HOLCIM ExtraDur 52®

CEM II/A-S 52,5 R
PRODUCT DATA SHEET | MAY 2024

HOLCIM

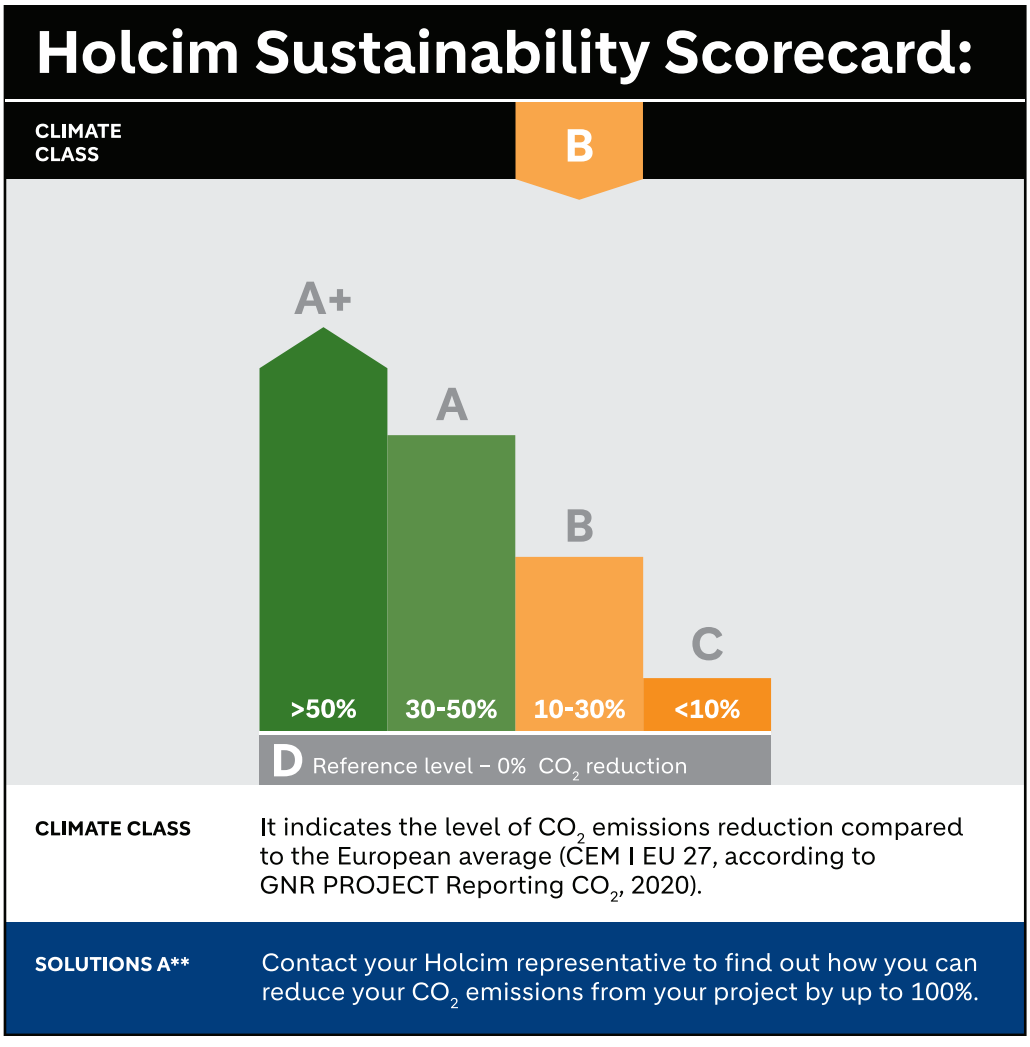
SUPERIOR PERFORMANCE FOR SUSTAINABLE CONSTRUCTION

CEM II/A-S 52,5 R

According to SR EN 197-1:2011

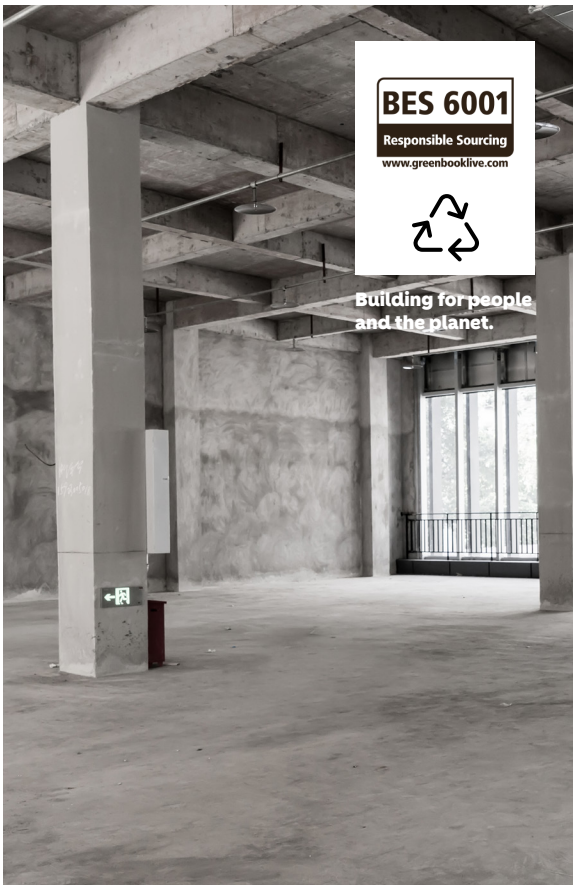
The new type of cement in our portfolio helps builders and developers to build with superior efficiency and confidence. Together with new methods and technologies of placing, this cement reduces carbon emissions embedded in concrete, and thus, has a positive impact for people and planet.

Climate performance of the product



General aspects

- Holcim ExtraDur 52® is a CEM II/A-S 52,5 R cement type, with highest quality blast furnace slag, cement which shows a rapid development of initial strength.
- It is a sustainable product for use in concrete production, offering a reduced CO_2 footprint compared to I 52.5 R cement.
- Holcim ExtraDur 52® contributes positively to the certification of green buildings under the LEED and BREEAM systems, thanks to the BES 6001 certification on the use of raw materials from sustainable sources.
- The use of this type of cement is easy, without modifications and adaptations on existing production lines.



Technical benefits

- It improves the workability of concrete, allowing it to be transported over a longer period of time.
- It ensures optimal pumpability of fresh concrete.
- It offers superior performance to concrete through the mechanical strengths achieved.
- It warrants all the sustainability conditions laid down for construction works.
- It provides superior aesthetics to concrete elements due to its fineness and optimal color.
- It improves the sustainability of the concrete structure through reduced carbon footprint.

Fields of use

According to NE012-1:2022; NE 013:2002; GP 075:2002; NE014:2002, ATE 004-07/1707-2022 and ATE 004-01/022-2023

- Precast reinforced concrete and prestressed concrete elements (in accordance with ATE 004-01/022-2023 Execution procedure of prestressed precast elements with CEM II A-S 52.5R): foundation cups, columns, wall panels, beams, wall panels, floor slabs, hollow core slabs, pipes and other drainage elements, special support elements (slopes, mine walls) etc.
- Monolithic structures made of simple reinforced and prestressed concrete (in accordance with ATE 004-01/022-2023), using usual or special technologies (sliding formwork, self-compacting concrete etc.) for the following construction segments:
- Civil (residential and non-residential) and industrial (warehouses, halls, power plants)
- Engineering works: bridges, overpasses, viaducts, tunnels, railways, ports and airports
- Hydro-technical and water regulation works: elements with maximum size < 0.8 m
- Road concrete: resistance and wear layers for motorways, airport runways, roads, industrial platforms and various traffic surfaces, including sections made of dispersed or continuous reinforced concrete (according to the provisions of ATE 004-07/1707-2022 - Procedure for the execution of cement concrete road covers, with CEM II AS 52.5R)
- Small precast products: paving blocks, tiles, kerbs, gutters, pipes, cladding elements, fence panels, masonry blocks (lightweight or normal masonry blocks) etc.
- Micro-concretes and special mortars used in strengthening, repairs, sub-casting, grouting, cladding materials and adhesives
- Autoclaved aerated concrete (AAC)

Recommendations for use

- In order to achieve an optimum mix that meets all technical and economic aspects of the project, laboratory tests must be carried out on both fresh and hardened concrete.
- Durability of concrete depends to a large extent on surface curing after casting
- When placing and curing concrete, external temperatures must be taken into account, with appropriate measures taken in the case of pouring at temperatures outside the usual range (5-30°C)
- The rules for concreting under extreme temperature conditions are described in standards NE012-2:2022, NE014:2002, C16-1984 and in information materials of Holcim Romania
- The duration of concrete curing after casting depends on the ratio Rc2days/Rc28days and the environmental conditions, and is specified in the table below.

Note: Issued for CEM II/A-S 52.5R Campulung.

Concrete surface temperature* (t),°C	Minimum curing period, days Rapid evolution of concrete strength (Rc2/Rc28 ≥ 0.50)
t ≥ 25	1,0
25 > t ≥ 15	1,0
15 > t ≥ 10	1,5
10 > t ≥ 5**	2,0

*Temperatures are as measured during the day at 12:00 noon

**For temperatures below 5°C, the duration is extended by a period equal to the duration of time with temperatures below 5°C

Constituents and characteristics

The conditions required by the product standard SR EN 197-1:2011 and specified in the product performance declaration are met.

ESSENTIAL CHARACTERISTICS	STANDARD CONDITIONS
Components and composition [% of mass]: Clinker (K) Blast furnace slag (S) Minor additional constituents	 80-94 6-20 0-5
Initial setting time [min]	min. 45
Stability (expansion) [mm]	max. 10
Compressive strength: initial [MPa]	min. 30
Compressive strength: standard [MPa]	min. 52,5
Sulfate content (as SO_3) [%]	max. 4,0
Chloride content [%]	max. 0,1
Durability	Durability refers to concrete, mortar, paste and other mixtures made from cement in accordance with with the rules of application valid at the place of use.
Release of dangerous substances [%]: Hexavalent chromium content	See Notes 1 and 2 in Annex ZA NPD. 0.1

Other characteristics:

- Blaine, grinding fineness: min. 3800 cm^2/g
- Absolute density: 3.05-3.1 g/cmc
- Water consistency: max. 32%

Exposure classes in which Holcim ExtraDur 52® cement can be used

According to NE012-1:2022

X0	XC1...XC4	XD1...XD3	XF1...XF4	XA1...XA3*	XS1...XS3	XM1...XM3
✓	✓	✓	✓	✓	✓	✓

* In the case of chemical attack of sulfate nature, when the presence of SO 4 - leads to an exposure class XA2 and XA3, it is essential to use a sulfate resistant cement.

Note: The concrete classes, minimum cement dosages, maximum water/cement ratios and other provisions (e.g. concrete protection) of the technical regulations in force (e.g. NE012-1:2022; NE012-2:2022; NE013-2002; NE014:2002) should be fulfilled.

Recommended types and classes of concrete

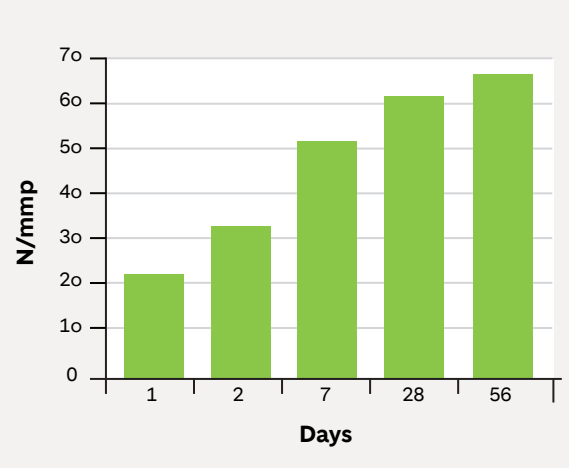
- Reinforced concrete (including dispersed reinforced concrete) of classes: C30/37...C60/75
- Micro-concretes (fine concretes) of classes: C30/37...C50/60
- Lightweight concretes: LC25/28...LC50/55
- Road concretes: BcR3,5... BcR5

Holcim ExtraDur 52® cement can be used for the manufacture of concrete placed by:

Pumping	Vibro-pressure	By grab	Specific road concrete technologies
✓	✓	✓	✓

Laboratory results

1. Cement: Mechanical strengths



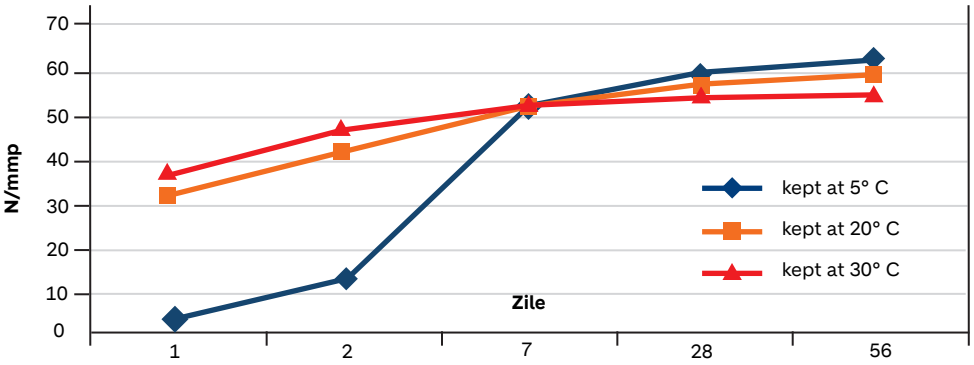
Ensuring a rapid evolution of compressive strength is essential to sustain an accelerated pace of construction and increase productivity in precast plants.

Analysis of this development provides important information for builders and manufacturers to plan the safe casting of building elements.

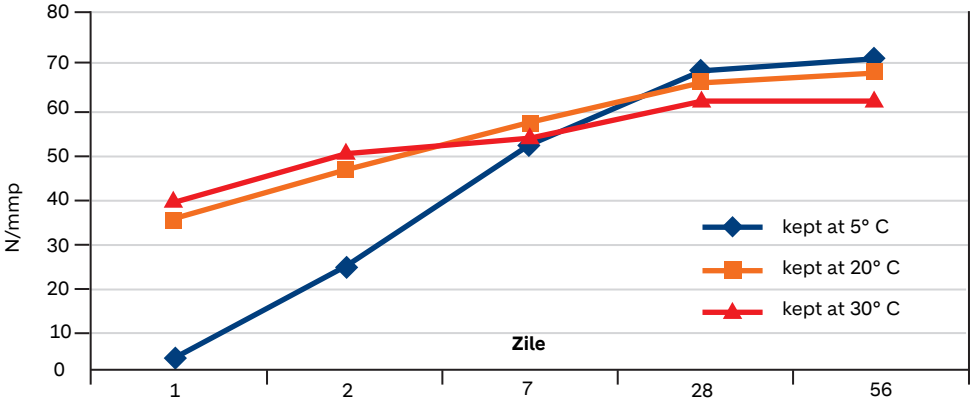
Evolution of compressive strengths on cement mortar (SR EN 197-2011)

2. Concrete: Development of strengths on various classes of concrete kept under different temperature conditions

- The impact of temperatures on the evolution of strengths from short time limits (corresponding to the time limits for stripping) up to 56 days must be known in order to schedule the work schedule and ensure the conditions for the protection of concrete elements. Particularly in low temperatures, the pace of execution must be adapted to the weather conditions.



Evolution of strengths for cement dosage 440 kg/mc, D16, S4



Evolution of strengths for cement dosage 490 kg/mc, D16, S4

3. Ratio Rc2/28 as a function of the temperature at which the concrete is kept

- The speed of strength development of concrete made with Holcim ExtraDur 52 is particularly important for the development of high class concrete recipes (> C40/50) in terms of reducing the risk of cracking, ensuring the deformation properties of the concrete (counter-tensioning), conditions imposed when applying pre- or post-tensioning forces.
- The graph below gives information on the Rc2/Rc28 ratio determined under different temperature conditions.
- In the case of precast elements, the use of strong water-reducing additives ensures a rapid evolution of concrete strength even in low temperature conditions.
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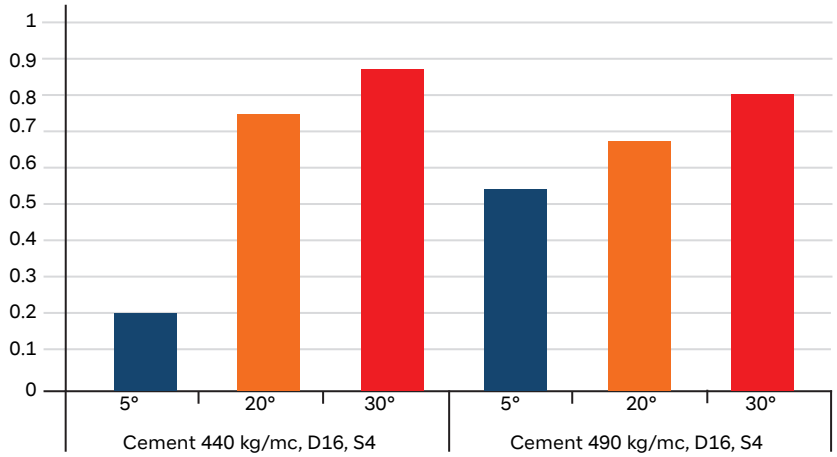
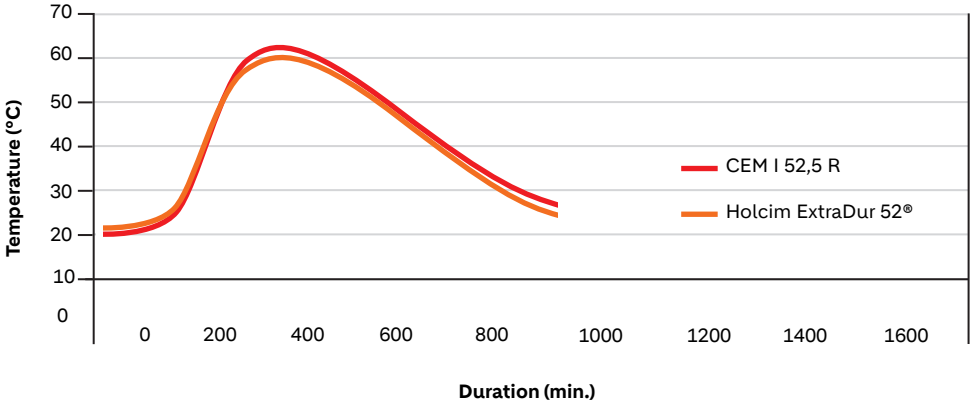


Ratio Rc2/Rc28 as a function of ambient temperature

4. Hydration temperature - semi-adiabatic method (Dewar vessel)

- The evolution of cement heat of hydration is extremely important for certain types of applications (e.g. precast elements and products), which usually include the application of heat treatments or storage conditions in climatic chambers. The results obtained on mortar according to SR EN 196-1, are shown in comparison with CEM I 52.5R in the following graph:



	CAMPULUNG	ALESD	BUCHAREST TERMINAL
MANUFACTURED AT:	✓	✓	
DELIVERED FROM:	✓	✓	✓

Product certification

- AeroQ certified product. Documents available on www.holcim.ro

Packaging

- Bulk

Validity term

- 60 days from the date of delivery, subject to the conditions of transport and storage as set out in the Product Safety Data Sheet, available at www.holcim.ro

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