

**Colour stimuli of just noticeable colour thresholds ( $p=50\%$ ) in GR 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                      | 0.01                                              | -1.13        | 0.1          | 1.13              | 0.04                                              | -0.87        | 0.06         | 0.87         | 1.59                                 | 1.08        | 1.62        | _WN, GR, BY                     |
| 1 WPN                      | 0.0                                               | -0.9         | 0.1          | 0.9               | 0.04                                              | -0.93        | 0.08         | 0.93         | 1.18                                 | 0.85        | 1.25        | grey surround                   |
| 2 WPN                      | 0.0                                               | -0.75        | 0.08         | 0.75              | 0.04                                              | -0.96        | 0.09         | 0.97         | 1.0                                  | 0.72        | 1.07        | $Y_G=16.6$                      |
| 3 WPN                      | 0.01                                              | -0.71        | 0.06         | 0.71              | 0.07                                              | -1.06        | 0.07         | 1.07         | 1.01                                 | 0.69        | 1.03        | with white                      |
| 4 WPN                      | 0.0                                               | -0.62        | 0.07         | 0.62              | 0.0                                               | -1.02        | 0.09         | 1.02         | 0.84                                 | 0.59        | 0.87        | border                          |
| 5 WPN                      | 0.0                                               | -0.64        | 0.07         | 0.64              | 0.0                                               | -1.07        | 0.09         | 1.07         | 0.89                                 | 0.6         | 0.88        | $X_w=95.18$                     |
| 6 WPN                      | 0.0                                               | -0.66        | 0.06         | 0.67              | 0.0                                               | -1.05        | 0.09         | 1.06         | 0.89                                 | 0.64        | 0.94        | $Y_w=100.0$                     |
| 7 WPN                      | 0.0                                               | -0.8         | 0.07         | 0.8               | 0.0                                               | -1.0         | 0.08         | 1.01         | 1.08                                 | 0.77        | 1.14        | $Z_w=44.15$                     |
| 8 WPN                      | 0.0                                               | -0.85        | 0.1          | 0.86              | 0.0                                               | -1.0         | 0.09         | 1.0          | 1.22                                 | 0.84        | 1.25        | $x_w=0.3977$                    |
| 9 WPN                      | 0.0                                               | -0.69        | 0.07         | 0.69              | 0.0                                               | -0.89        | 0.07         | 0.89         | 1.05                                 | 0.69        | 1.03        | $y_w=0.4178$                    |
| 10 WPN                     | 0.0                                               | -0.61        | 0.03         | 0.61              | 0.0                                               | -0.81        | 0.03         | 0.81         | 0.93                                 | 0.61        | 0.91        | near P4000                      |
| 11 WDN                     | 0.0                                               | -0.56        | 0.02         | 0.56              | 0.07                                              | -1.1         | 0.08         | 1.11         | 0.8                                  | 0.55        | 0.84        | _WN, GR, BY                     |
| 12 WDN                     | 0.0                                               | -0.49        | 0.02         | 0.49              | 0.0                                               | -1.06        | 0.09         | 1.06         | 0.73                                 | 0.48        | 0.73        | grey surround                   |
| 13 WDN                     | 0.0                                               | -0.49        | 0.02         | 0.49              | 0.0                                               | -1.14        | 0.08         | 1.14         | 0.69                                 | 0.48        | 0.72        | $Y_G=16.6$                      |
| 14 WDN                     | 0.0                                               | -0.5         | 0.01         | 0.5               | 0.0                                               | -1.19        | 0.07         | 1.2          | 0.7                                  | 0.49        | 0.73        | with white                      |
| 15 WDN                     | 0.0                                               | -0.53        | 0.02         | 0.53              | 0.0                                               | -1.27        | 0.11         | 1.27         | 0.76                                 | 0.52        | 0.78        | border                          |
| 16 WDN                     | 0.0                                               | -0.53        | 0.02         | 0.53              | 0.0                                               | -1.23        | 0.11         | 1.24         | 0.79                                 | 0.53        | 0.79        | $X_w=90.38$                     |
| 17 WDN                     | 0.0                                               | -0.61        | 0.02         | 0.61              | 0.0                                               | -1.33        | 0.1          | 1.33         | 0.93                                 | 0.61        | 0.91        | $Y_w=100.0$                     |
| 18 WDN                     | 0.0                                               | -0.61        | 0.03         | 0.61              | 0.0                                               | -1.25        | 0.11         | 1.25         | 0.89                                 | 0.6         | 0.9         | $Z_w=87.54$                     |
| 19 WDN                     | 0.0                                               | -0.7         | 0.02         | 0.7               | 0.0                                               | -1.27        | 0.08         | 1.27         | 0.99                                 | 0.68        | 1.02        | $x_w=0.3251$                    |
| 20 WDN                     | 0.0                                               | -0.7         | 0.03         | 0.7               | 0.0                                               | -1.12        | 0.09         | 1.12         | 0.96                                 | 0.67        | 1.01        | $y_w=0.3598$                    |
| 21 WDN                     | 0.0                                               | -0.68        | 0.03         | 0.69              | 0.0                                               | -1.13        | 0.09         | 1.13         | 0.95                                 | 0.66        | 1.0         | near D65                        |
| 22 GDR                     | 0.01                                              | -3.6         | 0.04         | 3.6               | 0.14                                              | -2.27        | 0.19         | 2.28         | 1.16                                 | 0.81        | 0.8         | _WN, GR, BY                     |
| 23 GDR                     | 0.01                                              | -2.46        | 0.04         | 2.46              | 0.14                                              | -2.38        | 0.19         | 2.39         | 0.96                                 | 0.78        | 0.77        | grey surround                   |
| 24 GDR                     | 0.01                                              | -1.69        | 0.05         | 1.69              | 0.13                                              | -2.33        | 0.22         | 2.35         | 0.89                                 | 0.78        | 0.79        | $Y_G=16.6$                      |
| 25 GDR                     | 0.01                                              | -1.19        | 0.02         | 1.19              | 0.11                                              | -2.01        | 0.09         | 2.01         | 0.84                                 | 0.73        | 0.86        | with white                      |
| 26 GDR                     | 0.01                                              | -0.94        | 0.04         | 0.95              | 0.12                                              | -1.83        | 0.18         | 1.85         | 0.97                                 | 0.76        | 1.0         | border                          |
| 27 GDR                     | 0.01                                              | -0.78        | 0.02         | 0.78              | 0.11                                              | -1.68        | 0.11         | 1.69         | 1.13                                 | 0.77        | 1.12        | $X_w=90.38$                     |
| 28 GDR                     | 0.01                                              | -0.99        | 0.04         | 0.99              | 0.13                                              | -1.97        | 0.19         | 1.99         | 0.51                                 | 0.42        | 0.43        | $Y_w=100.0$                     |
| 29 GDR                     | 0.01                                              | -0.96        | 0.04         | 0.96              | 0.15                                              | -1.69        | 0.2          | 1.71         | 0.35                                 | 0.26        | 0.26        | $Z_w=87.54$                     |
| 30 GDR                     | 0.01                                              | -1.1         | 0.03         | 1.1               | 0.12                                              | -1.74        | 0.16         | 1.76         | 0.37                                 | 0.24        | 0.24        | $x_w=0.3251$                    |
| 31 GDR                     | 0.01                                              | -1.04        | 0.04         | 1.04              | 0.11                                              | -1.55        | 0.19         | 1.57         | 0.33                                 | 0.2         | 0.2         | $y_w=0.3598$                    |
| 32 GDR                     | 0.02                                              | -1.1         | 0.03         | 1.1               | 0.25                                              | -1.59        | 0.19         | 1.63         | 0.34                                 | 0.2         | 0.2         | near D65                        |
| 33 BDY                     | 0.01                                              | -0.94        | 0.01         | 0.94              | 0.12                                              | -1.87        | 0.06         | 1.87         | 0.8                                  | 0.68        | 0.75        | _WN, GR, BY                     |
| 34 BDY                     | 0.01                                              | -0.8         | 0.01         | 0.8               | 0.11                                              | -1.66        | 0.08         | 1.66         | 0.8                                  | 0.62        | 0.81        | grey surround                   |
| 35 BDY                     | 0.01                                              | -0.8         | 0.02         | 0.8               | 0.12                                              | -1.66        | 0.12         | 1.67         | 0.95                                 | 0.67        | 0.94        | $Y_G=16.6$                      |
| 36 BDY                     | 0.01                                              | -0.77        | 0.01         | 0.77              | 0.12                                              | -1.61        | 0.06         | 1.61         | 1.0                                  | 0.68        | 0.98        | with white                      |
| 37 BDY                     | 0.01                                              | -0.76        | 0.02         | 0.76              | 0.12                                              | -1.63        | 0.11         | 1.64         | 1.0                                  | 0.72        | 1.07        | border                          |
| 38 BDY                     | 0.0                                               | -0.7         | 0.03         | 0.7               | 0.0                                               | -1.52        | 0.12         | 1.53         | 1.07                                 | 0.7         | 1.02        | $X_w=90.38$                     |
| 39 BDY                     | 0.01                                              | -0.78        | 0.03         | 0.78              | 0.12                                              | -1.7         | 0.08         | 1.7          | 1.24                                 | 0.67        | 1.02        | $Y_w=100.0$                     |
| 40 BDY                     | 0.01                                              | -0.88        | 0.06         | 0.88              | 0.11                                              | -1.82        | 0.11         | 1.83         | 0.93                                 | 0.62        | 0.77        | $Z_w=87.54$                     |
| 41 BDY                     | 0.01                                              | -0.86        | 0.11         | 0.86              | 0.12                                              | -1.82        | 0.13         | 1.83         | 0.78                                 | 0.55        | 0.65        | $x_w=0.3251$                    |
| 42 BDY                     | 0.01                                              | -0.95        | 0.21         | 0.98              | 0.12                                              | -2.01        | 0.16         | 2.02         | 0.74                                 | 0.54        | 0.66        | $y_w=0.3598$                    |
| 43 BDY                     | 0.01                                              | -0.92        | 0.4          | 1.01              | 0.1                                               | -1.93        | 0.14         | 1.94         | 0.64                                 | 0.46        | 0.58        | near D65                        |
| <b>mean</b>                |                                                   |              |              | <b>0.91</b>       |                                                   |              |              |              | <b>1.46</b>                          | <b>0.88</b> | <b>0.62</b> | <b>0.85</b>                     |
| <b>standard deviation</b>  |                                                   |              |              | <b>0.52</b>       |                                                   |              |              |              | <b>0.42</b>                          | <b>0.24</b> | <b>0.17</b> | <b>0.27</b>                     |

Samples: bright white (W, no. 0), dark black (S, no. 10), White (W, no. 11), Black (N, no. 21) Green (G=T (turquoise), no. 22), Red (R=M (magenta), no. 32), Blue (B, no. 33), Yellow (Y, no. 43)  
Source: BAM Research Report no. 115 (1985), Tables 5.40; 1 to 11