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EARTO Innovation Award 2016 goes to Dresden

Brussels, 12th October 2016

Tonight, Fraunhofer IWS Dresden received the second prize of the EARTO Innovation Awards 2016 in the category Impact Delivered for the: Development of super hard diamond-like carbon coatings for improved energy efficiency. These coatings are applied on piston rings and other parts in the powertrain. Coated piston rings show a reduction in fuel consumption of about 1.5 % or 3 g/km CO₂ emission. Series production has started. Further components will follow.

The reduction of friction has an especially large potential to reduce fuel consumption and CO₂ emission. Studies have revealed that a consequent use of coatings for the reduction of friction can lead to worldwide savings of up to 117 billion liter of fuel per year which corresponds to savings of up to 290 million tons of CO₂ emission. Hydrogen free carbon coatings (ta-C), the next generation of DLC, have a higher content of diamond bonds and a hardness which is a factor of 2-3 higher as compared to conventional DLC coatings. Therefore they reveal a significantly higher wear resistance especially under high load. Moreover they show excellent properties under dry running conditions. Depending on the working conditions they also show drastically reduced friction values.

Due to the urgent need of a reduction in fuel consumption ta-C coatings are of utmost interest for the automotive industry and their suppliers. Piston rings are known to have a significant impact on fuel consumption and CO₂ emission. They contribute to about 25 % to the total friction losses, which corresponds to 6 % of the total fuel energy. Fraunhofer has started an ambitious program with industrial partners, namely Vakuumtechnik Dresden (VTD) as an equipment manufacturer and Federal Mogul (FM), the world leading manufacturer of piston rings in order to exploit this potential to reduce fuel consumption. Due to the extreme wear conditions large coatings thicknesses of up to 20 µm are necessary, which up to now only can be made by the laser arc process developed by Fraunhofer IWS Dresden.

As a result it could be proved that ta-C coated piston rings have a wear resistance which is more than doubled as compared to the best alternative. Scuff resistance, especially important in modern combustion engines, improved by a factor of 10. Extensive tests confirmed that the use of ta-C coated piston rings resulted in a friction loss reduction of up to 20 % and therefore show an advantage in fuel economy and CO₂ reduction of 1.5 % and 3 g/km CO₂, respectively.

At the end of the year 2015 seven laser arc modules were built and delivered by Fraunhofer while the coating equipment was built by the industrial partner VTD. In the next years further coating machines will be built in order to meet the growing demand. Series production at Federal Mogul started late in 2015 and in 2016 a production volume of about 30 million ta-C coated piston rings is expected. Market penetration is expected to grow extremely rapidly since all major European car manufacturers have adopted or initiated testing these rings for their future engine programs.

The EARTO Innovation Awards were delivered during a ceremony held on 12th October at the BelVue Museum in Brussels by the European Commission Vice-President for Jobs, Growth, Investment and Competitiveness Jyrki Katainen. Fraunhofer, Europe's largest application-oriented research organization, has now received the distinction for the sixth time.

About EARTO

EARTO is the European trade association of the research and technology organizations (RTOs), a nonprofit organization founded in 1999. EARTO groups over 350 RTOs, with a combined staff of 150,000, an annual turnover of € 23 billion, special equipment and facilities to a value of many € billions and more than 100,000 customers from the public and private sectors annually.

www.earto.eu

About EARTO Awards

The EARTO Innovation Awards are given since 2009 to illustrate key contribution to innovation of Research and Technology Organizations. The Impact Delivered Award is given to an innovation which has proven its social and/or economic relevance, is today on the market and has proven its impact.

About Fraunhofer IWS

The Fraunhofer IWS conducts applied research and development in the field of laser and surface technology. Our core activities cover a wide range of areas such as laser welding, cutting, coating, hardening and cleaning as well as surface and thin film technology, vapor deposition processes, process monitoring and nano particle technology.



ta-C coated piston pins
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EARTO Innovation Awards Ceremony on October 12, 2016 in Brussels
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