

| Colour stimuli of just noticeable colour thresholds (p=50%) in BY direction                                                                                                                                                                                             |                                                   |              |              |                   |                                                   |              |              |              |                                      |      |      |                                 |                   |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------|--------------|--------------|-------------------|---------------------------------------------------|--------------|--------------|--------------|--------------------------------------|------|------|---------------------------------|-------------------|
| number<br>Colour<br>series                                                                                                                                                                                                                                              | CIELAB differences<br>lightness, chroma, $\Sigma$ |              |              |                   | LABJND differences<br>lightness, chroma, $\Sigma$ |              |              |              | colour differences<br>other formulae |      |      | notes<br>experimental<br>series |                   |
|                                                                                                                                                                                                                                                                         | $\Delta L^*$                                      | $\Delta a^*$ | $\Delta b^*$ | $\Delta E^*_{ab}$ | $\Delta L^*$                                      | $\Delta a^*$ | $\Delta b^*$ | $\Delta E^*$ | CMC                                  | C94  | C00  |                                 |                   |
| 0                                                                                                                                                                                                                                                                       | WPN                                               | 0.0          | -0.14        | -1.75             | 1.75                                              | 0.03         | -0.1         | -1.06        | 1.07                                 | 2.49 | 1.71 | 1.71                            | _WN, GR, BY       |
| 1                                                                                                                                                                                                                                                                       | WPN                                               | 0.0          | -0.1         | -1.16             | 1.16                                              | 0.04         | -0.11        | -0.98        | 0.99                                 | 1.4  | 1.02 | 1.0                             | grey surround     |
| 2                                                                                                                                                                                                                                                                       | WPN                                               | 0.0          | -0.08        | -1.01             | 1.02                                              | 0.04         | -0.1         | -1.07        | 1.07                                 | 1.32 | 0.93 | 0.91                            | $Y_G=16.6$        |
| 3                                                                                                                                                                                                                                                                       | WPN                                               | 0.0          | -0.08        | -0.94             | 0.95                                              | 0.0          | -0.13        | -1.13        | 1.14                                 | 1.4  | 0.93 | 0.92                            | with white        |
| 4                                                                                                                                                                                                                                                                       | WPN                                               | 0.0          | -0.09        | -1.08             | 1.08                                              | 0.0          | -0.15        | -1.36        | 1.37                                 | 1.43 | 1.01 | 1.02                            | border            |
| 5                                                                                                                                                                                                                                                                       | WPN                                               | 0.0          | -0.1         | -1.31             | 1.32                                              | 0.0          | -0.17        | -1.54        | 1.55                                 | 1.55 | 1.12 | 1.15                            | $X_W=95.18$       |
| 6                                                                                                                                                                                                                                                                       | WPN                                               | 0.0          | -0.08        | -0.97             | 0.98                                              | 0.0          | -0.13        | -1.31        | 1.32                                 | 1.29 | 0.9  | 0.89                            | $Y_W=100.0$       |
| 7                                                                                                                                                                                                                                                                       | WPN                                               | 0.0          | -0.12        | -1.12             | 1.13                                              | 0.0          | -0.16        | -1.22        | 1.23                                 | 1.51 | 1.05 | 1.03                            | $Z_W=44.15$       |
| 8                                                                                                                                                                                                                                                                       | WPN                                               | 0.0          | -0.12        | -1.26             | 1.27                                              | 0.0          | -0.14        | -1.16        | 1.16                                 | 1.88 | 1.24 | 1.21                            | $x_W=0.3977$      |
| 9                                                                                                                                                                                                                                                                       | WPN                                               | 0.0          | -0.08        | -0.91             | 0.92                                              | 0.0          | -0.1         | -0.93        | 0.93                                 | 1.41 | 0.91 | 0.91                            | $y_W=0.4178$      |
| 10                                                                                                                                                                                                                                                                      | WPN                                               | 0.0          | -0.04        | -0.84             | 0.84                                              | 0.0          | -0.05        | -0.89        | 0.89                                 | 1.27 | 0.84 | 0.84                            | <i>near P4000</i> |
| 11                                                                                                                                                                                                                                                                      | WDN                                               | 0.0          | -0.04        | -0.24             | 0.25                                              | 0.0          | -0.09        | -0.82        | 0.83                                 | 0.35 | 0.24 | 0.24                            | _WN, GR, BY       |
| 12                                                                                                                                                                                                                                                                      | WDN                                               | 0.0          | -0.04        | -0.24             | 0.25                                              | 0.0          | -0.1         | -0.93        | 0.93                                 | 0.37 | 0.24 | 0.25                            | grey surround     |
| 13                                                                                                                                                                                                                                                                      | WDN                                               | 0.0          | -0.04        | -0.26             | 0.27                                              | 0.0          | -0.09        | -1.1         | 1.1                                  | 0.38 | 0.25 | 0.25                            | $Y_G=16.6$        |
| 14                                                                                                                                                                                                                                                                      | WDN                                               | 0.0          | -0.04        | -0.28             | 0.28                                              | 0.0          | -0.1         | -1.21        | 1.22                                 | 0.4  | 0.27 | 0.27                            | with white        |
| 15                                                                                                                                                                                                                                                                      | WDN                                               | 0.0          | -0.02        | -0.27             | 0.27                                              | 0.0          | -0.06        | -1.16        | 1.16                                 | 0.39 | 0.26 | 0.26                            | border            |
| 16                                                                                                                                                                                                                                                                      | WDN                                               | 0.0          | -0.07        | -0.32             | 0.33                                              | 0.0          | -0.16        | -1.32        | 1.33                                 | 0.5  | 0.32 | 0.33                            | $X_W=90.38$       |
| 17                                                                                                                                                                                                                                                                      | WDN                                               | 0.0          | -0.06        | -0.34             | 0.35                                              | 0.0          | -0.14        | -1.31        | 1.32                                 | 0.54 | 0.35 | 0.36                            | $Y_W=100.0$       |
| 18                                                                                                                                                                                                                                                                      | WDN                                               | 0.0          | -0.08        | -0.36             | 0.37                                              | 0.0          | -0.16        | -1.25        | 1.26                                 | 0.54 | 0.36 | 0.37                            | $Z_W=87.54$       |
| 19                                                                                                                                                                                                                                                                      | WDN                                               | 0.0          | -0.06        | -0.39             | 0.39                                              | 0.0          | -0.12        | -1.17        | 1.17                                 | 0.55 | 0.37 | 0.38                            | $x_W=0.3251$      |
| 20                                                                                                                                                                                                                                                                      | WDN                                               | 0.0          | -0.12        | -0.44             | 0.46                                              | 0.0          | -0.19        | -1.16        | 1.18                                 | 0.6  | 0.42 | 0.44                            | $y_W=0.3598$      |
| 21                                                                                                                                                                                                                                                                      | WDN                                               | 0.0          | -0.08        | -0.42             | 0.43                                              | 0.0          | -0.14        | -1.19        | 1.19                                 | 0.58 | 0.4  | 0.41                            | <i>near D65</i>   |
| 22                                                                                                                                                                                                                                                                      | GDR                                               | 0.0          | -0.25        | -0.51             | 0.57                                              | 0.0          | -0.16        | -2.17        | 2.17                                 | 0.22 | 0.22 | 0.22                            | _WN, GR, BY       |
| 23                                                                                                                                                                                                                                                                      | GDR                                               | 0.0          | -0.22        | -0.51             | 0.55                                              | 0.0          | -0.21        | -2.11        | 2.12                                 | 0.26 | 0.27 | 0.28                            | grey surround     |
| 24                                                                                                                                                                                                                                                                      | GDR                                               | 0.0          | -0.11        | -0.46             | 0.47                                              | 0.0          | -0.16        | -1.84        | 1.85                                 | 0.3  | 0.31 | 0.31                            | $Y_G=16.6$        |
| 25                                                                                                                                                                                                                                                                      | GDR                                               | 0.0          | -0.1         | -0.47             | 0.48                                              | 0.0          | -0.18        | -1.86        | 1.86                                 | 0.41 | 0.37 | 0.35                            | with white        |
| 26                                                                                                                                                                                                                                                                      | GDR                                               | 0.0          | -0.09        | -0.5              | 0.51                                              | 0.0          | -0.19        | -1.94        | 1.95                                 | 0.58 | 0.45 | 0.44                            | border            |
| 27                                                                                                                                                                                                                                                                      | GDR                                               | 0.0          | -0.09        | -0.48             | 0.49                                              | 0.0          | -0.21        | -1.86        | 1.87                                 | 0.71 | 0.48 | 0.48                            | $X_W=90.38$       |
| 28                                                                                                                                                                                                                                                                      | GDR                                               | 0.0          | -0.1         | -0.55             | 0.56                                              | 0.0          | -0.2         | -2.22        | 2.23                                 | 0.75 | 0.39 | 0.33                            | $Y_W=100.0$       |
| 29                                                                                                                                                                                                                                                                      | GDR                                               | 0.01         | -0.12        | -0.6              | 0.62                                              | 0.15         | -0.23        | -2.48        | 2.5                                  | 0.59 | 0.32 | 0.27                            | $Z_W=87.54$       |
| 30                                                                                                                                                                                                                                                                      | GDR                                               | 0.01         | -0.07        | -0.63             | 0.63                                              | 0.12         | -0.14        | -2.61        | 2.61                                 | 0.54 | 0.28 | 0.23                            | $x_W=0.3251$      |
| 31                                                                                                                                                                                                                                                                      | GDR                                               | 0.01         | -0.06        | -0.69             | 0.69                                              | 0.11         | -0.12        | -2.89        | 2.89                                 | 0.55 | 0.28 | 0.23                            | $y_W=0.3598$      |
| 32                                                                                                                                                                                                                                                                      | GDR                                               | 0.01         | -0.08        | -0.74             | 0.75                                              | 0.11         | -0.14        | -3.13        | 3.13                                 | 0.58 | 0.29 | 0.23                            | <i>near D65</i>   |
| 33                                                                                                                                                                                                                                                                      | BDY                                               | 0.0          | -0.09        | -0.36             | 0.37                                              | 0.0          | -0.18        | -1.54        | 1.55                                 | 0.2  | 0.17 | 0.17                            | _WN, GR, BY       |
| 34                                                                                                                                                                                                                                                                      | BDY                                               | 0.0          | -0.12        | -0.46             | 0.48                                              | 0.0          | -0.25        | -1.96        | 1.97                                 | 0.3  | 0.26 | 0.27                            | grey surround     |
| 35                                                                                                                                                                                                                                                                      | BDY                                               | 0.0          | -0.1         | -0.42             | 0.44                                              | 0.0          | -0.22        | -1.73        | 1.75                                 | 0.34 | 0.28 | 0.29                            | $Y_G=16.6$        |
| 36                                                                                                                                                                                                                                                                      | BDY                                               | 0.0          | -0.1         | -0.42             | 0.43                                              | 0.0          | -0.21        | -1.69        | 1.7                                  | 0.41 | 0.32 | 0.33                            | with white        |
| 37                                                                                                                                                                                                                                                                      | BDY                                               | 0.0          | -0.1         | -0.46             | 0.47                                              | 0.0          | -0.21        | -1.77        | 1.79                                 | 0.56 | 0.41 | 0.41                            | border            |
| 38                                                                                                                                                                                                                                                                      | BDY                                               | 0.0          | -0.09        | -0.45             | 0.46                                              | 0.0          | -0.19        | -1.73        | 1.74                                 | 0.69 | 0.45 | 0.46                            | $X_W=90.38$       |
| 39                                                                                                                                                                                                                                                                      | BDY                                               | 0.0          | -0.13        | -0.74             | 0.75                                              | 0.0          | -0.3         | -2.11        | 2.13                                 | 0.6  | 0.5  | 0.51                            | $Y_W=100.0$       |
| 40                                                                                                                                                                                                                                                                      | BDY                                               | 0.0          | -0.09        | -0.81             | 0.82                                              | 0.0          | -0.19        | -1.44        | 1.46                                 | 0.42 | 0.36 | 0.36                            | $Z_W=87.54$       |
| 41                                                                                                                                                                                                                                                                      | BDY                                               | 0.0          | -0.08        | -1.24             | 1.24                                              | 0.0          | -0.17        | -1.59        | 1.6                                  | 0.54 | 0.45 | 0.45                            | $x_W=0.3251$      |
| 42                                                                                                                                                                                                                                                                      | BDY                                               | 0.0          | -0.09        | -2.0              | 2.0                                               | 0.0          | -0.2         | -1.56        | 1.57                                 | 0.75 | 0.58 | 0.59                            | $y_W=0.3598$      |
| 43                                                                                                                                                                                                                                                                      | BDY                                               | 0.01         | -0.11        | -4.84             | 4.85                                              | 0.1          | -0.24        | -1.71        | 1.73                                 | 1.59 | 1.1  | 1.14                            | <i>near D65</i>   |
| mean                                                                                                                                                                                                                                                                    |                                                   |              |              | 0.79              |                                                   |              |              |              | 1.58                                 | 0.77 | 0.54 | 0.53                            |                   |
| standard deviation                                                                                                                                                                                                                                                      |                                                   |              |              | 0.73              |                                                   |              |              |              | 0.53                                 | 0.51 | 0.35 | 0.35                            |                   |
| Samples: bright white (W, no. 0), dark black (S, no. 10), White (W, no. 11), Black (N, no. 21)<br>Green (G=T (turquoise), no. 22), Red (R=M (magenta), no. 32), Blue (B, no. 33), Yellow (Y, no. 43)<br>Source: BAM Research Report no. 115 (1985), Tables 5.40;1 to 11 |                                                   |              |              |                   |                                                   |              |              |              |                                      |      |      |                                 |                   |