



# Calibration Test Report

Spectrophotometer SD-700 · Serial No. 951227

REPORT NO.

**CS20260420038**

|                                     |                        |                             |                               |
|-------------------------------------|------------------------|-----------------------------|-------------------------------|
| PRODUCT<br><b>Spectrophotometer</b> | MODEL<br><b>SD-700</b> | SERIAL NO.<br><b>951227</b> | TEST RESULT<br><b>Grade 1</b> |
|-------------------------------------|------------------------|-----------------------------|-------------------------------|

## Standards of measurement used in the calibration

|                         |                                 |                       |
|-------------------------|---------------------------------|-----------------------|
| NAME / MODEL            | CERTIFICATION NO. / VALIDITY    | UNCERTAINTY           |
| <b>BCRA color tiles</b> | <b>GXfs2019-3311/2027-04-20</b> | <b>U(Y)=2.0 (k=2)</b> |

All data are traceable to National Measurement Institutes.

## Test summary

|                 |                                                    |
|-----------------|----------------------------------------------------|
| APPEARANCE      | All are working normally                           |
| TEST CONDITIONS | D65 · 10° · d/8 · Φ8mm · SCI                       |
| REPEATABILITY   | s(Y)=0.01   s(x)=0.0000   s(y)=0.0000   s(ΔE)=0.00 |

## Indication error

| Standard board | Reference value |                |                | Indication value |        |        | Indication error |        |        |
|----------------|-----------------|----------------|----------------|------------------|--------|--------|------------------|--------|--------|
|                | Y <sub>0</sub>  | x <sub>0</sub> | y <sub>0</sub> | Y                | x      | y      | ΔY               | Δx     | Δy     |
| White          | 89.79           | 0.3169         | 0.3351         | 90.09            | 0.3171 | 0.3352 | 0.30             | 0.0002 | 0.0001 |
| Red            | 14.42           | 0.4730         | 0.3314         | 14.28            | 0.4720 | 0.3310 | 0.14             | 0.0010 | 0.0004 |
| Green          | 23.30           | 0.2913         | 0.4050         | 23.09            | 0.2919 | 0.4053 | 0.21             | 0.0006 | 0.0003 |
| Blue           | 5.78            | 0.2560         | 0.2361         | 5.69             | 0.2556 | 0.2363 | 0.09             | 0.0004 | 0.0002 |
| Yellow         | 61.70           | 0.4482         | 0.4647         | 61.51            | 0.4474 | 0.4639 | 0.19             | 0.0007 | 0.0008 |
| Deep pink      | 15.35           | 0.3767         | 0.3136         | 15.34            | 0.3788 | 0.3144 | 0.01             | 0.0021 | 0.0008 |
| Diff green     | 23.73           | 0.3007         | 0.4132         | 23.56            | 0.2998 | 0.4114 | 0.17             | 0.0009 | 0.0019 |
| Cyan           | 23.90           | 0.2181         | 0.2682         | 23.61            | 0.2180 | 0.2664 | 0.29             | 0.0001 | 0.0018 |
| Orange         | 34.62           | 0.5052         | 0.3859         | 35.04            | 0.5030 | 0.3865 | 0.43             | 0.0022 | 0.0006 |
| Black          | 4.91            | 0.3103         | 0.3278         | 4.83             | 0.3080 | 0.3257 | 0.08             | 0.0023 | 0.0021 |
| Deep grey      | 9.05            | 0.3154         | 0.3317         | 9.18             | 0.3162 | 0.3333 | 0.13             | 0.0008 | 0.0016 |
| Mid grey       | 28.63           | 0.3142         | 0.3310         | 28.64            | 0.3139 | 0.3310 | 0.00             | 0.0003 | 0.0000 |
| Diff grey      | 27.37           | 0.3113         | 0.3377         | 27.46            | 0.3114 | 0.3375 | 0.09             | 0.0001 | 0.0001 |
| Pale grey      | 62.04           | 0.3141         | 0.3318         | 62.55            | 0.3139 | 0.3316 | 0.51             | 0.0002 | 0.0003 |

Indication error = |Indication value – Standard value|. Colour swatches are indicative renderings from the reference L\*a\*b\* values and are not a colour reference.

ISSUED BY      **Instrument manufacturer · factory calibration report (authorised signature held on the original).**



## Appendix

CIELAB values for the same standard boards

| Standard board                                                                                | Reference value |         |         | Indication value |        |        | Indication error |              |              |
|-----------------------------------------------------------------------------------------------|-----------------|---------|---------|------------------|--------|--------|------------------|--------------|--------------|
|                                                                                               | $L^*_0$         | $a^*_0$ | $b^*_0$ | $L^*$            | $a^*$  | $b^*$  | $\Delta L^*$     | $\Delta a^*$ | $\Delta b^*$ |
|  White       | 95.91           | -0.40   | 2.09    | 96.03            | -0.36  | 2.18   | 0.12             | 0.04         | 0.09         |
|  Red         | 44.83           | 38.31   | 18.94   | 44.63            | 38.09  | 18.65  | -0.20            | -0.22        | -0.29        |
|  Green       | 55.39           | -27.07  | 13.85   | 55.17            | -26.86 | 13.94  | -0.22            | 0.21         | 0.09         |
|  Blue        | 28.84           | 8.84    | -20.17  | 28.61            | 8.63   | -20.06 | -0.23            | -0.21        | 0.12         |
|  Yellow      | 82.76           | 2.41    | 75.09   | 82.65            | 2.44   | 74.39  | -0.10            | 0.02         | -0.70        |
|  Deep pink   | 46.11           | 21.96   | 2.92    | 46.09            | 22.24  | 3.34   | -0.02            | 0.28         | 0.42         |
|  Diff green  | 55.82           | -26.12  | 16.83   | 55.65            | -25.91 | 16.29  | -0.17            | 0.20         | -0.55        |
|  Cyan        | 55.99           | -15.46  | -26.44  | 55.69            | -14.79 | -26.86 | -0.29            | 0.67         | -0.42        |
|  Orange      | 65.45           | 39.85   | 50.45   | 65.78            | 39.23  | 50.28  | 0.33             | -0.62        | -0.18        |
|  Black       | 26.49           | -0.09   | -0.70   | 26.25            | -0.15  | -1.15  | -0.24            | -0.06        | -0.45        |
|  Deep grey   | 36.09           | 0.22    | 0.26    | 36.33            | 0.06   | 0.60   | 0.25             | -0.16        | 0.35         |
|  Mid grey   | 60.46           | 0.13    | 0.04    | 60.46            | 0.05   | 0.00   | 0.00             | -0.08        | -0.04        |
|  Diff grey | 59.32           | -3.01   | 1.36    | 59.40            | -2.95  | 1.34   | 0.08             | 0.06         | -0.03        |
|  Pale grey | 82.93           | -0.24   | 0.32    | 83.21            | -0.21  | 0.20   | 0.27             | 0.03         | -0.12        |

Indication error = Indication value – Standard value (signed).

### Reading this report

|                                                             |                                                                                                                                                                                      |
|-------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Y, x, y</b>                                              | CIE 1931 colorimetric values: Y is the luminance factor (lightness) and x, y are the chromaticity coordinates. $Y_0$ , $x_0$ , $y_0$ are the certified values of the reference tile. |
| <b><math>L^*</math>, <math>a^*</math>, <math>b^*</math></b> | CIELAB coordinates: $L^*$ lightness, $a^*$ green–red, $b^*$ blue–yellow.                                                                                                             |
| <b>D65, 10°</b>                                             | Standard illuminant D65 (average daylight) with the 10° standard observer.                                                                                                           |
| <b>d/8</b>                                                  | Diffuse illumination with the detector at 8° to the surface normal.                                                                                                                  |
| <b>SCI</b>                                                  | Specular component included: the gloss reflection is part of the measurement.                                                                                                        |
| <b>Φ8 mm</b>                                                | The measurement aperture is 8 mm in diameter.                                                                                                                                        |
| <b>Repeatability</b>                                        | Standard deviation of repeated measurements of the same tile; $s(\Delta E)$ is expressed in colour-difference units.                                                                 |
| <b>Grade 1</b>                                              | Overall calibration result.                                                                                                                                                          |