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Eco friendly mobility by vacuum coating: applications for low friction and light weight.

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For mobility eco-friendliness implies a reduction of pollution by toxic gasses, particulates and since the last 20 years also a reduction of greenhouse gases. A large development step was made with the introduction of high pressure injection systems leading to a dramatic improve of combustion efficiency. Carbon based coatings were enabling this because of their wear protection. Due to global heating the reduction of CO₂ became an important driver for further automotive developments in recent decades. Maximum allowed emissions were imposed and the automotive industry was forced to take strategic development measures. This caused a shift in the functional requirements to the coating systems from wear resistance only to reduction of friction and wear. Weight reduction plays an important role in saving fuel and thus reduced CO₂ emission. All these energy-saving developments have increased the demand for wear protection. Carbon-based coatings and especially hydrogen free tetrahedral carbon are playing a major role in achieving low friction and high wear protection. Today component coatings are applied on tens of millions components yearly. Large acceptance of coatings required cost reduction and thus high capacity systems. Nowadays also in-line technology is applied for the production of component coatings. Weight reduction causes a shift in applied materials, both in the engines as in interior and exterior parts. The latter are increasingly replaced by the light weight alternative of plastics. As hexavalent chromium will be banned in 2017, PVD-coatings are a viable alternative to replace electroplating. Processes like Cromatipic offer solutions for adhesion and levelling by application of a UV cured base lacquer covered by a PVD metallization with Cr. In aerospace applications reduction of weight is an important driver as well. Coatings are applied in engines. In bearings coatings play an important role for wear protection. In case of oil starvation due to failures in the lubrication system, safe operation is prolonged during the flight.

Keywords

Mobility
component coatings