Undressing Wearables: Electronic Materials are Essential to Function and Reliability

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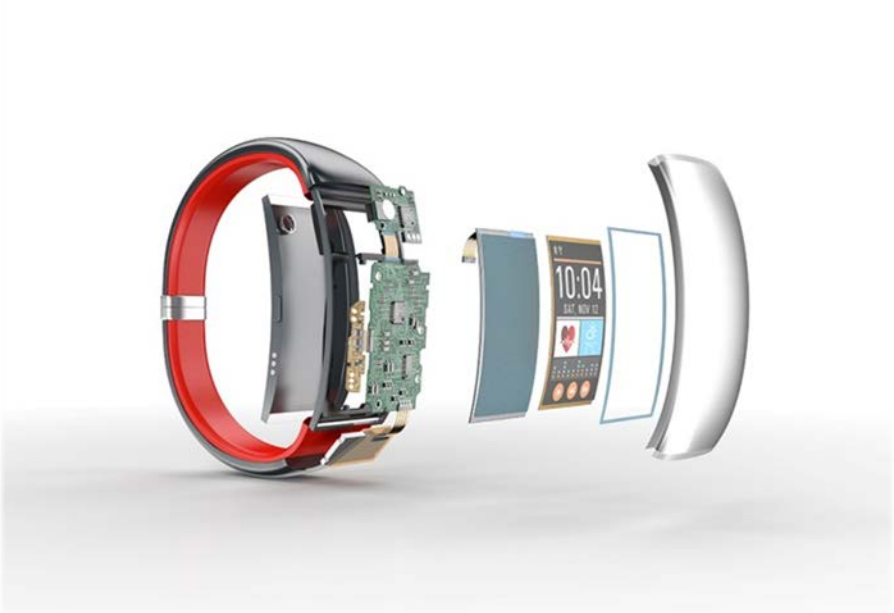
The second quarter of 2015 saw triple digit growth in the wearables market, according to market analyst IDC, and the category continues to expand. With shipment volumes of 18.1 million units, Q2 2015 represented a 223% increase in shipments over the same period in the prior year. Wearable market leaders like Fitbit, Apple, Xiaomi and Garmin continue to drive new developments and broaden wearables applications, while consumers continue to embrace their style, function and convenience.

Sustained growth in the sector, however, is dependent upon reliable function of the individual's preferred wearable device(s). In other words, while fashion and style are key factors, dependability and high functionality play equal – if not more important - roles. Extremely capable electronics materials that allow for high-volume processability, adaptability to manufacturing dynamics and miniaturized designs, as well as delivery of robust device protection against multiple environmental factors, are non-negotiable for products in the new wearables ecosystem.

Processability and Function

Materials that effectively provide signal carrying through robust electrical interconnects are what allow wearables to work as designed. With increasing use of flex circuitry and highly miniaturized dimensions, using material formulations such as Henkel's electrically conductive adhesives and inks deliver fast, low temperature processing for high-volume, sensitive componentry. The ability to accommodate flexible substrates while also ensuring the required performance is a delicate balance, but one that advanced materials can provide.



As consumer cost expectations are also a big consideration for manufacturers of wearables, the materials selected must align with cost/performance ratios. This is where a breakthrough material such as Henkel's game-

changing LOCTITE® GC 10 temperature stable solder paste can add tremendous value. While providing superior performance on the line and in use, LOCTITE GC 10 also adds an entirely new dimension to the performance of the bottom line. Temperature stability delivers unprecedented storage flexibility, shipping cost reduction and stability in process – all combining to offer an exceptionally low cost of ownership. This material, in addition to market-leading solders such as LOCTITE HF 212, also ensure compliance through their low halogen content and lead-free composition, which are important factors for the wider consumer market.

Reliability

The high reliability of handheld smartphones and tablets has established a precedent for wearables that is a bit more challenging to accommodate. Whereas the protection of handheld devices certainly isn't easy, the primary concerns are around drop and shock, as well as the occasional coffee or soda spill. With wearables, the constant proximity of the devices to the human body introduces the need not only for shock and drop protection, but safeguarding from moisture and salts in sweat, fluids such as sunscreen oil or soda, extreme temperatures, water submersion and more. It's a completely different scenario with wearables.

While this may seem like uncharted territory, device protection – even from the aforementioned conditions and materials --- is something Henkel has been managing for quite some time. Novel encapsulants that deliver both UV and shadow cure capability can be applied specifically to areas that require reinforcement as well as moisture or physical protection. Underfill material development is an area where Henkel has excelled and these products are essential for area array devices that are more sensitive to bend, shock and drop. Plus, with Henkel's robust reworkable underfill solutions, substrate recovery is an option if a component becomes non-functional, helping to eliminate scrap and reduce cost. Low pressure molding materials like Henkel's award-winning TECHNOMELT® formulas are also emerging as possible contenders for the external housing of wearable devices. In fact, electronics-enabled wristbands for consumers in different industries are already incorporating the materials in high-volume production. For these products, TECHNOMELT has successfully been employed for the encapsulation of RFID devices, flex circuitry and embedded sensors that are integrated into a wristband, raising the reliability level of these devices through protection from water, skin exposure and normal wear and tear from environmental impacts. Each application has specific reliability and longevity requirements as well; while the wristbands used for the entertainment industry are generally for short-term, consumable use, those in the medical industry tend to be more sophisticated and high-reliability products.

Resources beyond Compare

Henkel's reputation in the industry as the premier semiconductor and electronics assembly materials supplier is well-deserved. And, when it comes to wearables, Henkel's decades of expertise within the handheld, communications and medical sectors have informed some of the latest advances in wearables manufacturing. The ability to partner with a single source for

everything from solder to inks to encapsulants and underfills offers a supply chain advantage not available anywhere else.

But, it's not just its electronics know-how that makes Henkel the ideal wearables partner. Because Henkel is comprised of multiple businesses – one of which is laundry and home care – the holistic organizational structure enables wearables development that's untouchable. For example, the company is already working on understanding garment wearables and the impact of wash cycles and detergents (part of Henkel's Laundry division) on the clothing's electronics.

Wearables are the complete package – the union of fashion, function and reliability – and Henkel is the total solutions partner when it comes to this exciting market sector.