



Press Release

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Highly-filled, fast-flow material balances reliability and processability, extends company's package-level underfill leadership with multi-format solutions

Henkel unveils semiconductor capillary underfill for advanced silicon node flip chip applications

Irvine, CA – Henkel today announced the commercialization of its latest semiconductor-grade capillary underfill (CUF) formulation for advanced packaging applications. The material, Loctite Eccobond UF 9000AG, enables advanced silicon (Si) node flip chip integration by providing robust interconnect protection and compatibility with high-volume manufacturing environments. While the company has well-established pre-applied paste and film underfill materials for leading-edge chip technologies, this development broadens Henkel's post-applied capillary portfolio for flip chips with advanced node scaling.

Loctite Eccobond UF 9000AG breaks past conventional formulation paradigms, balancing high filler loading and fast flow capability to meet the extreme reliability and volume demands of next-generation semiconductor device packaging. Already proven in mass production environments with the latest node and currently under evaluation for next-generation node flip chip packages, the product is an epoxy-based underfill designed with a high glass transition temperature (T_g) and ultra-low (<20 ppm) coefficient of thermal expansion (CTE). Though among the market's highest filled (>70%) formulations to enable excellent bump protection, it still underfills 30% faster as tested against previous-generation and competitive CUFs. In addition, Loctite Eccobond UF 9000AG provides high fracture toughness, low warpage, and MSL3 reliability on dies ranging in size from 10mm x 10mm to 20mm x 20mm.

"This innovative solution represents a major breakthrough for the future of advanced node flip chip device processing and end product performance," said Ramachandran Trichur, Henkel's Global Market Segment Head for Semiconductor Packaging Materials, explaining the significance of the material's unique filler, resin and hardener balance. "Historically, high filler loading has correlated with slower underfilling rates. Loctite Eccobond UF 9000AG moves

beyond this boundary. It gives integrators of the latest node – and potentially next-generation node – chips a more comprehensive low CTE, high flow solution that marries productivity and thorough solder joint protection.”

The increasing use of the latest node flip chips and the projections that next-generation node scaling devices will be in volume production by year’s end underscore the immediate requirement for a proven, reliability-enhancing chip protection solution. Loctite Eccobond UF 9000AG meets the challenging performance metrics of advanced mobile devices and, having passed harsher thermal cycling level C testing (-65° C to 150° C), may also be a good candidate for certain automotive electronic and computing applications.

“With the addition of a best-in-class CUF, Henkel is now distinguished among semiconductor material suppliers as having engineered underfill formulations in every format to address the most advanced chip designs,” said Trichur. “Henkel’s pre-applied non-conductive paste (NCP) and non-conductive film (NCF) underfills are currently used in high volume advanced package manufacture. Loctite Eccobond UF 9000AG adds a leading-edge silicon node-capable capillary material to the mix. Regardless of process preference or device requirement, Henkel delivers innovation versatility for the most sophisticated semiconductor technologies.”

For more information, visit www.henkel-adhesives.com/electronics.

About Henkel

Henkel operates globally with a well-balanced and diversified portfolio. The company holds leading positions with its three business units in both industrial and consumer businesses thanks to strong brands, innovations and technologies. Henkel Adhesive Technologies is the global leader in the adhesives market – across all industry segments worldwide. In its Laundry & Home Care and Beauty Care businesses, Henkel holds leading positions in many markets and categories around the world. Founded in 1876, Henkel looks back on more than 140 years of success. In 2021, Henkel reported sales of more than 20 billion euros and adjusted operating profit of about 2.7 billion euros. Henkel employs about 53,000 people globally – a passionate and highly diverse team, united by a strong company culture, a common purpose to create sustainable value, and shared values. As a recognized leader in sustainability, Henkel holds top positions in many international indices and rankings. Henkel’s preferred shares are listed in the German stock index DAX. For more information, please visit www.henkel.com.

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