



Committed to reaching net zero carbon by 2050

Asphalt

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Heidelberg Materials





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Introduction



Heidelberg Materials UK makes essential materials to build our future and we are committed to reach net zero carbon by 2050.

We produce a range of heavy building materials including cement, aggregates, ready-mixed concrete and asphalt.

We are committed to fulfilling our role in meeting the UK government's ambitions and our parent company, Heidelberg Materials Group, has signed SBTi's Business Ambition for 1.5°C and joined the UN's Race to Zero campaign.

Our route to decarbonisation has been ongoing for many years and we have made significant headway.

We have a roadmap in place, which includes several important areas that will help us achieve net zero. These include:

- Improvements in plant efficiency and processes across our operations.
- Increased use of alternative raw materials and alternative fuels.
- Several industry-leading carbon reduction projects, including carbon capture and storage (CCS) at our Padeswood cement works in Mold, as part of the HyNet North West project, and demonstrating the use of a net zero fuel mix using hydrogen at our Ribblesdale cement works in Lancashire.

CO₂ emissions

reduced by 50%

since 1990

Investing

£55m by 2025

to cut CO₂ emissions by a further 15%



The Heidelberg Materials Group is transforming its business to build a more sustainable future and its strategy and sustainability commitments are shaped by the United Nations Sustainable Development Goals.

Working sustainably is at the heart of everything we do and our 2030 commitments are built around four pillars:

- 1. Net zero:** driving our decarbonisation/producing lower-carbon products
- 2. Safe and inclusive:** placing the health and wellbeing of our employees, communities and suppliers at the core of our operations
- 3. Circular and resilient:** supporting circularity to reduce/reuse materials and natural resources
- 4. Nature positive:** contributing through our biodiversity programmes/sustainable water management



Asphalt



Asphalt is durable, 100% reusable and recyclable.

Asphalt is one of the world's most recycled materials. It is used as the surface for 95 per cent of our roads – as well as for playgrounds, footways, car and lorry parking areas, airport runways and much more – it is uniquely versatile. It is also an essential material for ensuring the safe and efficient transportation of goods and people on motorways and local roads across the country.

Our high-quality solutions have been developed to be the ideal choice for a wide range of applications, from major civil engineering projects to domestic driveways and footpaths.

We are one of the UK's largest suppliers and are working with our customers to help meet their carbon reduction targets through innovative solutions such as our ERA range of warm mix asphalts, which can help cut the CO₂ emissions associated with asphalt production by up to 15%.

Cutting CO₂ emissions with
warm mix asphalt
by up to 15%



Sources of CO₂ emissions in asphalt

The asphalt production process has three main sources of CO₂ emissions:

- **Scope 1:** Direct production emissions from company owned or controlled sources, primarily from the asphalt plant itself.
- **Scope 2:** Indirect emissions from electricity consumption.
- **Scope 3:** Indirect emissions from purchased goods and services such as raw materials like bitumen, aggregates and recycled asphalt planings (RAP), as well as distribution to site.

Direct asphalt emissions
average 25kg
of CO₂ per tonne



Sources of CO₂ emissions in asphalt

The asphalt production process is typically as follows:

- Aggregates are stored in bays or bins before being transferred to the dryer/burner where they are heated to the required temperature.
- Next, they are usually transferred via a bucket elevator to the mixer, where the filler and bitumen is added to create asphalt.
- The manufactured product is then moved to hot storage bins from where it is loaded into trucks for delivery to end users.

The largest emission source at an asphalt plant is the dryer/burner, which heats up the aggregates to the required temperature of more than 100°C. The fuel source is normally gasoil, recycled oil or natural gas. The on-site mobile plant that moves the product around to keep it workable is a minor emissions source, while the use of electricity causes indirect emissions. On average the direct CO₂ emissions of asphalt are around 25kg per tonne.



We have several levers that will help reduce the CO₂ emissions associated with the production of asphalt. They are:

Supply chain and production process

Optimising our supply chain (e.g. delivering aggregates by rail) and plant set up, including state of the art production assets, will reduce CO₂ emissions by around a quarter. Increased digitalisation and global knowledge transfer to highlight best practices will further improve energy management, carbon reduction and reduce wastage.

Fuel source

The burner is the single largest CO₂ emission source in the asphalt production process. Changing the fuel source from gasoil to natural gas or recycled oil, will reduce the CO₂ emissions by ~25%, as natural gas has a lower CO₂ content per calorific value than gasoil. We will achieve further reductions by using alternative fuels including biofuels that are CO₂ neutral.

CO₂ emissions from electricity

Sourcing electricity from low carbon sources can substantially reduce CO₂ emissions. We purchase energy that is rated as a zero-carbon product for business.

Moisture content

Aggregates with a higher moisture content require more energy to dry and heat them to the required temperature. It is estimated that aggregates with a moisture content of 6% require double the amount of energy to dry and heat to the required temperature than those with 3% moisture content.

Using covered storage bays, leaving aggregates on stock for a few days and using aggregates from the top of a stockpile are all ways of reducing the moisture content.



We have several levers that will help reduce the CO₂ emissions associated with the production of asphalt. They are:

Asphalt mix temperature

In general, hot mix asphalt, produced at temperatures in excess of 160°C, is currently the default asphalt type being specified in the UK. Alternative products with similar characteristics, such as our ERA range of warm mix asphalts, which are produced at a lower temperature (110-150°C), have approximately 15% lower CO₂ emissions associated with production.

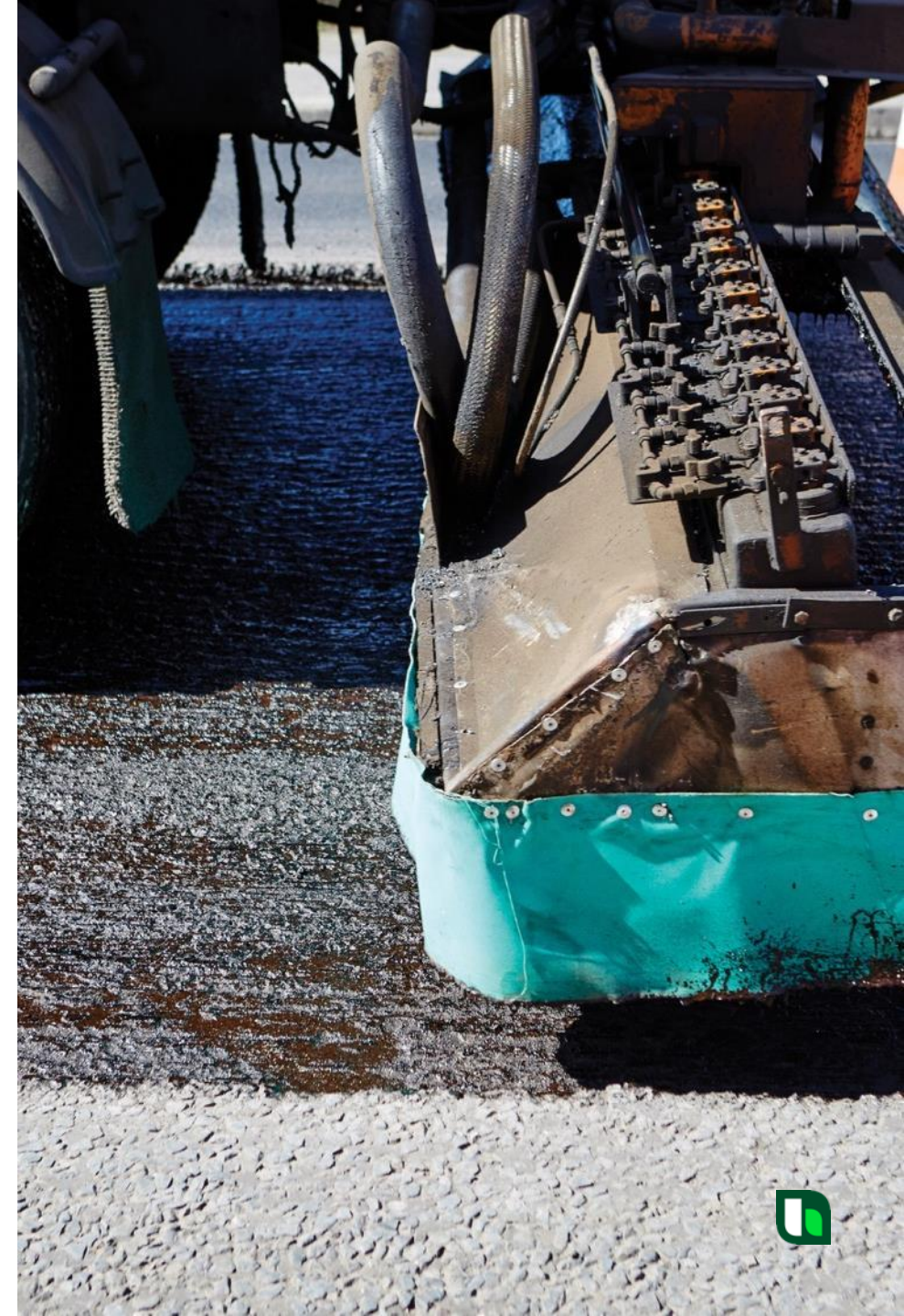
Recycled Asphalt Pavement (RAP)

Asphalt is 100% recyclable and using RAP in the asphalt production process avoids using virgin aggregates and reduces the use of bitumen. This supports the circular economy and helps reduce carbon emissions.

Product life

Extending the product life of asphalt helps to reduce carbon emissions as replacements are required less frequently. Asphalt life expectancy is based on many factors including its performance characteristics.

We have developed a range of sustainable asphalt solutions to improve the performance characteristics such as our single layer asphalt Tufflex, which uses a polymer modified binder (PMB). These products are designed with long term durability in mind. As they have low voids and they significantly reduce water ingress, which is a major factor in premature ageing and failure of asphalt. This supports the circular economy and reduces carbon emissions.



We're leading the way in the next generation of asphalts

Warm mix asphalt (WMA)

ERA WMAs can reduce the carbon emissions associated with asphalt production and laying by up to 15% (ERA 140) and up to 50% (ERA 100). They also offer additional benefits including:

- Faster setting times
- Increased durability through reduced oxidation
- Reduced steam production in wet weather
- Reduced odour on site
- Less fumes: a 12°C reduction in mix temperature reduces fuming by ~50%.

Alternative fuels

We are exploring the use of alternative fuels such as GTL (gas-to-liquids) as an alternative to diesel. GTL fuels are derived from natural gas, which burns more cleanly than conventional crude oil-based diesel. They also offer improved air quality, are classed as non-toxic, are odourless, readily biodegradable and have a low hazard rating.

Foam mix asphalt

Foam mix asphalt is currently a niche product in the UK, but we are exploring its wider application as we believe it has the potential to reduce carbon emissions by more than 50%. Foam mix asphalt consists of a high proportion of recycled asphalt using foamed bitumen resulting in cold asphalt paving, which leads to carbon savings. Road planings are reused in lower layer reconstruction, offering the additional benefits of savings in transportation and material disposal costs.

Anti-ageing and biogenic bitumen

We are engaging in early trials of anti-ageing and biogenic bitumen to extend the life cycle of asphalt, which will cut carbon emissions, as replacements are required less frequently. Both bitumen types resist oxidation, which is the key factor leading to hardening of the bitumen that ultimately leads to pavement failure. Trials of anti-ageing bitumen are encouraging whilst the development of biogenic bitumen is in its early stages.

Recycled plastic

We are also trialling a low temperature recycled bitumen, which uses chemically modified waste plastic to make it compatible with bitumen. This modified bitumen can be laid at lower temperatures (30-40°C) reducing energy consumption and carbon emissions. In addition, waste plastic is reutilised and prevented from going to landfill. We are the first asphalt producer in Europe to trial low temperature recycled bitumen.



Our actions today and what Heidelberg Materials UK has planned

By 2030

Done:

Scope 1:

- Usage of anti-ageing bitumen in asphalt

Scope 2:

- All purchased electricity is from carbon neutral sources

In progress:

Scope 1:

- Change all burners from gasoil to lower emission fuels
- Minimise moisture content in recycled and virgin materials
- Wider use of in situ recycling methods using cold emulsion binders
- Expand use of ERA WMAs
- Replacement asphalt burner plan to improve carbon efficiency
- Mobile plant efficiency
- Wider use of GTL fuels
- Further development of cold mix asphalt – emulsion technology to withstand greater traffic loading

Scope 3:

- Biogenic binders to reduce carbon footprint of bitumen
- Increase the use of recycled materials in asphalt production

In progress:

Scope 1:

- Start trials of using hydrogen in asphalt plant burners

2030

By 2040

Scope 1:

- Alternative asphalt types such as warm and cold mix asphalts become the norm
- Use of alternative bitumen types that increase the product life of asphalt become standard
- Majority of mobile plant runs on biofuels, electricity or hydrogen

Other:

- Self-charging road technology

2040

By 2050

- **Scope 1:** All asphalt plants have carbon neutral burners (use of hydrogen or biofuels)
- **Scope 1 and 3:** All mobile plant and delivery trucks are carbon neutral
- **Scope 3:** Input materials (scope 3 emissions) are carbon neutral
- **The asphalt business achieves net zero**

2050

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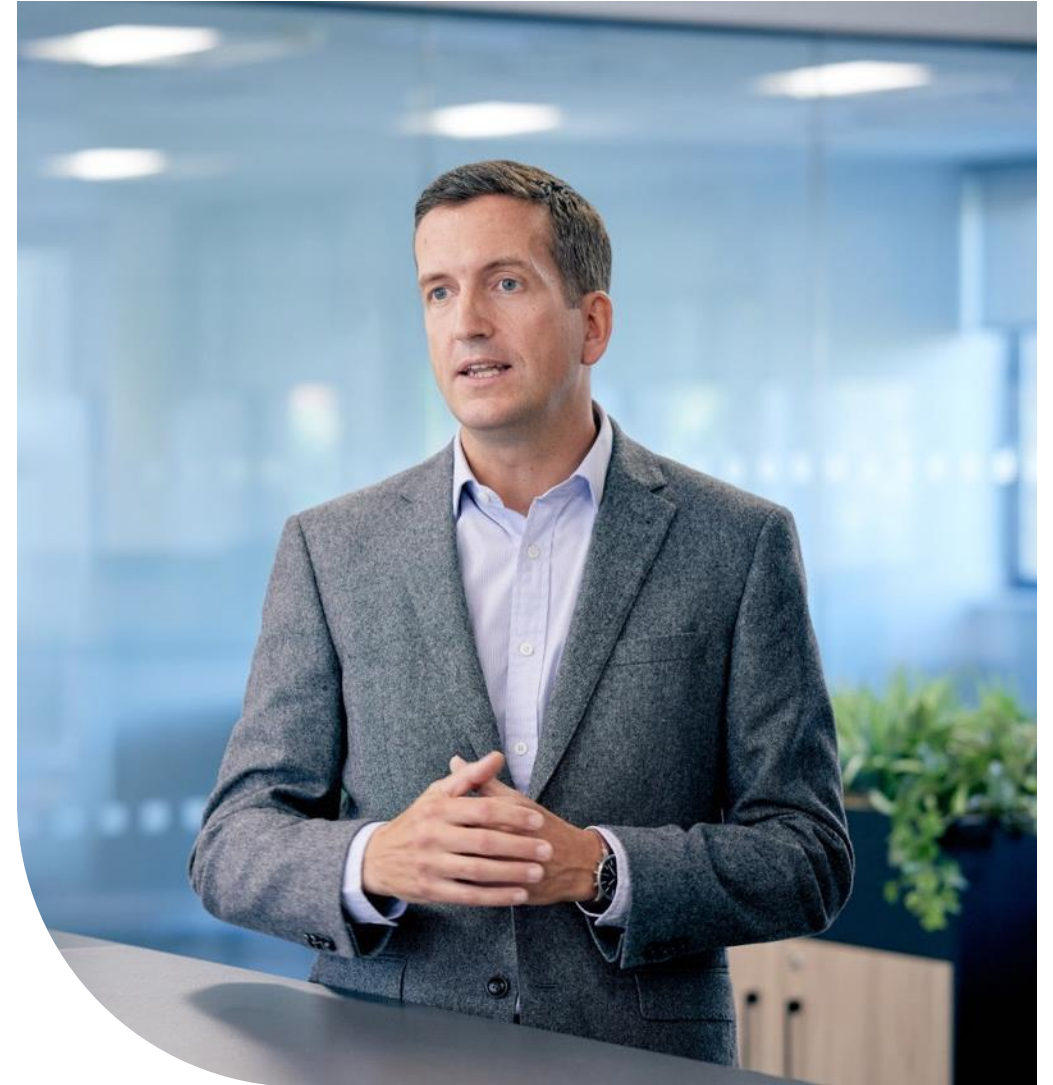




Sustainability and the path to net zero carbon are critical for our business. That's why we have set ourselves ambitious short, medium and long term goals to reduce carbon emissions with the ultimate objective that all our products and solutions are carbon neutral by 2050.

Gareth Day

Asphalt and Contracting Managing Director, Heidelberg Materials UK





Sustainability is at the heart of what we do, and we are committed to achieving net zero carbon asphalt. In the last 18 months we have seen the fastest rate of innovation in asphalt technology and we must continue this to meet our target.

Adrian Hadley

Head of Technical – Asphalt and Aggregate, Heidelberg Materials UK

Get in touch

Visit our website for more information and to find out how we can help you with your own carbon reduction aims.

[heidelbergmaterials.co.uk](https://www.heidelbergmaterials.co.uk)



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