Procedure for testing and approving coating materials - P-TAC

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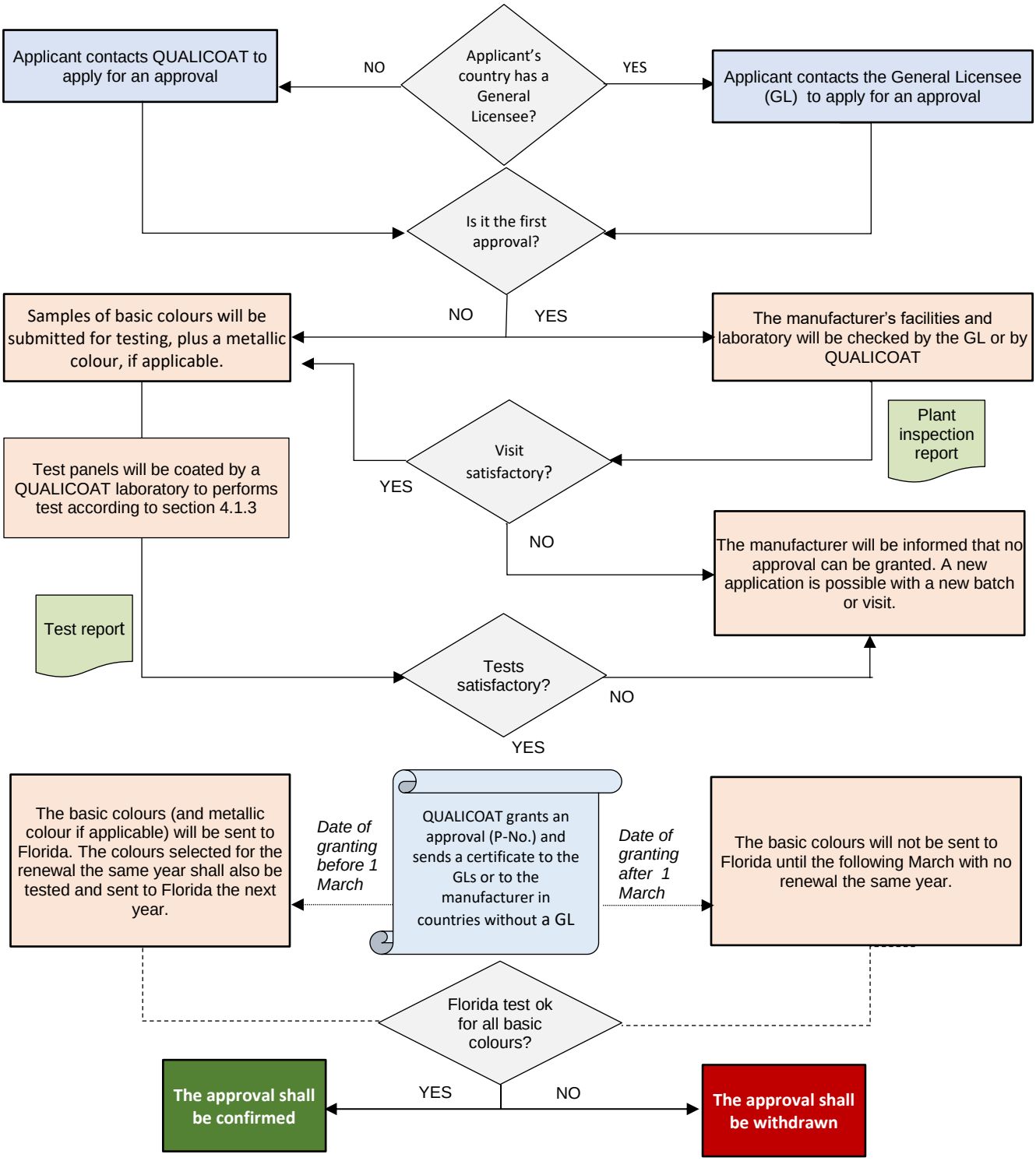
I. INTRODUCTION

This procedure defines the different steps for granting and renewal approvals with a special focus on the Florida test procedure

II. GRANTING, RENEWING AND WITHDRAWING APPROVALS

A. Granting of approvals *(Section 4.1 of the Specifications) – Excluding class 3*

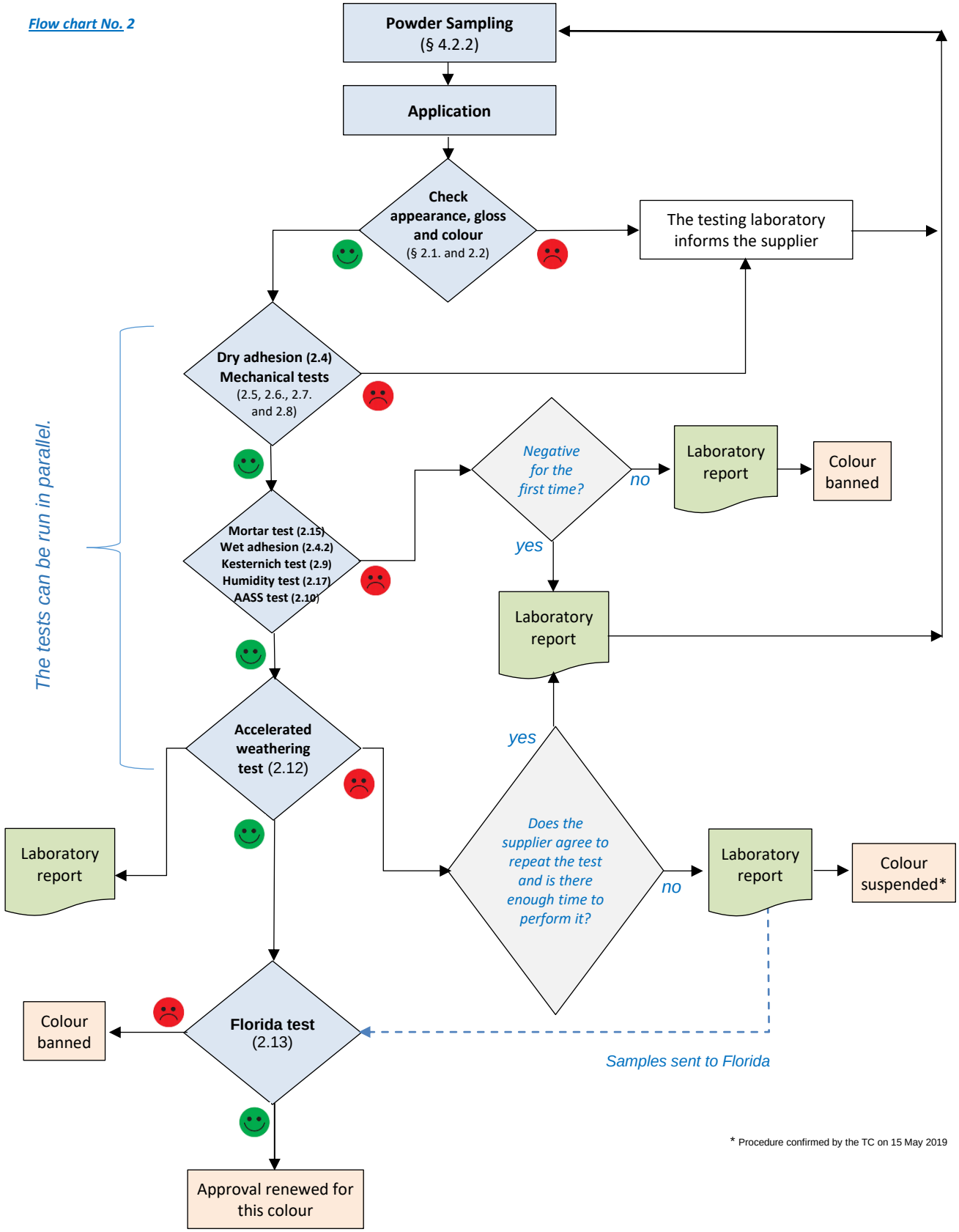
Flow chart No. 1



B. Renewal of approvals *(Section 4.2 of the Specifications) – Excluding class 3*

The following flow chart reflects the renewal procedure **by colour**.

Flow chart No. 2



* Procedure confirmed by the TC on 15 May 2019

C. Withdrawal of an approval *(§ 4.2.6 of the Specifications)*

CLASSES 1 & 1.5	CLASSES 2 & 3	ALL CLASSES
An approval shall be withdrawn as soon as four non-metallic colours are banned. In applying this rule, suspended colours shall not be considered.	An approval shall be withdrawn as soon as one of the following conditions applies: 1. Four solid i.e. non-metallic colours, belonging to at least to two different RAL families are banned. 2. two solid i.e. non-metallic colours and 1 RAL family are banned.[1] 3. two RAL families are banned	A special approval valid for a single colour shall be withdrawn as soon as this single colour is banned. As soon as an approval is cancelled, the supplier shall stop using any reference to the approval when selling the coating material concerned

III. SUMMARY OF REQUIREMENTS *(Appendix A10 of the Specifications)*

Summary of requirements for the approval of organic coating materials (all classes)

TESTS	STANDARDS	QUALICOAT SPECIFICATIONS			
		CLASS 1	CLASS 1.5	CLASS 2	CLASS 3
COLOUR 2.1	ISO 11664-4	The colour deviation from the certified RAL card shall not be greater than the limit prescribed in Appendix A8.	Same as class 1	Same as class 1	Same as class 1
GLOSS 2.2	ISO 2813	**Permissible variation from the nominal value specified by the coating supplier:** Gloss cat. 1: 0 – 30 +/- 5 units Gloss cat. 2: 31 - 70 +/-7 units Gloss cat. 3: 71 – 100 +/- 10 units	Same as class 1	Same as class 1	Same as class 1
COATING THICKNESS 2.3	ISO 2360	**Minimum thickness = 60 µm** None of the values measured may be less than **80%** of the specified minimum value	Same as class 1	Same as class 1	**Minimum thickness= 50 µm** None of the values measured may be less than **80%** of the specified minimum value
DRY ADHESION 2.4.1	ISO 2409	**The result shall be 0.**	Same as class 1	Same as class 1	Same as class 1
BUCHHOLZ INDENTAION 2.5	ISO 2815	**Minimum 80 with the specified required coating thickness**	Same as class 1	Same as class 1	Same as class 1

[1] Secretariat's clarification approved by the Powders WG on 24.02.2020.

TESTS	STANDARDS	QUALICOAT SPECIFICATIONS			
		CLASS 1	CLASS 1.5	CLASS 2	CLASS 3
CUPPING TEST 2.6	ISO 1520	**Minimum 5 mm** Using normal corrected vision, the coating shall not show any sign of cracking or detachment.	**Minimum 5 mm** Using normal corrected vision, the coating shall not show any sign of detachment following the tape pull adhesion test.	**Same as class 1.5**	**Same as classes 1.5**
BEND TEST 2.7	ISO 1519	Using normal corrected vision, the coating shall not show any sign of cracking or detachment.	Using normal corrected vision, the coating shall not show any sign of detachment following the tape pull adhesion test.	**Same as class 1.5**	**Same as classes 1.5**
IMPACT TEST 2.8	ISO 6272 ASTM D 2794	Using normal corrected vision, the coating shall not show any sign of cracking or detachment.	Using normal corrected vision, the coating shall not show any sign of detachment following the tape pull adhesion test.	**Same as class 1.5**	**Same as classes 1.5**
RESISTANCE TO HUMID TMOSPHERES 2.9	ISO 22479	**After 24 cycles** No infiltration exceeding 1 mm on both sides of the scratch, and no change in colour or blisters in excess of 2 (S2) according to ISO 4628-2.	**Same as class 1**	**Same as class 1**	**Same as class 1**
ACETIC ACID SALT SPRAY RESISTANCE 2.10	ISO 9227	**Testing time: 1000 hours** **RATING A** = 3 samples ok, 0 not ok **RATING B** = 2 samples ok, 1 not ok **RATING C** = 1 sample ok, 2 not ok **RATING D** = 0 sample ok, 3 not ok **Evaluation:** **A/B : test result satisfactory** **C: test result unsatisfactory** (repetition of the AASS test) **D: test result unsatisfactory** (repetition of all laboratory tests)	**Same as class 1**	**Same as class 1**	**Testing time: 2000 hours** **Evaluation: same as class 1**
ACCELERATED WEATHERING TEST 2.12	ISO 16474-2 (except for class 3)	**Exposure time: 1000 hours** **Gloss retention:** at least **50%** **Colour change:** according to the ΔE values stipulated in Appendix A12.	**Exposure time: 1000 hours** **Gloss retention**: at least **75%** **Colour change:** not greater than **75%** of the limits prescribed in Appendix A12	**Exposure time: 1000 hours** **Gloss retention**: at least **90%** **Colour change:** not greater than **50%** of the limits prescribed in Appendix A12	**Exposure time: 3 years in Florida** **Gloss retention**: at least **80%** **Colour change:** not greater than **50%** of the limits prescribed in Appendix A12

TESTS	STANDARDS	QUALICOAT SPECIFICATIONS			
		CLASS 1	CLASS 1.5	CLASS 2	CLASS 3
POLYMERISATION TEST 2.14 OPTIONAL	----	**Ratings:** 1: very dull and quite soft coating 2: very dull coating which can be scratched with a finger-nail. 3: slight loss of gloss i.e. less than 5 units 4: no perceptible change. Coating cannot be scratched with a finger-nail. **Evaluation:** **1/2:** test result unsatisfactory **3/4:** test result satisfactory	**Same as class 1**	**Same as class 1**	**Same as class 1**
RESISTANCE TO MORTAR 2.15	EN 12206-1 par. 5.9	There shall not be any change in appearance/colour after the mortar test.	**Same as class 1**	**Same as class 1**	**Same as class 1**
WET ADHESION 2.4.2	ISO 2409	Using normal corrected vision, the coating shall not show any sign of blistering or detachment.	**Same as class 1**	**Same as class 1**	**Same as class 1**
CONSTANT CLIMATE CONDENSATION WATER TEST 2.17	ISO 6270	**Testing time: 1000 hours** No blistering in excess of 2 (S2) according to ISO 4628-2; the maximum infiltration at the cross is 1 mm.	**Same as class 1**	**Same as class 1**	**Testing time: 2000 hours** No blistering in excess of 2 (S2) according to ISO 4628-2; the maximum infiltration at the cross is 1 mm.
WATER SPOT TEST 2.20	----	**Colour change** The ΔL value shall be less than 4	**Same as class 1**	**Same as class 1**	**Same as class 1**
SCRATCH AND MAR RESISTANCE TEST (Martindale) 2.21	CEN/TS 16611	**Gloss retention** • 40% for coatings with smooth appearance • 60% for organic coatings with structured appearance	**Same as class 1**	**Gloss retention** 30% for coatings with smooth appearance 60% for organic coatings with structured appearance	**Same as class 2**

IV. NATURAL WEATHERING TEST IN FLORIDA - ISO 2810 *(Section 2.13 of the Specifications)*[2]

A. Test panels

The panels sent for the Florida test shall meet the following requirements:

Dimensions
100 x 305 mm with a tolerance of 10 mm and a thickness of 0.8 to 1.0 mm.

Number of panels

Class 1	4 panels
Class 1.5	7 panels
Classes 2 and 3	10 panels

State of the panels
The panels shall be free from any kind of dirt, such as dust, grease and fingerprints, and must not have a damaged surface, for example scratches, machining marks, etc., that could affect the measurements.

Application of the coating material on the panels
The test panels shall be prepared following the QUALICOAT Specifications.

The laboratories shall make sure that the panels used for the Florida test have a consistent coating thickness.

The laboratories shall control that

- the gloss category of the coating corresponds to the category of the approval;
- the colour deviation from the original RAL colour satisfies the requirements specified in the Specifications (*see Appendix V-1 of this procedure*)

If these requirements are not satisfied, the laboratory will immediately inform the General Licensee and/or QUALICOAT and or the supplier that the testing programme described in Chapter 2 of the QUALICOAT Specifications cannot be started and the supplier should send a new powder batch of the colour which is not satisfactory.

When granted an approval, suppliers of clear coat systems shall inform the laboratories with which base coat the clear coat should be applied.[3]

[2] See Appendix VI (flow chart)
[3] Approved by the TC on 03.11.10

B. Colours to be sent

New approval
Panels shall only be sent to Florida after the approval has been granted, i.e. with a P-No and a code allocated by QUALICOAT.

In the case of class 3 systems for which an approval is only granted after 3 years[4], the panels shall be sent with a code allocated by QUALICOAT after receipt of the laboratory report.

The colours are defined for each class in § 4.1.4 of the Specifications.

If a manufacturer wishes to have an approval extended for metallic colours extended for metallic colours, tests shall be carried out on RAL 9006.

Renewal
For systems approved during the first two months of a calendar year, renewal tests shall be carried out in the same year.

For all other systems, the renewal procedure starts in the calendar year after an approval has been granted.

For **classes 1 and 1.5**, the Florida WG shall select three colours every year, from which each supplier shall select two. For **class 2**, the colours shall be selected applying the concept of families. For **class 3**, a special selection shall be made by the Florida WG since not all colours are suitable for this class.

For all classes, one metallic colour (RAL 9006 or RAL 9007 alternately) shall also be selected for the extension to metallic colours.

A table summarising the colours to be sent to Florida is published on the Internet. This table is updated after every Florida WG's meeting.

C. Packaging and shipment of the panels

Deadlines
The various QUALICOAT testing laboratories shall send the panels to the QUALICOAT laboratory responsible for coordination before 1 March of the year in which exposure of the panels begins.

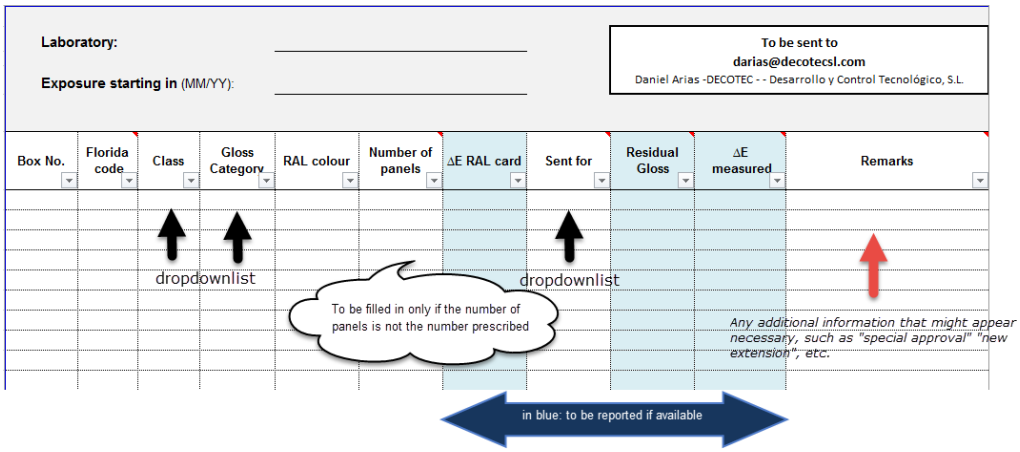
Preliminary information
Every testing laboratory shall deliver beforehand to the laboratory responsible for coordination an EXCEL file providing at least the following information shall be delivered:

- QUALICOAT code for the system
- new approval or renewal

[4] Rules for class 3 systems introduced on 1.7.14

- special approvals or extensions
- colour
- class
- category

Two more columns shall be provided for adding the Delta E and gloss retention when the accelerated weathering test has been completed. These data shall be used to compile statistics.



Packaging

The panels shall be well protected to prevent any kind of damage during transportation that could adversely affect the surface quality. Care shall be taken with some types of paper that leave traces of dust on the surface.

D. Assessment of the Florida test results

(excerpt from *Appendix A10 of the Specifications*)

Requirements

CLASS 1	CLASS 1.5	CLASS 2	CLASS 3
5° south 4 panels per colour shade **Exposure time:** 1 year **Gloss retention** at least **50%** **Colour change:** The ΔE values shall not exceed the maximum values stipulated in Appendix A12	**5° south** 7 panels per colour shade **Exposure time:** 2 years with an annual evaluation **Gloss retention** After 1 year : at least **65%** After 2 years : at least **50%** **Colour change:** After 2 years: within the limits prescribed in Appendix A12	**5° south** 10 panels per colour shade **Exposure time:** 3 years with an annual evaluation **Gloss retention** After 1 year : at least **75%** After 2 years : at least **60%** After 3 years : at least **50%** **Colour change:** After 3 years: within the limits prescribed in Appendix A12.	**45° south** 10 panels per colour shade **Exposure time:** 10 years with an evaluation after 3 and 7 years **Gloss retention** After 3 years: at least **80%** After 7 years :at least **55%** After 10 years: at least **50%** **Colour change:** After 3 years : max. 50% of the limits prescribed in Appendix A12 After 10 years: within the limits prescribed in Appendix A12.

Gloss retention for category 1
In the case of borderline gloss retention results after the Florida test, the responsible laboratory, should use an 85° geometry to measure the gloss[5].

General rules
The results of the instrumental measurements shall be evaluated by the responsible laboratory according to the following criteria:

PANELS (individual values)	**ASSESSMENT**
3 panels OK	SATISFACTORY
2 panels OK and 1 panel NOT OK	SATISFACTORY
1 panel OK and 2 panels NOT OK	UNSATISFACTORY
3 panels NOT OK	UNSATISFACTORY

Visual assessment (*Section 2.13 of the Specifications*)
If the instrumental result is unsatisfactory, the Florida WG members shall carry out an additional visual assessment for:

- category 1 organic coatings;
- organic coatings with a structured appearance in all gloss categories;
- organic coatings with a metallic or metallised effect
- organic coatings in light colours (L > 70)[6]

In case of doubt, the WG is allowed to carry out an additional visual assessment on coated panels in all classes and categories even if they do not belong to the above list of candidates for visual assessment.

This visual assessment shall be carried out completely anonymously. For this purpose, the panels shall be identified with special codes and every WG member shall assess the panels individually.

Every WG member shall record his or her assessment in a file and keep this evaluation until the end of the meeting. At the end of the meeting, the results of the assessment shall be compiled. The final assessment shall reflect the opinion of the majority of the WG members.

[5] Resolution No. 5/TC 22.11.18

[6] Resolution No. 4/TC 5.11.14.

Assessment of the different classes

CLASSES 1 & 1.5	CLASS 2	CLASS 3
The general criteria set out in the QUALICOAT Specifications shall be applied. If one colour does not meet the requirements, **this colour shall be banned**.	If the results do not comply with the requirements[7] for either colour change or gloss retention, **the colour shall be banned**. 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 not ok for two colours of the same RAL family, **only those two colours shall be banned**. The general criteria based on the intermediate limits specified by QUALICOAT shall be applied for gloss retention only.	If a system fulfils the requirements of the Specifications after 3 years, QUALICOAT shall grant an approval for the system (P-No). Exposure shall continue, and the criteria defined in table A10 of the Specifications shall be applied to evaluate the measurements made by the laboratory responsible for the Florida test after 7 and 10 years of outdoor exposure. If the annual measurements made by ATLAS indicate that a colour does not meet the final requirements, QUALICOAT shall ask ATLAS to send the panels for the next intermediate period and the laboratory responsible for the Florida test shall perform an instrumental evaluation. If the results confirm the values measured by ATLAS, the colour shall be banned.

E. Extension of an approval to metallic colours

Granting of an extension

The extension shall be withdrawn if one metallic colour to which the extension applies fails in Florida.

Renewal

The extension shall be withdrawn if both metallic colours (RAL 9006 and RAL 9007) are banned.

F. Withdrawal of an approval or ban of a colour after Florida exposure

Communication [8]

The GLs must notify the powder manufacturer of the Florida test results within 30 days of receiving the information from the QCT Secretariat.

G. Unbanning colours *(§ 4.2.5 of the Specifications)*

When a colour has been banned, the supplier shall submit that colour for testing as soon as possible after having received notification.

If the colour is satisfactory after the laboratory tests, the ban shall be suspended, i.e. the colour shall appear with an asterisk in the “banned colours” column of the list published on the QUALICOAT website.

[7] See section D -Requirements

[8] Resolution No. 4/EC 25.06.20

If the Florida test is satisfactory, the colour shall be unbanned following the meeting of the Florida WG.

H. Unbanning families[9] - *valid for class 2*

If a family is banned, the two banned colours and an additional one (that should have been tested in the affected renewal campaign) shall be tested.

- If all 3 colours are satisfactory, the family will be unbanned.
- If 2 colours are satisfactory and 1 colour is unsatisfactory, the family will be unbanned, but the negative colour will remain banned.
- If 2 or 3 colours are unsatisfactory, the family will remain banned.

[9] Resolution No. 5/TC 04.06.20 - The TC endorsed the Powders WG's Proposal No. 3/POWDERS/2020-02-24 (Procedure for unbanning colour families in class 2) and asked the Specifications WG to draft an update sheet.

V. APPENDICES

APPENDIX A - List of colour tolerances before granting or renewing an approval (for QUALICOAT laboratories)[1] – *Ref. Appendix A8 of the Specifications*

RAL	Tolerance	RAL	Tolerance	RAL	Tolerance	RAL	Tolerance	RAL	Tolerance	RAL	Tolerance
1000	2.00	**3000**	2.80	**5000**	2.00	**6000**	2.00	**7000**	2.00	**8000**	2.00
1001	2.00	**3001**	2.80	**5001**	2.00	**6001**	2.80	**7001**	2.00	**8001**	2.00
1002	2.00	**3002**	2.80	**5002**	2.00	**6002**	2.80	**7002**	1.40	**8002**	2.00
1003	3.60	**3003**	2.80	**5003**	2.00	**6003**	2.00	**7003**	1.40	**8003**	2.00
1004	3.60	**3004**	2.00	**5004**	2.00	**6004**	2.00	**7004**	1.00	**8004**	2.00
1005	3.60	**3005**	2.00	**5005**	2.00	**6005**	2.00	**7005**	1.40	**8007**	2.00
1006	3.60	**3007**	1.40	**5007**	2.00	**6006**	1.40	**7006**	1.40	**8008**	2.00
1007	3.60	**3009**	2.00	**5008**	2.00	**6007**	1.40	**7008**	2.00	**8011**	2.00
1011	2.00	**3011**	2.80	**5009**	2.00	**6008**	1.40	**7009**	1.40	**8012**	2.00
1012	2.80	**3012**	2.00	**5010**	2.00	**6009**	1.40	**7010**	1.40	**8014**	1.40
1013	1.00	**3013**	2.80	**5011**	2.00	**6010**	2.80	**7011**	1.40	**8015**	2.00
1014	2.00	**3014**	2.00	**5012**	2.00	**6011**	2.00	**7012**	1.40	**8016**	1.40
1015	1.00	**3015**	1.00	**5013**	2.00	**6012**	1.40	**7013**	1.40	**8017**	1.40
1016	2.80	**3016**	2.80	**5014**	2.00	**6013**	2.00	**7015**	1.40	**8019**	1.40
1017	2.80	**3017**	2.80	**5015**	2.00	**6014**	1.40	**7016**	2.00	**8022**	1.40
1018	2.80	**3018**	2.80	**5017**	2.00	**6015**	1.40	**7021**	1.40	**8023**	2.80
1019	1.00	**3020**	2.80	**5018**	2.00	**6016**	2.00	**7022**	1.40	**8024**	2.80
1020	2.00	**3022**	2.80	**5019**	2.00	**6017**	2.80	**7023**	1.40	**8025**	1.40
1021	3.60	**3027**	2.80	**5020**	2.00	**6018**	2.80	**7024**	1.40	**8028**	1.40
1023	3.60	**3028**	2.80	**5021**	2.00	**6019**	1.20	**7026**	2.00	**9001**	1.00
1024	2.00	**3031**	2.80	**5022**	2.00	**6020**	1.40	**7030**	1.00	**9002**	1.00
1027	2.80	**4001**	1.40	**5023**	2.00	**6021**	2.00	**7031**	2.00	**9003**	1.00
1028	3.60	**4002**	2.00	**5024**	2.00	**6022**	1.40	**7032**	1.00	**9004**	1.40
1032	3.60	**4003**	1.40			**6024**	2.80	**7033**	1.40	**9005**	1.40
1033	3.60	**4004**	2.00			**6025**	2.80	**7034**	1.40	**9010**	1.00
1034	2.80	**4005**	2.00			**6026**	2.00	**7035**	1.00	**9011**	1.40
1037	3.60	**4006**	1.40			**6027**	2.00	**7036**	1.00	**9016**	1.00
2000	3.60	**4007**	1.40			**6028**	2.00	**7037**	1.40	**9017**	1.40
2001	2.80	**4008**	1.40			**6029**	2.00	**7038**	1.00	**9018**	1.00
2002	2.80	**4009**	1.20			**6032**	2.80	**7039**	1.40		
2003	2.80	**4010**	2.00			**6033**	2.00	**7040**	1.00		
2004	3.60					**6034**	2.00	**7042**	1.00		
2008	3.60					**6037**	2.80	**7043**	1.40		
2009	3.60							**7044**	1.00		
2010	2.80							**7045**	1.00		
2011	3.60							**7046**	1.40		
2012	2.80							**7047**	1.00		

[1] The powder suppliers shall indicate which RAL card they use on the label, so that the laboratory knows which reference to work with. QUALICOAT recommends using the RAL GL Card for categories 2 and 3 solid powder coatings and RAL HR for category 1 and for textured coatings.

APPENDIX B - List of colour tolerances after weathering tests for granting or renewing an approval (for QUALICOAT laboratories) - *Ref. Appendix A12 of the Specifications*

Colour tolerances after weathering test for Class 1 & 1.5 organic coatings[1]																	
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	4.0	**3000**	5.0	4001	4.0	5000	4.0	6000	4.0	7000	3.0	8000	3.0	**9001**	2.0
1001	3.0	**2001**	5.0	3001	5.0	4002	4.0	5001	4.0	6001	4.0	**7001**	3.0	**8001**	3.0	**9002**	2.0
1002	3.0	2002	6.0	**3002**	5.0	**4003**	5.0	**5002**	4.0	**6002**	4.0	7002	3.0	8003	3.0	**9003**	2.0
1003	4.0	2003	6.0	**3003**	4.0	4004	4.0	**5003**	4.0	**6003**	4.0	7003	3.0	8004	3.0	**9004**	4.0
1004	4.0	**2004**	4.0	3004	4.0	**4005**	4.0	5004	4.0	6004	4.0	**7004**	3.0	**8007**	3.0	**9005**	4.0
1005	5.0	2008	6.0	**3005**	4.0	4006	4.0	**5005**	4.0	**6005**	3.0	7005	3.0	8008	3.0	**9006**	2.0
1006	5.0	**2009**	4.0	3007	4.0	4007	4.0	**5007**	3.0	6006	4.0	7006	3.0	**8011**	3.0	**9007**	2.0
1007	5.0	2010	6.0	**3009**	4.0	4008	4.0	**5008**	4.0	6007	3.0	7008	3.0	8012	3.0	**9010**	2.0
1011	3.0	2011	6.0	**3011**	4.0	4009	4.0	5009	4.0	6008	3.0	7009	3.0	**8014**	3.0	**9011**	4.0
1012	3.0	2012	4.0	**3012**	2.0	4010	4.0	**5010**	4.0	**6009**	4.0	7010	3.0	8015	3.0	**9016**	2.0
1013	2.0			3013	5.0			**5011**	4.0	**6010**	4.0	7011	3.0	8016	3.0	9018	2.0
1014	3.0			3014	4.0			5012	4.0	**6011**	4.0	**7012**	3.0	**8017**	3.0	9022	2.0
1015	2.0			3015	4.0			5013	4.0	**6012**	3.0	7013	3.0	**8019**	3.0		
1016	6.0			**3016**	5.0			**5014**	4.0	**6013**	3.0	7015	3.0	8022	3.0		
1017	3.0			3017	8.0			**5015**	3.0	**6014**	4.0	**7016**	3.0	8024	3.0		
1018	6.0			**3018**	6.0			**5017**	4.0	6015	3.0	**7021**	3.0	8025	3.0		
1019	3.0			**3020**	4.0			5018	4.0	**6016**	4.0	**7022**	3.0	**8028**	3.0		
1020	3.0			**3022**	4.0			5019	4.0	**6017**	4.0	7023	3.0				
1021	6.0			3027	5.0			5020	4.0	**6018**	4.0	7024	3.0				
1023	6.0			3031	4.0			5021	4.0	6019	2.0	7026	3.0				
1024	3.0							5022	4.0	**6020**	3.0	7030	3.0				
1027	3.0							**5023**	4.0	**6021**	2.0	7031	3.0				
1028	8.0							5024	4.0	6022	3.0	**7032**	2				
1032	5.0									**6024**	3.0	7033	3.0				
1033	8									6025	4	7034	3				
1034	4									**6026**	4	**7035**	2				
1037	5									6027	2	7036	3				
										6028	4	**7037**	3				
										6029	4	**7038**	2				
										6032	3	**7039**	3				
										6033	3	**7040**	3				
										6034	2	**7042**	3				
												7043	3				
												7044	2				
												7045	3				
												7046	3				
												7047	2				

Underlined colours are colours that have already been tested.

Colour tolerances after weathering test for Class 2 organic coatings[10]

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

[10] Underlined colours are colours that have already been tested.

Colour tolerances after weathering test for Class 3 organic coatings

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				