



## GranuControl Get to the Point

### Fraunhofer Institute of Optronics, System Technologies and Image Exploitation IOSB

Fraunhoferstraße 1  
76131 Karlsruhe

#### Contact Visual Inspection Systems

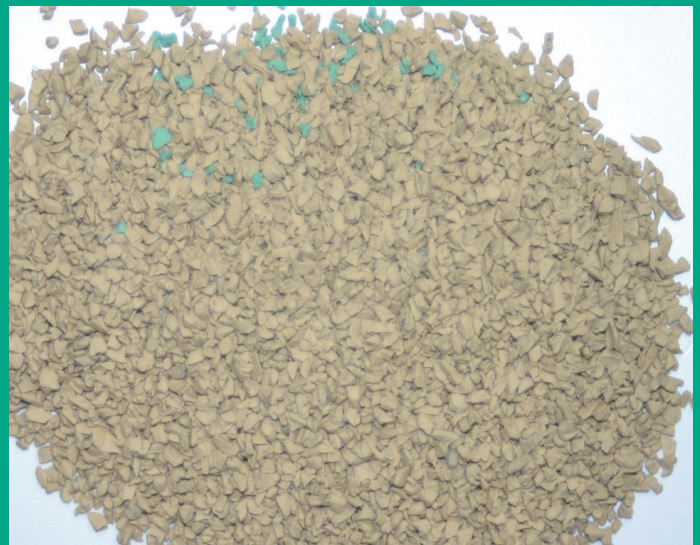
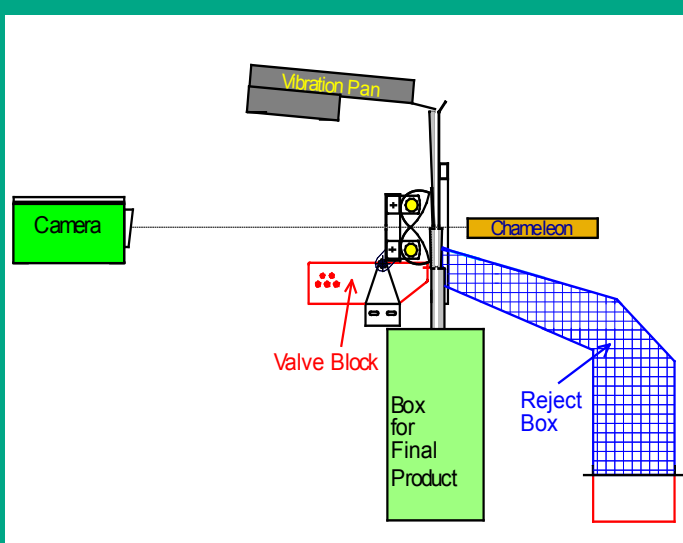
Dr. Kai-Uwe Vieth  
Phone +49 721 6091 279  
kai-uwe.vieth@iosb.fraunhofer.de

[www.iosb.fraunhofer.de](http://www.iosb.fraunhofer.de)

If you go through the research facility of the IOSB with a lowered head, not in a brooding but rather a searching for manner, with some luck you will be able to discover a red point in the bright dark-blue speckled natural rubber floor. With respect to cost and profit it might be the right decision to use a grade-two floor. However, a manufacturer will quickly get into economic trouble if he has to sell too large a portion of his product as inferior quality. The optoelectronic **GranuControl** sorting machine of the IOSB reliably removes faulty particles. For the company nora® a prototype was developed, which has been successfully in operation since March 2005 and has been extended continuously. Until now 5 systems have been put into operation. At company nora® **GranuControl** has definitely increased the product quality, in particular at a much earlier point in the process rather than at the end in order to optimise costs.

#### Description of Process

A vibrating pan guarantees an even distribution of the granulates which then fall vertically into a chute and accelerate up to 2.9 m/s at the point of image acquisition. At a width of 700 mm a continuous image is taken by two high-resolution colour line-scan cameras with over 4000 pixels. Thus, the resolution corresponds to approx. 0.23 x 0.23 mm<sup>2</sup>/pixel or 1900 pixels/cm<sup>2</sup>. The background image consists of a self-adapting illumination (chameleon), which takes on the colour of the product. The image interpretation, using a maximum of 8 classifiers, guarantees the reliable identification of foreign particles.



A classifier combines

- a discrimination of 2.1 Mio. colours,
- a surface and length analysis as well as
- up to 4 morphological operations.

A valve block with 256 nozzles ejects the detected faulty particles from the product stream. Automatic teach-in of the products is possible. The company nora® has been successful with its use of the automatic teach-in process.



#### Performance Characteristics – Measured experimentally at the IOSB

Product: natural rubber granulates

Contamination of the raw material: 0.5 %

Production rate: 500 kg/h

Contamination of the sorted material:  
< 0.001%

#### Specifications (exemplary)

Sorting width: 700 mm

Resolution: approx. 0.23 x 0.23 mm

Number of nozzles: 128 double nozzles

Colour Resolution: 2.1 Mio. colours

Analysis: Surface and length analysis