Global Cement and Concrete Association

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GCCA Low Carbon Ratings (LCR) and prEN 206-1: 2024 (E) Provisions

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Example of implementation of the draft standard

1. Introduction

The Global Cement and Concrete Association (GCCA) has developed a standardised low carbon rating system for concrete to support reporting, procurement and comparison of products. This system ensures transparency in low-carbon procurement and supports global efforts toward net-zero emissions by 2050. The ratings are the implementation of the numerical definitions introduced by the GCCA in COP 29 in December 2024 and categorise concrete products based on Global Warming Potential (GWP), measured in embodied carbon dioxide equivalent per cubic metre (ECO_2e/m^3).

A draft version of prEN 206-1:2024 (E) – "*Concrete - Specification, performance, production and conformity — Part 1: Performance, requirements, factory production control and assessment criteria for individual values*", includes classification of concrete products based on CO_2 emissions (*Clause 5.4 – Classes regarding CO_2 emissions*).

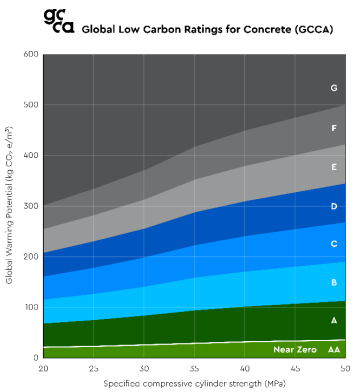
This document provides an example of how the GCCA Low Carbon Ratings for Concrete can be aligned with the requirements of prEN 206-1:2024 (E).

2. GCCA Low Carbon Ratings for Concrete

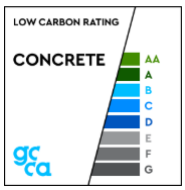
The GCCA low carbon concrete ratings system has the criteria of GWP (kg CO_2e/m^3) and categorises concrete by strength (MPa). This is because different strength concrete has different applications and higher-strength concrete generally requires more cement and hence has a higher carbon footprint. Users select the concrete strength for their specified or manufactured product and can read the relevant ratings from graphical and tabulated presentation (see figure and table below).

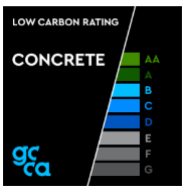
There are 8 ratings (AA to G):

Rating	Description
AA	**Near Zero Emissions Concrete** – builds on the International Energy Agency's near-zero definition for cement and the GCCA global roadmap to 2050 for efficiency of cement in concrete and fully decarbonised electrical grid and transport system
A - F	Equally spaced carbon footprint values define the ratings
G	Open ended band



	Specified Concrete Cylinder Strength (MPa)					
	20	25	30	35	40	50
Top of F	302	335	372	418	450	500
Top of E	255	283	314	353	380	422
Top of D	208	231	256	288	310	345
Top of C	161	179	199	224	241	268
Top of B	115	127	141	159	171	190
Top of A	68	75	83	94	101	113
Top of AA – Near Zero Product	21	23	26	29	32	36





3. prEN 206-1:2024 (E) – Clause 5.4: Classes regarding CO_2 emissions

Clause 5.4 of prEN 206-1:2024 (E) introduces a system of classification for concrete based on its CO_2 emissions. This classification system is referred to as the GWR (Global Warming Reduction) classes and is based on comparing the GWP of a specific concrete mix to that of a reference concrete.

The principle behind the classification is that each concrete mix can be assessed for its CO_2 emissions by calculating its GWP over the life cycle stages A1 to A3, in accordance with EN 15804 and EN 16757. The reference concrete used for comparison must have the same performance level (typically the same strength class) and is formulated using CEM I cement with no additions. National standards may provide specific guidance on how this reference concrete should be defined. Other parameters (Exposure classes or ERC, service life, ...) may also be considered to create more reference concretes (prEN 206-1:2024 - Annex G).

To determine the CO_2 reduction class, the percentage reduction in GWP (denoted as X) is calculated using the formula:

$X = 100[\ 1\text{-}GWP_{total}$ (assessed concrete) / GWP_{total} (reference concrete same performance)]

This percentage reduction forms the basis of the GWR classification, as per Table 1 below. The classes are defined in 10% increments, with GWR 0 representing less than 10% reduction and GWR 9 representing a reduction of 90% or more. Any negative reduction (i.e., an increase in emissions) is still classified as GWR 0.

Table 1: Reduction classes as per prEN206-1:2024

Reduction classes	Value of X
GW_R 0	X < 10
GW_R 1	10 ≤ X < 20
GW_R 2	20 ≤ X < 30
GW_R 3	30 ≤ X < 40
GW_R 4	40 ≤ X < 50
GW_R 5	50 ≤ X < 60
GW_R 6	60 ≤ X < 70
GW_R 7	70 ≤ X < 80
GW_R 8	80 ≤ X < 90
GW_R 9	90 ≤ X

The classification applies to one cubic metre (m^3) of concrete and may be included in specifications and delivery documentation. **In cases where national provisions define alternative classification systems, other acronyms may be used.**

4. Comparison of two methodologies

The Table below highlights the similarities and differences between GCCA LCR and prEN 206-1:2024:

	GCCA Low Carbon Ratings (LCR)	prEN 206-1:2024 (Clause 5.4) – GWR Classes
Objective	Provide a standardised classification for concrete based on CO_2 emission reductions	Provide a standardised classification for concrete based on CO_2 emission reductions
Units of comparison	GWP per cubic metre (kg CO_2e/m^3)	GWP per cubic metre (kg CO_2e/m^3)
Thresholds	Relative GWP reduction (%) compared to a global reference concrete	Relative GWP reduction (%) compared to a national reference concrete
Categorisation of concrete	strength (MPa); option to add further performance characteristics such as exposure class	strength (MPa) provided as the main example; other performance characteristics such as exposure class possible
Labels	AA (Near-Zero) to F, and open-ended band G	GW_R 0 to GW_R 9, but option provided for other labels
Range for each label	18.4%	10% of reference proposed, but option provided for any range to be prescribed
Calculation method	Environmental Product Declaration method (EPD) in accordance to EN15804 and EN 16757	Environmental Product Declaration method (EPD) in accordance to EN15804 and EN 16757
Applicability	Applicable globally, allows for local adaptation if needed	Reference concrete defined at country level

The two methodologies have many similarities. The differences are thresholds, labels and ranges, and all can be overcome because **prEN 206-1:2024 (Clause 5.4) – GWR Classes has flexibility in its drafting**:

- National reference values according to prEN 206-1:2024 can be chosen to be aligned with a global reference. A global reference, as used for LCR, is in accordance with the requirements expressed by CEM IDDI administered by UNIDO – their express wish was international comparability and this is enabled if the same reference is used globally

i. Labels in LCR method follow those prescribed by International Energy Agency (insert reference). The prEN 206-1:2024 (Clause 5.4) – state GWR Classes for when 10 equal bands are used below a reference value, **but permits any label nomenclature to be specified by a country**

ii. Ranges in LCR follow those of IEA, and **pr EN206**, whilst providing an example of 10% ranges, **permits any ranges to be specified by a country**.

5. Example of implementation of the draft standard

The GCCA recommends adopting the value of GW_R to be equal to the LCR Band E values, yielding the following reduction classes:

Reduction classes	Value of X
GW_{R-LCRG} E	X < 18.4
GW_{R-LCRG} D	18.4 ≤ X < 36.8
GW_{R-LCRG} C	36.8 ≤ X < 55.2
GW_{R-LCRG} B	55.2 ≤ X < 73.6
GW_{R-LCRG} A	73.6 ≤ X < 92
GW_{R-LCRG} AA	92 ≤ X < 100
GW_R NET ZERO	100 ≤ X

GCCA welcomes the option to incorporate exposure classes in the reference concrete and countries may choose to extend the methodology to a system that can be used appropriately. Precast elements may also be considered in a similar system.