



2

80,000



NUM83R5

In a world of numbers
one can help change the world



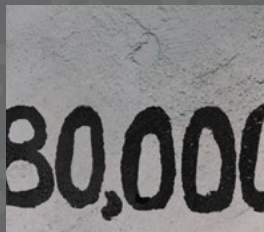
We're surrounded by numbers.

We measure our lives by them,
they're ever-present.

Counting, measuring, calculating, scoring.


We use numbers every day.

But how many of them do we remember?





3



2

Every year, concrete production is around **32** billion tonnes. How many zeros is that?



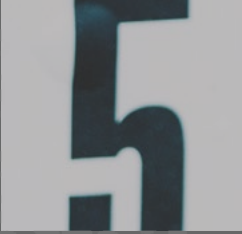
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32
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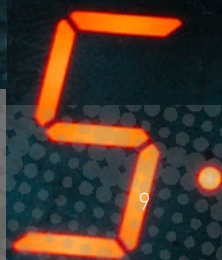


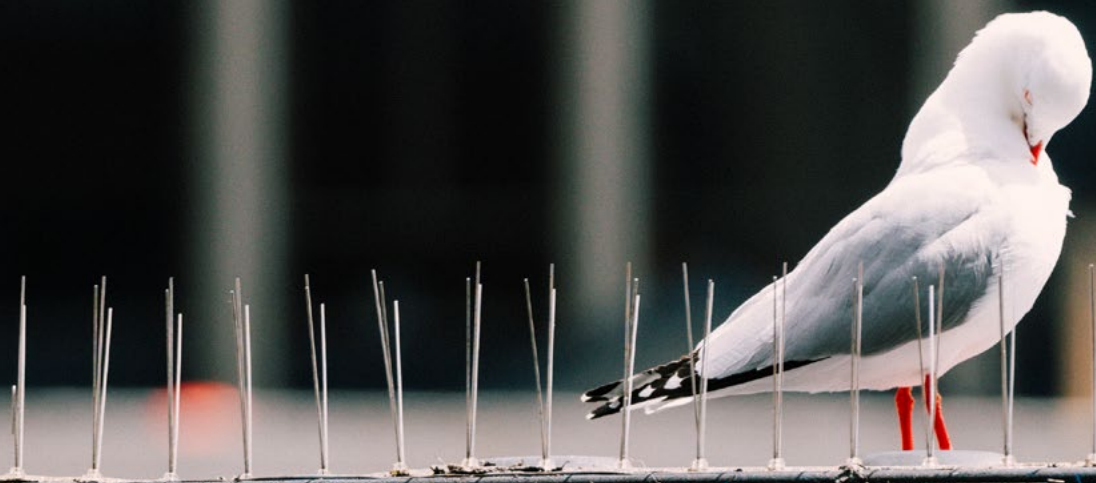
Concrete is the **2nd** most consumed material on earth, after water.



25MPa. One of the many 28-day compressive strengths Firth can supply with our EcoMix® and EcoMix®+ low carbon concrete.

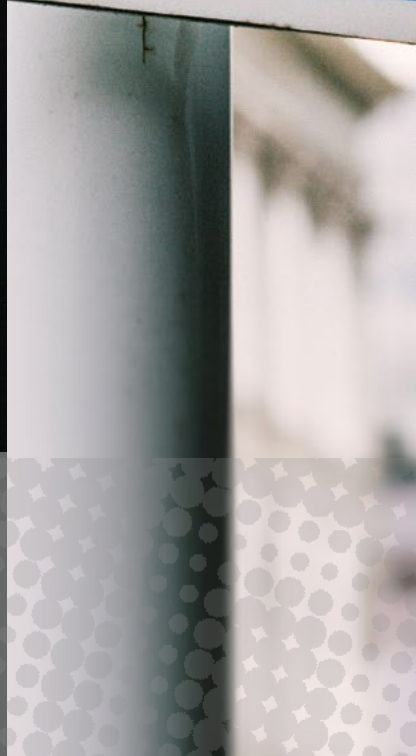






Auckland's Sky Tower used **15,000** cubic metres of concrete during its construction.

15,000



Area ID
5000

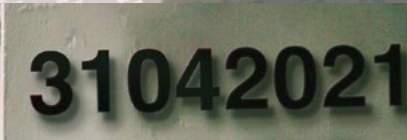
15,000

Area ID

3
1
0
4
2
0
2
1



31042021



NZS 3104:2021 – The New Zealand Standard Specification for concrete production.
Our experts at Firth know it inside out.





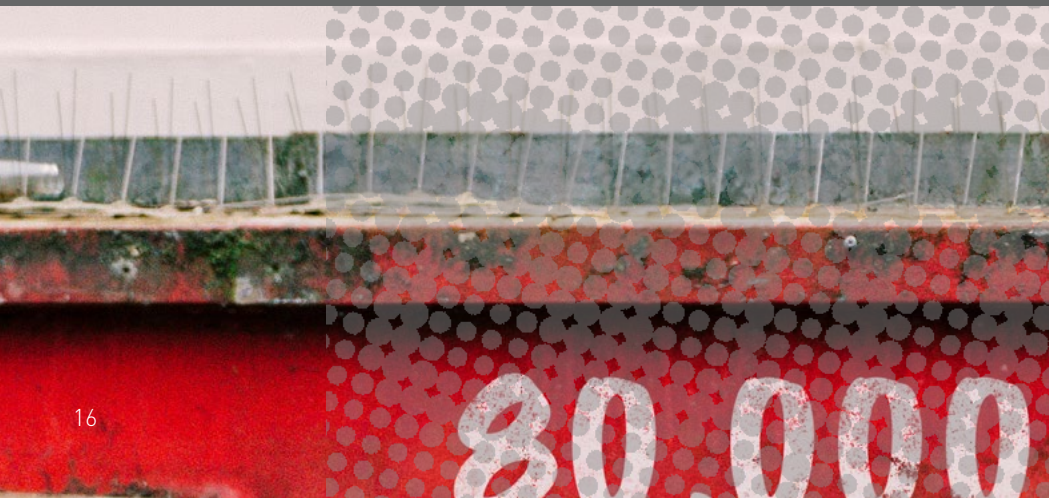
Firth are targeting a **24%** reduction in CO₂e per m³ of concrete by 2028 (compared to 2023 baseline of 260kgs CO₂e).





Stop **80,000**

The Te Papa Tongarewa Museum in Wellington used **80,000** cubic metres of concrete, and enough reinforcing steel to stretch from Wellington to Sydney.



80,000





We see lots of numbers.

So many numbers.

35

And now there's a **ANOTHER** one
to think about.

A solid yellow horizontal line that spans across the left side of the page, ending just before the text.

Your carbon number.

IHU 211624
24

Relax.

Firth will make it easy for you.



With the right low carbon concrete mix,
we'll help you achieve your carbon targets.

And that'll give you one less number
to worry about.



100%

Designing for climate change, we're here to help

Our experts at Firth are ahead of the curve when it comes to designing for climate change, and have put this handy information together to help you with designing and specifying the right concrete mix to reach your carbon goals.

Carbon Number?

You might know it as your Carbon Target Number, Carbon Reduction Target, or just your Carbon Number. You may also hear it referred to as a GWP (Global Warming Potential) number. Whatever you call it, it's there to help us all reduce our carbon emissions, and you'll need to know what it is.

Industry regulations are changing

As a part of the Ministry of Business, Innovation and Employment (MBIE)'s Building for Climate Change programme, reporting on embodied carbon for new buildings is set to become mandatory in 2025. So, you'll need to declare your Carbon Number (Carbon Reduction Target or GWP) for every project.



Relax. We'll make it easy for you

Simply, give us your Carbon Number, and we'll supply the right low carbon concrete mix that delivers to that target.

With your Carbon Number our Firth experts will understand your sustainability goal, and supply a low carbon concrete mix that'll achieve it. No more maths, no more thinking about mix design, we'll do it all for you.



How can we supply a product that will take care of your targets?

We're the market leaders in supplying low carbon concrete at scale, meeting the demands of both the construction industry and the environment.

It starts with our cement

To make products that hit your carbon target we use Golden Bay EcoSure® cement – NZ's lowest carbon GP (general purpose) cement that can be supplied at scale for a growing industry. We can then design a mix with additional SCMs (supplementary cementitious materials) to lower the embodied carbon of the concrete even further.

Independently verified

Our products are independently verified by a third party with an Environmental Product Declaration. Plus, our carbon calculator gives you a certificate that specifies the Carbon Number of your specific mix design.



Building for climate change

An increasing number of designers are looking to understand what building for climate change means when designing a building. It's hard to define; because building projects in New Zealand are so unique, our approach to sustainable design will be unique to each project.

But one thing we can do is take a holistic view of our projects and look at them with a whole of life approach, and consider that most structures in the built environment are for intergenerational use, so need sustainable materials that'll last lifetimes.

At Firth we're leading the way in designing for climate change with concrete. We're working hard to reduce carbon emissions through the use of lower carbon cements (such as Golden Bay EcoSure®) and supplementary cementitious materials in the mix design.

The benefits of concrete:

- Long product life, with low maintenance requirements
- Durability – hence its use in foundations, garages, retaining structures, infrastructure, and industrial floors
- Fire resistance
- Good sound attenuation properties
- Hardscape applications, like permeable mixes that assist with stormwater control and water quality
- Stores heat due to its thermal mass, so it is often used where building comfort is a consideration

More about your number

A carbon footprint, or Carbon Number (as many people refer to it) is a colloquial term for the Global Warming Potential (GWP) of a material or product. It is expressed as a number of kilograms per CO₂ equivalence (CO₂e). The equivalence refers to converting the impact to global warming of a range of gases to that of carbon dioxide.

For example, 1kg of methane is approximately equivalent to 24kg of CO₂ in terms of Global Warming Potential.

Knowing your number

This is why it's important to know your Carbon Number / GWP Number. You may see many claims about reductions in the percentage of embodied carbon (CO₂e), but what does this mean? Without knowing the reference number that reduction comes from it's impossible to know if that's the best option for reducing carbon. Instead, it's best to look for the GWP number.

So where do you find that?

Well, the easiest way is to refer to an Environmental Product Declaration (EPD). These are third party verified documents that let you know the GWP of a product, and whether it meets the requirements of your project.

You can check out Firth's EPD at www.firth.co.nz/lowcarbonconcrete, this covers all our standard concrete mixes at different strengths around New Zealand.

EcoSure[®], NZ's lowest carbon general purpose cement

All Firth EcoMix[®] concrete is lower in carbon because it's made with Golden Bay EcoSure[®]. EcoSure[®] is a GP cement with only 699kgs CO₂e /tonne, the lowest carbon GP cement in New Zealand at 27% less carbon than the ISC 2020 baseline. It's well suited for a range of uses including domestic concrete, structural concrete, concrete products, mortars, grouts, and soil stabilisation.



How to specify low carbon concrete

As a designer or engineer it's not your job to know how much less cement to use, or what SCM is needed to get the lowest carbon, all you need to know is what strength you want for your concrete and your GWP target.

Below is a recent project example of good, better, best targets for GWP in concrete at different strengths. The GWP numbers vary by area due to mix design, so we recommend talking to Firth for guidance, and using this as a guide when specifying concrete design.

Concrete Compressive Strength (MPa)	Standard Practice GWP Limit (Kg CO ₂ / m ³) A1-3	Good Practice GWP Target (Kg CO ₂ / m ³) A1-A3	Best Practice GWP Target (Kg CO ₂ / m ³) A1-A3
20	264	240	200
25	294	270	220
30	342	280	245
35	368	300	275
40	392	320	320
45	441	360	350
50	465	420	390

Firth have developed an EC (Embodied Carbon) rating system to make specification writing easy, you can find these on Masterspec, or see links on www.firth.co.nz/lowcarbonconcrete

You can also use the table to the right which shows GWP targets for a variety of concrete strengths. With NZ manufactured cement it is generally possible to achieve GWP values close to or below Firth's EcoMix® EC20 rating. Firth's EC30, EC40 and EC50 can be achieved with project specific mix designs.

	20 MPa	25 MPa	30 MPa	35 MPa	40 MPa	45 MPa	50 MPa
EC10 CO ₂ reduction 10% to 20%	256	282	312	352	397	446	495
EC20 CO ₂ reduction 20% to 30%	227	250	278	313	353	396	440
EC30 CO ₂ reduction 30% to 40%	199	219	243	274	309	347	385
EC40 CO ₂ reduction 40% to 50%	170	188	208	235	265	297	330
EC50 CO ₂ reduction to 50%+	142	157	174	196	221	248	275

ECOMIX

ECOMIX+

EcoMix®+ will typically require supplementary cementitious materials such as Fly Ash, Ground Granulated Blast Furnace Slag, or advanced admixtures.

Reduction in embodied carbon compared to 2020 EC Baseline (ISC) for ready mix concrete provided by the infrastructure Sustainability Council from the Materials Calculator NZ 2.0.

Leave it to the experts (that's us)

Don't worry about having to specify ingredients for your concrete mix design, just leave it to our experts. They'll make sure it's the correct specification. Just select the strength of concrete you want, the GWP target or specify your EC rating, and Firth will design the mix to meet those needs.

All you need to do:

1. Specify strength → 2. Then specify either your:

Maximum GWP number

e.g. 30MPa, with a maximum cradle to gate GWP of 278kg CO₂e/m³

OR

EC rating

e.g. 30MPa and EC40

3. Talk to us and we'll help with the mix design.

It's a good idea to talk to us early, because lots of things can impact achieving your carbon requirements, like aggregate size, admixtures, pump size and type of concrete placement.



ECOMIX[®]
LOW CARBON CONCRETE

With Firth EcoMix[®] low carbon concrete it's possible to build with concrete and reduce your carbon footprint. Firth can help you every step of the way. For advice on specifying EcoMix[®] low carbon concrete, contact the Firth technical team on info@firth.co.nz or **0800 FIRTH 1**



ECOMIX®

LOW CARBON CONCRETE

WWW.FIRTH.CO.NZ/LOWCARBONCONCRETE