

News Release

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Merck KGaA, Darmstadt, Germany, Launches New High-Temperature Pigment Series for the Ceramics Industry

- **Thermaval™ pearlescent pigments withstand high temperatures of over 1,100°C**
- **Four color pigments in gold, silver, copper and red with metallic shine**

Darmstadt, Germany, July 8, 2016 – Merck KGaA, Darmstadt, Germany, a leading science and technology company, has developed innovative products for the ceramics industry. Thermaval™ pigments, the first series of pearlescent pigments for the high-temperature range, not only retain their brilliant color when used in ceramic glazes at cost-efficient single firing temperatures beyond 1,100°C, they also enable completely new sparkle effects.

As an innovation leader, Merck KGaA, Darmstadt, Germany, has thus achieved what has not been possible before with pearlescent pigments. Until now, ceramics manufacturers have only had the possibility of on-glaze decoration to enhance their products with pearl luster effects. On-glaze decoration is fired at considerably lower temperatures of around 800°C and is far less dishwasher-resistant than the result with the in-glaze method (high- temperature fast firing process). However, due to the extremely high operating temperature of over 1,100°C for single firing, conventional pearlescent pigments have considerably lost their color effect until now. "By contrast, Thermaval™ pigments withstand high temperatures without losing their high color intensity. They also exhibit a completely new, intensive sparkle while showing very good dishwasher resistance," said Carsten Handrosch,



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Deputy Head of R&D Decorative Pigments at Merck KGaA, Darmstadt, Germany, about the breakthrough in the high-temperature range.

Four temperature-stable effect pigments from the Thermaval™ series from Merck KGaA, Darmstadt, Germany, are available to ceramics users: Thermaval™ Metallic Silver, Thermaval™ Metallic Gold, Thermaval™ Metallic Copper and Thermaval™ Metallic Red. "The launch of Thermaval™ marks the first of many highly innovative product developments that we will introduce to the market this year as part of our high-value strategy in the field of industrial pigments," said Alexander Peters, Head of Global Marketing Decorative Pigments at Merck KGaA, Darmstadt, Germany.

Merck KGaA, Darmstadt, Germany, has signed an exclusive contract with Ferro GmbH effective through February 2017 for the application of its Thermaval™ pigments in the tableware sector. Ferro is a market leader in ceramic decoration and ceramic pigments based in Frankfurt am Main, Germany. "Merck KGaA's, Darmstadt, Germany, innovative pigments for the high-temperature range offer our customers unique effects that weren't possible to date – and they are practically free from lead and cadmium," said Hans Hilgenfeld, European Product Manager Performance Colors & Glass at Ferro. He emphasized, "Our new Starlight 100 in-glaze series for porcelain, which is based on Thermaval™ technology, is the promising result of an excellent development cooperation with Merck KGaA, Darmstadt, Germany."

Merck KGaA, Darmstadt, Germany, will independently market the new Thermaval™ pigments in the floor tile, sanitary ware, enamel, roof tile, and glass segments.

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About Merck KGaA, Darmstadt, Germany:

Merck KGaA, Darmstadt, Germany, is a leading science and technology company in healthcare, life science and performance materials. Around 50,000 employees work to further develop technologies that improve and enhance life – from biopharmaceutical therapies to treat cancer or multiple sclerosis, cutting-edge systems for scientific research and production, to liquid crystals for smartphones and LCD televisions. In 2015, Merck KGaA, Darmstadt, Germany, generated sales of € 12.85 billion in 66 countries.

Founded in 1668, Merck KGaA, Darmstadt, Germany, is the world's oldest pharmaceutical and chemical company. The founding family remains the majority owner of the publicly listed corporate group. Merck

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