

Press Release

Applying technical cleanliness in the assembly process

TECHNICALLY CLEAN IF YOU PLEASE!

Continuous prevention, reduction and removal of dirt particles in assembly process

Technical cleanliness is no trend. It is essential in the production and assembly of ever more complex products with increased quality requirements. Components and units, whose function can be impaired by dirt, must be produced and assembled in a technically clean environment. It is for this reason that the renowned screwdriving technology specialists DEPRAG SCHULZ GMBH u. CO. have placed great emphasis on the realization of technical cleanliness in the assembly process using standardized solutions.

"For all the innovative individual solutions, the complete assembly process should always be considered", explains Jürgen Hierold, Sales Manager at DEPRAG. The approach towards technical cleanliness relates to all areas, beginning with the design and production of components, training of personnel, layout of production environment, the assembly and entire logistical processes. But the discussion into technical cleanliness really comes to the forefront in the selection of suitable assembly equipment for joining technology. "The technology and components used in the realization of technical cleanliness must be available at a competitive price. Technical cleanliness should be achievable without massive extra costs and individual components must be compatible with each other", adds Jürgen Hierold. This is one challenge which the screw automation company DEPRAG has mastered by implementing their CleanFeed concept. Diverse standard components have been developed, incorporating decades of processing knowledge, which all have one aim: the prevention of abrasion during feeding of fasteners and the systematic suction of dirt particles within the screwdriving process.



But what is the best course of action? First the cleanliness requirements for the product should be precisely defined. Only in cooperation with the quality management, production and logistics teams will there be the best possible chance to achieve technical cleanliness and therefore reliability. Well-trained staff are equally as important as a clean production environment. It is imperative to keep the cleanroom meticulously pristine. This relates above all to people, material or transport that bring in damaging particles.

Screwdriving tools and feeding technology for the cleanroom

Suitability for use in a cleanroom must be considered starting with the screwdriving tool. Even insertion of a bit into the screw's drive head can generate undesired abrasive particles. DEPRAG screwdrivers from the series MINIMAT®-EC-Servo reduce speed as the screwdriver makes contact with the bit. Built-in sensors recognize the exact screw position and ensure the correct contact point of the bit with the screw head. Only once contact has been established does the speed increase, thereby minimizing abrasion. Any remaining residual particles are suctioned off by a vacuum device.



Bit with vacuum device

Covering and screwdriving templates on the components also reduce the risk of the collection of particles. "All our screwdriving function modules can be used for under-floor screw assembly due to their small size. Therefore gravity can be useful in reducing particles and enabling technically clean assembly", explains Jürgen Hierold. Additional equipment such as dirt deflectors collect fallen particles for simple removal.

The use of ESD-enabled materials can also reduce dirt from static load. Jürgen Hierold: "Our CleanFeed complete package comprises all options for particle minimization".

However, particles do not only appear during the screw assembly process, feeding the connection elements can also cause friction. "Therefore, it is very important to select the correct feeding technology and consider the separation of screws in order to achieve a reduction in particles", states Jürgen Hierold. Most vibratory feeders transport screws with pulsing movements in a feed bowl, which consequently cause the parts to rub on each other and create abrasive contaminants.

Sword feeders offer a more component friendly, low abrasion realization of technical cleanliness. The feed parts in the container are moved using a stroke action into an adapted segment shaped sword. They slide along mechanical rails using gravity and reach the screw separator already sorted.

Incorrectly positioned fasteners are returned to the container along mechanical rails. A sensor in the supply rail regulates the amount of stroke movement required. If fewer parts are being



Sword Feeder

used by the operator then the feeder will supply fewer parts and vice versa.

The DEPRAG sword feeders are available in two sizes with 0.15 liter or 1.5 liter fill capacities. The depth of in-house production, use of hardened, low-wear materials, as well as specific coating procedures, ensure the consistently high quality, reliability and efficiency of the DEPRAG sword feeders.

Particle killers guarantee clean feeding



Particle Killer

If the screw is directly fed via the screwdriver to the component then contamination from falling particles cannot be discounted. The DEPRAG particle killer ensures clean and safe feeding: if the required screw is blow-fed with a blast of air, then potentially discharged dirt particles can be removed using a vacuum device. The suctioned out particles are caught in a filter having a transparent window and an exchangeable filter element. Next the cleaned fasteners are fed into the screwdriving module (inline version) or positioned for easy pickup (Pick & Place version). "Such vacuum devices increase cleanliness and are to be recommended for all relevant abrasive positions", explains Hierold.

It is essential to select a system manufacturer who can provide all core components from their own development and production for cleanroom installations. Partnership with DEPRAG SCHULZ GMBH u. CO. guarantees the best possible harmonization of individual components and processes such as feeding, positioning and screwdriving. DEPRAG is to be highly recommended as a one-stop-shop for comprehensive solutions in the implementation of technical cleanliness.



Protective Pick & Place Nest

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