

Slag aggregates

Sustainable aggregate solutions



Building our future



Slag aggregates

Offering quality, versatility, safety and economy, Tarmac slag aggregates provide sustainable solutions. Inherent benefits play a critical part in the preservation of natural resources whilst also delivering premium performance.

Versatile

Steel slag aggregates provide high abrasion and crushing resistance for road applications. Air-cooled blast furnace products offer increased bonding performance to both cement and bituminous binders.



The use of slag aggregates in construction dates back to Roman times where crushed slag from crude iron making was used in road building.

Today, approximately four million tonnes of slag aggregates are processed every year at our strategically located units across the UK. A direct alternative to primary aggregates, slag aggregates offer versatility and most importantly sustainable solutions to standard construction products.

Blast furnace slag

Formed during the manufacture of iron, molten blast furnace slag is cooled and processed in three ways to form slag aggregates for different applications.

Air-cooling

Cooled slowly by ambient air the slag is processed into different sizes for use primarily as a construction aggregate in ready-mixed and precast concrete, asphalt, as a fill material and also as a filter media in water and sewage treatment.

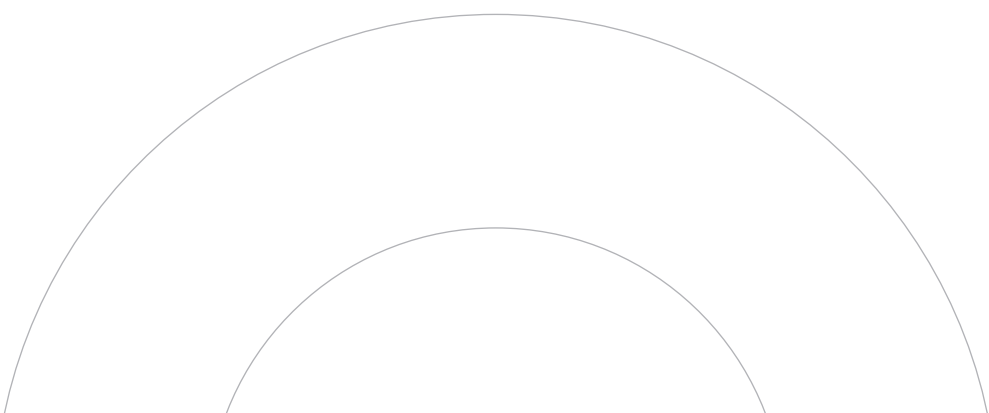
The largest air-cooled slag aggregate product, called riprap, is used to stabilise shorelines and stream banks and prevent erosion along slopes and embankments either loose or in gabion baskets. Air-cooled slag is also used in the manufacture of insulating mineral wool.

Granulation

The rapid cooling of molten slag by large quantities of water produces sand-like granule aggregate. Primarily ground into a cement replacement known as ground granulated blast furnace slag (GGBS) this is used in ready-mixed and precast concrete and masonry, floor levelling compounds and high temperature resistant building products.

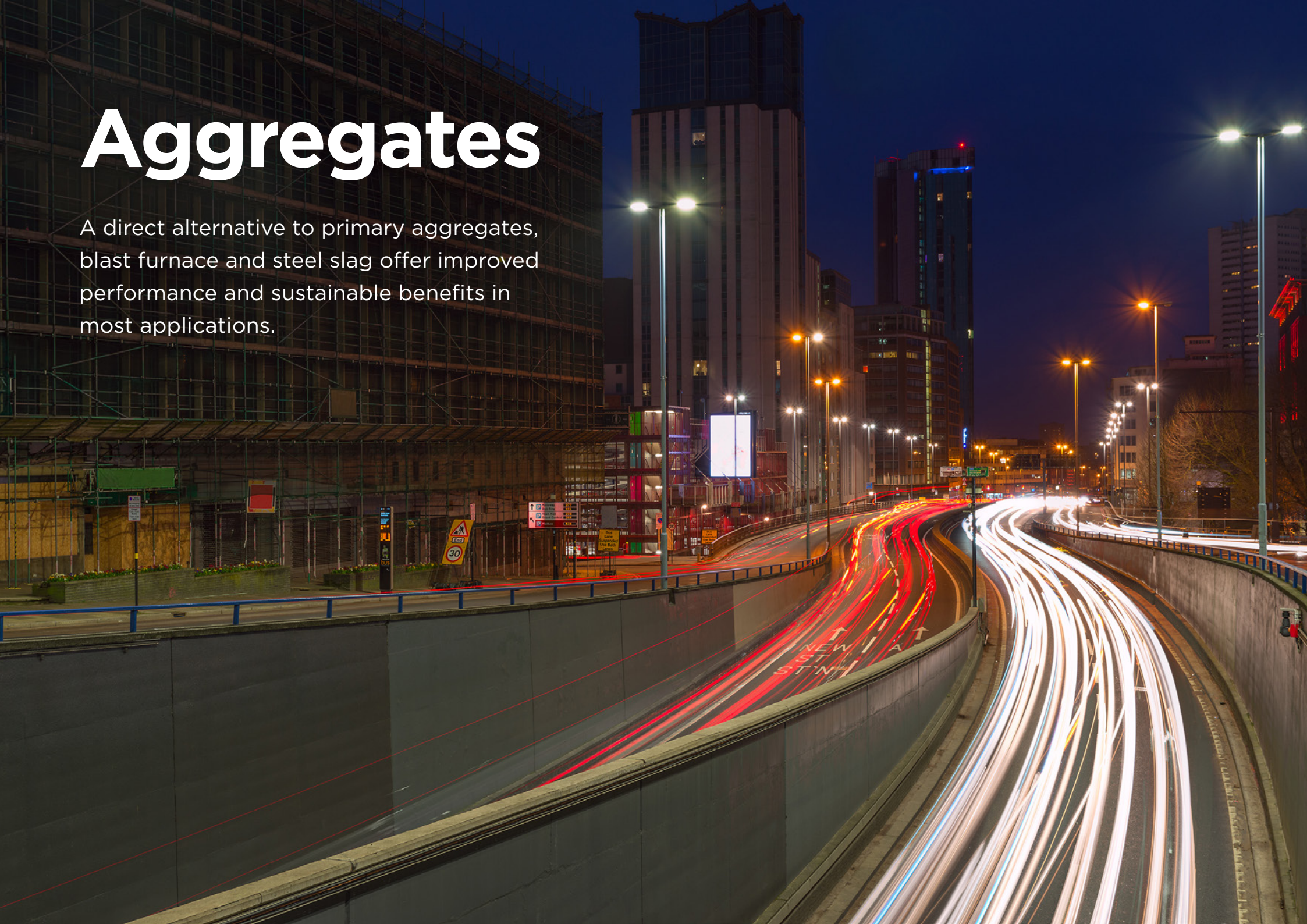
Steel slag

Steel slag is produced during the steel making process where, after air cooling, a dense rock material is processed and sized into specific products suitable for diverse applications. These include construction aggregates, rail ballast, agricultural soil amendment, in the manufacture of Ordinary Portland Cement and as an environmental remediation material. The durability and surface properties of steel slag also make it an ideal material for use in asphalt where high grip surfacing is required for skid resistance.



Aggregates

A direct alternative to primary aggregates, blast furnace and steel slag offer improved performance and sustainable benefits in most applications.



Performance

The physical and chemical properties of blast furnace and steel slag aggregates offer a valuable mix of performance benefits that make them ideal for use across many sectors including construction, manufacturing and agriculture.

Benefits

- Durable and strong
- Lower specific gravity and greater surface area than most primary aggregates
- Highly resistant to weathering action such as freeze
- Mildly alkaline (pH-value 8-10)
- No corrosion risk to steel in pilings or to steel embedded in concrete made with blast furnace slag cement and/or aggregates
- Reduced energy use and emissions from quarrying, processing and transportation of primary aggregates
- Reduced shipping and handling costs for precast units
- High resistance to sulfate attack and alkali-silica reaction
- Superior thermal properties to primary aggregates
- Higher levels of fire resistance in masonry
- Superior sound absorption
- Steel slag aggregates have high abrasion and skid resistance properties making them ideal for use in asphalt surface course materials.

Premium solutions

Quality controlled production delivers consistent chemical and mineral properties alongside shape and surface texture that provides unique friction properties and adhesion to bituminous and cementitious binders.

©

Building a more sustainable future

An aerial photograph of a winding asphalt road through rolling green hills. The road curves through the landscape, with several cars visible. A herd of sheep is grazing in a field to the right of the road. The scene is bathed in warm, golden light, suggesting a sunrise or sunset. The hills are covered in lush green grass, and the overall atmosphere is peaceful and scenic.

Slag aggregates are unique, sustainable products that can help minimise the impact of construction activity on the environment. At Tarmac they play an important role in our sustainability framework.

Tarmac's products and services support the move towards low carbon and more sustainable construction. We lead the industry, by continuously enhancing the 'whole life' performance of our products from the extraction of raw materials, product manufacture and delivery, to performance in use and recycling at the end of life.

Tarmac slag aggregates have inherent sustainability benefits which can play a critical part in delivering sustainable construction projects, providing the built environment today while managing resources for tomorrow. Blast furnace slag and steel slag offer significant carbon savings, across a variety of applications, as an alternative to primary and some recycled aggregates.

Certified to BES 6001, Tarmac slag aggregates have been utilised in numerous projects throughout the UK to help lower the environmental impact of the contract. Projects built under the BREEAM assessment scheme have used slag products to achieve the highest award under the scheme and points can also be obtained if participating in the Code for Sustainable Homes and CEEQUAL schemes.

Responsive sourcing

All of our products are certified 'Very Good' to BES 6001 (the framework standard for the Responsible Sourcing of Construction Products) and 100% of our operations have Achilles Building Confidence accreditation. Compliance with these two schemes enables our customers to achieve the highest possible BREEAM and CEEQUAL ratings and meet their own responsible sourcing obligations.

Low carbon products

We are committed to reducing energy consumption and CO₂ emissions through the use of waste-derived fuels and renewable sources of energy, and by incorporating recycled materials into our products. Our industry leading carbon footprint tool enables us to provide customers with a complete cradle-to-gate or cradle-to-site carbon report for all of our products.

Sustainable product performance

Tarmac leads the way in the development of innovative products, which are more durable, use resources wisely, have a lower carbon footprint and incorporate sustainable performance benefits in use such as increasing thermal efficiency or reducing the risk of flooding.

Product certification

Product quality is the cornerstone of sustainable performance and one of the reasons so many contractors choose Tarmac. Our products meet the strict criteria of construction technical standards and are manufactured and supplied in accordance with BS EN ISO 9001 Quality Management and BS EN ISO 14001 Environmental Management Standards.

Innovation

We continue to develop our product portfolio to meet our customers' evolving needs. We are proud to work with our customers and other partners and lead the industry in the development of construction materials that reduce energy consumption and carbon emissions.

FAQs

What are slag aggregates?

By-products of the steel and iron industries, slag aggregates have many valuable properties that can be used in construction and infrastructure projects.

What advantages do slag aggregates offer over other aggregates?

Steel aggregates have a high abrasion and crushing resistance for road applications; air-cooled blast furnace products bond particularly well to cement and bituminous binders. They also offer significant environmental benefits such as the re-use of secondary materials and avoidance of the need to quarry natural aggregates.

Are blast furnace and steel slags covered by a European Standard?

Yes, where applicable. Slag aggregates produced by Tarmac are supplied as CE marked products under the Factory Production Control Process of BS EN ISO 9001:2008 for the production of products to BS EN 12342-Aggregates for Unbound and Hydraulically Bound Mixtures, BS EN 13043-Aggregates for Unbound Bituminous Mixtures and BS EN 12620-Aggregates for Concrete.

What is meant by 'falling' of air-cooled blast furnace slag?

One of the minerals (beta dicalcium silicate) present in some crystalline blast furnace slags can undergo a transformation in its crystalline structure on cooling that can cause disintegration of the product in a phenomenon known as 'falling', 'dicalcium silicate unsoundness' or 'lime unsoundness'. Chemical equations and microscopic tests are intended to exclude slags that might contain this compound from use as aggregate. When it does occasionally occur, 'falling' happens only during cooling and will not affect slag aggregates in service.

How will the products be affected by the aggregates tax?

In April 2002 taxation was introduced on primary aggregates sold for construction purposes. Both blast furnace slag and steel slag are exempt.

What about expansion of slag aggregates?

Steel slag and old bank slags may undergo volumetric expansion in the presence of water. The risk of damaging expansion occurring when using steel slag produced in modern processes is minimised by a combination of careful production control and processing. Air-cooled blast furnace slag is non-expansive.

Why does steel slag expand and how are problems with expansion of steel slag avoided?

Steel slag contains oxides of calcium and magnesium (lime and magnesia) that expand upon reaction with water. Expansion issues in service are avoided by process control measures which subject the steel slag to long periods of natural weathering in exposed stockpiles before use. As part of this quality protocol the steel slag's volumetric expansion is tested during the weathering process at monthly intervals using in-house developed test methods and measured against set limits, with a minimum of three months weathering per windrow.

The quarantined windrows of steel slag are released for sale when expansion test data complies with internal control limits to ensure fitness for purpose as part of the CE and FPC requirements of BS EN 13242, the testing for volume stability of steel slag using BS EN 1744-1 19.3 is carried out at a minimum of six monthly intervals.

Does air-cooled blast furnace slag exhibit any volumetric expansion?

No. 'Falling' of blast furnace slag should not be confused with expansion.

What effects can slag aggregates have on groundwater quality?

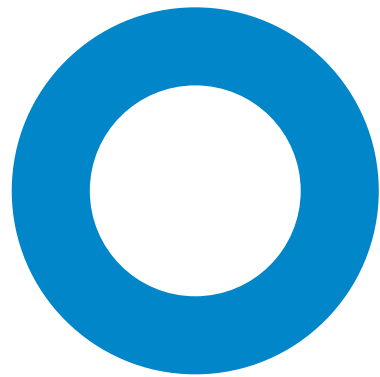
Unbound steel slag in contact with groundwater initially increases the pH-value of groundwater to about 11-12 but this 'first flush finite' effect diminishes once lime and magnesia have been washed from the surface. Similarly, blast furnace slag increases the pH-value and may also de-oxygenate stagnant groundwater. Adherence to QPA/Environment Agency guidance minimises these risks. More details are in CIRIA Report 167.

**We have achieved a BES 6001
'Very Good' rating across our entire
product range**



AWARDED TO _____





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