



Printing United Alliance Sheet Uniformity Index Test Chart and Workbook 2025

How this chart and workbook were developed

In both FOGRA and Printing United Alliance digital press certifications, printed press sheet uniformity is a measured aspect of a passing grade. This measurement is defined (ISO TS-18621-21:2023) as a comparison of the dE_{00} of adjoining rows and columns in press sheets consisting of solid areas for highlight, midtone and shadow CMYK gray values. Each of the three (20%, 40% and 65%) press sheets required by the certifications consist of 2944 measurements in a 46x64 pattern. Tonal values are 20% - (20K 15C 15M 15Y) 40% (K40 C30 M30 Y30) and 65% (K65 C50 M50 Y50). It is unimportant that these values do not adhere to G7 Grey balance patches, as the test does not compare to any standard colorspace. Rather, the test uses either an average of the Lab values of each column or row with it's column or row neighbor.



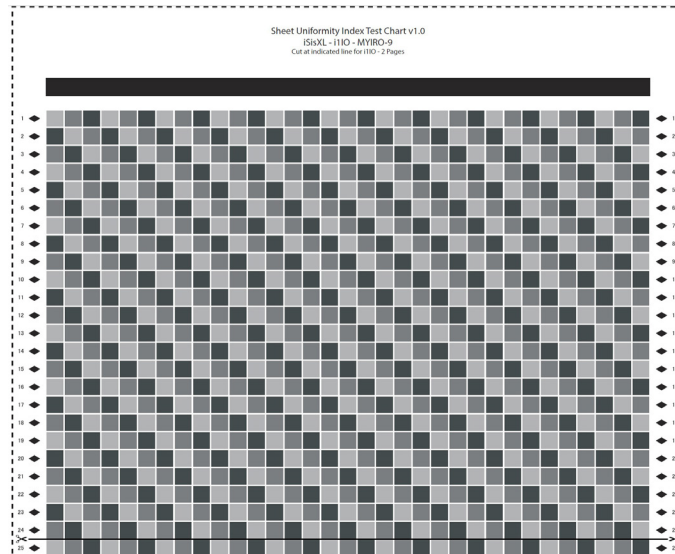
Rows and columns of cell $L^*a^*b^*$ values are averaged and dE 's are then calculated between each row and column and it's neighboring row or column. . dE_{00} 's of all rows and columns are averaged and normalized. The result is passed thru the M Score scaling algorithm to produce a score ranging between 0-100. Zero (0) being the worst and 100 being a perfect score. The PrUA Idealliance Digital Press Certification program specifies a score of 60 or greater on each of these three sheets to pass qualification. This measurement is known as the M Score.

The existing IDEAlliance official test form are formatted to be measured with large format scanning spectrophotometers, such as the xRite iSis Wide, iSisXL or Myro 9 (KM FD9). These devices are unusual in production environments.

This test is normally administered by PrUA at the Manufacturer's level to achieve the coveted G7 Certified Digital/Inkjet Press badge and is not normally a test end users might perform. The certification consists of measurements for colorspace, consistency, repeatability, uniformity and durability.

The Uniformity M Score component of these certifications evaluates for visual defects due to streaking and banding on digital production presses. It was felt that a deeper look at the data might be beneficial to the day-to-day operations of any digital press.

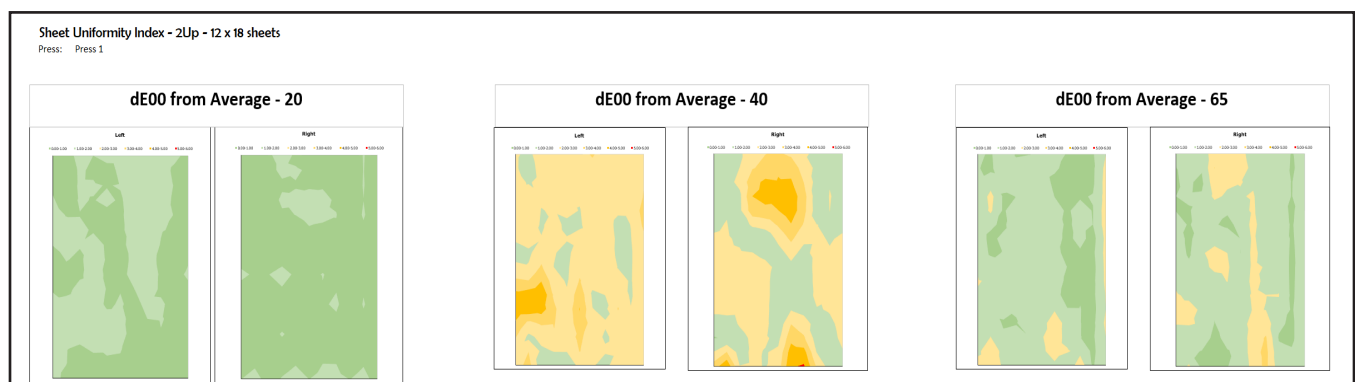
To that end, members of the PrUA Print Properties Committee have developed a quicker, more usable alternate test chart and associated workbook to not only evaluate for press sheet uniformity but to also provide addition visual analysis of the data.



This new single-sheet 13x19 test form can be read by large area scanners like the iSis2XL, but also by much more common spectrophotometers in the market, such as the xRite i110 Pro2 and Pro3 when separated into 2 sheets. The distribution kit contains workflows for i1Profiler as well as text reference files for use with other measurement tools.

This will allow those without access to the higher end spectros to measure and evaluate their own digital printing systems.

The workbook uses a modified scoring algorithm (to account for the fewer number of patches in each tone) to produce a Sheet Uniformity Index. The Sheet Uniformity Index is hinged on a passing score of 60 for consistency with MScore. The workbook also takes a deeper look into the data to display dE00, dL*, da* and db* variations of the highlight, midtone and shadow areas compared to the averages of each in easy to understand Heat Maps, which we are calling Topocolormetric Maps.

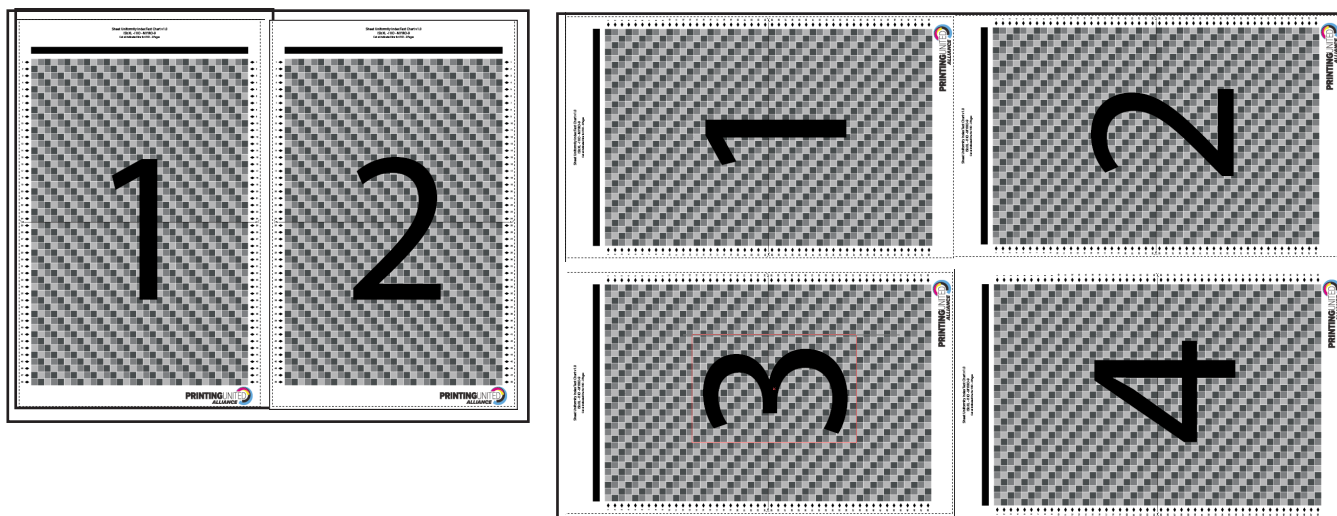


How to Use the Supplied Test Chart and Workbook

Print

Print the Sheet Uniformity Index Test Chart v1.0 on 12x18 stock, coated or uncoated. Since this test does not compare to a given standard, ICC Profile color matching or GCR should not be used. This is a test of the mechanical transfer of toner or ink to the substrate and is not intended to verify gray balance. Instead, it should be printed with density or ink limits and linearization only, if possible.

When printing on oversized sheets, the 12x18 form may be stepped for 2-up or 4-up forms. Layout as below:

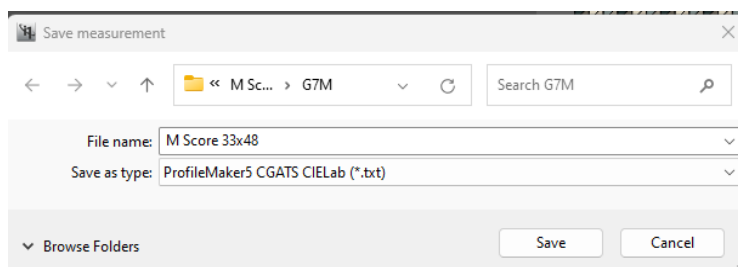


Measure

Trim top and left edges of the chart for this iSisXL. Measure using the xrite iSis Wide, iSis2XL. Any version of the xRite i1IO may be also used by cutting the chart in half along the indicated line. Measure using M0, M1 for coated and M2 for papers with high OBAs. Using i1Profiler, load the appropriate included workflow (.rwx) file from the Charts and Refereces folder.

Save

Save the measurements as ProfileMaker5 CGATS CIELAB text file. Name the files to define their relative position on oversized press sheets.



Load Data

In the Excel Data menu, in the Get data (Power Query) submenu, go to Launch Power Query Editor....

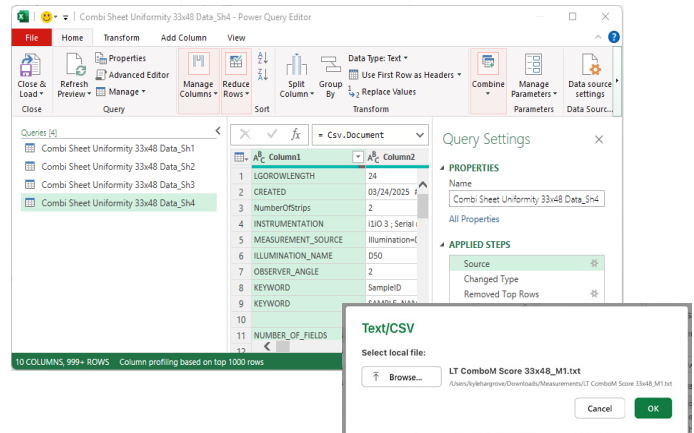
Opens the Home view of the Editor with 3 sections below the toolbar. On the left are the 4 workbook Queries named for their relative position in the layout schema, in the middle is the current data and on the right are the Properties and Applied Steps in the Power Query. If the third column is not displayed, go to the View menu and enable Query Settings.

In the Power Query Editor -> Home tab, Select one of the Queries in the left column.

In the Right column, Query Settings, -> Applied Steps, Select the Source step and double-click or click on the small gear to change the Source file path. A navigation widow will appear.

Browse... to your new measurement files and OK to load. Repeat for each of the remaining Queries

The Query Names suggest the position of the document on oversized sheets.



Sheet 1 = Top Left

Sheet 2 = Top Right

Sheet 3 = Bottom Left

Sheet 4 = Bottom Right

Click on Close and Load the data. The workbook will auto update with your new data.

If using an iSisWide - delete the "Remove Top Rows" step in the Queue Settings -> Applied Steps

If using a CGATS.txt file from a third party measurement utility, Edit the "Remove Top Rows" step so the "Begin_DATA" cell appears on Line 16 when previewing this step. By default, 1 row is removed so line 17 in the Source becomes line 16 in this step.

Do Not Edit or Remove the Change Column Type step. This bit is needed for the Scatterproof charts.

Results

The workbook is divided into several individual worksheets. Depending on whether you are loading only a single 12x18, sequential 12x18s, a 2-up or a 4 up measurements, different worksheets will display the data for those combinations.

Single 12x18 Sheetwise

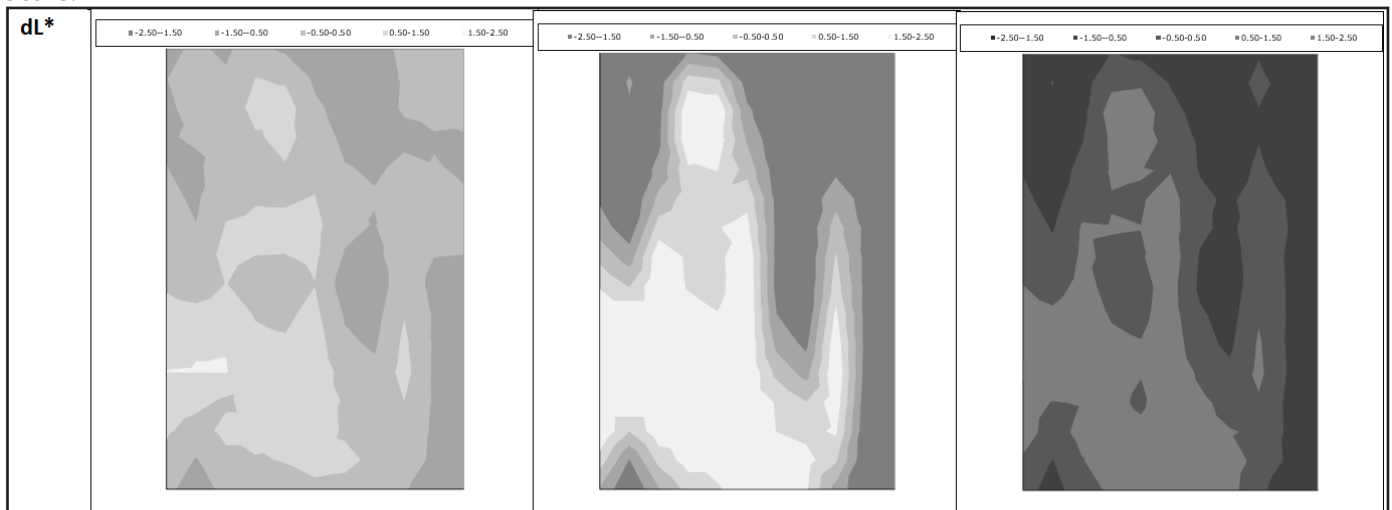
This worksheet displays the Sheet Uniformity Index and associated data for Sheet 1. The Index is the 0-100 score derived from the modified M Score math. The table shows each tonal value, the average de00 for columns and rows, the normalized average and the Index. Index color represents a score of 60 or greater in Green, and those below in Red. Also shown is the 95th Percentile for all de00 results.

Sheet Uniformity Index - Single 12 x 18 sheet					
Press:	Press 1				
Date:	03/24/2025				
Device:	i1iO 3 ; Serial number 2001119				
Illuminant:	D50				
Sheet 1	Date 03/24/2025		Time 08:55:23		
Tint	Avg Columns	Avg Rows	AVG dE	Index	95th Percentile
20	0.35	0.19	0.27	72	1.79
40	0.73	0.34	0.53	51	3.83
65	0.52	0.31	0.42	59	2.39

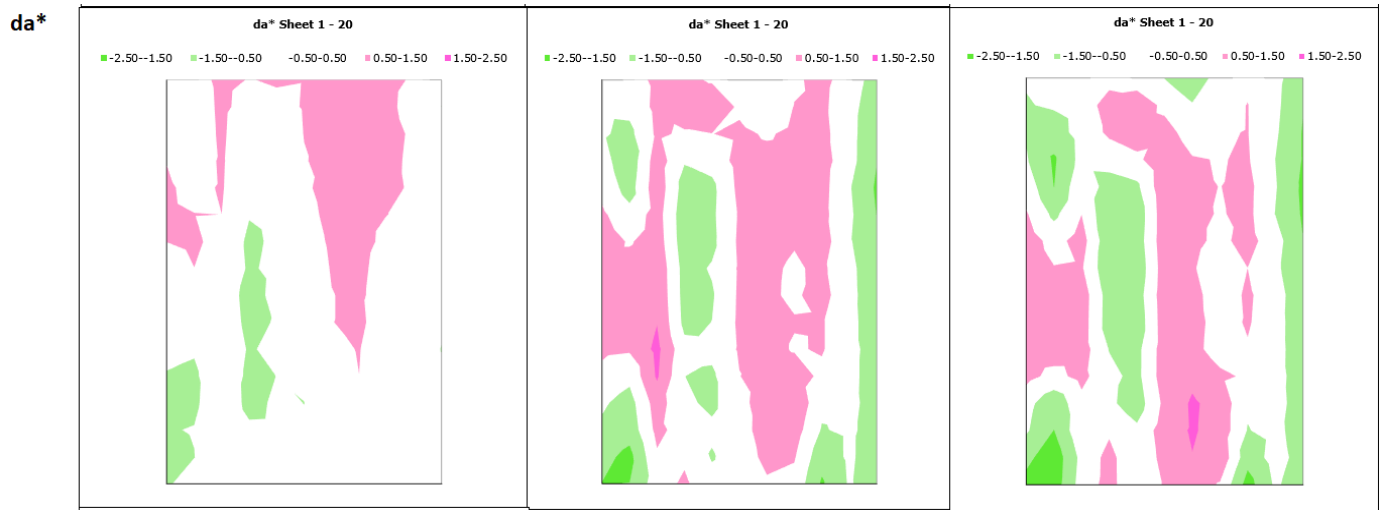
It also displays Heatmaps of the averages of dE00 values of all patches of each tonal value, 20, 40 and 65%. Darker green <1, lighter green is 1-2, yellow is 2-3, orange is 3-4, dark orange is 4-5 and red is dE00 >5.



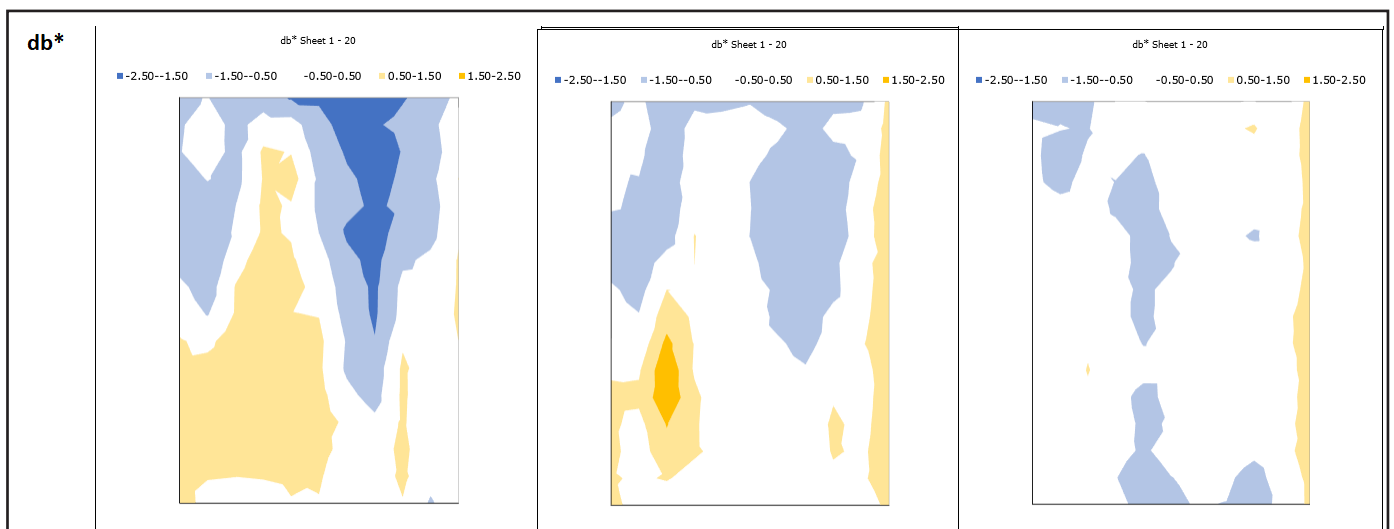
It displays Heatmaps of the averages of dL* values of all patches of each tonal value, 20, 40 and 65%. These heatmaps indicate darker or lighter areas than average. The midpoint scale of each is represented by an approximation of that tone, so the lowest dL values are the midtone shades of each tonal scale.



It displays Heatmaps of the averages of da^* values of all patches of each tonal value, 20, 40 and 65%. These heatmaps indicate areas of negative a^* from average in Green, and positive values in a Magenta scale. The midpoint scale of each is represented by white.



It displays Heatmaps of the averages of db^* values of all patches of each tonal value, 20, 40 and 65%. These heatmaps indicate areas of negative b^* from average in a Blue scale, and positive values in a Yellow to Orange scale. The midpoint scale of each is represented by white.



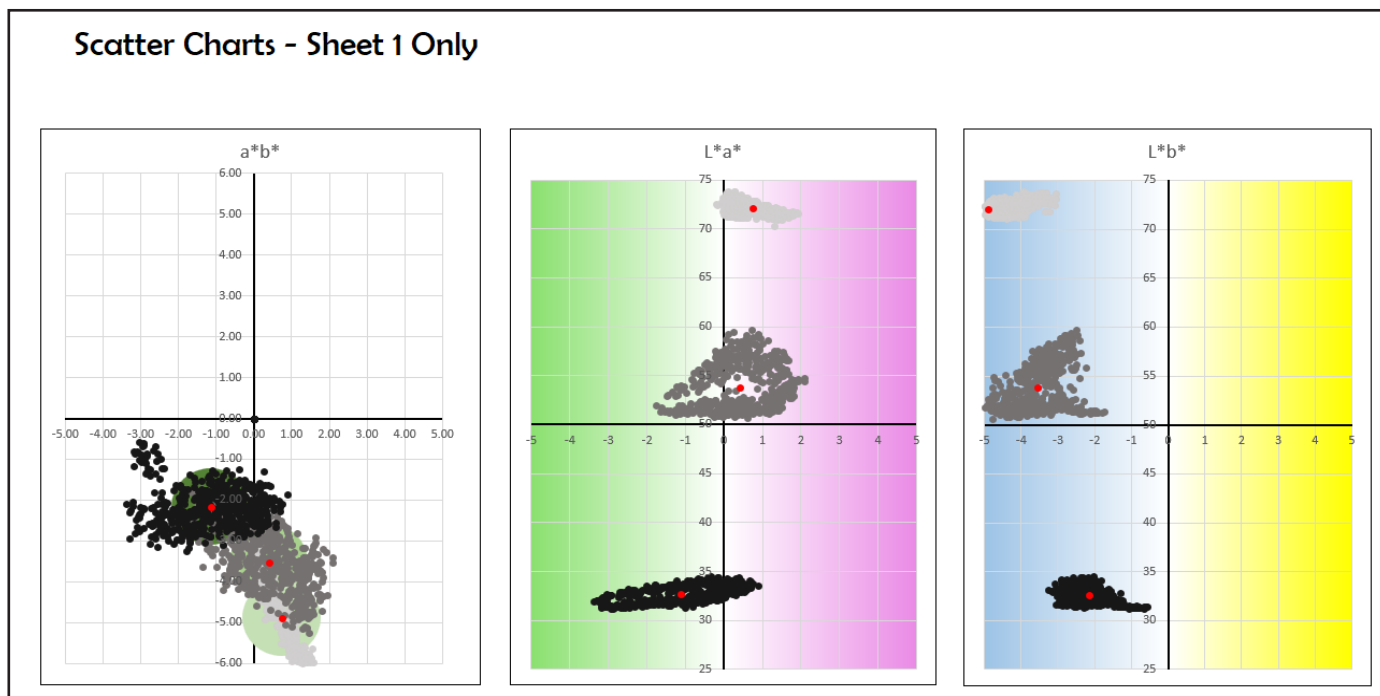
4x 12x18 Sequential - displays individual Uniformity Index scores for each page along with Heatmaps aligned vertically. Scrolling down on the page shows the progression from Sheets 1-4

4 Up Scores - displays the individual Uniformity Index Scores along with a Combined overall score for all 4 quadrants of a large press sheet.

2Up Heatmaps - displays all Heatmaps of Pg1 and Pg 2 aligned as per the press sheet.

4Up Heatmaps - displays Heatmaps of the 4 quadrants aligned as per a large press sheet.

Scatters Sheet 1 - displays the distribution of all patches for a^*b^* , L^*a^* and L^*b^*



Scatter 2Up - displays the distribution of sheets 1&2 for a^*b^* , L^*a^* and L^*b^*

Scatters 4Up - displays the distribution of all patches of a large press sheet for a^*b^* , L^*a^* and L^*b^* .

