



Anti-CRAK® fibers for concrete reinforcement





Since their development and launch in 1970, Alkali Resistant glass fibers have been used in more than 120 countries for the reinforcement of cement and concrete products. They are best known for their use in factory-produced GRC elements (Glass fiber Reinforced Concrete), but the range of Anti-CRAK® fibers has been developed to target the use of AR glass fibers in the general ready-mix concrete and precast industries (e.g. flooring, thin-walled elements).

Our state of the art facilities allow us to provide technical support in the use of our products and design dedicated solutions for specific applications.

Owens Corning's global platform ensures support and delivery of consistent solutions in all regions.



Furnace & glass science



Innovative chemistry



Fiber solutions



Global platform



Why glass fiber?

With its total affinity to cementitious composites, high tensile strength and modulus of elasticity, glass fibers are an ideal reinforcement for concrete, already efficient at very early stages of the cracking process. Moreover, glass fiber density is similar to concrete, which allows a quick dispersion for very short mixing times, with minimum clumping risk and exceptionally low influence on workability.

Raw Material	Density	Elastic Modulus (GPa)	Tensile Strength (MPa)
Concrete	2.4	30 – 40	3 – 4
Cem-FIL® glass	2.7	72	1700
Steel	7.8	210	500 – 1100
Polypropylene	0.9	1.5 – 9.5	100 – 500

Anti-CRAK® fibers as concrete reinforcement

There is an Anti-CRAK® solution for every type of cracking. From the micro to the macrofiber range, Anti-CRAK® fibers control cracking processes that can take place during the entire life-span of concrete. From cracks due to volume changes in fresh (settlement and plastic shrinkage) and hardened states (thermal and drying shrinkage), to post-crack load-bearing capacity contribution.

	Plastic shrinkage	Secondary reinforcements		Primary reinforcements
	Plastic shrinkage cracking	Thermal and Shrinkage cracking		Structural Performance
	Micro fibers		Macro fiber	
	Low addition rate		High addition rate	
Fiber Type	HD 12 HP 58/12	HP 58/12	HP 67/36	
Addition rate	0.3 - 0.6 kg/m³ 0.5 - 1.0 lb/cu.yd	0.9 - 1.5 kg/m³ 1.5 - 2.5 lb/cu.yd	1.5 - 5 kg/m³ 2.5 - 8.5 lb/cu.yd	5 - 15 kg/m³ 8.5 - 25.5 lb/cu.yd
Benefit	Anti-cracking	Anti-cracking mesh replacement	Light mesh and rebar replacement	Heavy mesh and rebar replacement
Evaluation method	ASTM C1579 (Plastic shrinkage)	ASTM C1579 (Plastic shrinkage) ASTM C78 (Flexural Strength) ICC ES Acceptance Criteria 32	ASTM C1581 (Drying shrinkage) ASTM C78 (Flexural Strength)	ASTM C1609 EN 14651 (Post-cracking residual strength)
Primary applications	Concrete flatwork Flooring		Residential floors Light commercial floors	Commercial and industrial floors/ pavements Composite metal deck Thin walled precast

Applications

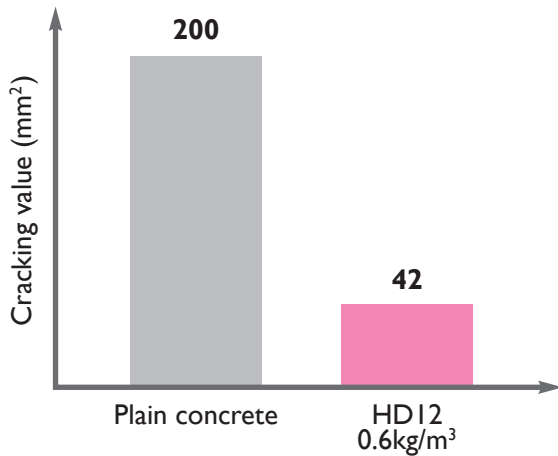


Technical performance of Anti-CRAK® fibers

PLASTIC SHRINKAGE CRACKING

Product: Anti-CRAK® HD 12mm @ 0.6kg/m³

Solution to control plastic shrinkage cracking in combination with standard curing practices, in flooring applications under severe environmental conditions.

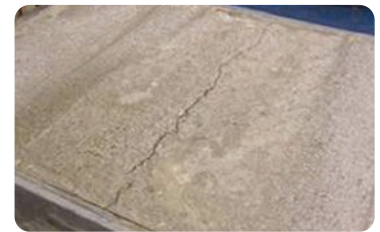


78%
Crack
reduction

Obtained on concrete class C25
(4000 PSI) – workability S2
Coarse aggregate 20mm (3/4 in.)



ASTM C1579-06

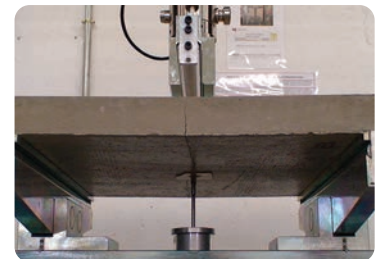
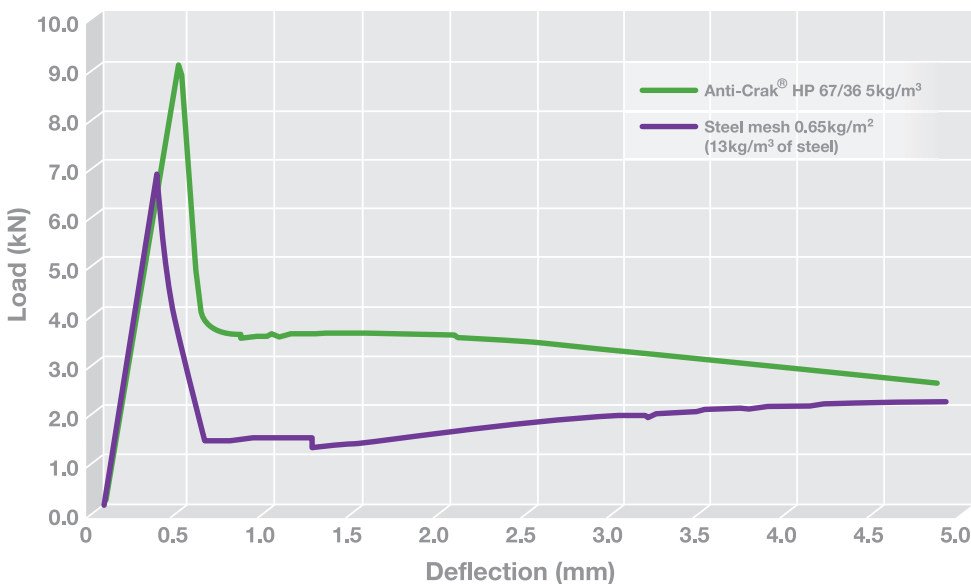


Typical crack pattern
for plain concrete

SECONDARY REINFORCEMENT:

Thermal and shrinkage cracking prevention

Product: Anti-CRAK® HP 67/36 @ 5kg/m³



3 point flexural test on
600 x 600 x 50mm slab

Alternative solution to anti-cracking mesh in order to control thermal and drying shrinkage cracking in residential and light commercial floors.



PRIMARY REINFORCEMENT:

Steel mesh and rebar replacement

Product: Anti-CRAK® HP 67/36 @ 5-15kg/m³

At different levels of fiber addition Anti-CRAK® HP 67/36 provides a higher peak strength than plain concrete, due to the total bond between fiber and matrix, which allows the contribution of the fiber action even before the peak load, at the very beginning of the microcracking process. Subsequently, Anti-CRAK® HP 67/36 provides residual strength over a large range of crack openings.

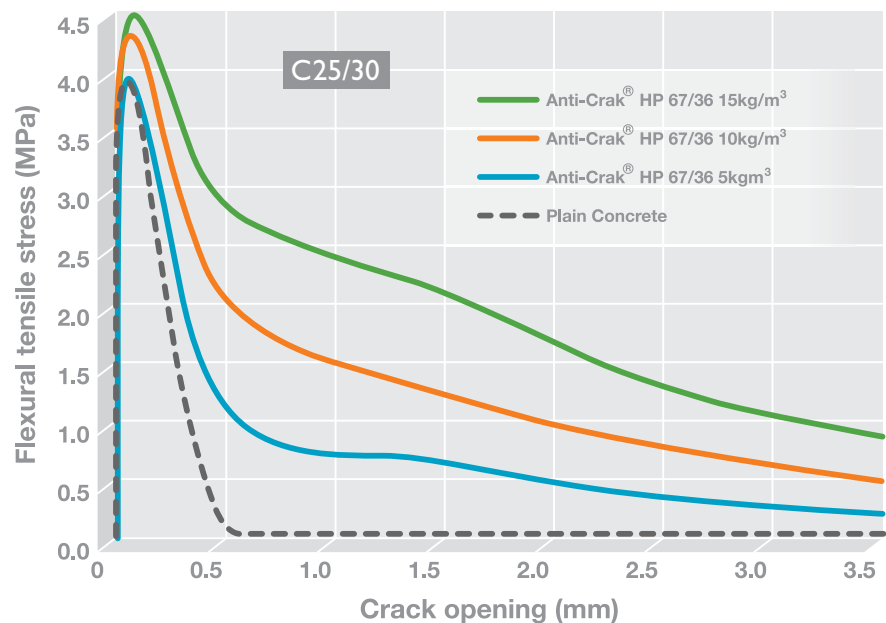
EN 14651 Flexural Test



First
Structural
macro glass fiber
with CE mark



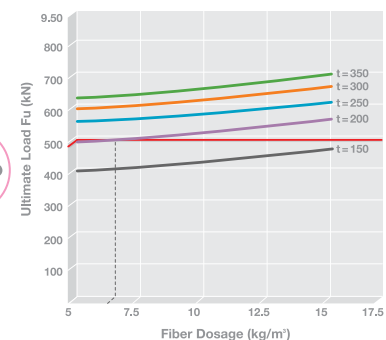
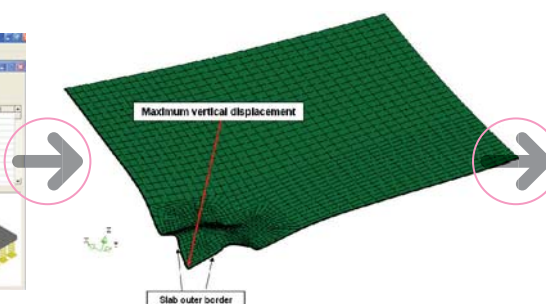
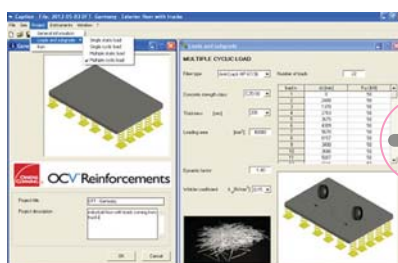
Macro glass fibers pulled out of the matrix at the fracture plane



Slab-on-ground design

All over the world, OC offers local support to glass fiber reinforced concrete projects. From fiber selection, mix design, and general FRC practical guidance, to modern structural design by non-linear fracture mechanics following the new fib Model Code 2010. In this way, fiber contribution is maximized, providing safer and cost-efficient designs.

Our design software collects all necessary project details, and processes them through a finite element analysis plus non-linear fracture mechanics data base. The output includes the fiber content versus ultimate load relationship for different slab thicknesses, and the corresponding project requirements.



Application Range

The high flexural performance of Anti-CRAK® HP 67/36 makes this fiber an ideal solution to replace conventional steel reinforcement in a wide range of applications.



Commercial floor – Audi dealership, France.
5 kg/m³ Anti-CRAK® HP 67/36 + 0.6 kg/m³ Anti-CRAK® HD12, C 20/25.



Industrial floor – OC Puma plant, Mexico.
10 kg/m³ Anti-CRAK® HP 67/36 + 0.6 kg/m³ Anti-CRAK® HD12, C 25/30



Airport pavement – Aeródromo T-35, AVIALSA, Spain.
5 kg/m³ Anti-CRAK® HP 67/36, C 30/37.



Farm floor – France.
7 kg/m³ Anti-CRAK® HP 67/36, C 30/37



Roundabout – Road K 1060/1013, Germany.
10 kg/m³ Anti-CRAK® HP 67/36, C 30/37



Railway base – Zurich Diameter Line, Switzerland.
8 kg/m³ Anti-CRAK® HP 67/36, C 25/30



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