Coating solutions from Thermaspray for wear protection of glass product manufacturing tools

Joint venture companies Thermaspray and Surcotec have a combined technical expertise and experience of over three decades in offering a comprehensive range of coating solutions that protect against wear and extend the service life of tools used in the manufacturing of glass products.

Most technologies used in the manufacturing of products from glass include either glass melts or softened glass. Depending on their composition, glass melting points vary from below 1000°C to over 1700°C. “Exposure to such high temperatures can dramatically reduce the service life of manufacturing tools with subsequent downtime, production levels and financial implications for end-users,” explains Dr. Jan Lourens, Managing Director of Thermaspray, South Africa’s market leader in coating technology. Abrasive wear is another leading cause of decreased component lifespan. The deposit of thermal spray coatings on these tools can assist in extending the service life. Moreover, coatings can also prevent the corrosion of tools and help with the wetting problem when molten glass sticks on the tools.”

There are a number of specialised coating technologies which include thermal spray (Flame spraying, HVOF (High Velocity Oxy-Fuel), Plasma Spray) and hardfacing processes (powder welding, and PTA welding) which are used with self-fluxing powder in the production of new moulds, plungers, baffles, neck rings, plates etc.

According to Dr. Jan Lourens, thermal surfacing with self-fluxing nickel based alloys offers the ideal solution for wear protection of tools in the glass container industry. “Machine tools used in the manufacturing of bottles work under highly stringent conditions and are subjected wear, corrosion and fast thermal cycling. The major properties of self-fluxing nickel based alloys offer good abrasive and corrosion resistance at high temperatures resulting in the extensive use of nickel alloys for surfacing cast iron parts in the glass bottle manufacturing industry.”

The powder welding method which uses a simple oxy-acetylene torch has a deposit thickness of between 0.1 mm to 10 mm and is especially suitable for building up edges and corners. It can be used on original parts or for repairs on neck rings, blanks and final moulds.

The flame spraying process which consists of two steps - spraying with a spray gun and fusing of the deposit with a fusing torch - is recommended for cylindrical and flat pieces like a plunger for example, which can be rotated on a lathe or turntable.

Dr. Lourens recommends HVOF and plasma processes for less severe impact applications. “HVOF is normally used for coatings on narrow neck plungers and to a limited extent on both press and blow plungers in the glass mould industry.”

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PTA (Plasma Transferred Arc) welding is a coating method that is becoming increasingly popular in the glass mould industry according to Dr. Lourens. “As PTA is a welding method, it enables a metallic bonding with the base material. It can be used for both cast iron and bronze moulds and even bronze containing Zn (zinc). The method is most commonly used on bottom-plates and different types of guide rings.”

Thermaspray and Surcotec provide blue-chip companies in the local glass industry with a range of coating technologies. These include coating of scoops using plasma and HVOF coating processes, the coating of calibrator plates with HVOF process; PTA weld on plungers and the use of the HVOF process on dead plates, also known as transfers.

Ian Walsh, Marketing and Sales Manager of Surcotec, the oldest established thermal spray coating company in the Western Cape, affirms that they recently successfully completed a coating project for a key customer in the glass industry based in Cape Town.

“Our customer reported a life span of only five days on uncoated dead plates (figure 1) after which the original parts have to be scrapped. This was proving to be a very costly exercise and the customer looked to us for a solution. We recommended an application with the HVOF process which resulted in the extension of the coated components’ life span to an impressive five weeks after which re-coating was required. When we removed the transfer plate after four weeks’ service (figure 2), no wear was apparent on the coated leading edge compared to an uncoated part which after five days of use would have been completely destroyed. In addition to the fact that the components can be re coated indefinitely, our customer is also benefitting from great savings due to improved uptime of the bottle line and stock holding.”

Figure 1: Uncoated Transfer plate after 5 days in service

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Figure 2: Coated Transfer plate after 4 weeks service

Walsh also points out that as the cost of the coating is only 40% more expensive than the purchase of a new part, massive savings are realised on the purchase of replacement parts."

Component wear can be caused by a number of factors including high temperatures, abrasion, corrosion, etc. Thermaspray and Surcotec have the necessary expertise to provide the best coating or combination of coatings and process technology solutions for optimum component protection and life span extension, resulting in substantial time and cost savings for customers and end users.

Thermaspray, in a joint venture with Cape Town-based Surcotec, offers an extensive portfolio of engineering and thermal spray coating solutions that extend component life cycles to assist OEM and end-user clients across southern Africa in reducing costs and increasing production.
The companies' world-class quality wear- and corrosion-resistant thermal spray coatings, Plasma Transferred Arc (PTA) cladding and Polymer coatings (in partnership with Plasma Coatings USA and Diamant Metallplastic Germany) are augmented by a host of specialised allied services.

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