

Subsector	SIC code	Description	Total direct jobs	Principal fuel type	Key locations	SME concentration	Specific challenges	Decarbonisation considerations
Refractories	23200	Specialised high temperature materials, essential to other industrial processes	2000	Gas	Derbyshire, Midlands, North East, North West	Medium	Demand is dependent on other challenged industries such as steel, glass and cement. Highly specialised supply chains and small order volumes.	Refractories employ extremely high temperatures and require precise thermal controls which are not currently technically possible to electrify. Some are co-located with industrial sites so hydrogen or CCUS may be viable routes, though hydrogen costs may present a long-term barrier to fuel switching.
Ceramic tiles and flags	23310	Manufacture of wall, floor, and paving tiles, and flags made of ceramic materials.	600	Gas	South West, Midlands	Very High	Intense competition from imports, especially from Southern Europe and Asia, has decimated UK market share. Domestic demand fluctuates with construction cycles. Smaller producers face high input costs and limited access to working capital.	Electrification proven in Spain and Italy for medium-scale plants but remains technically and economically challenging. Hydrogen access limited outside industrial clusters. Material substitution and recycled inputs could reduce firing temperatures but face regulatory and quality barriers.
Building ceramics and tile	23320	Bricks, tiles, roof, wall, and other construction ceramics; bulk of UK ceramics output.	5600	Gas	National	High	Production depends heavily on the housing market and public infrastructure investment. Tight profit margins, ageing equipment, and low R&D investment limit innovation.	Vast majority of sites are continuous processes tunnel kilns which are challenging to electrify at this time, although there are examples in the EU. Lowering firing temperatures with material substitution may make this more possible, but this can be challenging within existing regulatory frameworks. Material substitution and dematerialisation is already being done (e.g. bigger and more holes in bricks).

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Household ornaments and articles	23410	Ceramic tableware, ornamental and other domestic products	3800	Gas, some electrified processes	Stoke-on-Trent	Very High	Heritage brands dominate but rely heavily on export markets vulnerable to currency swings and global demand shifts. Consumer preference for low-cost imports constrains domestic sales. The lack of Geographical Indication Status or other form of product trade protections for non-food items allow competitors to falsely brand their products as Heritage brands e.g. 'Royal Stafford'. SME base makes it more challenging to invest.	Electrification is possible and in use for smaller kilns, although economic challenges currently disincentivise fuel switch to electricity; Hydrogen access unlikely in near term.
Sanitary ware	23420	Ceramic sanitary ware and fixtures	600	Gas	West Midlands	Medium	Highly energy intensive processes with long production cycles. Aging facilities and strong import competition constrain profitability. Demand closely tied to housing and refurbishment markets, leading to cyclical production levels.	Technically challenging to electrify but Hydrogen firing and electric kilns are under testing, with the world's first electric sanitary ware kiln now in operation in Austria.

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Electrical insulators	23430	Ceramic electrical insulators and fittings	300	Gas	South Yorkshire, Midlands	High	Dependent on infrastructure investment cycles and public procurement. High technical standards and long approval processes deter new entrants. Facing increased competition from polymer substitutes.	Electrification possible for smaller batch processes. Sector could support grid expansion necessary for decarbonisation.
Other technical ceramic products	23440	Laboratory, chemical and industrial products.	900	Mixed, increasingly electrified	Derbyshire, Oxfordshire, Midlands,	High	Serves advanced manufacturing and R&D markets with high precision requirements. Competition from large international suppliers. High capital costs for specialised equipment and testing.	Many processes can be fully electrified although there may be challenges with some processes which require high temperatures and thermal control. Precise product specifications can create barriers to changing materials and fuel types.
Other ceramics	2349	Ceramics used in packaging and transport and other ceramics not elsewhere included.	500	Gas	N/A	Very High	Fragmented production base, often composed of small businesses serving local or niche markets.	Small-batch production could transition to electric kilns. Unlikely to be part of larger industrial cluster.

Table 2: Ceramics subsectors and challenges