

Russell Compact Sieve provides solution to screening pharma powders in a downflow booth

Hygienic screening machine integrated within downflow containment booth delivers high-capacity sieving of active pharmaceutical ingredients

Founded in 1981, Extract Technology Ltd. (ETL) has gained the reputation as a leading containment and aseptic systems manufacturer. The company, based in Huddersfield, UK and New Lisbon, WI USA, supplies customized aseptic system solutions, containment solutions, restricted access barriers and mobile clean rooms to a global network of pharmaceutical, healthcare, biotech and chemical customers. To provide a diverse and premium range of solutions for the evolving needs of its customers, ETL embraces the expertise of other equipment manufacturers for certain requirements.




When a leading pharmaceutical producer sought a high containment powder processing solution, ETL combined its extensive knowledge of containment technology with Russell Finex - a global leader in **sieving and filtration equipment** - to supply two downflow booths with integrated sieving solutions. With a range of hygienic, compact and contained screening technology and vast experience within the pharmaceutical industry, Russell Finex's reputation for providing separation solutions that safeguard the quality of pharmaceutical products was a key factor behind its selection.

The pharmaceutical manufacturer had recently opened a new 50-acre production facility in India. This site was expected to produce 8 billion tablets and 1 billion capsules over a course of a year, for anti-inflammatory medicine oral dose. Various meetings were held between ETL and Russell Finex to finalize the design of the turnkey package, comprising of product testing and mechanical design integration as well as an in-depth factory acceptance test (FAT) at ETL's premise.

ETL's range of downflow booths provide clean, contained environments for the safe handling of pharmaceutical powders. Whether dispensing, weighing or sampling materials, these provide an effective and versatile option to ensure operator safety and protect product from contamination. In this instance, the customer required two downflow booths for unloading, transferring and screening active pharmaceutical ingredients in a contained operation. The screening solutions needed to be compact, to allow full integration into the booth, as well as easy to disassemble



Figure 1. Installation of the Russell Compact Sieve® next to the elevated loading hopper

-  **Ensure product quality** - Eliminate oversize contamination and guarantee product hygiene
-  **Enclosed screening** - Eliminates dusts and fumes, safeguarding operators
-  **Compact design** - Easy to install in existing production lines or enclosed areas such as downflow booths

and clean. In addition, the machine required the capacity to screen fine, often sticky pharmaceutical powders at high throughputs, without compromising product quality. The solution was a Russell Compact Sieve® with Vibrasonic® Deblinding System.



Peter Devenny, Technical Sales Engineer at ETL comments, "It was a pleasure working with the team at Russell Finex. During initial powder processing trials with other suppliers, we experienced difficulties with very long sieving times. Conventional vibratory sieving methods struggled to continually sieve the powder at our desired capacity. The addition of the Vibrasonic Deblinding System with the Russell Compact Sieve reduced overall processing times."

various powders are layered into the hopper before release into the sieve. When released, the powders pass through the sieving unit, where oversize and foreign contamination is removed via fine mesh separation. The good product passes through the outlet and into an IBC below, whilst the contamination is removed and disposed of.

Due to its compact design, the Russell Compact Sieve® was easy to mount on a lifting device, meaning it can be lifted to various heights to account for different sized IBCs. These versatile screeners provide accurate, high-capacity screening at less than half the size of traditional sieving units, and are available in various sizes and configurations. For this application, a 400mm diameter sieve was provided with a pharma-grade mirror-polished stainless-steel finish. Russell Finex's specialist polishing techniques allow the company to offer the highest standard mirror polished finish to a documented Ra 0.1. This easy-clean design with all-stainless-steel contact parts and no bug-trap areas makes the Russell Compact Sieve® the most hygienic sieve of its kind. Customization of standard equipment is available to meet the unique needs of certain applications, and on this occasion the standard oversize outlet was removed from the design to achieve total containment during operation, another key requirement for the manufacturer.



Figure 2. Installation of the Russell Compact Sieve® inside an ETL downflow booth

For this process the powdered pharmaceutical product, such as folic acid or silicon dioxide, is delivered into the downflow booth via a sealed pharmaceutical-grade drum or sack. If delivered in a drum, an integrated drum lifting device safely transfers the drum to a dispensary table, where the operator can load the powder onto a weighing mechanism, ensuring an accurate quantity. A containment screen installed above the dispensary table ensures maximum operator protection. Once weighed, the powder is then transferred to a hopper. If the product is delivered in a sack, it is automatically lifted onto the hopper, where crossbars support its weight. The sack can then be slit and its content weighed quickly and easily, directly from this hopper, before being discharged to a larger hopper, which will transfer the powder to the sieve.

This larger hopper is mounted on a lifting mechanism, eradicating the need for manual loading. When the powder is loaded and ready to be screened, the hopper is raised and connected to the Russell Compact Sieve®. For this application,



Figure 3. The all-stainless steel Russell Compact Sieve®



An additional feature was incorporated to aid the sieving of fine and sticky pharmaceutical powders. The **Vibrasonic® Deblinding System** effectively prevented mesh blockage, by applying an ultrasonic frequency to the mesh screen. Whereas the screening of complex and fine pharmaceutical powders such as these can be inhibited through mesh blinding, this ultrasonic screening technology allows the good powder to flow freely through the mesh, resulting in significantly increased sieving capacity. The system also enhances production efficiency, reducing downtime by eliminating the need to stop operation and clean the screens, or having to re-screen the product.

Mr. Devenny continues, “The Vibrasonic Deblinding System is an impressive option to consider for products that do not have typically good flow characteristics. Furthermore, Russell Finex’s facility is well equipped for product trials. The company’s experience and guidance in this field is second to none. Our client and our team who visited the test facility for product trials were suitably impressed.”

Established in 1934, Russell Finex has a wealth of experience in supplying pharmaceutical companies and processing equipment manufacturers with customized sieving and filtration equipment. Its longevity and reputation sees it regarded as one of the top three global market leaders, supporting a variety of industries including **pharmaceutical, chemical, food and beverage, coatings, metal powders and ceramics.**



Figure 4. The Russell Compact Sieve® is quick and easy to dismantle and clean