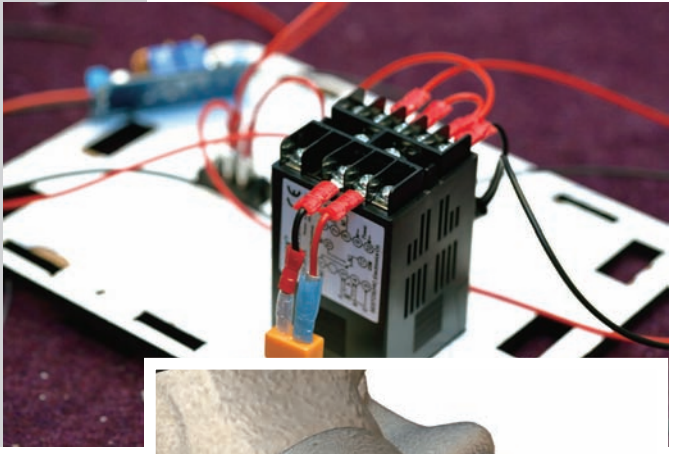
Small Screw in the US Electronic and Medical Markets



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Introduction

Small fasteners have created substantial progress in the industrial markets globally such as electronic components and medical industries. Threaded small screws were among the first types of fasteners that fit well in such applications recognized by limiting design structure and path for fastener placement and installation. Although there are many types of small fasteners utilized in various industries, small screws remain a feasible and practical choice today in many applications and several industries.

In order to define a small screw, there are various definitions of small screws, for example in screw feeding systems, small screws are known as screw sizes smaller than #4 for American National Standard or ANSI screws. For metric screws, sizes smaller than 3 millimetres would also be considered small screws. Another definition defines small screws as fasteners with the diameter where the assembly time starts to increase compared to typical screw configuration. Generally, assembly time decreases with decreasing diameter and accordingly as fasteners get tinier, fasteners bring big feeding and driving challenges to engineers and manufacturers.

Assembly Issue

The process of installing small and micro screws into assemblies has caused challenges on the production line and it has increased a variety of related workplace issues. The challenge of the assembly of small screws is the overall length to the head diameter ratio. For some of the small screws this ratio is near to 1:1 which is very challenging to feed successfully. The rule of thumb is that the overall screw length needs to be longer than the major diameter of the screw head. If those small screws are non-ferrous the assembly process would be even tougher with higher accuracy since it would require a vacuum pick up.

The major issue with assembly applications involving small screws is the lack of clearance allowed around the screw head for driver components. That is, screws are too close to the wall of the customer's application, and consequently in some cases the assembly parts may not put together well for good part alignment.

Small and Micro Screws' Applications

Applications for small screws are enormously diverse, but typically small screws are utilized in medical devices, electrical or electronic components, circuit board assemblies, small toy assemblies, cell phones, laptops, IT gadgets, etc. The electronics industry is evolving at an extremely rapid pace and with no doubt creates more demand for small screws today in both industrial and end-user products.

Electronic Components in the US Market

Semiconductor, integrated circuits and printed circuit boards are some of the major examples of small and micro screws' applications. This market has been registered the largest end-use segment for electronic material market by 65% of the total electronic materials and its market in the US. Whereas, the demand for electronic materials for manufacturing printed circuit boards was accounted over USD 18 million in 2015. Printed circuit boards (PCB) are vital components of integrated chip technology used in consumer electronic appliances. Rising application scope of PCBs in automotive, defence and aerospace industry are likely to open new avenues for electronic materials market over the next couple of years in the US.

The market is fragmented as a result of the existence of several producers. The market competition is projected to intensify among the manufacturers due to the development of product portfolios and technological expansions. However, the significant cost of capital for setting up new manufacturing facilities and R&D are expected to limit entry of new players. The US electronic market accounts for a large consumer base which is involved in engineering and producing of electronic parts and semiconductor technologies for the end-users. Technology innovation related to the use of advanced electronic materials in manufacturing integrated circuits is likely to drive higher demand for small and micro screws. Those fasteners are in a high demand for today's market as manufacturers strive to make smaller, thinner and lighter consumer electronics. From cell phones to tablets computers, micro screws

fit well in the market demand and its market expansion is projected to face a significant growth rate in the US as IT gadgets and devices trending headed for smaller is better.

Medical Devices in the US Market

As mentioned earlier manufacturing of Medical Devices is another major market for small and micro screws. United States is the world leader in medical devices market by size, as in 2015 its total revenue was around $110 billion, around one-third of the $350 billion global market, which is the enormous demand for small and micro screws. In recent years, although, the U.S. medical technology industry has been growing fast, this industry faces complicated challenges which are obstructing the market growth. Through 2020, the market in the U.S. is anticipated to expand by only 5%.

As one of the good examples, we could name orthopaedic devices. The global orthopaedic devices market was valued at $38.9 billion in 2010. U.S. sales of orthopaedic devices totalled about $19.7 billion, or about 51 percent of worldwide sales. The major product groups are artificial joints, spinal implants, devices for fracture repair which are mainly intramedullary nails, plates, and small screws.

The number of manufacturers in this market is significantly lower than standard fastener suppliers. The complexity of the small implant screw designs and the variety of attachments make major challenges on the production of this type of screws.

Wrap Up!

For small fasteners, in general, and for small screws, in specific, high accuracy and precision engineering have become vital to success. Some of small or micro screws are not simply scaled-down versions of their larger counterparts and they need special processing and manufacturing facilities. Although it's common in any types of fasteners, the downsized screws have tremendous issues relating to tight tolerances and performance values. Specialty design and unique features must be engineered to meet specifications.

In the future, with no doubt, there will be more innovations on small and micro screws. New innovative products in automotive, aerospace, IT, medical and other industries are manufactured at fast pace in response to customer challenges and needs. Consequently, the growth of demand for these types of fasteners will create steady supply of high quality small screws from the various manufacturers in the US and the global market.

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