

Presse Release Sensor Instruments

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Color measurement of recyclates in the recycling process

Color differentiation of recyclates

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Why should the color of recyclates also be measured? A lot of effort is already put into separating the color of the objects to be recycled. The color separation of whole plastic objects is followed by a further color separation of the flakes or plastic fragments after shredding and the subsequent washing and drying process.



However, due to the changes in the EU Packaging and Packaging Waste Regulation (PPWR) regarding the proportion of recycled material in plastics (for example, from 2025, at least 25% of disposable PET beverage bottles must contain recycled plastic (recyclate) and from 2030 at least 30%), the quality requirements for the recyclate to be produced is increasing.



The plastics processing industry places the same quality demands on the recyclate as it does on virgin material, and the color of the recyclate is one of these quality demands. Although random recyclate color measurements are carried out in the laboratory at recycling companies, in most cases, the color of the recyclate is not monitored at the production facilities.

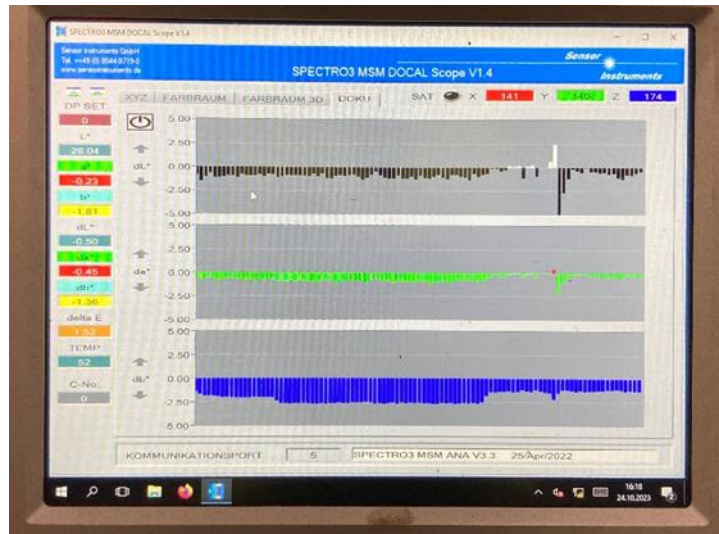
This is certainly also due to the fact that fewer recyclates have been used in new plastic products to date and also to the lack of suppliers of such inline recyclate color measurement systems, but measuring systems are now also available for this field of application. Sensor Instruments took care not only to develop an inline color measurement system, but also include the items required for on-site calibration in its product range.

As laboratory color measurement systems are now used in almost all companies, the inline systems must provide comparable values to the color data measured in the laboratory. However, it should be noted that in order to measure the color value of recyclates in the laboratory, they must first



be formed into injection-molded plates at a certain economic and time expenditure, as many laboratory color measurement systems require a flat measuring surface. A color comparison between color plates and recyclates therefore requires, due to the different surface, a certain approximation of the color values from the inline color recycle measurement.

The DOCAL software is very useful for this purpose. Using this Windows® software, the measured color values and their trends can be displayed and documented not only graphically and numerically on site, but also on-site calibration and so-called user calibration is made possible. A sample is taken from the current recycle production flow and the L*a*b* color value is determined in the laboratory after conversion into an injection-molded platelet. At the same time as the sample is taken, the L*a*b* color values are recorded using the



COLTEM-85 inline color measurement system. The colorimetric value L*a*b* determined in the laboratory is now entered into the DOCAL software and compared with the L*a*b* color value determined by the inline colorimetric system. In the next step, the color values determined inline are matched to the color values determined in the laboratory. The same color values are now displayed in the laboratory and inline for the same recycle.

The DOCAL software informs the system operator about the L*a*b* color values and their trends in the current production in real time. The measuring head of the COLTEM-85 measuring system can be positioned on the vibrating feeder immediately after extrusion and pelletizing of recycle. In addition to the color of the recycle, its temperature can also be measured inline and the level of the recycle flow on the vibrating feeder can be monitored using additional integrated laser displacement sensors. If the fill level is too high, this can be an indication that the screen at the outlet of the vibrating feeder is partially clogged, causing the recycle produced to enter the reject channel, or if the fill level is too low, this can be an indication that not enough recycle is being produced.



With the increasing need to use recyclates, the plastics processing industry will also focus on the color quality of the material supplied by the recycling companies in the future. Recyclate color control could therefore already take place at the solid, the material feed or dosing unit. Using a special sight glass and corresponding SPECTRO-3-0°/45°-MSM-INLINE-DIG or SPECTRO-3-DIF/0°-MSM-INLINE-DIG color sensors from Sensor Instruments, an exact color measurement can be carried out at these positions. The DOCAL software is also available for this, which provides information on the color value trends $dL^*da^*db^*$ in addition to the actual value L*a*b*. Appropriate calibration units are also available for these inline color measurement systems, which enable on-site calibration. For on-site calibration, Sensor Instruments offers RAL plastic cards, which are additionally measured by SI according to the respective color measurement geometry (0°/45° or d/0°). The determined color value is applied to the respective color card together with a consecutive 5-digit number by



means of a label and each color card is also included in the SI color file. During on-site calibration, this color file, which is available on the homepage of Sensor Instruments, can then be conveniently accessed. Factory recalibration is therefore no longer necessary.

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