

CUSTOM COLOR MATCHING GUIDELINES

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1. OBJECTIVE

The purpose of this document is to lend directions for designers and vendors to increase accuracy and speed with custom color matching.

2. POSSIBLE CUSTOM COLORS

- **RAL semi matt: K5 and D8 fans***
- **Portable register box RAL840***
- **RAL plastic chips****
- **Pantone® plastic chips ****
- **Physical sample, preferably plastic: flat surface, min. size 30x30 mm****
- **Any other samples/color codes – on request**

*RAL: In general colors without special pigmentation. Excluding RAL4011, RAL4012, RAL5026, RAL6036, RAL7048, RAL9006, RAL9007, RAL9022, RAL9023.

** need to be sent to GMK for color matching, including the filled out "GMK color sample form".

Pantone® specializes in printing. The company states that colors without plastic chips have a difficult coding and can't be produced in plastic. Hence, it is important for the designer to make sure that he or she has the plastic chip for the Pantone® color before the GB. Otherwise, it is best to choose another color code base.

3. UPON REQUEST - Pantone® Booklet Colors (solid coated)

- Pantone® booklet color matching cannot be guaranteed.
- If a designer chooses a Pantone® color and cannot provide the plastic chip, GMK will review the request, if this color can be matched.
- To increase accuracy, only solid coated color codes are used.
- Should GMK accept a Pantone® booklet color, solid coated only – a maximum of two color matching rounds are included. Any additional color matching round costs are covered by the lead vendor.
- As paper, exposed to UV-lighting, changes in color, GMK changes their Pantone® color booklet annually to ensure precise color matching.

4. PRICING

- All color matching rounds are included until a Delta E2000 below 2.0 is reached.
- Any additional color matching after GMK fulfilled Delta: 650€ net per round.
- If the designer chooses a new color code during the color matching process, GMK will need to charge 650€ net per round.

5. VENDOR'S RESPONSIBILITIES

- At time of quote request: lead vendor needs to check that the designer fulfills the above and has a physical color sample, i.e. not monitor color selection!
- To check that the render colors are a true reflection of the chosen color codes.
- Vendors need to have the RAL fans themselves.
- GMK sends the custom color samples to the lead vendor, who in turn will forward them to the designer, as needed.
- Once the custom color is approved, the vendor needs to send in a picture of the filled out and signed custom color bag label to GMK.

6. CUSTOM COLOR MEASURING

- Vendors need to use an instrument that is used for plastic, not paper!
- An industry standard for plastic color measuring is the

Spectrophotometer: Konica Minolta CM-36dG

<https://www5.konicaminolta.eu/en/measuring-instruments/products/colour-measurement/spectrophotometers-bench-top/cm-36dg/introduction.html>

and color measurement method (see appendix)

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Appendix - Color Measurement Method



D65 Standard Light (6500 Kelvin)

Measured on the front side of the key cap, without extraneous light, mean value taken from several measurements

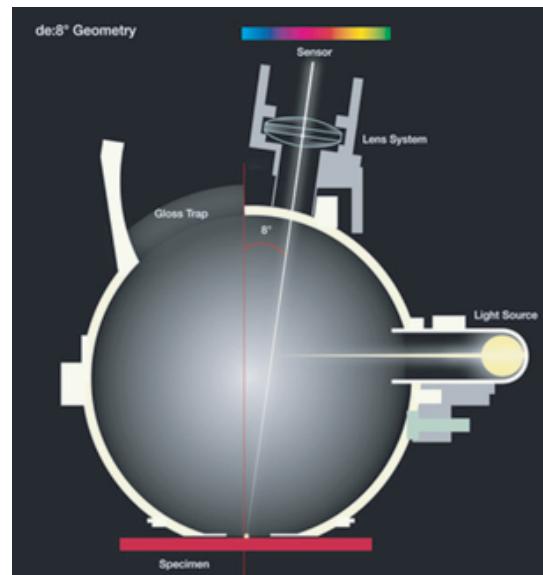
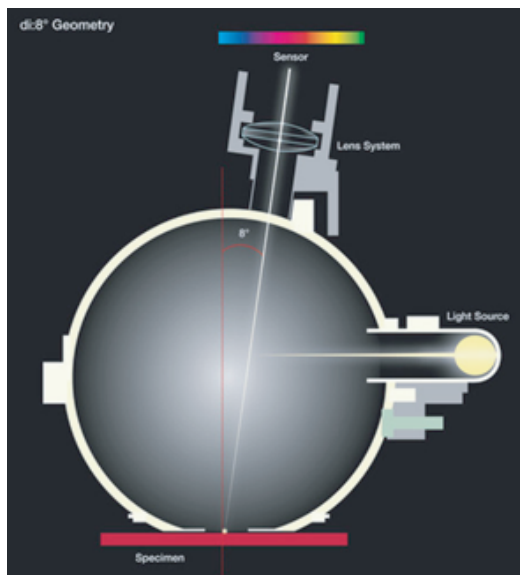
SCI (Specular Component Included) measurement: when using the SCI mode, the specular reflectance is included with the diffuse reflectance during the measurement process. This type of color evaluation measures total appearance independent of surface conditions.

dE00(D65) = CIE2000

The CIE2000 color distance formula is currently the formula best adapted to visual perception. It includes not only weighting functions for brightness, chroma and hue, but also mixing terms. These terms take into account an additional dependence of chromaticity on hue.

di: 8°(SCI)

The measuring geometry d:8° features an optical device which provides diffuse illumination (Ulbricht sphere). The light e.g. of a Xenon lamp is projected into a sphere. The interior of the sphere is coated with a white highly reflecting substance (barium sulphate, ceramic, special plastic) which reflects the light manifold. A shutter, an optical element inside the sphere, prevents the directional rays from reaching the measuring sample directly. The sample is positioned at an opening of the sphere and is illuminated from all directions with a close to perfect diffuse light. Differences in surface condition (texture and/or gloss level) cannot influence the measuring value. Through an opening at the top of the sphere the sensor is viewing the surface being measured with an angle of 8° to the vertical. To prevent reflection of specular light from the sample surface, many instruments feature a gloss trap. This can be an "optical" gloss trap, a black-coated cavity outside the sphere. When the trap which is arranged with an angle of -8° to the viewing opening, is open, the light which would otherwise be reflected from the interior wall of the sphere, will be eliminated, and can therefore not illuminate the sample. As an equally adequate alternative a numerical control of gloss is possible. Here an additional light source illuminates the measuring sample with a directional light beam at -8° to the sample normal. The relation between directional and diffuse reflection allows calculating the gloss component. The measuring system including gloss is named di:8° whilst the measuring system excluding gloss is described as de:8°.



Spherical geometry d:8°; optionally with (de:8°) or without (di:8°) gloss trap: The d:8°- geometry features both possibilities.