# Surge in demand for flexible circuit assembly expected by 2025



In the rapidly evolving landscape of technology, the demand for flexible circuit assembly is witnessing an exceptional surge, expected to peak in 2025. David Fromm, Chief Operations Officer of Promex Industries, Inc., detailed this trend in an analysis for Semiconductor Digest. He indicated that customer inquiries concerning flexible assembly capabilities have risen dramatically from a mere 10% two years ago to an astonishing 70-80% today.

According to Fromm, the complexity of these requests has also increased significantly. Assemblies that incorporate flexible circuit boards now often involve intricate designs such as chip-on-flex and other non-surface-mount components. The advantages of flexible circuits over traditional rigid circuits are crucial; they offer greater product design flexibility and adaptability in various applications, yet they also come with distinct challenges. As the technology matures, so too does the need for modified equipment and workflows to accommodate these advancements in assembly processes.

The primary driver behind this burgeoning interest in flexible circuits lies in their deployment across information-gathering devices, which increasingly rely on sensors and actuators. These devices connect to the cloud, often via smartphones, and require a degree of compactness and durability which flex circuits can provide. The nature of these devices often necessitates a flexible design, allowing sensors to be positioned precisely where they are needed. As a consequence, the assembly processes must consider the mechanical stresses introduced during the movement of these flexible circuits.

Creating an effective assembly solution for these components involves overcoming significant engineering hurdles. Fromm explained that it is essential to limit motion in the Z direction and prevent curling of the flex substrate during the assembly phase. Additionally, selecting the right encapsulant and underfill materials is vital to accommodate the movement in the completed device while safeguarding sensitive electrical and mechanical joints.

Further accentuating the rising demand for flexible circuits, Fromm highlighted advancements in fabrication technologies—specifically in lithography—enabling the production of high-density circuits on flexible substrates. The capabilities have evolved to such an extent that circuits on flexible materials are now achieving trace densities comparable to rigid substrates, with commercially available flex accommodating lines and spaces as narrow as 10 microns.

The adoption of flex technology is transforming a wide array of industries, impacting applications from wearables and medical implants to automotive and aerospace systems. Notably, even sophisticated projects like Mars Rover units are utilising rigid-flex technologies as well as extended-length flexible circuits, demonstrating the crucial role of advanced semiconductor packaging in maximising functionality within limited space.

Moreover, the evolving material requirements for these devices, especially for bio-compatible materials suited for implantable and wearable technology, are presenting additional assembly challenges, as fewer material options are available. Nonetheless, flexible circuit technology mitigates common issues associated with connectors, which are prone to failure. The durability and robustness of flex circuits make them less vulnerable to thermal cycling failures, further bolstering their appeal in various applications.

As Fromm concludes, the compelling growth trajectory of flex assembly indicates a persistent rise in demand for contract manufacturing capabilities, predicated on the expertise and knowledge of skilled engineers and assembly specialists in the field.

Source: [Noah Wire Services](https://www.noahwire.com)

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