

### Colour stimuli of just noticeable colour thresholds ( $p=50\%$ ) in WN 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                                                                                                                               |  |
|----------------------------|---------------------------------------------------|--------------|--------------|--------------|---------------------------------------------------|--------------|--------------|--------------|--------------------------------------|------|------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
|                            | $\Delta L^*$                                      | $\Delta a^*$ | $\Delta b^*$ | $\Delta E^*$ | $\Delta L^*$                                      | $\Delta a^*$ | $\Delta b^*$ | $\Delta E^*$ | CMC                                  | C94  | C00  |                                                                                                                                                               |  |
| 0 WPN                      | 0.29                                              | 0.0          | 0.0          | 0.29         | 1.03                                              | 0.0          | 0.0          | 1.03         | 0.14                                 | 0.29 | 0.13 | _WN, GR, BY<br>grey surround<br>$Y_G=16.6$<br>with white<br>border<br>$X_W=95.18$<br>$Y_W=100.0$<br>$Z_W=44.15$<br>$x_W=0.3977$<br>$y_W=0.4178$<br>near P4000 |  |
| 1 WPN                      | 0.19                                              | 0.0          | 0.0          | 0.19         | 0.91                                              | 0.0          | 0.0          | 0.91         | 0.1                                  | 0.19 | 0.12 |                                                                                                                                                               |  |
| 2 WPN                      | 0.14                                              | 0.0          | 0.0          | 0.14         | 0.83                                              | 0.0          | 0.0          | 0.83         | 0.09                                 | 0.14 | 0.11 |                                                                                                                                                               |  |
| 3 WPN                      | 0.12                                              | 0.0          | 0.0          | 0.12         | 0.82                                              | 0.0          | 0.0          | 0.82         | 0.09                                 | 0.12 | 0.12 |                                                                                                                                                               |  |
| 4 WPN                      | 0.15                                              | -0.01        | -0.01        | 0.15         | 1.13                                              | -0.03        | -0.02        | 1.13         | 0.14                                 | 0.15 | 0.12 |                                                                                                                                                               |  |
| 5 WPN                      | 0.15                                              | -0.02        | -0.03        | 0.15         | 1.15                                              | -0.04        | -0.05        | 1.15         | 0.19                                 | 0.15 | 0.11 |                                                                                                                                                               |  |
| 6 WPN                      | 0.19                                              | 0.0          | 0.02         | 0.19         | 1.41                                              | 0.0          | 0.04         | 1.41         | 0.28                                 | 0.19 | 0.13 |                                                                                                                                                               |  |
| 7 WPN                      | 0.21                                              | 0.02         | 0.01         | 0.21         | 1.22                                              | 0.03         | 0.03         | 1.22         | 0.41                                 | 0.21 | 0.13 |                                                                                                                                                               |  |
| 8 WPN                      | 0.18                                              | 0.0          | 0.0          | 0.18         | 0.96                                              | 0.01         | 0.02         | 0.96         | 0.35                                 | 0.18 | 0.1  |                                                                                                                                                               |  |
| 9 WPN                      | 0.18                                              | 0.0          | 0.0          | 0.18         | 1.06                                              | 0.0          | 0.01         | 1.06         | 0.35                                 | 0.18 | 0.1  |                                                                                                                                                               |  |
| 10 WPN                     | 0.18                                              | 0.0          | 0.0          | 0.18         | 1.11                                              | -0.01        | -0.01        | 1.11         | 0.35                                 | 0.18 | 0.1  |                                                                                                                                                               |  |
| 11 WDN                     | 0.08                                              | 0.0          | 0.0          | 0.08         | 0.77                                              | 0.0          | 0.0          | 0.77         | 0.05                                 | 0.08 | 0.07 | _WN, GR, BY<br>grey surround<br>$Y_G=16.6$<br>with white<br>border<br>$X_W=90.38$<br>$Y_W=100.0$<br>$Z_W=87.54$<br>$x_W=0.3251$<br>$y_W=0.3598$<br>near D65   |  |
| 12 WDN                     | 0.08                                              | 0.0          | 0.0          | 0.08         | 0.92                                              | 0.0          | 0.0          | 0.92         | 0.07                                 | 0.08 | 0.08 |                                                                                                                                                               |  |
| 13 WDN                     | 0.1                                               | 0.0          | 0.0          | 0.1          | 1.16                                              | 0.01         | 0.01         | 1.16         | 0.09                                 | 0.1  | 0.09 |                                                                                                                                                               |  |
| 14 WDN                     | 0.09                                              | 0.0          | 0.0          | 0.09         | 1.04                                              | 0.0          | 0.01         | 1.04         | 0.09                                 | 0.09 | 0.07 |                                                                                                                                                               |  |
| 15 WDN                     | 0.11                                              | 0.0          | 0.0          | 0.11         | 1.33                                              | 0.0          | -0.01        | 1.33         | 0.14                                 | 0.11 | 0.08 |                                                                                                                                                               |  |
| 16 WDN                     | 0.11                                              | 0.0          | 0.0          | 0.11         | 1.28                                              | 0.0          | 0.02         | 1.28         | 0.16                                 | 0.11 | 0.08 |                                                                                                                                                               |  |
| 17 WDN                     | 0.14                                              | -0.02        | 0.01         | 0.15         | 1.53                                              | -0.05        | 0.04         | 1.53         | 0.25                                 | 0.15 | 0.1  |                                                                                                                                                               |  |
| 18 WDN                     | 0.11                                              | -0.03        | 0.0          | 0.11         | 1.1                                               | -0.06        | -0.03        | 1.1          | 0.22                                 | 0.11 | 0.08 |                                                                                                                                                               |  |
| 19 WDN                     | 0.14                                              | 0.0          | -0.01        | 0.14         | 1.23                                              | -0.02        | -0.06        | 1.23         | 0.27                                 | 0.14 | 0.09 |                                                                                                                                                               |  |
| 20 WDN                     | 0.17                                              | -0.01        | 0.0          | 0.17         | 1.34                                              | -0.02        | -0.05        | 1.34         | 0.34                                 | 0.17 | 0.1  |                                                                                                                                                               |  |
| 21 WDN                     | 0.18                                              | 0.0          | 0.0          | 0.18         | 1.44                                              | -0.03        | -0.1         | 1.45         | 0.35                                 | 0.18 | 0.1  |                                                                                                                                                               |  |
| 22 GDR                     | 0.09                                              | 0.46         | 0.03         | 0.47         | 1.0                                               | 0.37         | 0.22         | 1.09         | 0.16                                 | 0.13 | 0.13 | _WN, GR, BY<br>grey surround<br>$Y_G=16.6$<br>with white<br>border<br>$X_W=90.38$<br>$Y_W=100.0$<br>$Z_W=87.54$<br>$x_W=0.3251$<br>$y_W=0.3598$<br>near D65   |  |
| 23 GDR                     | 0.05                                              | 0.11         | 0.01         | 0.13         | 0.59                                              | 0.16         | 0.07         | 0.61         | 0.06                                 | 0.06 | 0.06 |                                                                                                                                                               |  |
| 24 GDR                     | 0.09                                              | 0.11         | 0.01         | 0.14         | 0.96                                              | 0.21         | 0.07         | 0.99         | 0.09                                 | 0.1  | 0.1  |                                                                                                                                                               |  |
| 25 GDR                     | 0.08                                              | 0.03         | 0.01         | 0.09         | 0.91                                              | 0.09         | 0.08         | 0.92         | 0.07                                 | 0.09 | 0.09 |                                                                                                                                                               |  |
| 26 GDR                     | 0.07                                              | 0.02         | 0.0          | 0.07         | 0.76                                              | 0.06         | 0.04         | 0.77         | 0.06                                 | 0.07 | 0.07 |                                                                                                                                                               |  |
| 27 GDR                     | 0.08                                              | 0.0          | 0.0          | 0.08         | 0.92                                              | -0.01        | 0.0          | 0.92         | 0.07                                 | 0.08 | 0.08 |                                                                                                                                                               |  |
| 28 GDR                     | 0.05                                              | -0.03        | 0.01         | 0.06         | 0.56                                              | -0.12        | 0.05         | 0.58         | 0.04                                 | 0.05 | 0.05 |                                                                                                                                                               |  |
| 29 GDR                     | 0.07                                              | -0.12        | 0.03         | 0.15         | 0.82                                              | -0.35        | 0.17         | 0.91         | 0.07                                 | 0.08 | 0.08 |                                                                                                                                                               |  |
| 30 GDR                     | 0.1                                               | -0.17        | 0.04         | 0.2          | 1.03                                              | -0.47        | 0.28         | 1.17         | 0.09                                 | 0.1  | 0.1  |                                                                                                                                                               |  |
| 31 GDR                     | 0.11                                              | -0.18        | 0.03         | 0.22         | 1.15                                              | -0.51        | 0.26         | 1.29         | 0.1                                  | 0.11 | 0.11 |                                                                                                                                                               |  |
| 32 GDR                     | 0.11                                              | -0.25        | 0.06         | 0.28         | 1.15                                              | -0.6         | 0.43         | 1.37         | 0.11                                 | 0.12 | 0.12 |                                                                                                                                                               |  |
| 33 BDY                     | 0.08                                              | 0.0          | 0.03         | 0.09         | 0.89                                              | 0.01         | 0.29         | 0.94         | 0.07                                 | 0.08 | 0.08 | _WN, GR, BY<br>grey surround<br>$Y_G=16.6$<br>with white<br>border<br>$X_W=90.38$<br>$Y_W=100.0$<br>$Z_W=87.54$<br>$x_W=0.3251$<br>$y_W=0.3598$<br>near D65   |  |
| 34 BDY                     | 0.05                                              | 0.0          | 0.02         | 0.05         | 0.52                                              | 0.01         | 0.15         | 0.54         | 0.04                                 | 0.05 | 0.05 |                                                                                                                                                               |  |
| 35 BDY                     | 0.07                                              | 0.0          | 0.01         | 0.07         | 0.76                                              | 0.01         | 0.13         | 0.77         | 0.06                                 | 0.07 | 0.07 |                                                                                                                                                               |  |
| 36 BDY                     | 0.07                                              | 0.0          | 0.02         | 0.07         | 0.76                                              | 0.0          | 0.13         | 0.77         | 0.06                                 | 0.07 | 0.07 |                                                                                                                                                               |  |
| 37 BDY                     | 0.07                                              | 0.0          | 0.0          | 0.07         | 0.75                                              | -0.01        | 0.0          | 0.75         | 0.05                                 | 0.07 | 0.07 |                                                                                                                                                               |  |
| 38 BDY                     | 0.07                                              | 0.0          | 0.0          | 0.07         | 0.81                                              | -0.01        | 0.0          | 0.81         | 0.06                                 | 0.07 | 0.07 |                                                                                                                                                               |  |
| 39 BDY                     | 0.05                                              | 0.0          | -0.02        | 0.05         | 0.55                                              | -0.01        | -0.09        | 0.56         | 0.04                                 | 0.05 | 0.05 |                                                                                                                                                               |  |
| 40 BDY                     | 0.05                                              | -0.02        | -0.07        | 0.09         | 0.56                                              | -0.05        | -0.17        | 0.59         | 0.06                                 | 0.06 | 0.06 |                                                                                                                                                               |  |
| 41 BDY                     | 0.07                                              | -0.01        | -0.17        | 0.19         | 0.75                                              | -0.05        | -0.28        | 0.8          | 0.09                                 | 0.09 | 0.09 |                                                                                                                                                               |  |
| 42 BDY                     | 0.07                                              | -0.01        | -0.31        | 0.32         | 0.73                                              | -0.04        | -0.29        | 0.79         | 0.13                                 | 0.11 | 0.11 |                                                                                                                                                               |  |
| 43 BDY                     | 0.07                                              | -0.01        | -0.8         | 0.8          | 0.72                                              | -0.03        | -0.31        | 0.79         | 0.27                                 | 0.2  | 0.2  |                                                                                                                                                               |  |
| mean                       |                                                   |              |              | 0.16         |                                                   |              |              |              | 0.99                                 | 0.14 | 0.12 | 0.09                                                                                                                                                          |  |
| standard deviation         |                                                   |              |              | 0.12         |                                                   |              |              |              | 0.25                                 | 0.1  | 0.05 | 0.02                                                                                                                                                          |  |

Samples: bright white (Q, no. 0), dark black (S, no. 10), White (W, no. 11), Black (N, no. 21) Samp

Source: BAM Research Report no. 115 (1985), Tables 5.40;1 to 11