No Pellet Escapes

Pellet Inspection Ensures 100 % Control during the Compounding Process

Today’s markets are very competitive and sensitive to quality. To ensure the highest quality levels for its high-tech compounds, a Czech manufacturer has installed several online pellet scanners on one of its production lines.

Pellet scanners monitor production and immediately separate contaminants from the manufactured product. This guarantees significant reduction of defects for the company’s customers and provides additional data about the production process, which can be used for its improvement.

**Inspection Technology**

The online PS800C Pellet Scanner (manufacturer: OCS Service GmbH, Witten, Germany) scans the pellets in “free fall” from above and below using two color line scan cameras in reflection on driven rollers. Contaminants, discoloration and other impurities will be precisely measured and classified by size class and coloration (Title figure).

A sorting unit shoots the contaminants into a separate bin for further analysis. This occurs at a pellet speed of 270 m/min in free fall.

The high-speed cameras take photos of the contaminated pellets. The sophisticated software enables the generation of statistics and further evaluations.

System resolution is 100µm and a throughput of up to 1,000kg/h can be achieved depending on pellet size and density. An additional benefit is that the mixing ratio of masterbatch and compounding materials can be established exactly (Fig. 1).

**History of Flawless Quality Control**

In the past, raw material producers visually inspected pellets offline on a light table in the laboratory. This is a high risk method and is also very subjective, depending on the person performing the inspection. Nowadays, automatic offline pellet scanners (table units) are used to increase objectivity. Increasingly, these pellet scanners are used at-line with samples taken automatically and regularly. However, this is not a 100 % inspection but a simple statistical evaluation of the quality.

The high speed PS800C Pellet Scanner was developed for super transparent pellets with a target of 400 kg/h (formerly called the PS400C). Meanwhile, with the newest generation throughputs of up to 1,000 kg/h could be achieved.

Inspection of super transparent pellets is very critical due to their reflecting properties. So, a light tunnel, with LED technology and a special diffuser design guarantees a very uniform light source and blocks any external light.

The systems are installed in high-end applications to ensure that only clean pellets enter the final product. Such applications include polymer production for the high voltage cable industry. The cable producers themselves also use this technology: Every instance of contamination could potentially cause a shortcut if it contains any metal parts (Fig. 2).

**Online Application for High-Tech Compounds at Silon**

Silon s.r.o., Sezimovo Ústi, Czech Republic, provides solutions for products, which demand that the surface of finished goods being used in the construction business is of excellent quality. For such applications it is essential to prevent contamination or burned particles and 100% inspection of the produced goods is the best option to as...
sure the quality of products supplied to customers.

At the beginning of 2014 Silon consequently decided to implement an online monitoring and sorting system for better understanding the production process and improving the quality of the finished goods. Based on previous cooperation with OCS GmbH and their recognized expertise, Silon installed the PS800C sorting unit (Fig. 3).

The PS800C online sorting equipment has been used for high-tech compounds produced using the reactive extrusion process and is currently located on one of the company’s main production lines. The system is located after the final product dryer and receives the final product in pellet form via conveyor. The stream of pellets then passes through the camera system with subsequent separation of detected defective pellets.

The data on detected defects is stored on the hard drive of the PS800C as a report, which is later studied by the technology department and results in better understanding of the production process, conclusions and implementation of improvements. The clean product is conveyed from the PS800C to the packaging unit.

The current location of the PS800C also takes into account possible utilization of this equipment on an offline stream, allowing its use for critical contamination inspection of other products or samples produced on other production lines as well. Initial data from the PS800C has already led to several optimizations of the production process with proven efficiency.

During standard operation the PS800C enables sorting of 121 t/d of finished goods per day with a current output of 500 kg/h. The software features of the PS800C, such as the contamination level alarm, contamination histogram and others, have been used for detection of possible contamination peaks and online quality monitoring (Fig. 4). The PS800C and connected equipment are cleaned once every 24 hours by mechanics who have been trained by OCS specialists.

Conclusion

Silon has been operating the PS800C for some time now and the resulting improved online quality control, new data about the production process and elimination of defects via sorting lead to potential expansion of the use of sorting units on additional production lines. Both companies would like to continue working together on modifying the PS800C to meet new production requirements.