

Coatings – the basis of the UK’s manufacturing economy.

In 2015/16 the surface coatings industry contributed an estimated £13.5bn to the UK economy. By improving surface characteristics and performances, it positively impacted products valued at about £173bn, directly adding value to 50% of the UK’s £358bn total manufacturing sales.

Ever since tools were first used by hominoids, improvements to their performance have been the bedrock of mankind’s technological, economic and social evolution and attributable to the tools’ critical outermost surface coatings. “Surface coatings” are “Substances applied to another material to change the surface properties”¹ and they can be thought of as methods for promoting longer use of engineering and structural components as well as providing reduced environmental impacts. The technologies and processes supporting the surface coating industry are known generically as “surface engineering”.

Between 2011 and 2015 the total sales from the UK’s manufacturing sector rose by 5%, from £341bn to £358bn². In 2014 the UK’s surface coatings business had a reported turnover of about £11.2bn and represented about 7.8% of the total value of products requiring surface coatings³, but the Institute of Materials Finishing (IMF) now estimates that by 2015/16, this had grown by about 20% to an estimated £13.5bn, giving a total market impact value of £173bn, or 50% of the UK’s total manufacturing sales.

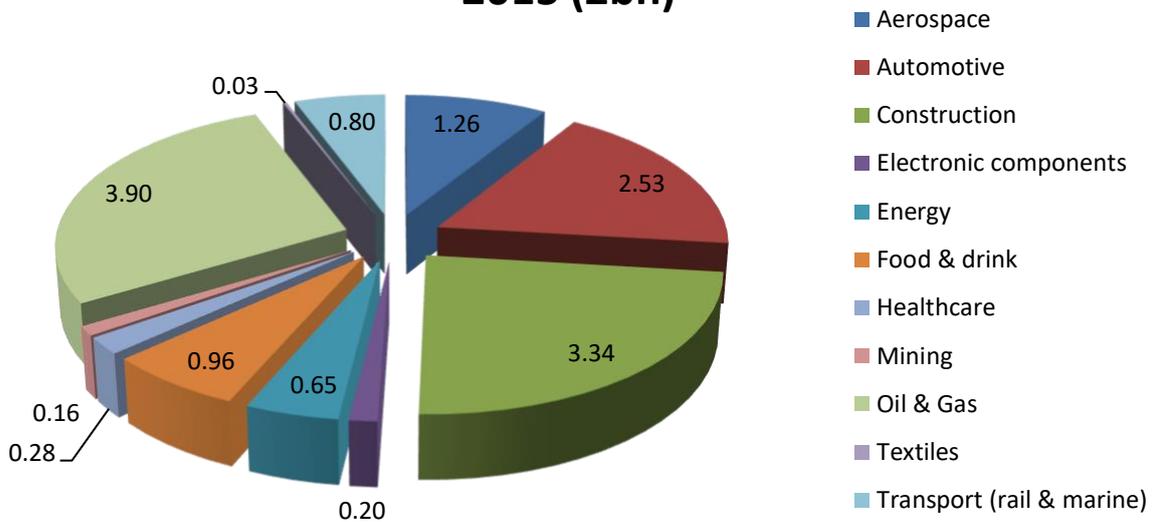
The surface coatings market embraces virtually all manufacturing sectors, but is dominated by the very diverse sectors of oil and gas, construction, automotive (Figure 1).

¹ <http://encyclopedia2.thefreedictionary.com/Surface+coating>

² Office of National Statistics; Prodcom; Intermediate estimates 2015.

³ SEAC SIG; “Time for a Strategic Change: UK Surface Engineering and Advanced coatings Industry”; pub SEAC SIG June 2014; (<https://admin.ktn-uk.co.uk/app/uploads/2016/11/Time-for-a-Strategic-Change-SEAC-SIG-report.pdf>; downloaded 10/12/16).

Market share of surface coatings, by value in 2015 (£bn)



Source: IMF –based on previously published SEAC SIG data

Figure 1: The market share, by value, of surface coatings, by end user.

The oil and gas industries require coatings to withstand the harsh environments met within their operations as well as providing maximum reliability to their functional parts.

These industries require virtually every type of available coating, many of which must provide high levels of both chemical and abrasion resistance, whilst others must provide specialist features, such as intumescent and heat resistant properties.

Conversely, the construction industry's demands on surface coatings are more focussed on using wet paints, plastics and powder coatings. Similarly, both the automotive and aerospace industries use high volumes of paints and powder coatings, as well as electroplating, anodising and thermal spraying for component protection and corrosion inhibition. It is estimated that about 60% of the aerospace industry's maintenance costs are directly attributed to corrosion⁴.

There are least 40 different surface engineering and advanced coatings processes, but the Institute of Materials Finishing is mainly concerned with the surface treatment of metals. In 2014 there were just over 1,300 enterprises treating and coating metals in the UK, when they employed an estimated 21,600 people⁵, with an average employment of about 17 people, so the industry is dominated by

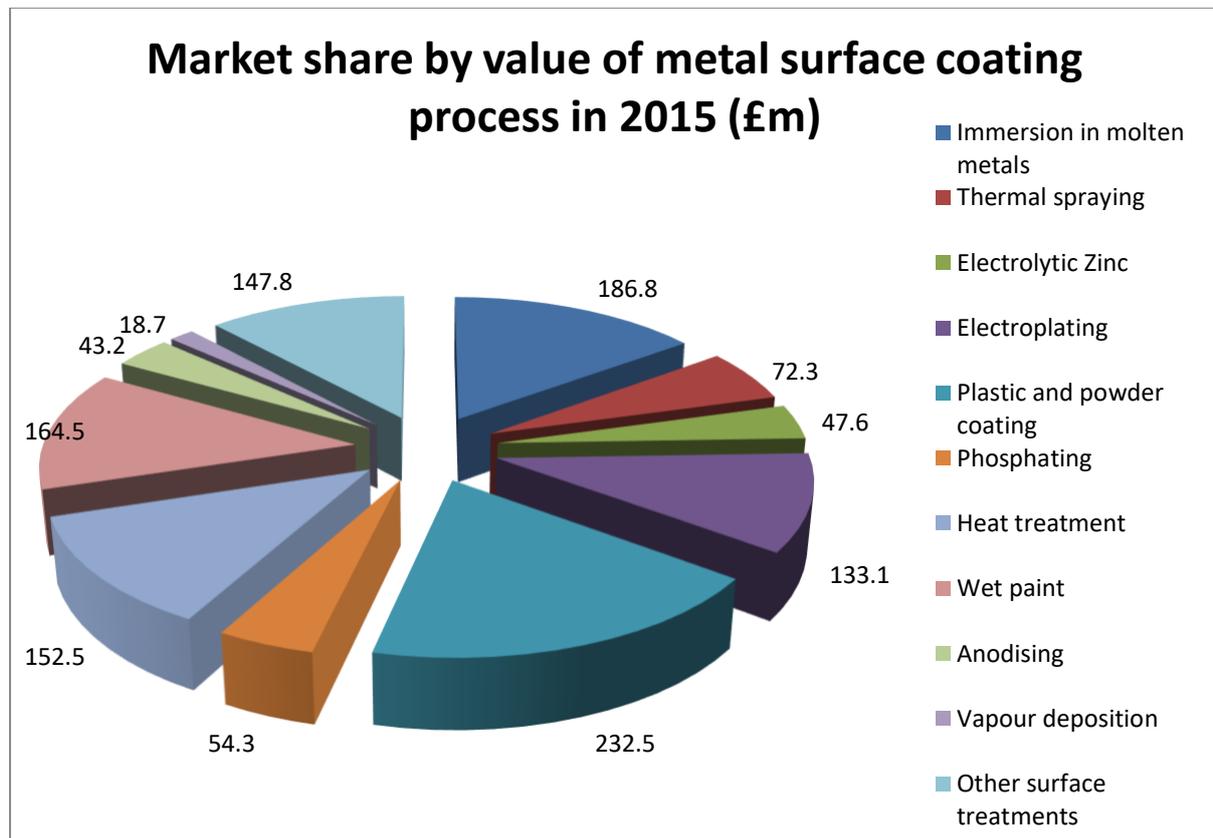
⁴ Prevention and control in corrosion; Colavita, M., Italian Air Force ([http://ftp.rta.nato.int/public//PubFullText/RTO/MP/RTO-MP-079-II///MP-079\(II\)-\(SM\)-10.pdf](http://ftp.rta.nato.int/public//PubFullText/RTO/MP/RTO-MP-079-II///MP-079(II)-(SM)-10.pdf))

⁵ Eurostat; Annual detailed enterprise statistics for industry (NACE Rev. 2, B-E) updated 14th December 2016

Small and Medium Sized Enterprises. These enterprises have a gross turnover of about £1.6bn and net sales of about £1.3bn⁶, or 10% of the total surface engineering sector.

The application of coatings to metallic substrates includes all forms of metallic and polymeric coatings for use as engineering and decorative finishes, corrosion protection, specialist coatings for the aerospace and automotive sectors, as well as the final manufacturing stages of electronics and electrical equipment; it also includes near-to-product manufacturing techniques such as electroforming. This industry sector has always been closely aligned with the formation of nano-scale structures and assemblies and many of the processes used in nanotechnology are based on well established ones that were originally used to produce coatings. Furthermore, the electrodeposition of metals, composites and alloys can allow the production of combinations of materials which cannot be otherwise manufactured.

The coatings sectors of major interest to the IMF's membership cover a wide range of processes, including the established technologies of galvanising, electroplating, anodising, plastic and powder coatings and wet painting, as well as more recently commercialised surface treatments such as vapour deposition and other niche processes such as ion implantation (Figure 2).



Source: Prodcom. /IMF

Figure 2: The market share, by sales, of metal treatment and coatings processes in 2015.

In 2015, the surface coating of metals was still headed by other metal coatings, with a 35% share of sales, worth an estimated £439.8m; this includes electrolytic zinc, electroplating and molten metal

⁶ Office of National Statistics; Prodcom Intermediate estimates 2015; pub 15th December 2016

immersion. This sector was followed plastic and paint coatings, with a 32% share, worth £397m. Surface treatments such as anodising, phosphating accounted for 8% (£97.5m), whilst other treatments, including heat treatment, ion implantation, vapour deposition etc accounted for 25%, or £319m.

However, in terms of specific processes, the UK's largest metal coating processes are plastic and powder coating, followed by molten metal immersion and wet paint coatings. Surface treatments can enhance both product performances and life expectancies, resulting in major environmental benefits such as reduced carbon dioxide emissions for both the manufacture and use of the final products. Through correct product specification and design, surface engineering can also promote reuse and recycling of critical materials and natural resources, helping to implement and foster the circular economy.

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