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| <b>Subject:</b>                          | <b>NEW SPECIFICATIONS FOR CLASS 3</b>   |
| <b>QUALICOAT resolution:</b>             | <b>Resolution No. 8/TC 23.05.17</b>   |
| <b>Date of ratification:</b>             | 24 May 2017   |
| <b>Date of application:</b>              | 1 September 2017  |
| <b>Amendments to the Specifications:</b> | <ul style="list-style-type: none"> <li>• Changes in Chapter 4. Approval of Organic Coatings</li> <li>• Additional section in Appendix A11 – RAL families and critical colours: Section 3 “Critical colours and classification of RAL families for class 3”</li> <li>• Division of Appendix A7 into three tables (Delta E table classes 1 and 1.5, Delta E table class 2 and Delta E table class 3)</li> </ul> |

## 4. Approval of Organic Coatings

The organic coatings used in quality label coating shall be approved before they may be used. It is not permissible to apply a second coat for organic coating materials that are intended and approved for the application of a single coat.

When a two-coat organic coating material (primer and coloured topcoat) approved by QUALICOAT is used, the coating plant may apply either a class 1, 1.5 or class 2 topcoat on the approved primer provided that the powder supplier gives written authorisation for it. It is not necessary to have an approval for each combination. However the organic coating material (primer and coloured topcoat) used by the coating plant installation shall originate from the same manufacturer.

Any modification of the chemical properties of the binder (resin(s) and/or hardening agent(s) is tantamount to a new product and absolutely requires a new QUALICOAT approval. Furthermore, if the physical appearance of the final coating is modified, a new specific QUALICOAT approval shall be required (see Appendix A3).

Special approvals or extensions of existing approvals may be granted for specific colours or applications such as decoration.

The concept of RAL families for class 2 and class 3 approvals is described in Appendix A11.

### 4.1. Granting of an approval

Organic coating materials have a reference identifying a specific chemical formulation. Every organic coating material can have a variety of gloss levels (matt, satin or gloss) and appearances (see Appendix A3).

Approvals are granted for each organic coating material, gloss level and appearance.

Additionally, class 3 approvals are granted by lightness category.<sup>1</sup>

Approvals are usually requested by the manufacturers themselves, but any third party interested may apply for approval of an organic coating material he wishes to sell under his own brand name provided that he clearly informs the General Licensee and QUALICOAT of the sources used. An approval is granted for one single production site. If an approval holder changes his source, he shall advise the General Licensee and QUALICOAT and have such new organic coating materials approved.

In order for an approval to be granted, the following conditions shall be met:

[...]

#### **4.1.4 Basic colours to be tested for standard approvals**

##### **Classes 1, 1.5 and 2**

[...]

##### **Class 3**

The following RAL colours shall be tested:

###### **• Lightness category LIGHT**

- RAL 1015
- RAL 7035
- RAL 9010

plus a metallic colour or a colour with a metallised effect if an extension for metallic colours is requested (see Appendix A4).

###### **• Lightness category MEDIUM**

- RAL 5012
- RAL 7040
- RAL 8024

plus a metallic colour or a colour with a metallised effect if an extension for metallic colours is requested (see Appendix A4).

###### **• Lightness category DARK**

- RAL 7016
- RAL 8019
- RAL 9005

plus a metallic colour or a colour with a metallised effect if an extension for metallic colours is requested (see Appendix A4).

~~Not all the colours are suitable for use for class 3. Therefore it is the responsibility of the manufacturer to indicate the critical colours.~~

[...]

<sup>1</sup> See Appendix A11

## **4.2. Renewal of approved systems**

After an approval has been granted to a coating material, laboratory tests and Florida exposure shall be performed annually and an inspection of the coating manufacturer's plant shall be carried out every five years.

### **4.2.1 Laboratory tests and Florida exposure**

[...]

#### **Renewal of class 2 and class 3 approvals**

Consistent quality of approved systems is monitored annually with tests 1 to 15 (see § 4.1.3) being performed on two colours chosen from the three colours of the same RAL family<sup>2</sup> specified by QUALICOAT each year, excluding critical RAL colours<sup>3</sup>.

If a powder supplier himself considers a colour or a family specified by QUALICOAT to be critical, he shall inform QUALICOAT and this information will be mentioned on the approval certificate and published on the QUALICOAT website. QUALICOAT will specify an alternative colour or family for the renewal.

One metallic colour specified by QUALICOAT shall also be tested every year if there is an extension for metallic colours.

#### **Renewal of class 3 approvals**

~~Consistent quality of approved systems is monitored annually with tests 1 to 15 (see § 4.1.3) being performed on two colours chosen by QUALICOAT.~~

[...]

### **4.2.2 Assessment of the Florida test results**

The Florida Working Group shall submit the test results to QUALICOAT.

- **For classes 1 and 1.5**

- The approval shall be renewed if the result of the natural weathering test in Florida (test 15) is satisfactory.
- If the result is unsatisfactory for one colour, the colour shall be banned.

- **For classes 2 and 3**

- If the colour change result is unsatisfactory for two colours of the same RAL family, the RAL family shall be banned.
- If the gloss retention result is unsatisfactory for two colours of the same RAL family, only those two colours shall be banned.

If a manufacturer has failed for any reason to submit the required colours to the laboratory on time and if no samples were sent to Florida as a result, two renewal colours specified by the Florida Working Group and one metallic colour (if there is an extension to metallic colours) shall be banned.

[...]

<sup>2</sup> For a definition and list of RAL families, see Appendix A11.

<sup>3</sup> For a definition and list of critical colours, see Appendix A11.

#### 4.2.6 Withdrawal of an approval

##### Classes 1 and 1.5

The approval shall be withdrawn as soon as four non-metallic colours are banned. In applying this rule suspended colours will not be considered.

##### Classes 2 and 3

The approval shall be withdrawn as soon as one of the following conditions is met:

- two RAL families are banned; or
- four solid, i.e. non-metallic, colours belonging to at least two different RAL families are banned.

##### ~~Class 3~~

~~The approval shall be withdrawn as soon as three non-metallic colours are banned.~~

For all classes as soon as an approval is cancelled, the supplier shall stop using any reference to the approval when selling the coating material concerned.

## A11 – RAL families and critical colours

### 1. Introduction

QUALICOAT has introduced the concept of RAL families for class 2 and class 3 organic coatings in the specifications for colour change after the natural weathering test (see § 4.2.1) because if a manufacturer’s coating material shows a colour change failure in one RAL colour after Florida exposure, this indicates a technological deficiency affecting similar colours.

### 2. Critical colours and classification of RAL families for class 2

30 groups of homogeneous colours (solid colours of a similar hue and shade) have been defined as RAL families for renewals of class 2 approvals. QUALICOAT has excluded 12 critical RAL colours which, as powder coating technology stands today, do not have sufficient resistance to colour change after 3 years of outdoor exposure.

| SUMMARY   |            |
|---|------------|
| <b>Number of solid RAL colours</b> (excluding metallic and pearl RAL colc | <b>190</b> |
| <b>Solid RAL colours (non-critical)</b>                                   | <b>178</b> |
| <b>Critical solid RAL colours</b>   | <b>12</b>  |
| <b>Number of RAL families</b>   | <b>30</b>  |

| 12 CRITICAL RAL COLOURS (colours excluded from the RAL families) |                 |                 |                 |
|--|-----------------|-----------------|-----------------|
| <b>RAL 1003</b>  | <b>RAL 2004</b> | <b>RAL 3015</b> | <b>RAL 4001</b> |
| <b>RAL 1012</b>  | <b>RAL 2011</b> | <b>RAL 3017</b> |                 |
| <b>RAL 1018</b>  |                 | <b>RAL 3018</b> |                 |
| <b>RAL 1028</b>  |                 | <b>RAL 3020</b> |                 |
| <b>RAL 1033</b>  |                 |                 |                 |

|   |
|---|
| <b>178 SOLID RAL COLOURS (non-critical)</b> |
| <b>30 RAL FAMILIES</b>                      |

| <b>RAL 1XXX</b>         | <b>FAMILY 1/A</b>                          | <b>FAMILY 1/B</b>      | <b>FAMILY 1/C</b>   | <b>FAMILY 1/D</b>                   |
|-------------------------|--|------------------------|---|-------------------------------------|
| <b>DESCRIPTION</b>      | <b>IVORY AND BEIGE</b>                     | <b>GREENISH YELLOW</b> | <b>REDDISH YELLOW</b>                                       | <b>OCHRE / DARK YELLOW</b>          |
| RAL                     | 1000 - 1001 - 1002 -<br>1013 - 1014 - 1015 | 1016 - 1021 - 1023     | 1004 - 1005 - 1006 -<br>1007 - 1017 - 1032 -<br>1034 - 1037 | 1011 - 1019 - 1020 -<br>1024 - 1027 |
| <b>Total 22 colours</b> | 6  | 3                      | 8   | 5                                   |

| <b>RAL 2XXX</b>        | <b>FAMILY 2/A</b>                | <b>FAMILY 2/B</b>     |
|------------------------|----------------------------------|-----------------------|
| <b>DESCRIPTION</b>     | <b>YELLOWISH ORANGE</b>          | <b>REDDISH ORANGE</b> |
| RAL                    | 2000 - 2003 - 2008 - 2009 - 2010 | 2001 - 2002 - 2012    |
| <b>Total 8 colours</b> | 5                                | 3                     |

| <b>RAL 3XXX</b>         | <b>FAMILY 3/A</b>         | <b>FAMILY 3/B</b>  | <b>FAMILY 3/C</b>                   |
|-------------------------|---------------------------|--|-------------------------------------|
| <b>DESCRIPTION</b>      | <b>LIGHT RED AND PINK</b> | <b>RED</b>   | <b>DARK RED</b>                     |
| RAL                     | 3012 - 3014 - 3022        | 3000 - 3001 - 3002 - 3003 -<br>3013 - 3016 - 3027 - 3028 -<br>3031 | 3004 - 3005 - 3007 - 3009 -<br>3011 |
| <b>Total 17 colours</b> | 3                         | 9  | 5                                   |

| <b>RAL 4XXX</b>        | <b>FAMILY 4/A</b>     | <b>FAMILY 4/B</b>         | <b>FAMILY 4/C</b>             |
|------------------------|-----------------------|---------------------------|-------------------------------|
| <b>DESCRIPTION</b>     | <b>REDDISH VIOLET</b> | <b>BLUEISH VIOLET</b>     | <b>DARK AND PASTEL VIOLET</b> |
| RAL                    | 4002 - 4003 - 4010    | 4004 - 4005 - 4006 - 4008 | 4007 - 4009                   |
| <b>Total 9 colours</b> | 3                     | 4                         | 2                             |

| <b>RAL 5XXX</b>         | <b>FAMILY 5/A</b>   | <b>FAMILY 5/B</b>                          | <b>FAMILY 5/C</b>            | <b>FAMILY 5/D</b>                   |
|-------------------------|---|--|------------------------------|-------------------------------------|
| <b>DESCRIPTION</b>      | <b>REDDISH BLUE</b>   | <b>GREENISH BLUE</b>                       | <b>DARK BLUE</b>             | <b>LIGHT BLUE</b>                   |
| RAL                     | 5000 - 5002 - 5003 -<br>5005 - 5010 - 5013 -<br>5017 - 5022 | 5001 - 5007 - 5009 -<br>5018 - 5019 - 5021 | 5004 - 5008 - 5011 -<br>5020 | 5012 - 5014 - 5015 -<br>5023 - 5024 |
| <b>Total 23 colours</b> | 8   | 6  | 4                            | 5                                   |

| <b>RAL 6XXX</b>         | <b>FAMILY 6/A</b>                             | <b>FAMILY 6/B</b>  | <b>FAMILY 6/C</b>                             | <b>FAMILY 6/D</b>                             | <b>FAMILY 6/E</b>            |
|-------------------------|---|--|---|---|------------------------------|
| <b>DESCRIPTION</b>      | <b>BLUISH GREEN</b>                           | <b>YELLOWISH GREEN</b>   | <b>INORGANIC GREEN</b>                        | <b>DARK GREEN</b>                             | <b>LIGHT GREEN</b>           |
| RAL                     | 6000 - 6004 -<br>6005 - 6009 -<br>6016 - 6026 | 6001 - 6002 - 6006<br>- 6010 - 6017 -<br>6018 - 6024 - 6029<br>- 6032 - 6033 -<br>6037 | 6003 - 6011 -<br>6013 - 6014 -<br>6025 - 6028 | 6007 - 6008 -<br>6012 - 6015 -<br>6020 - 6022 | 6019 - 6021 -<br>6027 - 6034 |
| <b>Total 33 colours</b> | 6   | 11   | 6   | 6   | 4                            |

| <b>RAL 7XXX</b>         | <b>FAMILY 7/A</b>                    | <b>FAMILY 7/B</b>  | <b>FAMILY 7/C</b>  |
|-------------------------|--------------------------------------|--|--|
| <b>DESCRIPTION</b>      | <b>LIGHT GREY<br/>WITH L &gt; 70</b> | <b>MEDIUM GREY<br/>WITH L &lt; 70 AND &gt; 50</b>  | <b>DARK GREY<br/>WITH L &lt; 50</b>  |
| RAL                     | 7032 - 7035 - 7038 - 7044 -<br>7047  | 7000 - 7001 - 7002 - 7003 -<br>7004 - 7005 - 7023 - 7030 -<br>7033 - 7034 - 7036 - 7037 -<br>7040 - 7042 - 7045 - 7046 | 7006 - 7008 - 7009 - 7010 -<br>7011 - 7012 - 7013 - 7015 -<br>7016 - 7021 - 7022 - 7024 -<br>7026 - 7031 - 7039 - 7043 |
| <b>Total 37 colours</b> | 5                                    | 16   | 16   |

| <b>RAL 8XXX</b>         | <b>FAMILY 8/A</b>                          | <b>FAMILY 8/B</b>                          | <b>FAMILY 8/C</b>                                 |
|-------------------------|--|--|---|
| <b>DESCRIPTION</b>      | <b>LIGHT BROWN</b>                         | <b>MEDIUM BROWN</b>                        | <b>DARK BROWN</b>                                 |
| RAL                     | 8000 - 8001 - 8004 - 8023 -<br>8024 - 8025 | 8002 - 8003 - 8007 - 8008 -<br>8012 - 8015 | 8011 - 8014 - 8016 - 8017 -<br>8019 - 8022 - 8028 |
| <b>Total 19 colours</b> | 6  | 6  | 7   |

| <b>RAL 9XXX</b>         | <b>FAMILY 9/A</b>  | <b>FAMILY 9/B</b>           | <b>FAMILY 9/C</b>         |
|-------------------------|--------------------|-----------------------------|---------------------------|
| <b>DESCRIPTION</b>      | <b>WHITE</b>       | <b>CREAM AND GREY WHITE</b> | <b>BLACK</b>              |
| RAL                     | 9003 - 9010 - 9016 | 9001 - 9002 - 9018          | 9004 - 9005 - 9011 - 9017 |
| <b>Total 10 colours</b> | 3                  | 3                           | 4                         |

### 3. Critical colours and classification of RAL families for class 3

15 groups of homogeneous colours (solid colours of a similar hue and shade) have been defined as RAL families for the renewal of class 3 approvals.

3 RAL families match lightness category LIGHT (CIELAB L\* > 70), 6 match lightness category MEDIUM (CIELAB L\* between 40 and 70), and 6 match lightness category DARK ((CIELAB L\* < 40).

QUALICOAT has excluded **62 critical RAL colours**, which, as powder coating technology stands today, do not have sufficient resistance to colour change after 10 years of outdoor exposure.

| <b>62 CRITICAL RAL COLOURS (colours excluded from the RAL families)</b> |                 |                 |                 |                 |
|---|-----------------|-----------------|-----------------|-----------------|
| <b>RAL 1004</b>   | <b>RAL 1003</b> | <b>RAL 2000</b> | <b>RAL 3000</b> | <b>RAL 4001</b> |
| <b>RAL 1005</b>   | <b>RAL 1012</b> | <b>RAL 2001</b> | <b>RAL 3001</b> | <b>RAL 4002</b> |
| <b>RAL 1006</b>   | <b>RAL 1016</b> | <b>RAL 2002</b> | <b>RAL 3002</b> | <b>RAL 4003</b> |
| <b>RAL 1007</b>   | <b>RAL 1018</b> | <b>RAL 2003</b> | <b>RAL 3003</b> | <b>RAL 4004</b> |
| <b>RAL 1017</b>   | <b>RAL 1021</b> | <b>RAL 2004</b> | <b>RAL 3013</b> | <b>RAL 4005</b> |
| <b>RAL 1032</b>   | <b>RAL 1023</b> | <b>RAL 2008</b> | <b>RAL 3014</b> | <b>RAL 4006</b> |
| <b>RAL 1034</b>   | <b>RAL 1027</b> | <b>RAL 2009</b> | <b>RAL 3015</b> | <b>RAL 4007</b> |
| <b>RAL 1037</b>   | <b>RAL 1028</b> | <b>RAL 2010</b> | <b>RAL 3016</b> | <b>RAL 4008</b> |
|   | <b>RAL 1033</b> | <b>RAL 2011</b> | <b>RAL 3017</b> | <b>RAL 4009</b> |
|   |                 | <b>RAL 2012</b> | <b>RAL 3018</b> | <b>RAL 4010</b> |
|   |                 |                 | <b>RAL 3020</b> |                 |
|   |                 |                 | <b>RAL 3022</b> |                 |
|   |                 |                 | <b>RAL 3027</b> |                 |
|   |                 |                 | <b>RAL 3028</b> |                 |
|   |                 |                 | <b>RAL 3031</b> |                 |
| <b>RAL 5002</b>   | <b>RAL 6016</b> |                 |                 |                 |
|   | <b>RAL 6018</b> |                 |                 |                 |
|   | <b>RAL 6019</b> |                 |                 |                 |
|   | <b>RAL 6024</b> |                 |                 |                 |
|   | <b>RAL 6027</b> |                 |                 |                 |
|   | <b>RAL 6029</b> |                 |                 |                 |
|   | <b>RAL 6032</b> |                 |                 |                 |
|   | <b>RAL 6034</b> |                 |                 |                 |
|   | <b>RAL 6037</b> |                 |                 |                 |



|   |                                  |
|---|----------------------------------|
| Number of solid RAL colours (excluding metallic and pearl RAL col | 190                              |
| Solid RAL colours (non-critical)                                  | 128                              |
| Critical solid RAL colours  | 62                               |
| Number of RAL families  | 15                               |
| Lightness category LIGHT (L>70)                                   | 3 RAL families<br>17 RAL colours |
| Lightness category MEDIUM (<70 > 40)                              | 6 RAL families<br>62 RAL colours |
| Lightness category DARK (L<40)                                    | 6 RAL families<br>49 RAL colours |

**128 SOLID RAL COLOURS (non-critical)<sup>4</sup>**  
**14 RAL FAMILIES**

| RAL 1XXX                | FAMILY 1/LIGHT                                | FAMILY 1/MEDIUM          |
|-------------------------|---|--------------------------|
| DESCRIPTION             | IVORY AND BEIGE                               | OCHRE / YELLOW MEDIUM    |
| RAL                     | 1000 - 1001 - 1002 - 1013 -1014 – <u>1015</u> | 1011 - 1019 - 1020 -1024 |
| <b>Total 10 colours</b> | <b>6</b>                                      | <b>4</b>                 |

| RAL 3XXX               | FAMILY 3/MEDIUM | FAMILY 3/DARK                    |
|------------------------|-----------------|----------------------------------|
| DESCRIPTION            | MEDIUM RED      | DARK RED                         |
| RAL                    | 3012            | 3004 - 3005 - 3007 - 3009 - 3011 |
| <b>Total 6 colours</b> | <b>1</b>        | <b>5</b>                         |

| RAL 5XXX                | FAMILY 5/MEDIUM   | FAMILY 5/DARK   |
|-------------------------|---|---|
| DESCRIPTION             | MEDIUM BLUE   | DARK BLUE   |
| RAL                     | 5007 - 5009 - <u>5012</u> - 5014 - 5015 - 5017 5018<br>- 5019 - 5021- 5023 - 5024 | 5000 - 5001- 5003- 5004 -5005 - 5008 – 5010 -<br>5011 - 5013 - 5020 -5022 |
| <b>Total 22 colours</b> | <b>11</b>   | <b>11</b>   |

| RAL 6XXX                | FAMILY 6/MEDIUM   | FAMILY 6/DARK  |
|-------------------------|---|--|
| DESCRIPTION             | MEDIUM GREEN  | DARK GREEN   |
| RAL                     | 6000 – 6001 - 6010 –6011 - 6013 - 6017- 6021<br>– 6025 - 6033 | 6002 – 6003 - 6004 – 6005 - 6006 - 6007 - 6008<br>- 6009 - 6012 - 6014 - 6015 - 6020 – 6022 -<br>6026 - 6028 |
| <b>Total 24 colours</b> | <b>9</b>  | <b>15</b>  |

<sup>4</sup> Colours underlined = basic colours (see Section 4.1.4)

| RAL 7XXX                | FAMILY 7/LIGHT                          | FAMILY 7/MEDIUM  | FAMILY 7/DARK                                  |
|-------------------------|---|--|--|
| DESCRIPTION             | LIGHT GREY                              | MEDIUM GREY  | DARK GREY                                      |
| RAL                     | 7032 – <u>7035</u> - 7038 - 7044 - 7047 | 7000 - 7001 - 7002 - 7003 - 7004 - 7005 - 7006 - 7008 - 7009 - 7010 - 7011 - 7012 - - 7015 - 7023 - 7030 - 7031 - 7033 - 7034 - 7036 - 7037 - 7039 - <u>7040</u> - 7042 – 7043 - 7045 - 7046 | 7013 – <u>7016</u> - 7021 - 7022 - 7024 - 7026 |
| <b>Total 37 colours</b> | 5                                       | 26   | 6  |

| RAL 8XXX                | FAMILY 8/MEDIUM  | FAMILY 8/DARK   |
|-------------------------|--|---|
| DESCRIPTION             | MEDIUM BROWN   | DARK BROWN  |
| RAL                     | 8000 - 8001 - 8002 - 8003 - 8004 - 8008 -8012 – 8015 -8023 - <u>8024</u> -8025 | 8007 - 8011- 8014 - 8016 - 8017 – <u>8019</u> - 8022 - 8028 |
| <b>Total 19 colours</b> | 11   | 8   |

| RAL 9XXX                | FAMILY 9/LIGHT                                | FAMILY 9/DARK                   |
|-------------------------|---|---------------------------------|
| DESCRIPTION             | WHITE - CREAM AND GREY WHITE                  | BLACK                           |
| RAL                     | 9001- 9002 - 9003 – <u>9010</u> - 9016 - 9018 | 9004 – <u>9005</u> - 9011- 9017 |
| <b>Total 10 colours</b> | 6   | 4                               |

**A7 – RAL Colours<sup>5</sup>**

**DELTA E Table**

**CLASSES 1 & 1-5**

| RAL         | Δ E | RAL         | Δ E | RAL         | Δ E | RAL         | Δ E | RAL         | Δ E | RAL         | Δ E | RAL         | Δ E | RAL         | Δ E | RAL         | Δ E |
|-------------|-----|-------------|-----|-------------|-----|-------------|-----|-------------|-----|-------------|-----|-------------|-----|-------------|-----|-------------|-----|
| 1000        | 3.0 | 2000        | 6.0 | <u>3000</u> | 6.0 | 4001        | 4.0 | 5000        | 4.0 | 6000        | 5.0 | 7000        | 4.0 | 8000        | 4.0 | <u>9001</u> | 2.0 |
| 1001        | 3.0 | <u>2001</u> | 5.0 | 3001        | 6.0 | 4002        | 4.0 | 5001        | 4.0 | 6001        | 5.0 | <u>7001</u> | 3.0 | <u>8001</u> | 3.0 | <u>9002</u> | 2.0 |
| 1002        | 3.0 | 2002        | 8.0 | <u>3002</u> | 6.0 | <u>4003</u> | 5.0 | <u>5002</u> | 4.0 | <u>6002</u> | 4.0 | 7002        | 4.0 | 8003        | 3.0 | <u>9003</u> | 2.0 |
| <u>1003</u> | 4.0 | 2003        | 6.0 | <u>3003</u> | 4.0 | 4004        | 5.0 | <u>5003</u> | 4.0 | <u>6003</u> | 5.0 | 7003        | 4.0 | 8004        | 4.0 | <u>9004</u> | 5.0 |
| <u>1004</u> | 4.0 | <u>2004</u> | 4.0 | 3004        | 4.0 | <u>4005</u> | 4.0 | 5004        | 5.0 | 6004        | 5.0 | <u>7004</u> | 4.0 | <u>8007</u> | 4.0 | <u>9005</u> | 5.0 |
| 1005        | 6.0 | 2008        | 6.0 | <u>3005</u> | 4.0 | 4006        | 5.0 | <u>5005</u> | 4.0 | <u>6005</u> | 3.0 | 7005        | 4.0 | 8008        | 4.0 | <u>9006</u> | 2.0 |
| 1006        | 6.0 | <u>2009</u> | 4.0 | 3007        | 4.0 | 4007        | 5.0 | <u>5007</u> | 3.0 | 6006        | 4.0 | 7006        | 4.0 | <u>8011</u> | 4.0 | <u>9007</u> | 2.0 |
| <u>1007</u> | 6.0 | 2010        | 6.0 | <u>3009</u> | 4.0 | 4008        | 4.0 | <u>5008</u> | 5.0 | 6007        | 4.0 | 7008        | 4.0 | 8012        | 4.0 | <u>9010</u> | 2.0 |
| <u>1011</u> | 3.0 | 2011        | 6.0 | <u>3011</u> | 5.0 | 4009        | 4.0 | 5009        | 4.0 | 6008        | 5.0 | 7009        | 4.0 | <u>8014</u> | 3.0 | <u>9011</u> | 5.0 |
| <u>1012</u> | 3.0 | 2012        | 4.0 | <u>3012</u> | 2.0 | 4010        | 5.0 | <u>5010</u> | 4.0 | <u>6009</u> | 4.0 | 7010        | 4.0 | 8015        | 4.0 | <u>9016</u> | 2.0 |
| <u>1013</u> | 2.0 |             |     | 3013        | 6.0 |             |     | <u>5011</u> | 5.0 | <u>6010</u> | 5.0 | 7011        | 4.0 | 8016        | 4.0 | 9018        | 2.0 |
| 1014        | 3.0 |             |     | 3014        | 4.0 |             |     | 5012        | 4.0 | <u>6011</u> | 4.0 | <u>7012</u> | 4.0 | <u>8017</u> | 4.0 | <u>9022</u> | 2.0 |
| <u>1015</u> | 2.0 |             |     | 3015        | 3.0 |             |     | 5013        | 5.0 | <u>6012</u> | 4.0 | 7013        | 4.0 | 8019        | 3.0 |             |     |
| 1016        | 6.0 |             |     | <u>3016</u> | 5.0 |             |     | <u>5014</u> | 4.0 | <u>6013</u> | 3.0 | 7015        | 4.0 | 8022        | 5.0 |             |     |
| 1017        | 3.0 |             |     | 3017        | 8.0 |             |     | <u>5015</u> | 3.0 | <u>6014</u> | 4.0 | <u>7016</u> | 3.0 | 8024        | 4.0 |             |     |
| 1018        | 6.0 |             |     | <u>3018</u> | 5.0 |             |     | <u>5017</u> | 5.0 | 6015        | 4.0 | <u>7021</u> | 4.0 | 8025        | 4.0 |             |     |
| <u>1019</u> | 2.5 |             |     | <u>3020</u> | 4.0 |             |     | 5018        | 5.0 | <u>6016</u> | 5.0 | <u>7022</u> | 4.0 | <u>8028</u> | 3.0 |             |     |
| <u>1020</u> | 6.0 |             |     | <u>3022</u> | 4.0 |             |     | 5019        | 4.0 | <u>6017</u> | 5.0 | 7023        | 3.0 |             |     |             |     |
| 1021        | 6.0 |             |     | 3027        | 6.0 |             |     | 5020        | 5.0 | <u>6018</u> | 4.0 | 7024        | 4.0 |             |     |             |     |
| 1023        | 3.0 |             |     | 3031        | 4.0 |             |     | 5021        | 4.0 | 6019        | 2.0 | 7026        | 4.0 |             |     |             |     |
| 1024        | 3.0 |             |     |             |     |             |     | 5022        | 5.0 | <u>6020</u> | 2.0 | 7030        | 2.0 |             |     |             |     |
| 1027        | 3.0 |             |     |             |     |             |     | <u>5023</u> | 4.0 | <u>6021</u> | 4.0 | 7031        | 4.0 |             |     |             |     |
| <u>1028</u> | 8.0 |             |     |             |     |             |     | 5024        | 4.0 | 6022        | 4.0 | <u>7032</u> | 2.0 |             |     |             |     |
| 1032        | 6.0 |             |     |             |     |             |     |             |     | <u>6024</u> | 3.0 | 7033        | 3.0 |             |     |             |     |
| 1033        | 8.0 |             |     |             |     |             |     |             |     | 6025        | 5.0 | 7034        | 3.0 |             |     |             |     |
| 1034        | 4.0 |             |     |             |     |             |     |             |     | <u>6026</u> | 5.0 | <u>7035</u> | 2.0 |             |     |             |     |
| 1037        | 6.0 |             |     |             |     |             |     |             |     | 6027        | 2.0 | 7036        | 3.0 |             |     |             |     |
| <u>1038</u> | 2.0 |             |     |             |     |             |     |             |     | 6028        | 5.0 | <u>7037</u> | 2.5 |             |     |             |     |
|             |     |             |     |             |     |             |     |             |     | <u>6029</u> | 4.0 | <u>7038</u> | 2.0 |             |     |             |     |
|             |     |             |     |             |     |             |     |             |     | <u>6032</u> | 3.0 | <u>7039</u> | 4.0 |             |     |             |     |
|             |     |             |     |             |     |             |     |             |     | <u>6033</u> | 2.0 | <u>7040</u> | 3.0 |             |     |             |     |
|             |     |             |     |             |     |             |     |             |     | <u>6034</u> | 2.0 | <u>7042</u> | 3.0 |             |     |             |     |
|             |     |             |     |             |     |             |     |             |     |             |     | <u>7043</u> | 3.0 |             |     |             |     |
|             |     |             |     |             |     |             |     |             |     |             |     | 7044        | 2.0 |             |     |             |     |
|             |     |             |     |             |     |             |     |             |     |             |     | 7045        | 3.0 |             |     |             |     |
|             |     |             |     |             |     |             |     |             |     |             |     | 7046        | 4.0 |             |     |             |     |
|             |     |             |     |             |     |             |     |             |     |             |     | 7047        | 2.0 |             |     |             |     |

<sup>5</sup> Table continuously updated ([www.qualicoat.net](http://www.qualicoat.net)), Underlined colours are colours that have already been tested.

**A7 – RAL Colours<sup>6</sup>**

**DELTA E Table**

**CLASS 2**

| RAL         | Δ E | RAL         | Δ E | RAL         | Δ E | RAL         | Δ E | RAL         | Δ E | RAL         | Δ E | RAL         | Δ E | RAL         | Δ E | RAL         | Δ E |
|-------------|-----|-------------|-----|-------------|-----|-------------|-----|-------------|-----|-------------|-----|-------------|-----|-------------|-----|-------------|-----|
| 1000        | 3.0 | 2000        | 6.0 | <u>3000</u> | 6.0 | 4002        | 4.0 | 5000        | 4.0 | 6000        | 5.0 | 7000        | 4.0 | 8000        | 4.0 | <u>9001</u> | 2.0 |
| 1001        | 3.0 | <u>2001</u> | 5.0 | 3001        | 6.0 | <u>4003</u> | 5.0 | <u>5001</u> | 4.0 | 6001        | 5.0 | <u>7001</u> | 3.0 | <u>8001</u> | 3.0 | <u>9002</u> | 2.0 |
| 1002        | 3.0 | 2002        | 8.0 | <u>3002</u> | 6.0 | 4004        | 5.0 | <u>5002</u> | 4.0 | <u>6002</u> | 4.0 | 7002        | 4.0 | 8003        | 3.0 | <u>9003</u> | 2.0 |
| <u>1004</u> | 4.0 | 2003        | 6.0 | <u>3003</u> | 4.0 | <u>4005</u> | 4.0 | <u>5003</u> | 4.0 | <u>6003</u> | 5.0 | 7003        | 4.0 | 8004        | 4.0 | <u>9004</u> | 5.0 |
| 1005        | 6.0 | 2008        | 6.0 | 3004        | 4.0 | 4006        | 5.0 | 5004        | 5.0 | 6004        | 5.0 | <u>7004</u> | 4.0 | <u>8007</u> | 4.0 | <u>9005</u> | 5.0 |
| 1006        | 6.0 | <u>2009</u> | 4.0 | <u>3005</u> | 4.0 | 4007        | 5.0 | <u>5005</u> | 4.0 | <u>6005</u> | 3.0 | 7005        | 4.0 | 8008        | 4.0 | <u>9006</u> | 2.0 |
| <u>1007</u> | 6.0 | 2010        | 6.0 | 3007        | 4.0 | 4008        | 4.0 | <u>5007</u> | 3.0 | 6006        | 4.0 | 7006        | 4.0 | <u>8011</u> | 4.0 | <u>9007</u> | 2.0 |
| <u>1011</u> | 3.0 | 2012        | 4.0 | <u>3009</u> | 4.0 | 4009        | 4.0 | <u>5008</u> | 5.0 | 6007        | 4.0 | 7008        | 4.0 | 8012        | 4.0 | <u>9010</u> | 2.0 |
| <u>1013</u> | 2.0 |             |     | <u>3011</u> | 5.0 | 4010        | 5.0 | 5009        | 4.0 | 6008        | 5.0 | 7009        | 4.0 | <u>8014</u> | 3.0 | <u>9011</u> | 5.0 |
| 1014        | 3.0 |             |     | <u>3012</u> | 2.0 |             |     | <u>5010</u> | 4.0 | <u>6009</u> | 4.0 | 7010        | 4.0 | 8015        | 4.0 | <u>9016</u> | 2.0 |
| <u>1015</u> | 2.0 |             |     | 3013        | 6.0 |             |     | <u>5011</u> | 5.0 | <u>6010</u> | 5.0 | 7011        | 4.0 | 8016        | 4.0 | 9018        | 2.0 |
| 1016        | 6.0 |             |     | 3014        | 4.0 |             |     | 5012        | 4.0 | <u>6011</u> | 4.0 | <u>7012</u> | 4.0 | <u>8017</u> | 4.0 | 9022        | 2.0 |
| 1017        | 3.0 |             |     | <u>3016</u> | 5.0 |             |     | 5013        | 5.0 | <u>6012</u> | 4.0 | 7013        | 4.0 | <u>8019</u> | 3.0 |             |     |
| <u>1019</u> | 2.5 |             |     | <u>3022</u> | 4.0 |             |     | <u>5014</u> | 4.0 | <u>6013</u> | 3.0 | 7015        | 4.0 | 8022        | 5.0 |             |     |
| <u>1020</u> | 6.0 |             |     | 3027        | 6.0 |             |     | <u>5015</u> | 3.0 | <u>6014</u> | 4.0 | <u>7016</u> | 3.0 | 8024        | 4.0 |             |     |
| 1021        | 6.0 |             |     | 3031        | 4.0 |             |     | <u>5017</u> | 5.0 | 6015        | 4.0 | <u>7021</u> | 4.0 | 8025        | 4.0 |             |     |
| 1023        | 3.0 |             |     |             |     |             |     | 5018        | 5.0 | <u>6016</u> | 5.0 | <u>7022</u> | 4.0 | <u>8028</u> | 3.0 |             |     |
| 1024        | 3.0 |             |     |             |     |             |     | <u>5019</u> | 4.0 | <u>6017</u> | 5.0 | 7023        | 3.0 |             |     |             |     |
| 1027        | 3.0 |             |     |             |     |             |     | 5020        | 5.0 | <u>6018</u> | 4.0 | 7024        | 4.0 |             |     |             |     |
| 1032        | 6.0 |             |     |             |     |             |     | 5021        | 4.0 | 6019        | 2.0 | 7026        | 4.0 |             |     |             |     |
| 1034        | 4.0 |             |     |             |     |             |     | 5022        | 5.0 | <u>6020</u> | 2.0 | 7030        | 2.0 |             |     |             |     |
| 1037        | 6.0 |             |     |             |     |             |     | <u>5023</u> | 4.0 | <u>6021</u> | 4.0 | 7031        | 4.0 |             |     |             |     |
| <u>1038</u> | 2.0 |             |     |             |     |             |     | 5024        | 4.0 | 6022        | 4.0 | <u>7032</u> | 2.0 |             |     |             |     |
|             |     |             |     |             |     |             |     |             |     | <u>6024</u> | 3.0 | 7033        | 3.0 |             |     |             |     |
|             |     |             |     |             |     |             |     |             |     | 6025        | 5.0 | 7034        | 3.0 |             |     |             |     |
|             |     |             |     |             |     |             |     |             |     | <u>6026</u> | 5.0 | <u>7035</u> | 2.0 |             |     |             |     |
|             |     |             |     |             |     |             |     |             |     | 6027        | 2.0 | 7036        | 3.0 |             |     |             |     |
|             |     |             |     |             |     |             |     |             |     | 6028        | 5.0 | <u>7037</u> | 2.5 |             |     |             |     |
|             |     |             |     |             |     |             |     |             |     | <u>6029</u> | 4.0 | <u>7038</u> | 2.0 |             |     |             |     |
|             |     |             |     |             |     |             |     |             |     | <u>6032</u> | 3.0 | <u>7039</u> | 4.0 |             |     |             |     |
|             |     |             |     |             |     |             |     |             |     | <u>6033</u> | 2.0 | <u>7040</u> | 3.0 |             |     |             |     |
|             |     |             |     |             |     |             |     |             |     | <u>6034</u> | 2.0 | <u>7042</u> | 3.0 |             |     |             |     |
|             |     |             |     |             |     |             |     |             |     |             |     | <u>7043</u> | 3.0 |             |     |             |     |
|             |     |             |     |             |     |             |     |             |     |             |     | <u>7044</u> | 2.0 |             |     |             |     |
|             |     |             |     |             |     |             |     |             |     |             |     | 7045        | 3.0 |             |     |             |     |
|             |     |             |     |             |     |             |     |             |     |             |     | 7046        | 4.0 |             |     |             |     |
|             |     |             |     |             |     |             |     |             |     |             |     | 7047        | 2.0 |             |     |             |     |

<sup>6</sup> Table continuously updated ([www.qualicoat.net](http://www.qualicoat.net)), Underlined colours are colours that have already been tested.

**A7 – RAL Colours**

**DELTA E Table**

**CLASS 3**

| RAL  | Δ E | RAL  | Δ E | RAL  | Δ E | RAL  | Δ E | RAL  | Δ E | RAL  | Δ E | RAL  | Δ E |
|------|-----|------|-----|------|-----|------|-----|------|-----|------|-----|------|-----|
| 1000 | 3.0 | 3004 | 5.0 | 5000 | 5.0 | 6000 | 5.0 | 7000 | 4.0 | 8000 | 4.0 | 9001 | 3.0 |
| 1001 | 3.0 | 3005 | 5.0 | 5001 | 5.0 | 6001 | 5.0 | 7001 | 4.0 | 8001 | 4.0 | 9002 | 3.0 |
| 1002 | 3.0 | 3007 | 5.0 | 5003 | 5.0 | 6002 | 5.0 | 7002 | 4.0 | 8002 | 4.0 | 9003 | 3.0 |
| 1011 | 3.0 | 3009 | 5.0 | 5004 | 5.0 | 6003 | 5.0 | 7003 | 4.0 | 8003 | 4.0 | 9004 | 5.0 |
| 1013 | 3.0 | 3011 | 5.0 | 5005 | 5.0 | 6004 | 5.0 | 7004 | 4.0 | 8004 | 4.0 | 9005 | 5.0 |
| 1014 | 3.0 | 3012 | 5.0 | 5007 | 5.0 | 6005 | 5.0 | 7005 | 4.0 | 8007 | 4.0 | 9006 | 4.0 |
| 1015 | 3.0 |      |     | 5008 | 5.0 | 6006 | 5.0 | 7006 | 4.0 | 8008 | 4.0 | 9007 | 4.0 |
| 1019 | 3.0 |      |     | 5009 | 5.0 | 6007 | 5.0 | 7008 | 4.0 | 8011 | 4.0 | 9010 | 3.0 |
| 1020 | 6.0 |      |     | 5010 | 5.0 | 6008 | 5.0 | 7009 | 4.0 | 8012 | 4.0 | 9011 | 5.0 |
| 1024 | 3.0 |      |     | 5011 | 5.0 | 6009 | 5.0 | 7010 | 4.0 | 8014 | 4.0 | 9016 | 3.0 |
|      |     |      |     | 5012 | 5.0 | 6010 | 5.0 | 7011 | 4.0 | 8015 | 4.0 | 9017 | 5.0 |
|      |     |      |     | 5013 | 5.0 | 6011 | 5.0 | 7012 | 4.0 | 8016 | 4.0 | 9018 | 3.0 |
|      |     |      |     | 5014 | 5.0 | 6012 | 5.0 | 7013 | 4.0 | 8017 | 4.0 | 9022 | 4.0 |
|      |     |      |     | 5015 | 5.0 | 6013 | 5.0 | 7015 | 4.0 | 8019 | 4.0 |      |     |
|      |     |      |     | 5017 | 5.0 | 6014 | 5.0 | 7016 | 4.0 | 8022 | 5.0 |      |     |
|      |     |      |     | 5018 | 5.0 | 6015 | 5.0 | 7021 | 4.0 | 8023 | 4.0 |      |     |
|      |     |      |     | 5019 | 5.0 | 6017 | 5.0 | 7022 | 4.0 | 8024 | 4.0 |      |     |
|      |     |      |     | 5020 | 5.0 | 6020 | 5.0 | 7023 | 4.0 | 8025 | 4.0 |      |     |
|      |     |      |     | 5021 | 5.0 | 6021 | 5.0 | 7024 | 4.0 | 8028 | 4.0 |      |     |
|      |     |      |     | 5022 | 5.0 | 6022 | 5.0 | 7026 | 4.0 |      |     |      |     |
|      |     |      |     | 5023 | 5.0 | 6025 | 5.0 | 7030 | 4.0 |      |     |      |     |
|      |     |      |     | 5024 | 5.0 | 6026 | 5.0 | 7031 | 4.0 |      |     |      |     |
|      |     |      |     |      |     | 6028 | 5.0 | 7032 | 3.0 |      |     |      |     |
|      |     |      |     |      |     | 6033 | 5.0 | 7033 | 4.0 |      |     |      |     |
|      |     |      |     |      |     |      |     | 7034 | 4.0 |      |     |      |     |
|      |     |      |     |      |     |      |     | 7035 | 3.0 |      |     |      |     |
|      |     |      |     |      |     |      |     | 7036 | 4.0 |      |     |      |     |
|      |     |      |     |      |     |      |     | 7037 | 4.0 |      |     |      |     |
|      |     |      |     |      |     |      |     | 7038 | 3.0 |      |     |      |     |
|      |     |      |     |      |     |      |     | 7039 | 4.0 |      |     |      |     |
|      |     |      |     |      |     |      |     | 7040 | 4.0 |      |     |      |     |
|      |     |      |     |      |     |      |     | 7042 | 4.0 |      |     |      |     |
|      |     |      |     |      |     |      |     | 7043 | 4.0 |      |     |      |     |
|      |     |      |     |      |     |      |     | 7044 | 3.0 |      |     |      |     |
|      |     |      |     |      |     |      |     | 7045 | 4.0 |      |     |      |     |
|      |     |      |     |      |     |      |     | 7046 | 4.0 |      |     |      |     |
|      |     |      |     |      |     |      |     | 7047 | 3.0 |      |     |      |     |