heavy fuel oil (HFO)	0.970	3.15	3.05
Marine diesel oil (MDO)	0.900	3.24	2.92
Marine gas oil (MGO)	0.890	3.24	2.88

The total CO_{2e} emitted for passengers, their cars and cargo transport in the reference period and for a specific ship line is to be calculated in accordance with the following Formula 2, Formula 3 and Formula 4 respectively.

 $CO_{2ep} = CO_{2e} \times P$

Formula 2: CO_{2e} emission for carrying passengers

$$CO_{2ec} = CO_{2e} \times C$$

Formula 3: CO_{2e} emission for carrying passenger' cars

$$CO_{2ef} = CO_{2e} \times F$$

Formula 4: CO_{2e} emission for carrying freight

Where C, F and P are the allocation parts of emission to passenger 'cars, freight and passengers.

They are to be calculated in accordance with the area method reported in the following [6.1.2].

6.1.2 Area method

The whole passenger deck area is allocated to passengers in accordance with the following Formula 5.

$$P = A_P / (A_v + A_p)$$

Formula 5: passenger allocation

Where

"Ap" is accessible passenger deck area

"A_v" is accessible vehicle decks area, including hanging decks (if available and operational)

The total area $(A_p + A_v)$ is the total accessible area capacity in $[m^2]$ according to ship's general arrangement plan.

The vehicle deck area is allocated according to the ratio between passengers' vehicles and freight vehicles including their cargo. Unaccompanied vehicles are to be considered as cargo.

The area not accessible for passenger and cargo such as bridge, engine area, crew area, galley and other service area are not to be included in the calculation.

The parts of allocation of emission to cars of passengers and freight are to be calculated in accordance with the following Formula 6 and Formula 7:

$$C = R \times A_v / (A_v + A_p)$$

Formula 6: car of passenger allocation

 $F = (1 - R) \times A_v / (A_v + A_p)$

Formula 7: freight allocation

Where

"R" is the allocation ratio of vehicle deck area based on the real data of the reference period and line.

$$R = A_{pv} / (A_{pv} + A_{fv})$$

Formula 8: allocation of vehicle deck area

Where

"A_{pv}" is global area of passengers' vehicles (refer to Formula 9)

" A_{fv} " is the global area of freight vehicles (refer to Formula 10)

$$A_{pv} = \sum_e Ae \times Qe$$

Formula 9: passengers' vehicles area

Where

"e" is the passenger vehicle, i.e. type 1-7 of the following Table 3 $\,$

 $\ensuremath{^\circ}A_e\ensuremath{^\circ}$ is the default value of the area of each passengers' vehicle "e"

 ${}^{\ast}\text{Q}_{e}{}^{\ast}$ is the quantity of type "e" carried in the reference period and line

Table 2: default area value per passenger' vehicletype

N°	Туре	A _e [m ²]
1	Passenger car	18.6
2	Bus	37.2
3	Caravan (small)	9.3
4	Caravan (medium)	18.6
5	Caravan (large)	31
6	Mobile home	24.8
7	Motorcycle	4.65

$$A_{fv} = \sum_{f} Af \times Qf$$

Formula 10: freight vehicles area

Where

"f" is the freight vehicle, i.e. type 1-5 of the following Table 3

Table 3: default area value per freight vehicle

N°	Туре	A _f [m ²]
1	Car	18.6
2	Unaccompanied trailer	43.4
3	Accompanied/ articulated trailer (semi/ mega trailer plus tractor unit)	52.7
4	Road train continent	58.9
5	Road train Scandinavia	75.9

"A_f" is the default value of the area of each freight vehicle "f"

" Q_{f} " is the quantity of type "f" carried in the reference period and line

6.1.3 CO_{2e} emission per passenger carried

The CO_{2e} emitted by the ro-ro pax ship in the reference period for the specific line per each passenger carried, expressed in [kg CO_{2e} /km] or [kg CO_{2e} /nm], is to be calculated in accordance with the following Formula 11:

$$CO_{2epc} = CO_{2ep} \times 10^3 / (D \times Q_p)$$

Formula 11: CO_{2e} emission per passenger carried by ro-ro pax ship

Where

"D" is the distance sailed in [nm] or [km] in the reference for the line under analysis. The noncommercial voyages (i.e. transfer for repositioning or to shipyards) are not to be included

" Q_p " is the average of passengers carried in the reference period for the specific line. It is to be calculated in accordance with the Formula 12

$$Q_p = LF_p \times C_p$$

Formula 12: average of passengers carried in the reference period for the specific line

"LF_p" is the load factor of passengers carried by the ship in the reference period for the specific line

 ${}^{"}C_{p}{}^{"}$ is the ship passenger capacity as indicated in the general arrangement plan

In case the load factor is not available, it can be acceptable alternative calculation such as

$$Q_p = Q_{tp} / L$$

Formula 13: alternative calculation of average of passengers carried

Where

" Q_{tp} " is the total quantity of passengers carried in the reference period for the specific line

"L" is the number of legs of the specific line

For the calculation of real CO_{2e} emitted by the ro-ro pax ship for the carrying of a specific passenger, expressed in [kg CO_{2e}], the following Formula 14 applies:

$$CO_{2erp} = CO_{2epc} \times D_p$$

Formula 14: CO_{2e} emission for carrying passenger in real voyage

Where

"D_p" is the distance sailed in [nm] or [km] in the leg(s) of the passenger voyage

6.1.4 CO_{2e} emission per passengers' car carried

The CO_{2e} emitted by the ro-ro pax ship in the reference period for the specific line per each passenger's car carried, expressed in [kg CO_{2e} /km] or [kg CO_{2e} /nm], is to be calculated in accordance with the following Formula 15:

$$CO_{2ecc} = CO_{2ec} \times A_{pvc} \times 10^3 / (A_{pv} \times D \times Q_c)$$

Formula 15: CO_{2e} emission per passengers' car carried by ro-ro pax ship

Where

" A_{pvc} " is the global area of passengers' cars carried in the reference period for the specific line (ref to Formula 9 considering only passenger car)

" A_{pv} " is global area of passengers' vehicles (refer to Formula 9)

"D" is the distance sailed in [nm] or [km] in the reference for the line under analysis. The non-commercial voyages (i.e. transfer for repositioning or to shipyards) are not to be included

" Q_c " is the average of passengers' cars carried in the reference period for the specific line. It is to be calculated in accordance with the Formula 16

$$Q_c = LF_c \times C_c$$

Formula 16: average of passengers 'cars carried in the reference period for the specific line

" LF_c " is the load factor of passengers 'cars carried by the ship in the reference period for the specific line

 $^{\rm "}C_{\rm c}$ " is the ship passenger's car capacity as indicated in the general arrangement plan

In case the load factor is not available, it can be acceptable alternative calculation such as

 $Q_c = Q_{tc} / L$

Formula 17: alternative calculation of average of passenger 'cars carried

Where

 $^{\ast}\text{Q}_{tc}$ " is the total quantity of passenger's cars carried in the reference period for the specific line

"L" is the number of legs of the specific line

For the calculation of real CO_{2e} emitted by the ro-ro pax ship for the carrying of a specific passengers' car, expressed in [kg CO_{2e}], the following Formula 18 applies:

$$CO_{2erc} = CO_{2ecc} \times D_c$$

Formula 18: CO_{2e} emission for carrying passengers' car in real voyage

Where

"D_c" is the distance sailed in [nm] or [km] in the leg(s) of the passenger voyage

6.1.5 CO_{2e} emission per trailer carried

The CO_{2e} emitted by the ro-ro pax ship in the reference period for the specific line per each accompanied/ articulated and unaccompanied trailer carried, expressed in [kg CO_{2e} /km] or [kg CO_{2e} /nm], is to be calculated in accordance with the following Formula 19 and Formula 20:

$$CO_{2eatpax} = CO_{2ef} \times A_{fva} \times 10^{3} / (A_{fv} \times D \times Q_{at})$$

Formula 19: CO_{2e} emission per articulated trailer carried by ro-ro pax ship

$$CO_{2eutpax} = CO_{2ef} \times A_{fvu} \times 10^3 / (A_{fv} \times D \times Q_{ut})$$

Formula 20: CO_{2e} emission per unaccompanied trailer carried by ro-ro pax ship

Where

"A_{fva}" is the global area of accompanied trailers carried in the reference period for the specific line (ref to Formula 10 considering only accompanied/ articulated trailer)

" A_{fv} " is the global area of freight vehicles (refer to Formula 10)

"D" is the distance sailed in [nm] or [km] in the reference for the line under analysis. The non-commercial voyages (i.e. transfer for repositioning or to shipyards) are not to be included

" A_{fvu} " is the global area of unaccompanied trailers carried in the reference period for the specific line (ref to Formula 10 considering only unaccompanied trailer)

" Q_{at} " and " Q_{ut} " are respectively the average of accompanied trailers and non-accompanied trailers carried in the reference period for the specific line. They are to be calculated in accordance with the Formula 21 and Formula 22:

$Q_{at} = LF_{at} \times C_{at}$

Formula 21: average of accompanied trailers carried in the reference period for the specific line

$$Q_{ut} = LF_{ut} \times C_{ut}$$

Formula 22: average of unaccompanied trailers carried in the reference period for the specific line

" LF_{at} " is the load factor of accompanied trailer carried by the ship in the reference period for the specific line

"C_{at}" is the ship accompanied trailer capacity as indicated in the general arrangement plan

" LF_{ut} " is the load factor of unaccompanied trailer carried by the ship in the reference period for the specific line

" C_{ut} " is the ship unaccompanied trailer capacity as indicated in the general arrangement plan

In case the load factors are not available, they can be acceptable alternative calculation such as

$$Q_{at} = Q_{tat} / L$$

Formula 23: alternative calculation of average of accompanied trailers carried

$$Q_{ut} = Q_{tut} / L$$

Formula 24: alternative calculation of average of unaccompanied trailers carried

Where

" Q_{tat} " is the total quantity of accompanied trailers carried in the reference period for the specific line

"L" is the number of legs of the specific line

"Q_{tut}" is the total quantity of unaccompanied trailers carried in the reference period for the specific line

For the calculation of real CO_{2e} emitted by the ro-ro pax ship for the carrying of a specific accompanied/ articulated and unaccompanied trailer, expressed in [kg CO_{2e}], the following Formula 25 and Formula 26 apply:

$$CO_{2eratpax} = CO_{2eatpax} \times D_{at}$$

Formula 25: CO_{2e} emission for carrying accompanied trailer in real voyage

$$CO_{2erutpax} = CO_{2eutpax} \times D_{ut}$$

Formula 26: CO_{2e} emission for carrying unaccompanied trailer in real voyage

Where

"D_{at}" is the distance sailed in [nm] or [km] in the leg(s) of the accompanied trailer voyage

" D_{ut} " is the distance sailed in [nm] or [km] in the leg(s) of the unaccompanied trailer voyage

6.2 Calculation methodology for ro-ro cargo ship

6.2.1 CO_{2e} emission of the ship

The CO_{2e} in the reference period and for a specific ship line, expressed in [t CO_{2e}], is to be calculated in accordance with the Formula 1.

6.2.2 CO_{2e} emission per trailer carried

The CO_{2e} emitted by the ro-ro cargo ship in the reference period for the specific line per each accompanied/ articulated and unaccompanied trailer carried, expressed in [kg CO_{2e} /km] or [kg CO_{2e} /nm],

are to be calculated in accordance with the following Formula 27 and Formula 28:

$$CO_{2eatcargo} = CO_{2e} \times A_{fva} \times 10^{3} / (A_{fv} \times Q_{at} \times D)$$

Formula 27: CO_{2e} emission per accompanied trailer carried by ro-ro cargo ship

 $CO_{2eutcargo} = CO_{2e} \times A_{fvu} \times 10^{3} / (A_{fv} \times Q_{ut} \times D)$

Formula 28: CO_{2e} emission per unaccompanied trailer carried by ro-ro cargo ship

Where

"A_{fva}" is the global area of accompanied trailers carried in the reference period for the specific line (ref to Formula 10 considering only accompanied/ articulated trailers)

" A_{fv} " is freight vehicles area in the reference period for the specific line: it is to be calculated in accordance with the Formula 10

" Q_{at} " is the average of accompanied trailers carried in the reference period for the specific line. It is to be calculated in accordance with the Formula 29

$$Q_{at} = LF_{ac} \times C_{ac}$$

Formula 29: average of accompanied trailer carried in the reference period for the specific line

"LF_{ac}" is the load factor of the accompanied trailer of the ship in the reference period for the specific line

"C_{ac}" is the accompanied trailer capacity of the ship as indicated in the valid general arrangement plan

"D" is the distance sailed in [nm] or [km] in the reference for the line under analysis. The noncommercial voyages (i.e. transfer for repositioning or to shipyards) are not to be included

" A_{fvu} " is the global area of unaccompanied trailers carried in the reference period for the specific line (ref to Formula 10 considering only unaccompanied trailers)

" Q_{ut} " is the average of unaccompanied trailers carried in the reference period for the specific line. It is to be calculated in accordance with the Formula 30

$$Q_{ut} = LF_{uc} \times C_{uc}$$

Formula 30: average of unaccompanied trailer carried in the reference period for the specific line

" LF_{uc} " is the load factor of the unaccompanied trailer of the ship in the reference period for the specific line

 C_{uc} is the unaccompanied trailer capacity of the ship as indicated in the valid general arrangement plan

For the calculation of real CO_{2e} emitted by the ro-ro cargo ship for the carrying of a specific accompanied/ articulated and unaccompanied trailer, expressed in [kg CO_{2e}], the following Formula 31 and Formula 32 apply:

$CO_{2eratcargo} = CO_{2eatcargo} \times D_{at}$

Formula 31: CO_{2e} emission for carrying accompanied trailer in real voyage

 $CO_{2erutcargo} = CO_{2eutcargo} \times D_{ut}$

Formula 32: CO_{2e} emission for carrying unaccompanied trailer in real voyage

Where

"D_{at}" is the distance sailed in [nm] or [km] in the leg(s) of the accompanied trailer voyage

" D_{ut} " is the distance sailed in [nm] or [km] in the leg(s) of the unaccompanied trailer voyage

6.3 Calculation methodology for other transport service

6.3.1 CO_{2e} emission of car

The CO_{2e} emitted by a car for a specific ship line, expressed in [kg CO_{2e}], is to be calculated in accordance with the following Formula 33.

$$CO_{2ecar} = 0.05 \times 2.67 \times D_{c}$$

Formula 33: CO_{2e} emission of a car

Where

0.05 is the average fuel consumption of diesel [l/km] of a new EU car in compliance with the law limit by 2015. The data is calculated by the European Commission;

2.67 is the GHG emission factor expressed in $[kgCO_{2e}/I]$ for a diesel fuel according to the EN 16258:2012;

" D_c " is the distance theoretically travelled in [km] or [nm] by a car from the same departure point to the same destination point of the specific leg(s) of the line.

6.3.2 CO_{2e} emission of truck

The CO_{2e} emitted by a truck for a specific ship line, expressed in [kg CO_{2e}], is to be calculated in accordance with the following Formula 34.

$$CO_{2etruck} = 74.5 \times 10^{-3} \times EC \times D_t$$

Formula 34: CO_{2e} emission of a truck

Where

74.5 is the GHG emission factor expressed in $[kgCO_{2e}/MJ]$ for a diesel fuel according to the EN 16258:2012

"EC" is the energy consumption. The value of EC is listed in the following Table 4 deriving from the data reported in the Ecological Transport Information (EcoTransIT) Tool for Worldwide Transports - Methodology and Data – Update 4th December 2014, considering the trucks EURO VI with an average load factor of 100% in Europe (motorway, average gradient for hilly countries).

Table 4: Energy consumption of trucks

Truck size [t]	EC [MJ/km]
> 3.5 – 7.5	5.1
> 7.5 – 12	7.1
> 12 – 20	8.5
> 20 – 26	10.6
> 26 - 40	13.3
> 40 - 60	19

"D_t" is the distance theoretically travelled in [km] or [nm] by a truck that transport cargo from the same departure point to the same destination point of specific leg(s) of the line.

6.4 Data comparison

6.4.1 CO_{2e} gap per passenger without car

The CO_{2e} saving due to the voyage by ship is to be calculated in accordance with the following Formula 35:

Formula 35: CO_{2e} emission gap per passenger without car

It is considered that the passenger makes the same voyage by car.

6.4.2 CO_{2e} gap per passenger(s) with car

The CO_{2e} saving due to the voyage by ship is to be calculated in accordance with the following Formula 36:

$$CO_{2egpc} = CO_{2ecar} - (CO_{2erp} \times 2 + CO_{2erc})$$

Formula 36: CO_{2e} emission gap per passenger(s) with car

6.4.3 CO_{2e} gap per truck

The CO_{2e} saving due to the voyage by a ro-ro pax and cargo ships for a not accompanied trailer are to be calculated in accordance with the following Formula 37 and Formula 38:

CO_{2equtpax} = CO_{2etruck} - CO_{2erutpax}

Formula 37: CO_{2e} emission gap per unaccompanied trailer for ro-ro pax ship

 $CO_{2egutcargo} = CO_{2etruck} - CO_{2erutcargo}$

Formula 38: CO_{2e} emission gap per unaccompanied trailer for ro-ro cargo ship

The CO_{2e} saving due to the voyage by a ro-ro pax and cargo ships for an accompanied trailer are to be calculated in accordance with the following Formula 39 and Formula 40:

 $CO_{2egatpax} = CO_{2etruck} - CO_{2eratpax} + CO_{2egp}$

Formula 39: CO_{2e} emission gap per accompanied trailer for ro-ro pax ship

 $CO_{2egatcargo} = CO_{2etruck} - CO_{2eratcargo}$

Formula 40: CO_{2e} emission gap per accompanied trailer for ro-ro cargo ship

7 VALIDATION PROCESS

7.1 General

The process of validation is divided into two steps:

- 1) Calculation review
- 2) Input data spot check

The activity relevant to each step may be carried out independently and may result in the issuance of a specific statement.

7.1.1 Calculation review

A document or an electronic form with the relevant hypothesis (if any), data entry and relevant CO_{2e} calculation is to be submitted for verifying the compliance of the methodology with the present rules.

The documentation is to be relevant to each ship and line for which Company has applied for CO_{2e} emission validation.

The input data are to be relevant to the year preceding the date of the validation request; in case of seasonal line, the data are to be relevant to the last entire season.

The review consists in the check that the calculation procedure given in [6] has been followed.

7.1.2 Input data spot check

The distance of each sailed leg and of each road trip are to be validated against the most updated tools of route planning considering, for road vehicle, the shortest trip.

The ship data (such as distance sailed, fuel consumptions, number of passengers and vehicles carried) are to be validated by auditing yearly the Company technical offices. The aim of initial and annual audit is to verify the process of data

management from the origin (ship or other office) to the data sheet analyzing at least data of one voyage (including all its legs) for each line for each ship. During the annual audit is to be verified the correct use of statement.

7.2 Validation statements

7.2.1

The Company which has positively completed the first and/ or the second step of the validation process is allowed, under the general criteria given in the "Rules for the use of the Tasneef certification logo", to use respectively the following statements:

- for the first step: "CO_{2e} calculation procedure validated by Tasneef"
- for both steps: "CO_{2e} values validated by Tasneef".

The validation statements are issued with one year validity and confirmed on the basis of the results of the annual calculation review and input data spot check performed during the annual audit.

The statements are renewed yearly.

7.2.2

Examples of validation statements are reported in Appendix 1 and 2, respectively.

7.2.3

The Society is to be promptly informed by the Company in case of any changes occurring related to aspects which could influence the validated data.

The Society reserves the right to perform additional audits to the Company if the changes communicated are considered particularly relevant as regards maintenance of compliance with the requirements of these rules. Appendix 1

[EXAMPLE] Statement No. [job identification number/ n°]

To whom it may concern

Ship name and RI	IMO number

It is hereby stated that the CO_{2e} indexes calculation for the line [port of departure- port of arrival], based on the data relevant to year_____ (or to the season _____), are calculated in accordance with the procedure described in the "Tasneef rules for the validation of CO_{2e} index calculation".

This statement is valid for one year and expires on _____

On:_____

Appendix 2

[EXAMPLE] Statement No. [job identification number/ n°]

To whom it may concern

Ship name and RI	IMO number

It is hereby stated that, on the basis of the audit carried out on ______ relevant to the year _____ (or to the season ______), the CO_{2e} values for the line [port of departure- port of arrival] are validated in accordance with the "Tasneef rules for the validation of CO_{2e} index calculation".

This statement is valid for one year and expires on _____

Issued at _____

On:_____

Tasneef