

# Characterizing color and tonal responses of a device condition

You can characterize the color and tonal response of each device condition to generate color control elements that produce the color you want on output. Color and tonal responses describe the relationship between input tint values of a digital file and the output values on a printing device, which characterize the resulting colors and tones that appear.

Color response is categorized into three types:

- **Full Color response:** The relationship between input tints and output colors in [CIELAB](#), representing all possible process ink tint values on the device. You can generate Gray Balance curves and ICC profiles, from a Gray Balance response.
- **Gray Balance response:** The relationship between input tints and output colors in [CIELAB](#), representing primarily the Black and near-neutral CMY tint values on the device. You can generate Gray Balance curves, but not ICC profiles, from a Gray Balance response.
- **Tonal response:** The relationship between input data and:
  - for CMYK inks, the resulting [Effective Dot Area \(EDA\)](#) on the printed press.
  - for extended process inks, the resulting [Spot Color Tone Value \(SCTV\)](#) on the printed press.
  - for spot inks, either or both of the resulting EDA or SCTV on the printed press.

You can [characterize](#) color or tonal response by exporting a built-in or a custom measurement chart in ColorFlow, printing the chart using Prinergy, and then measuring the printed chart using a ColorFlow supported measurement device. The type of tonal or color response that you obtain from a chart depends on [the type of chart that you measure](#).

Depending on how you print the chart in Prinergy, you can characterize the color or tonal response of a device condition by the following two methods:

## Method 1 (only for curve-controlled devices):

1. In ColorFlow, add the device and define the device condition.
2. In the device condition, [choose and export a measurement chart](#).
3. [Create a custom print transfer curve](#) to control the response of the device. This step is optional. ColorFlow provides several built-in transfer curves for you to use. You can create a custom transfer curve if you don't want to use the built-in transfer curves. For flexographic presses, you should always create a print transfer curve to control the [Mindot](#) behavior.
4. In Prinergy, output and print the chart by selecting a built-in or the custom transfer curve in the **Process Template**.
5. In ColorFlow, [measure the printed chart](#).

**Note:** At the beginning of the measurement wizard, a dialog box appears asking you to specify the print curve you used to print the chart. In the dialog box, from the **Print Curve** list, select the print transfer curve you created.

After the measurement is completed, the color response for the device condition is established and the print transfer curve you created becomes the device curve of the device condition. That device curve will be included in the print calibration curve delivered to Prinergy for output to the device.

## Method 2 (for all types of devices):

1. In ColorFlow, add the device and define the device condition.
2. In the device condition, [choose and export a measurement chart](#).
3. For a curve-controlled device, [define the device curve](#) to control the response of the device.
4. In Prinergy, output and print the chart by selecting the device and the device condition.  
For a curve-controlled device, select the **Print Characterization** mode.
5. In ColorFlow, [measure the printed chart](#).

**Note:** For a curve-controlled device, at the beginning of the measurement wizard, a dialog box appears asking you to specify the print curve you used to print the chart. In the dialog box, select the **Selected by Prinergy Color Relationship Management: Print Characterization Mode** check box.

After the measurement is completed, the color response for the device condition is established and the device curve you created is associated with the measurement. If you [redefine the device curve](#), you must redo your measurement.

You can also characterize color responses of a device condition by the following:

- [Import existing measurements or Harmony response curves](#)
- [Estimate color response from another device condition](#)
- [Activate an existing measurement set](#)
- [Import a device profile](#)