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EXPLOSIVE EMBOSsing OF HOLOGRAPHIC AUTHENTICITY SIGNETS

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Explosive embossing is an interesting process which allows the imprinting of even relatively soft materials, with almost any structure, into metals. The structural template is placed on the part or on the mould surface and then transferred into the metal by a strong impulse from an explosive. A holographic structural template - or any other structural template - placed between the explosive and the metal plate can also create a detailed embossing. The structural template is destroyed in the process. This means that the process cannot be copied even where an identical structural template is used, as a complex process such as embossing with detonation could never be repeated in detail by product pirates. Explosive embossing is consequently an ideal protection against piracy. The detonation also hardens the embossed material. A resolution of under 100 nanometres can be achieved.

Further development of the explosive embossing process for the holographic nanostructuring of steel surfaces means that it is no longer necessary to produce a costly daughter-shim. It is now possible to imprint the holographic structures of a relatively soft master-shim (nickel) onto a significantly harder steel material. The holographic structuring of steel inserts means that significantly higher residence times can be achieved in injection moulding, hot and cold stamping of foils and other substrates. This is an ideal starting point for cost-efficient mass production with an individual, non-reproducible holographic authenticity signet.

In addition, the explosive embossing process can be used to mark the lateral area of stamping rollers with a holographic structure, which is then transferred onto plastics and other materials during processing. These rollers have a significantly improved residence times compared to current rollers made from nickel materials. Other potential applications are embossing dies and erosion electrodes.