Applications Note

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Shade Numbering and Sorting Versus Grouping and Sequencing

As much as we hate to admit it, some shade variation within the coloring process is inevitable. Sorting methods are appropriate for use when the normal color variation within a process is greater than a visible amount of difference and this difference is unacceptable to a customer. The dyeing of textiles is a good example. Variation in temperature, humidity, dye strength, and the dye uptake characteristics of cloth can result in color variation that is visible and unacceptable between cloth pieces used in a cut-and-sew shirt product. Yet the economics of the textile industry do not allow large amounts of re-work.

If the color of each bolt of cloth can be assessed and then the bolts ordered or grouped so that there is no visible difference from bolt to bolt, then a gradual color change can be accommodated between the first and last bolts in a single order. As long as the manufacturer of the shirts cuts and sews in the defined order or grouping, there will be no visible difference within a single shirt, though there might be a slight visible difference between the first shirt and the thirtieth.

The techniques of shade numbering/sorting, grouping, and sequencing, described below, were developed to allow shipping as much product as possible while still satisfying customers with each shipment.

Shade Numbering, which is available in EasyMatch QC and EasyMatch OL software, as well as the ColorFlex and MiniScan XE Plus firmware, assigns a shade number to each sample read based on how close it is to the product standard. This information is presented in the form of three numbers, one representing each component of the color scale. For instance, a sample assigned shade number 555 is very close in color to the standard, which is also 555. A sample with shade number 356 is two blocks from the standard for L* (3 versus 5), in the same block as the standard for a* (5 versus 5), and one block from the standard for b* (6 versus 5). All samples with the same shade number are similar enough that they can be shipped or sewn together.

Shade Sorting takes shade numbering a step further by placing the samples in order by their established shade numbers. Shade numbers can be sorted in EasyMatch QC by showing the 555 Shade field in your Color Data Table and then clicking on the 555 Shade column (or row) header to sort the samples based on their shade numbers.

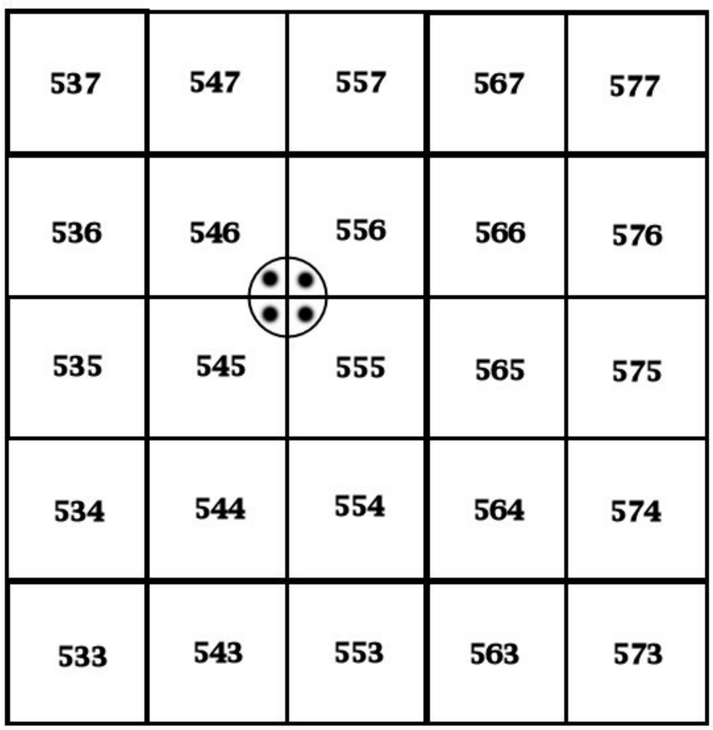
An add-on package to EasyMatch QC, EasyGroup, can **group** these samples into clusters of product that are close enough in shade to be shipped together, though the various clusters themselves may be too different from each other to be sold together. It can also taper, or **sequence**, the samples into the order in which you would lay them out on a cutting table, minimizing the color difference between samples placed next to each other. Both of these assessments can be performed much more quickly and repeatably within EasyGroup than they can visually.

So, when should you use shade numbering/sorting and when should you use grouping or sequencing?

Shade numbering/sorting is preferable when you wish to sort product based on all three components of the color scale (such as L, a, and b) and to easily understand which of those components differs from the product standard.

Grouping is preferable when you wish to create very few shade groups, as it will generally produce fewer groups than shade sorting. You will also want to use grouping if you wish to maintain group histories and fit new samples into the historical groups, so that customer A always receives similar samples and customer B always receives similar samples, though they may be different from customer A's.

Grouping will be more accurate than shade sorting in cases where samples are very close to the corners of their shade blocks, such as in the picture below. (Only two dimensions are shown.) The four circled samples are placed in different shade blocks by shade numbering, though they are very close in shade. EasyGroup would place these samples in the same group and they would, rightly, be used together.



Though basic groupings are based on the CMC color difference equation, EasyGroup also allows you to select one parameter (such as L*, a*, or b*) by which to group samples, so if one parameter is your main concern, you will want to use grouping.

If you plan to ship or sew all product, but need to lay them out in an order where the differences between adjoining samples are slight, tapering/sequencing will do what you need.

EasyGroup allows grouping and tapering to be used at the same time, creating groups and then tapering within them. This combination decreases the possibility of visually noticing shade differences more than any single one of these techniques.

See also "Shade Numbering, Shade Sorting, and Shade Tapering," *Applications Note*, HunterLab, and "555 Shade Numbering," *Applications Note*, HunterLab.

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