Earth Friendly Concrete

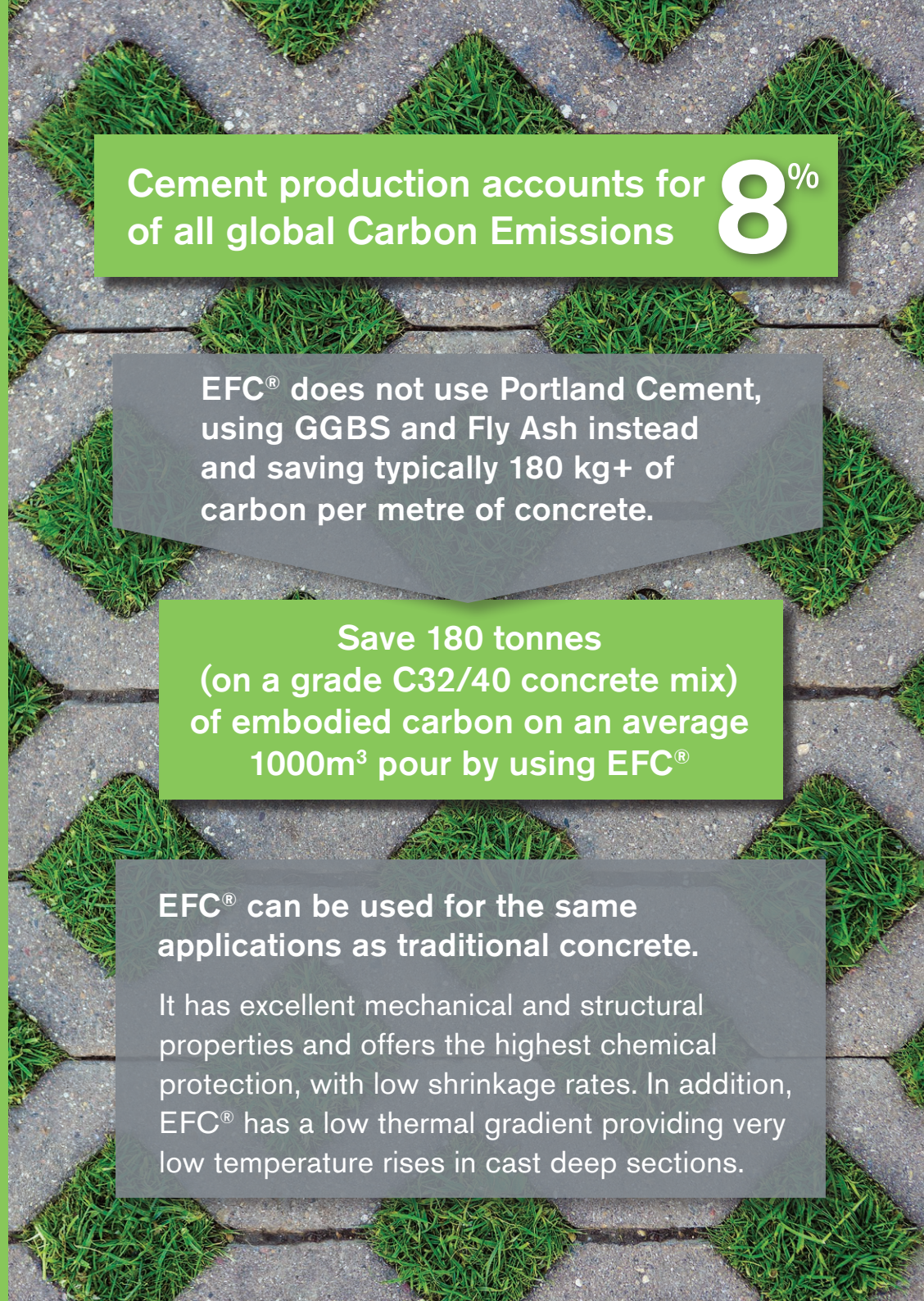
Reduce your project's carbon footprint

THE CONCRETE PEOPLE

If a reduced carbon footprint is an important part of your project's specification then Earth Friendly Concrete will help you achieve your goals.

Earth Friendly Concrete (EFC®) / Geopolymer Concrete is a cement-free concrete which typically offers between a 75% and 87% saving in embodied carbon compared to standard concrete mixes and helps to reduce the carbon footprint associated with concrete use in construction projects.

Contents



Cement production accounts for 8% of all global Carbon Emissions

EFC® does not use Portland Cement, using GGBS and Fly Ash instead and saving typically 180 kg+ of carbon per metre of concrete.

Save 180 tonnes (on a grade C32/40 concrete mix) of embodied carbon on an average 1000m³ pour by using EFC®

EFC® can be used for the same applications as traditional concrete.

It has excellent mechanical and structural properties and offers the highest chemical protection, with low shrinkage rates. In addition, EFC® has a low thermal gradient providing very low temperature rises in cast deep sections.

What Is EFC®

EFC® is Earth Friendly Concrete supplied by Capital Concrete under an agreement with Australian company, Wagner Group, within the Greater London area. It is more sustainable than traditional concrete, typically 75 - 87% less embodied CO_2 or -180kg CO_2 per cubic metre, helping your project reach sustainability targets.

Geopolymer concrete is made from a binder consisting of 75% Ground Granulated Blast Furnace Slag (GGBS), 25% Pulverized Fuel Ash (PFA) with zero Portland Cement, this is combined with normal constituent materials of the concrete mix including aggregate types and weight and Alkali Activators together with a super plasticizing admixture with or without extended open life as required for any project.

The Geopolymer binders are usually derived from waste products, such as Ground Granulated Blast Furnace Slag (GGBS), Pulverized Fuel Ash (PFA) and may include rice husk ash, palm oil and fuel ash, which are high in aluminosilicates and are activated by adding a strong alkali solution to produce an aluminosilicate gel which is the usual chemical reaction produced by Portland Cement.

To place an order or to talk to us about the requirements for your project please call our team on 020 3974 0520.

Applications

EFC® may be utilised in all applications where traditional concrete is used, for example, slabs, walls, columns, footings etc., traditional slip form paving including machine paving, deck units and tunnel segments in major infrastructure projects.

EFC® has special advantage over traditional concrete in tunnel segment manufacture where early strength development is required as well as providing a high fire resistance.

EFC® has been shown to perform better than traditional concrete in marine applications.

Benefits And Features* Of Using EFC®

Sustainable

- Zero Portland Cement
- Typical carbon content of up to 87% less embodied CO_2 or -180kg CO_2 per cubic metre
- Reuses industry waste by-products slag and fly ash

Structural

- Same compressive strength as standard concrete
- 30% higher flexural tensile strength
- High early strength and good final strength gain

Reliable

- 40% less shrinkage (typically 350 με)
- Very low heat development (circa ~15°C)
- Less susceptible to cracking

High Durability

- Acid and sulphate resistant
- Fire resistant to AS1530 Part 4 2005
- Chloride ion ingress resistant
- High permeability resistance and reduced water ingress

Looks Great

- Natural off-white colour
- Clean off-form finish
- Compatible with colour pigments and oxides

Easy To Work With

- Batched in a concrete plant
- Delivered in an agitator/ traditional concrete mixer
- Placed by pump, chute or pre-cast
- Can be disposed of under European Waste - Catalogue code 17 01 01 (concrete)

* when compared with traditional concrete.

Key Features

- **Performs better than traditional concrete in marine situations with a high chloride resistance rate.**
- **Aggregate proportions are typically the same as traditional concrete.**
- **All commercial grades: 10 to 60 MPa compressive strength can be achieved.**
- **EFC® Concrete is supplied by Capital Concrete from batching plants which are all third party accredited by QSRMC**

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Building A Highly Successful Track Record

Recent Projects

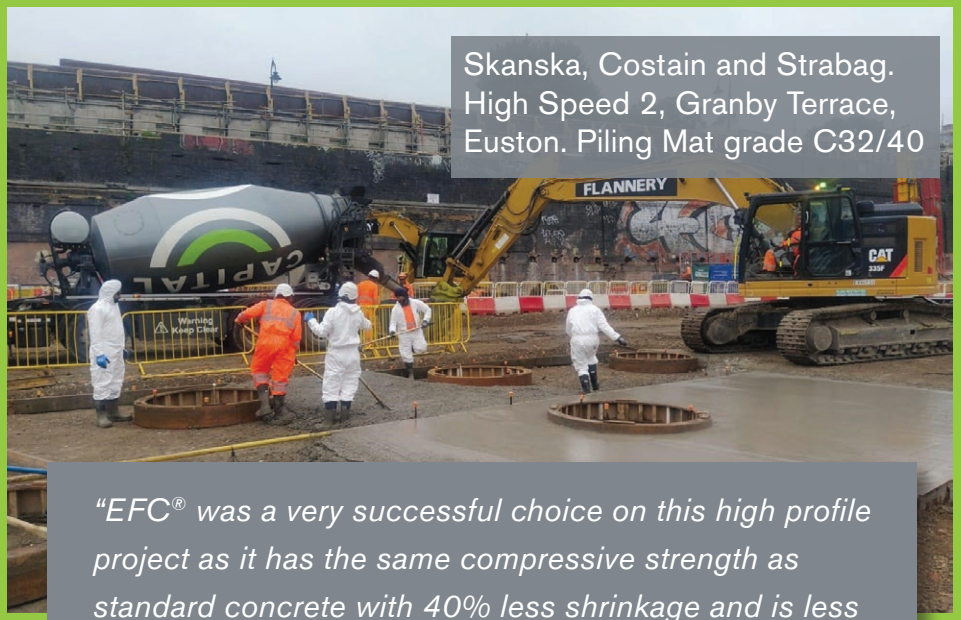
Capital Concrete's dedicated team has over 150 years' experience in the concrete industry and has worked on some of London's most prestigious and complex projects.

We understand construction in London, so not only are you in good hands, chances are you already know some of us well. We have been supplying EFC® since January 2020 in the Greater London area for numerous temporary and permanent works.

Wagner has been developing EFC® over the past 12 years. The first commercial use in permanent works was in 2012 where it was used in floor beams for the Global Change Institute in Brisbane.

Temporary Works

Byrne Brothers at Wood Wharf, London E14. Grades C32/40 & C40/50



Skanska, Costain and Strabag. High Speed 2, Granby Terrace, Euston. Piling Mat grade C32/40

"EFC® was a very successful choice on this high profile project as it has the same compressive strength as standard concrete with 40% less shrinkage and is less susceptible to cracking. It provided HS2 with a saving of 180kgs CO2/m^3 on the 3,000m^3 of EFC® delivered by Capital Concrete."

Luke Smith, Managing Director, Capital Concrete

Temporary Works

Keltbray Piling Projects:
Nova East. Hallsville Quarter,
Ropemaker Street.

"The reduction in the carbon footprint achieved by using EFC® gave us a competitive advantage. Our thanks to Capital Concrete who made the whole supply process on this new and innovative product run smoothly."

Stuart Norman, Managing Director, Keltbray Piling

Keltbray Structures at
Charterhouse Place and
Gateway Central.

Permanent Works

November 2020 for British Land and Piling Contractor Keltbray at Canada Water, Southwark, London. Grade C32/40

December 2020 for Canary Wharf Contractors and Byrne Brothers at Wood Wharf, London. Grade C50/60

"Our successful trials and use of EFC® have furthered our ambition to promote and use this novel low carbon concrete more widely. Capital Concrete's support and expertise, alongside their close relationship with Wagners has really helped us raise aspirations for using EFC® in structural applications, which is beginning to translate into opportunities for our business. EFC®'s technical performance has been impressive, with our testing supporting existing evidence of rapid strength gain to high final strength and a low heat of hydration."

Simon Houska, Technical Manager, Bryne Brothers

Let's Get Technical

EFC® and Existing Standards *

Earth Friendly Concrete is a relatively new novel product to the UK however, it has achieved compliance with DIN EN 196-2 and DI 1045-2 in Germany and is subject to rigorous ongoing testing across its use globally.

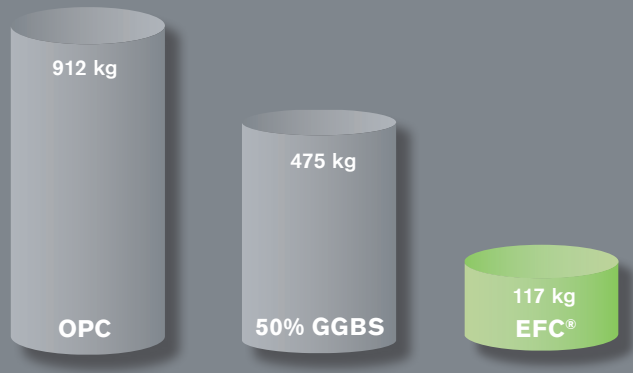
In the UK EN 206 and BS8500 govern the specification, performance, production and conformity requirements for concrete, and are based on a general and historic assumption that concrete mixes include CEM I.

Alkali-activated cementitious material (AACM) and geopolymer binders in concretes may be used in compliance with BS PAS 8820.

EFC® mix design approval is assisted by the use of test data for a route to specification, and Wagners together with Capital Concrete can help you achieve this.

**Byrne Brothers Wagners' Earth Friendly Concrete® An evaluation of our use to date.*

EFC® vs UK cement blends kg CO_2 per tonne



EFC® uses between 75% and 87% less embodied CO_2 when compared to UK 100% OPC and UK 50% GGBS mixes.

Calculating Embodied CO_2 And Carbon Footprints

CO_2 contents for CEM I, GGBS blends and EFC® concrete

	BY TONNE OF BINDER								
	CEM I	CEM IIA	CEM IIB-S	CEM IIIA			CEM IIIB		EFC
GGBS - kg/t	0	200	300	400	500	600	700	800	GGBS/PFA + ACTIVATOR
CEM I - kg/t	1000	800	700	600	500	400	300	200	
1 tonne binder	860	703.9	625.9	547.8	469.8	391.8	313.7	235.7	117.6

	BY CEMENTITIOUS CONTENT								
KG/M3									
300	258	211	188	164	141	118	94	71	35
310	267	218	194	170	146	121	97	73	36
320	275	225	200	175	150	125	100	75	38
330	284	232	207	181	155	129	104	78	39
340	292	239	213	186	160	133	107	80	40
350	301	246	219	192	164	137	110	82	41
360	310	253	225	197	169	141	113	85	42
370	318	260	232	203	174	145	116	87	44
380	327	267	238	208	179	149	119	90	45
390	335	275	244	214	183	153	122	92	46
400	344	282	250	219	188	157	125	94	47
410	353	289	257	225	193	161	129	97	48
420	361	296	263	230	197	165	132	99	49
430	370	303	269	236	202	168	135	101	51
440	378	310	275	241	207	172	138	104	52
450	387	317	282	247	211	176	141	106	53
460	396	324	288	252	216	180	144	108	54
470	404	331	294	257	221	184	147	111	55
480	413	338	300	263	226	188	151	113	56
490	421	345	307	268	230	192	154	115	58
500	430	352	313	274	235	196	157	118	59
510	439	359	319	279	240	200	160	120	60
520	447	366	325	285	244	204	163	123	61
530	456	373	332	290	249	208	166	125	62
540	464	380	338	296	254	212	169	127	64
550	473	387	344	301	258	215	173	130	65

NOTES:

1. CO2e contensts are based on raw material values for cementitious blend and content only
2. CO2e value for EFC is based on Autralian values provided by Wagner
3. CO2e contributions from aggregates, production and transport are not included as it is considered that these will be similar for all types of concrete.
4. GGBS proportions are those normally used by suppliers

MPA DECLARED VALUES 2020 - TO FACTORY GATE	
	CO2e kg/kg
CEM I	0.860
GGBS	0.0796
PFA	0.0001
Limestone	0.0080
Agg	0.0026
Rebar	0.4120

ULTRA LOW	0-50
VERY LOW	51-100
LOW	101-150
MODERATE	151-200
AVERAGE	201-250
HIGH	251-300
VERY HIGH	>301

Taking a typical C50/60 concrete mix in the UK with 420kg/m³ cementitious content containing 30% GGBS i.e. a CEM IIB-S, table 1 shows that the ECO_2 of the binder content of 1m³ of this type of concrete would be approximately 263kg/m³. EFC® concrete with a similar binder content of 420kg/m³ would have a ECO_2 value of 49kg/m³ therefore a reduction of approximately 214kg of embodied carbon in each cubic metre of concrete – 81% saving.

Sales office

020 3974 0520
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www.capitalconcrete.co.uk

Capital Concrete
Brett House, St Michael's Close,
Aylesford, Kent ME20 7XE

Plant locations

1. Bow
Chapman Road, Bow, London E9 5DW

2. Cricklewood
Cricklewood Railway Yard,
400 Edgware Road, London NW2 6ND

3. Croydon
Endeavour Way, Beddington Farm Road,
Croydon, Surrey CR0 4TR

4. Enfield
Jeffreys Road, Enfield EN3 7UA

5. Feltham
Falcon Way Trading Estate, Feltham
TW14 0UQ

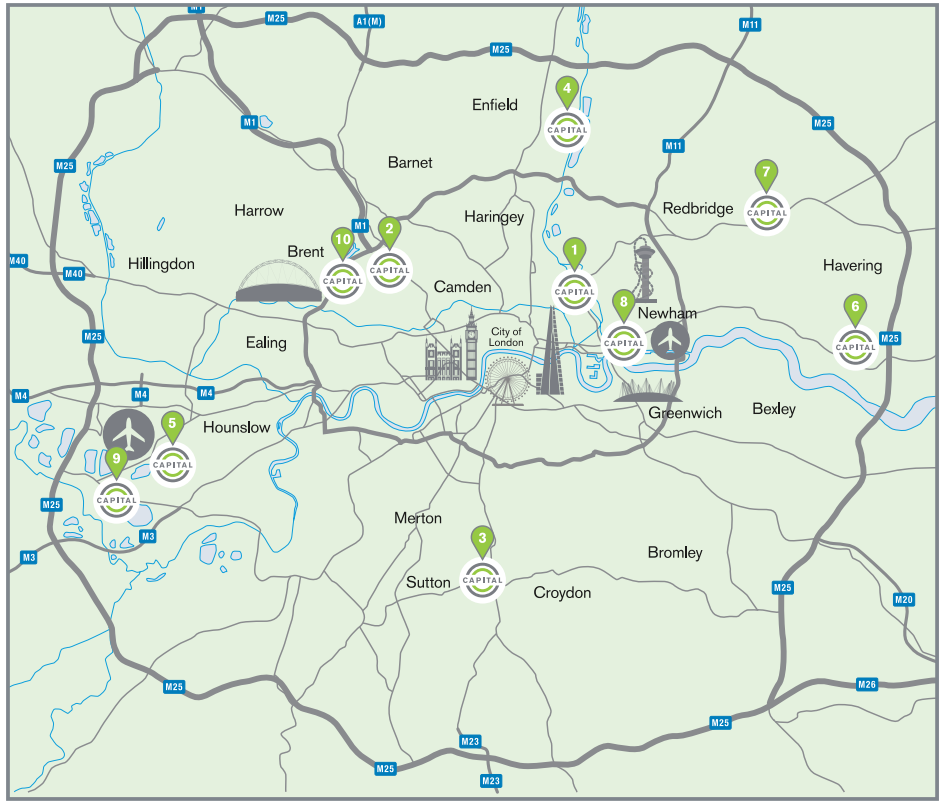
6. Rainham
Launders Lane, Rainham, Essex RM13 9GJ

7. Romford
Hainault Road, Little Heath, Romford,
Essex RM6 5SS

8. Silvertown
Peruvian Wharf, North Woolwich Road,
Silvertown E16 2AB

9. Staines
Ashford Road, Laleham, Middlesex TW18 1QF

10. Wembley
Neasden Rail Siding, The Rail Yard, Drury Way,
London NW10 0JJ



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