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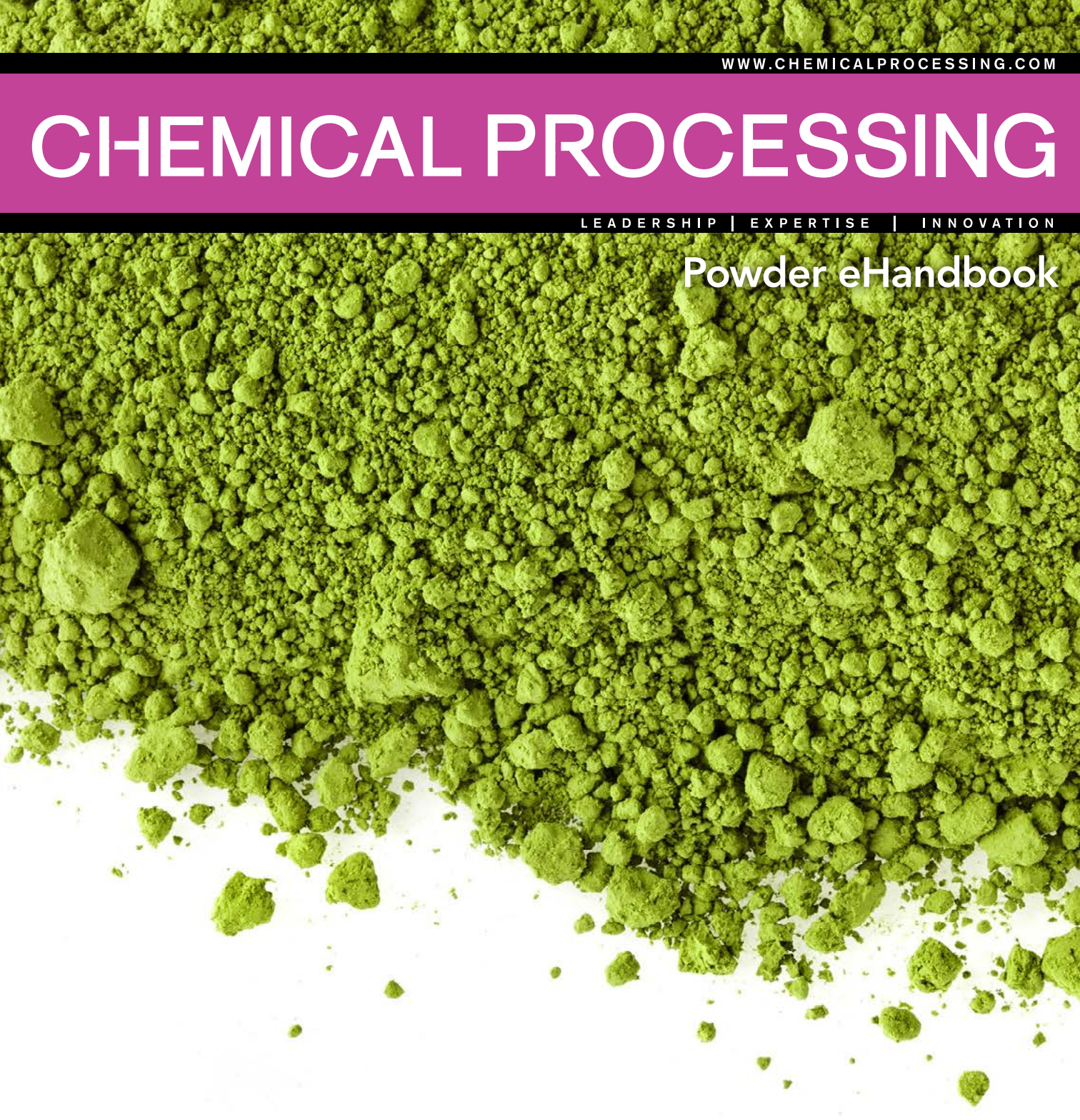

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Improve Cleanability in Process Weighing Technology

An innovative solution tackles the challenge of hygienic security

By Matthias Rehren and Matthias Hasselmann, Sartorius

THE FOOD and pharmaceutical industries are known for high standards regarding hygiene in the production process. Many sensitive areas, from delivery to packaging and distribution are located next to one another, making it particularly challenging to combine precise measurement results with compliance to hygiene requirements.

In the food industry, the stipulations set out by the European Union (EU), EHEDG (European Hygienic Engineering & Design Group), HACCP (Hazard Analysis and Critical Control Points), the Machinery Directive (Directive 2006/42/EC on machinery) and IFS (International Food Standard), among others, require that equipment is easy to clean in order to avoid microbiological contamination. On the other hand, in the pharmaceutical industry these requirements are regulated by FDA standards or EU good manufacturing practice (GMP) guidelines. To ensure the most hygienic production environment possible, a combination of two targets must be pursued: system technology that's aimed at meeting hygiene requirements, and correspondingly adapted cleaning management.

The most critical requirements are those regarding components of machines and systems which come directly into contact with the product. These must have a high level of corrosion resistance, must not give off any chemical substances and will ideally have surfaces that have been optimized for ease of cleaning. As all substances that are processed in a factory may, in the splash zone, also come into contact with parts that have indirect contact with the product, these parts must also be designed in such a way that the risks of contamination are reduced to the greatest possible extent.

Even the most hygienic system is dependent upon regular and careful cleaning. This may be done in various different ways, including: mechanically dry, mechanically wet or chemically wet cleaning.

Depending on the type of contamination (e.g. flour, cocoa, egg white, fat), system components must withstand methods such as compressed air, suction, fluids or water, or steam blasting. For this to be the case, high-quality materials, such as stainless steel or highly resistant plastics, are used. These offer effective protection against dust and moisture and typically fulfill at least the IP65 standard. In the design of such modules, it's essential to ensure that the surfaces are sloped and feature low roughness. In the field of weighing, in addition to hygienically optimized platform scales, this also applies to components for container weighing. The greatest challenge here is achieving precise measurement results with simultaneous implementation of hygiene criteria in the design.

CURRENT INSTALLATION SOLUTIONS

The PR 6202 pressurized load cell from Sartorius is specially designed for use with medium to large containers and has a nominal load of 1t to 50t. Its housing is made of high-quality AISI 316L stainless steel (1.4404), which means that the formation of hygienically critical areas is avoided and cleaning times are thus reduced. The EHEDG-compliant load cell is characterized by smooth run-off surfaces, which make cleaning easy.

Together with the PR 6002 mounting kit, this model is ideal for use in hygienically challenging environments. This combination impresses here, especially through its high corrosion resistance and compliance with the highest protection class, IP 68/69k. The load cell and mounting kit have both been issued with an expert's report from the EHEDG, which confirms the fulfillment of hygienic requirements.

According to current hygienic solutions such as the PR 6202, other approaches can achieve higher

resistance and better cleanability in container weighing. For example, in the pharmaceutical industry, load cells are housed in stainless steel sleeves, known as elephant feet. These are intended to offer protection against dust and fluids and enable simple cleaning from the outside. However, this solution involves much cost-intensive design work, even in the planning phase. Furthermore, this installation solution does include some gaps, as the entire weighing system must be free from force shunts in order to achieve a high degree of measuring accuracy. This, however, represents a risk of contamination. While it may appear clean from the outside, pockets of contamination may form on the inside.

HYGIENIC CONTAINER WEIGHING OVERHAULED

For small- to medium-size process containers, Sartorius offers an innovative solution which is said to bring groundbreaking changes to hygienic container weighing. A completely new module has been developed for containers with a total load of 100kg–8t, which combines the load cell and mounting kit in one hygienic weighing solution. The Contego module is easily installed under the foot of the container, which means that a separate structure isn't necessary. A 6.6-in. diameter offers a space-saving installation solution. This module combines everything required for hygienic weighing and easy cleaning.

The head and base plates are made of stainless steel AISI 316 L (1.4404). They protect all central components against corrosion and offer an extremely hygienic and stable solution for attachment to the container and base element. An integrated jack-up function provides simple and correct lifting or lowering of the container during maintenance work without the need for additional tools. As a special element for stabilizing the container, this weighing solution has an integrated lift-off protector and a constrainer. These ensure reliable stability of the container during operation. If the floor is sealed with silicone, an optional adapter plate is directly cast as well, which prevents the risk of dirt accumulating.

The casing is a sleeve made from FDA-compliant special silicone, which is also approved for the pharmaceutical industry, and offers the highest levels of hygienic security. It's securely connected to the head and base plates through a special geometric seal and thus avoids the formation of gaps which can cause contamination. This protective casing also has high chemical resistance to most cleaning agents.

As this weighing solution is used primarily in sensitive production areas, great importance was placed on the precision of measurement results during development. The module is therefore available in accuracy classes D1 and C3 and possesses a corresponding OIML-compliant type approval.

Overall, the advantage of this weighing solution lies in its impressive hygienic properties, combined with significant cost savings in planning, design and operation. The Contego is available in two different versions — with the cable outlet on the side or on the top and has an appropriately hygienic cable connection. The conformity of the module has been confirmed by certification from the EHEDG. Both load cell models are naturally available as an explosion-proof version suitable for use in potentially explosive areas.

For connecting the weighing technology to field bus control, a transmitter in the field housing can be used, such as the PR-5230. This consists of an electropolished stainless steel housing in accordance with IP 66, a graphical display as well as various different communication interfaces. For ease of configuration, a PC connection is provided via Ethernet TCP/IP and an integrated web server. Optionally, a connection card can also be used, which means that an additional cable connection box isn't necessary. An intrinsically safe load cell supply for use in potentially explosive areas also can be integrated.

With special load cells and a unique transmitter concept, Sartorius offers a range of products tailored to the requirements of the pharmaceutical and food industries. The hygienically optimized weighing technology offers significant advantages with regard to risk of contamination and cleanability. Plant engineers and manufacturers are now able to fulfill more demanding standards in these areas.

For more information, call your Lesman account manager at 800-953-7626.

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Contego® – The clean solution

More hygiene for your process vessel weighing

The innovative weighing module is the solution for hygienic applications.

- Designed according to EHEDG directives
- Quick and reliable cleaning
- High chemical resistance
- Compact design
- Integrated lift-off protection for high stability
- Allows standardized installation solutions
- Reduces design work

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