International Quality Regulations for the Coating of Building Components

GSB AL 631-4 GSB ST 663-4

Material approval for coating materials Aluminium, Steel and Galvanized steel

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Modifications compared to previous version:

Ser. No.	Section	Chapter	Page	Kind of Change*	Modification
	n.a.			editorial	General correction of wording for “tape tear-off” (before “adhesive tape removal”)
1	n.a.	n.a.	3	editorial	Implementation of modification history
2	**1**	**2.1.1**	**4**	**technical**	**Definition of the term “curing conditions” added.**
3	**1**	**2.1.2**	**5**	**technical**	**List of material samples to be submitted for approval extended to include additional information for liquid coatings**
4	1	2.2.2	6	editorial	Implementation of the residual gloss value (75%) after 36 months for Florida 5 systems (as described in Table Section 2, Chapter 2.2)
5	**1**	**3.1**	**7**	**technical**	**The addition “metallic” to the system structures eligible for approval is no longer necessary.**
6	1	3.2	7	editorial	Limitation of the section to powder coatings
7	1	3.3	7	editorial	Limitation of the section to powder coatings, adaptation to new terms
8	**1**	**3.3.1** **3.3.2**	**8** **8**	**technical**	**Implementation of specifications for liquid-based multi-layer systems**
9	**1**	**6**	**11**	**technical**	**Definition of “standard coating thickness” and standardized designation of the coating layers added**
10	2	2	2	editorial	Correction of the variant when specifying the material specification for test panels
11	**2**	**2.2** **2.3** **3.2.1** **3.2.2** **3.3.1** **3.3.2**	**3** **5** **10** **11** **13** **15**	**technical**	**Note on the absence of TGIC extended or added to include pigments containing heavy metals that require labeling.**
12	2	2.2 2.3 3.2.2 3.3.2	3 6 11 14	editorial	Correction of typing error in the degree of gloss for Florida 10 systems.
13	**2**	**2.2**	**3**	**technical**	**Change of stadard layer thickness to 50 – 80 µm**
14	**2**	**2.2** **2.3**	**3** **5**	**technical**	**The adhesive tape tear-off after the ball impact test, cupping test and mandrel bending test is not required for Florida 1 systems**
15	**2**	**2.2** **2.3** **3.2.2** **3.3.2**	**3** **6** **12** **16**	**technical**	**Specification as entry requirement for Florida 10 systems defined**
16	**2**	**2.2** **2.3** **3.2.2** **3.3.2**	**4** **6** **12** **16**	**technical**	**A maximum radiation intensity of 2800 MJ/m² is maintained for Florida 10 systems**
17	2	2.2	4	editorial	Layout adjustment of specification for Florida 10 based on Florida 5
18	2	2.2 2.3 2.4	4	editorial	Layout adjustment of the note to the table
19	**2**	**2.3** **3.3.1**	**5** **13**	**technical**	**Implementation of delivery tolerances for gloss for smooth and fine texture systems**
20	**2**	**2.4**	**7**	**technical**	**Extension of table of colour differences by colour DB703**
21	**2**	**2.4**	**8**	**technical**	**Extension of comment to table of colour differences**
22	**2**	**3.2.1**	**9**	**technical**	**Change of stadard layer thickness to 50 – 80 µm**

		3.2.2	**11**		
~~**23**~~[1]	~~**2**~~	~~**3.2.1**~~ ~~**3.2.2**~~ ~~**3.3.1**~~ ~~**3.3.2**~~	~~**9**~~ ~~**11**~~ ~~**13**~~ ~~**15**~~	~~**technical**~~	~~**The adhesive tape tear-off after the ball impact test, cupping test and mandrel bending test is not required for Florida 1 systems**~~
24	**2**	**3.2.2** **3.3.2**	**12** **15**	**technical**	**A maximum radiation intensity of 2800 MJ/m² is maintained for Florida 10 systems**
25	2	3.2.1 3.2.2 3.3.1 3.3.2	10 12 14 15	editorial	Note at end of table analogous to single layer systems inserted
26	2	3.2.2	12	editorial	Change of reference to test criteria for accelerated weathering test for Florida 10 systems according to section 1, chapter 2.3.1 (linguistically revised)
27	2	3.3.1	15	editorial	Adjustment of chapter headline regarding to new terms
28	2	3.3.2	15	editorial	Inclusion of reference to test criteria for accelerated weathering test for Florida 10 systems according to section 1, chapter 2.3.1 (linguistically revised)
29	**3**	**1.1**	**2**	**technical**	**Change in metal sheet specification for corrosion and technological testing for steel and galvanized steel**
30	**3**	**2.2** **2.3**	**3** **6**	**technical**	**The adhesive tape tear-off after the ball impact test, cupping test and mandrel bending test is not required for Florida 1 systems**
31	3	2.2 2.3	5 7	editorial	Inclusion of reference to test criteria for accelerated weathering test for Florida 10 systems according to section 1, chapter 2.3.1 (linguistically revised)
32	3	2.2 2.3	5 7	editorial	Correction of the linked chapter in the refrence to the table for colour distances
33	3	2.2 2.3 2.4 3.2 3.3	5 7 9 10 11	editorial	Layout adjustment of the note to the table
34	3	2.2 2.3	4 6	editorial	Correction of typing error in the degree of gloss for Florida 10 systems.
35	**3**	**2.2** **2.3** **3.2** **3.3**	**3** **6** **10** **11**	**technical**	**Note on the absence of TGIC extended or added to include pigments containing heavy metals that require labeling.**
36	**3**	**2.2** **2.3** **3.2** **3.3**	**5** **7** **10** **11**	**normative**	**Change in the method of analyzing neutral salt spray test from determining d_{max} to calculating d**
37	**3**	**2.4**	**9**	**technical**	**Extension of table of colour differences by colour DB703**
38	**3**	**2.4**	**9**	**technical**	**Extension of comment to table of colour differences**
39	4/5	n.a.	n.a.	editorial	Correction of edition and change of status date due to modification in chapter 2 and 3

[1] changes withdrawn after the resolutions of the general meeting on April 8th, 2025.

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*editorial Stylistic adjustments without changing the factual content (including punctuation), correction or addition of references to other tables, paragraphs, chapters or documents
- Informing members, the quality committees and the board

*normative Adaptation or supplementation of existing data and established procedures by inserting or changing content that refers directly to standards
- Informing members, the quality committees and the board
Normative changes are shown in italics

*technical	Technical, factual or linguistic changes that change the meaning, have an impact on specifications, procedures, processes or audits and reviews, as well as changes of any kind that are not covered by the definition of editorial or normative change - Resulotion by general meeting Technical changes are shown in bold

1 Material approval for coating materials

1.1 Purpose

The content of this section covers the granting and confirmation of the material approval for coating materials.

GSB-CERT approves the coating material in accordance with the requirements of quality regulations GSB AL 631-4 and/or GSB ST 663-4.

1.2 Scope of application

The regulations set out in this section apply to the granting and confirmation of the material approval for coating materials by GSB-CERT.

1.3 Responsibilities

The GSB offices are responsible for providing quality guidelines GSB AL 631-4 and/or GSB ST 663-4 to the inspector and the named test institute.

The inspector and the named test institute are responsible for carrying out and documenting the tests. Information is exchanged exclusively with GSB-CERT.

Documents and statements must be treated as confidential.

1.4 Areas covered by license

On application, GSB-CERT grants a material approval if the requirements are met. The material approvals can be issued with the following quality seals:

GSB AL 631-4

GSB ST 663-4

If a coating material is approved, the material approval covers all production sites named by the manufacturer in which this material is produced and which are member of GSB.

2 Material approval process

2.1 Stage 1 – Application

2.1.1 General

The application for the material approval must be made in writing to GSB-CERT. The application is checked by GSB-CERT.

The following documents must be included with the application:

- Technical information sheets with curing conditions*
- Material and safety data sheets (MSDS)
- Processing instructions
- Material samples
- Gloss (60° measurement angle)
- Reference sheets

*The minimum and maximum curing temperature and the minimum and maximum curing times required for each system must be specified as the curing conditions.

If an application is made for a coating material approval for multiple substrates, the following tests are only carried out on one substrate.

- Resistance to the effects of moisture
- Resistance to alkalis
- Adhesion of sealing compounds
- Accelerated weathering
- Natural weathering

The approval for coating material is issued in the gloss approval range.

Approval range	Tolerance range
2 - 15 GU	± 5 GU
16 - 60 GU	± 10 GU
61 - 100 GU	± 15 GU

Structured surfaces are exempted (±10 regardless of the submitted gloss). The approval range defines the tolerance that GSB allows for a submitted system. The tolerance range applies to an approved system and can also be within 2 approval ranges..

Regradless of approval and tolerance areas, the delivery tolerance is as follows:

Delivery tolerance for approval range > 15 GU and fine structure: Florida 1-10 ±5 GU

Delivery tolerance for smoothly transitioning systems with an approval range of 2-15 GU: Florida 1-10: ± 3 GU

2.1.2 Material samples to be submitted

Material samples		GSB class	Uni colours	+ Metallics
Powder coat (top coat) 1,5 kg		Florida 1	RAL 3016, 8014, 9001	Instead of RAL 9001 --> RAL 9006 or RAL 9007
		Florida 3, 5, 10	RAL 3009, 5003, 9001	Additionally RAL 9006 or RAL 9007
Liquid paint (top coat) 1,5 kg Undercoat with hardener and thinner	1,5 kg undercoat (chromium free pretreatment)	Florida 1	RAL 3016, 8014, 9001	Instead of RAL 9001 --> RAL 9006 or RAL 9007
		Florida 3, 5, 10	RAL 3009, 5003, 9001	Additionally RAL 9006 or RAL 9007
Aluminium specific (powder coat)				
Primer and topcoat		Florida 1, 3, 5, 10	Topcoat one colour from 5000 series	Instead of 5000 series -> RAL 9006, 9007, DB703
Basecoat and clearcoat		Florida 1, 3, 5, 10	Basecoat one colour from 5000 series	Instead of 5000 series -> RAL 9006, 9007, DB703
Aluminium specific (liquid paint) with chromium free pretreatment				
Undercoat and topcoat	1,5 kg undercoat (chromium free pretreatment)	Florida 1, 3, 5, 10	Topcoat one colour from 5000 series	Instead of 5000 series -> RAL 9006, 9007, DB703
Steel specific				
Primer and topcoat			Topcoat one colour from 5000 series	Instead of 5000 series -> RAL 9006, 9007, DB703

2.1.3 Partial material approval

Partial material approval for primers, single colours, metallics, colours with a structural effect, colour groups or coating materials with limited or special properties are possible and must be agreed in advance with GSB-CERT.

With partial material approvals, the material manufacturer is obligated to provide clear labelling in the technical data sheet.

2.2 Florida 1, 3 & 5 material approval licence

2.2.1 Stage 2 – provisional material approval (see procedure section 3)

The coating materials are sent by the manufacturer to a test institute appointed by GSB-CERT. This test institute produces the samples for stage 2 in accordance with the details in the technical information sheets

and carries out tests in accordance with GSB AL 631-4 and/or GSB ST 663-4. A pre-treatment chemical certified by GSB-CERT is used as pre-treatment.

The requirements in quality regulations GSB AL 631-4 and/or GSB ST 663-4 must be met for the material approval. UVB accelerated weathering can be replaced with the submission of results from an accredited weathering station in Florida. These results must not be more than one year old.

GSB-CERT grants a provisional material approval if the requirements are met.

If the curing temperature or curing time is reduced, GSB must be informed and an application for a new licence must be submitted.

2.2.2 Stage 3 – material approval (see procedure section 3)

The following requirement must be met for the **Florida 1** coating material approval:

> The samples from stage 2 have met the requirements of GSB AL 631-4 and/or GSB ST 663-4 and have been subjected to a natural weathering test in Florida for 1 year.
>
> If the natural weathering test in Florida has a negative result, the provisional material approval is withdrawn.

The following requirement must be met for the **Florida 3 & 5** material approval:

> The samples from stage 2 have met the requirements of GSB AL 631-4 and/or GSB ST 663-4 and have been subjected to a natural weathering test in Florida for 3 & 5 years.
>
> Florida 5 systems have an intermediate evaluation after 3 years. The samples must have a residual gloss value of ≥ 75%.
>
> If the natural weathering test result is negative for one of the colours submitted, the colour with a negative test will be blocked. The system receives its provisional material approval. A new material approval procedure must be carried out for the colour with the negative test result.
>
> If the natural weathering test for this colour now gives a positive result, the system receives its material approval with quality seal.
>
> If the natural weathering test for this colour once again gives a negative result, the provisional material approval for the entire system is withdrawn.

If the requirements of quality regulations GSB AL 631-4 and/or GSB ST 663-4 are met, the GSB-CERT grants a material approval with quality seal.

2.3 Florida 10 license

2.3.1 Stage 2 – provisional material approval (see procedure section 3)

The coating materials are sent by the manufacturer to a test institute appointed by GSB-CERT. This test institute produces the samples for stage 2 in accordance with the details in the technical information sheets and carries out tests in accordance with GSB AL 631-4 and/or GSB ST 663-4.

The following requirement must be met for the material approval:

1. The full, conclusive licence process (stage 3) has been carried out for **Florida 5** and the samples show ≥ 80% residual gloss.

If the requirement is met, GSB-CERT grants a **Florida 10** provisional material approval.

2.3.2 Stage 3 – material approval (see procedure section 3)

The following requirement must be met for the **Florida 10** material approval:

Once the requirements from stage 2 are met, the samples are subjected to outdoor weathering for 5 additional years.

After a total of 10 years of outdoor exposure, the samples show a residual gloss of ≥ 50%.

If the requirements of quality regulations GSB AL 631-4 and/or GSB ST 663-4 are met, the GSB-CERT grants a material approval with quality seal.

3 Approval multi-layer system

3.1 General

Multi-layer systems consist of the following system buildups:

- Powder primer / powder topcoat, pigmented
- Powder base coat / transparent powder clearcoat
- Liquid paint undercoat / Liquid paint topcoat, pigmented
- Liquid paint undercoat / Liquid paint base coat / clear coat transparent

3.2 Multilayer system with primer (powder coating)

When approving a multi-layer system with primer, the following tests are not performed:

- Resistance to moisture
- Resistance to alkalis/ mortar
- Adhesion of sealants
- Accelerated weathering
- Natural weathering

3.3 Multilayer system with transparent clearcoat (powder coating)

A powder clearcoat for use on aluminium substrates can only be approved in a multi-layer structure. The approval of a transparent clearcoat as a single-layer coating, i.e. without a pigmented basecoat, is not permitted. For the individual approval of the clearcoat coating material, the applicant must state on the approval number of the pigmented GSB coating material already approved coating material.

A clear coat may not be used directly on a primer.

When approving powder clearcoat in a multi-layer system, the material manufacturer shall supply a GSB-approved basecoat. Either a pigmented basecoat of the RAL 5000 series (e.g. RAL 5017) or a metallic (e.g. RAL 9007) basecoat must be used. For a multi-layer system with a transparent clearcoat, all tests are carried out as with single-coat systems. If a clearcoat in a multi-layer system has received approval, this applies this applies to all substrates.

3.3.1 Multi-layer system with undercoating (liquid paint)

A liquid coating for use on aluminum substrates can only be approved in a multi-layer structure if a chromium-free pre-treatment is used.

The approval of a liquid coating in a single-layer structure is not intended.

The use of a liquid paint in a single-layer structure is only possible with GSB-approved liquid paints on aluminium substrates with pre-anodization. Proof of adhesion and corrosion resistance is the responsibility of the coater and must be verified by an acetic acid salt spray test and a filiform corrosion test as part of a Sea Proof Plus corrosion test (QR GSB AL 631-5, section 6).

If a multi-layer system is approved, the material manufacturer must also supply a primer.

For a multi-layer system, all tests are carried out in the same way as for single-layer systems.

3.3.2 Multi-layer system with transparent clearcoat (liquid paint)

A liquid clearcoat can only be approved in a multi-layer structure.

The approval of a transparent clearcoat as a single-layer structure is not intended.

The use of a transparent clearcoat in a single-layer structure is only possible with GSB-approved liquid coatings on aluminium substrates with pre-anodization. Proof of adhesion and corrosion resistance is the responsibility of the coater and must be verified by an acetic acid salt spray test and a filiform corrosion test as part of a Sea Proof Plus corrosion test (QR GSB AL 631-5, section 6).

For the individual approval of the clear coat coating material, the applicant must state the approval number of the already approved pigmented GSB coating material on the material approval application.

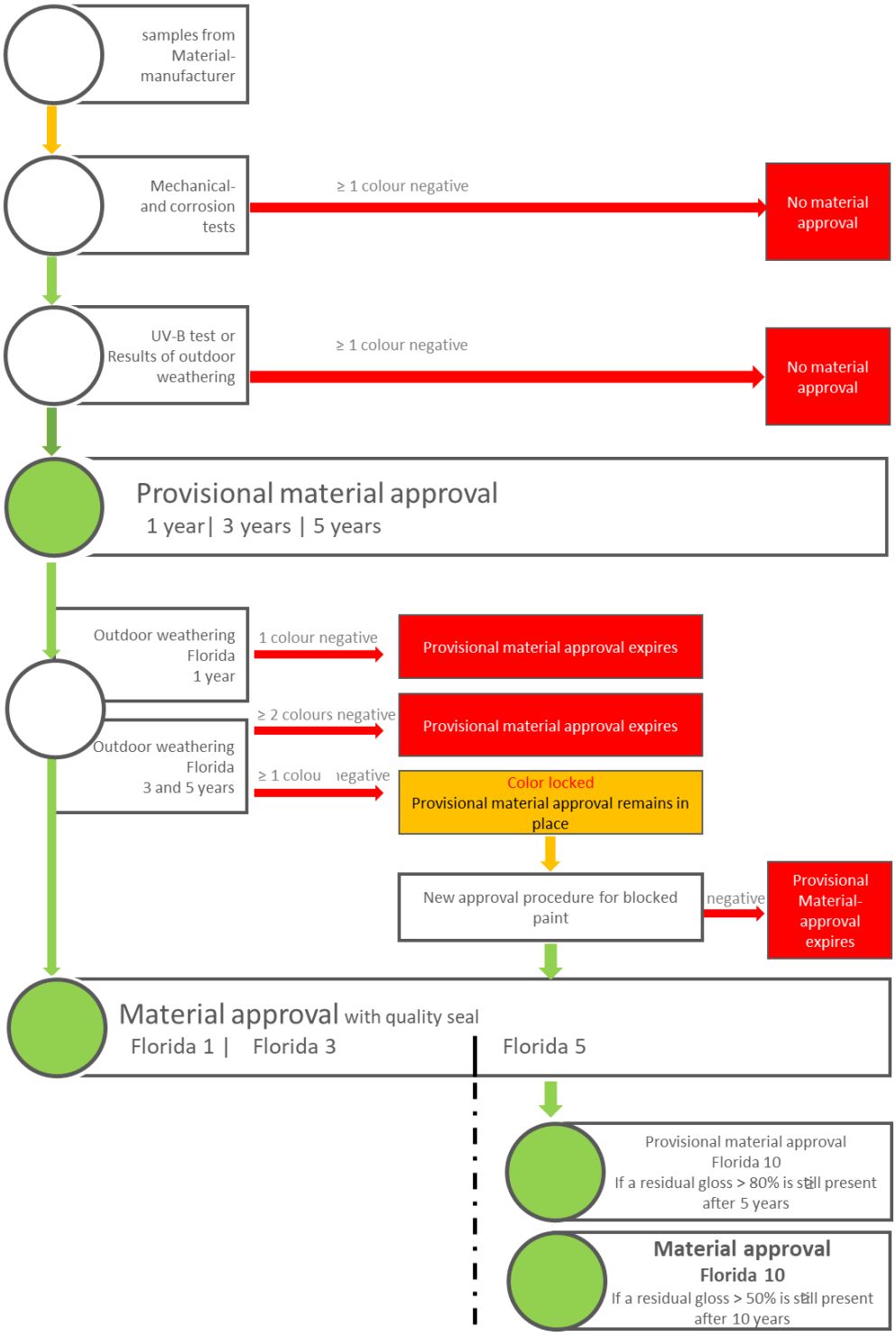
A clearcoat may not be applied directly on a primer.

When approving a liquid clearcoat coating material in a multi-layer structure, the material manufacturer must also supply a primer and a GSB-approved basecoat. Either a pigmented basecoat from the RAL 5000 series (e.g. RAL 5017) or a metallic basecoat (e.g. RAL 9007) must be used.

For a multi-coat system with a transparent clearcoat, all tests are carried out as for single-coat systems.

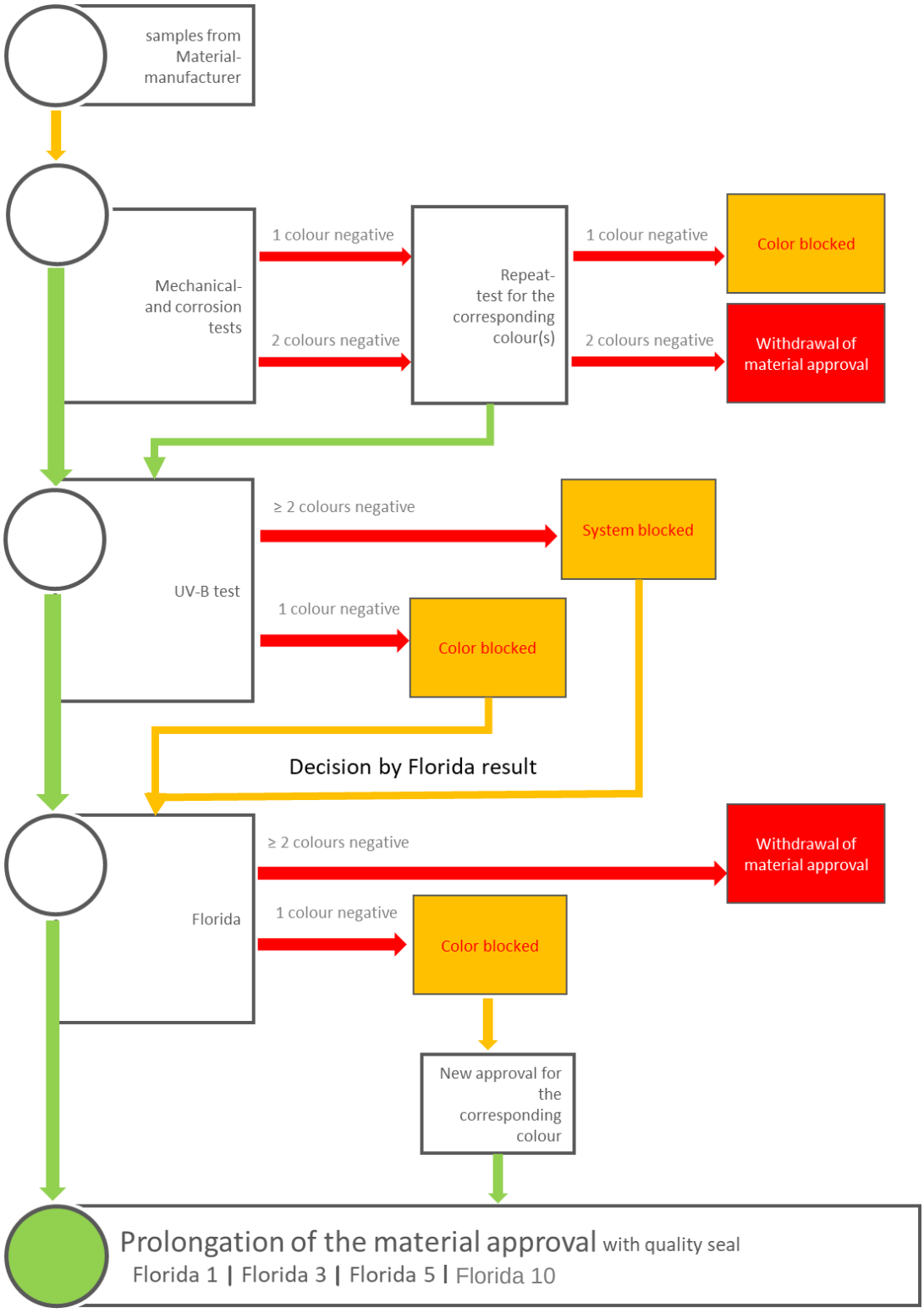
If a clearcoat in a multi-coat system has received approval, this applies across all substrates.

4 Schematic procedure of material approval process



5 Monitoring the material approval

5.1 Schematic procedure of prolongation test



Adherence to quality regulations GSB AL 631-4 and/or GSB ST 663-4 is monitored by means of annual prolongation tests.

For the prolongation test, any two colours from different colour groups are tested. If the coating material including metallic is approved, then one of the two colours must be a metallic colour.

The samples for the prolongation tests are taken from a GSB-certified coating company by an inspector named by GSB-CERT.

If this is not possible, an inspector commissioned by GSB-CERT can take the required material samples from one of the manufacturer's warehouses. Alternatively, GSB-CERT can request that the material manufacturer provide the material samples within 4 weeks.

The tests are carried out in a test institute named by GSB-CERT.

If the requirements of the quality regulations GSB AL 631-4 and/or GSB ST 663-4 are met, the period of validity for the material approval is extended up to the end of the following year.

5.2 Negative result for prolongation test

If part of the prolongation test has a negative result for both colours, then the entire prolongation test is deemed unsuccessful. The manufacturer is informed by GSB-CERT.

If a colour does not meet the requirements in three successive prolongation tests, the material approval for this coating material is withdrawn.

The manufacturer can make an appeal in writing against the decision of GSB-CERT within 4 weeks.

The detailed process for the prolongation tests can be found in the corresponding graphic. The implications of partial tests must be taken into account here.

5.3 Depleting time for blocked materials

After the licence has been withdrawn for a coating material, the material manufacturer can use up/sell existing stocks of the coating material affected by the withdrawal of the licence within a period of 6 months after the withdrawal of the licence.

The material manufacturer have to inform the GSB coater concerned.

The coater can use up the within 3 month after the end of the depleting time.

The evidence concerning the deadlines is approved based on the invoice.

However, the coating material to be used up must - apart from the material licence - meet all the requirements of the quality guidelines relating to this material; it is the responsibility of the material manufacturer to check this for each individual batch of the coating material to be used up before they bring coating material from this batch onto the market. The manufacturer must document these checks and present them to their customer and/or GSB upon request.

6 Definition

6.1 Technical terms

6.1.1 Standard coating thickness

In order to achieve a uniform surface appearance, the opacity of the powder coating must be taken into account. It depends on the color shade and pigmentation. In order to achieve sufficient coverage and a uniform appearance, it is necessary to apply a layer thickness that is often considerably higher than the minimum layer thickness specified in GSB Al 631-5 or in the relevant standards, depending on the color shade and pigmentation.

Due to the electrostatic application of the powder coating, there is a higher accumulation of powder on sharp edges and narrow surfaces. Even with careful adjustment of the coating parameters, layer thicknesses that exceed the maximum layer thickness specified in GSB AL 631-5 may be unavoidable, depending on the color-specific opacity and the geometry of the profile.

For this reason, the GSB has introduced the term “standard coating thickness”.

6.2 Definition of the layers of a coating

The designations of the coating layers in single and multi-layer systems for powder and liquid coating systems (also: coating material) are defined below. These are also used in the quality guidelines GSB AL 631-5 and GSB ST 663-6.

6.2.1 General specifications

6.2.1.1 Powder coating

The term “powder coating” refers to all coating materials that are present in a powder form at room temperature and does not distinguish between individual layers of paint.

6.2.1.2 Liquid coating

The term “liquid coating” refers to all coating materials that are present in a conventional or aqueous solution and in a liquid form at room temperature and does not distinguish between individual layers of paint.

6.2.2 Specific definitions

6.2.2.1 Primer

Primers are coatings that mainly have adhesion-promoting properties and thus provide greater adhesion for the top coat applied subsequently. Primers are used exclusively in two- or multi-layer systems.

6.2.2.2 Undercoat

Coatings that also have adhesion-promoting properties but that also provide additional functions such as improved corrosion protection, compensation for surface defects such as micropores and thus an improved surface finish are referred to as primers.

Primers are mostly used in liquid coating systems in a two- or multi-layer structure.

6.2.2.3 Base coat

Base coats are color-imparting layers of paint that have only limited durability when exposed to external influences such as UV light and therefore need to be protected with a clear coat. Base coats are used almost exclusively in liquid paint systems in two- or three-layer structures. These can be solid paints, effect paints or metallics.

6.2.2.4 Clear coat

Clear coats are applied as the final coat on top of a basecoat. They can be used in powder or liquid coating systems.

6.2.2.5 Top coat

A top coat is a colorant component in single- or multi-layer systems in powder and liquid coatings. It has sufficient gloss and resistance to external influences (such as UV light) to do without a clear coat. However, a top coat can be used on a base coat or a primer. These can be solid colors, effect paints or metallics.

7 Distribution list

- GSB-CERT
- GSB Office

- Members
- Inspector

1 Production of samples

1.1 Test panels

- **Base material: aluminium**

  Predominantly the following aluminium alloys are used:

  – Sheets: EN AW-5005a H 14/24 [AlMg1(C)] mill finish
  The sample size is chosen in accordance with the specifications of the respective test (preferably 70 x 140 x 0.7-0.8 mm).

  – Profiles: EN AW-6060/6063 T5/T6

1.2 Surface pre-treatment

The chemical or electrochemical pretreatment and its testing is to be carried out in accordance with the relevant regulations The test panels/profile sections must be pre-treated in accordance with the following standard:

- Approved chromium-free or chromium VI-free pre-treatment
- Pre-anodising
- Chromating in accordance with EN 12487

1.3 Application

The coating material must be processed in accordance with the specifications of the manufacturer.

The layer thickness of the test panels must be 50 µm to 80 µm unless otherwise specified by the material manufacturer.

The samples must be produced in sufficient numbers in accordance with the minimum curing conditions specified (object temperature and dwell time); for two-component paints plus 60 minutes ageing at 120°C or in accordance with the specifications of the manufacturer.

The processing parameters must be recorded in written form.

For liquid paints on a silicone polyester or PVDF base, the minimum layer thickness on the visible surfaces exposed to weathering must not fall below the specifications of the material manufacturer submitted with the registration.

2 Requirements for the coating material

2.1 General

All tests are carried out in accordance with the GSB technical guidelines for measurement and test procedures and the standards referred to there.

2.2 Aluminium – powder coating material

The coating materials must not contain TGIC (triglycidyl isocyanurate) or any heavy-metal-based pigments that are subject to labeling requirements.

Test	**Aluminium Florida 1**	**Aluminium Florida 3 & 5**	**Aluminium Florida 10**
Layer thickness Thin layer powder Normal powder – colour-dependent Standard layer thickness	 20 ≤ 40 µm ≥ 60 µm - ≤ 120 µm 50 – 80 µm	 20 ≤ 40 µm ≥ 60 µm - ≤ 120 µm 50 – 80 µm	 20 ≤ 40 µm ≥ 60 µm - ≤ 120 µm 50 – 80 µm
Cross cut	GT0	GT0	GT0
Mandrel bending test Cracking of coating Adhesive tape tear	≤ 5 mm Not permitted -	≤ 5 mm Permitted No detachment of the coating	≤ 5 mm Permitted No detachment of the coating
Cupping test Cracking of coating Adhesive tape tear	≥ 5 mm Not permitted -	≥ 5 mm Permitted No detachment of the coating	≥ 5 mm Permitted No detachment of the coating
Ball impact test Cracking of coating Adhesive tape tear	20 inch/pound Not permitted -	20 inch/pound Permitted No detachment of the coating	20 inch/pound Permitted No detachment of the coating
Cutting, drilling, sawing (naked eye assessment at distance of 20 – 30 cm)	No spalling of coating	No spalling of coating	No spalling of coating
Gloss 60° Approvalrange	2 – 15 GU ± 5 GU 16 – 60 GU ±10 GU 61 GU – 100 GU ±15 GU	2 – 15 GU ± 5 GU 16 – 60 GU ±10 GU 61 GU – 100 GU ±15 GU	2 – 15 GU ± 5 GU 16 – 60 GU ±10 GU 61 GU – 100 GU ±15 GU
Structured surfaces are exempted (±10 regardless of the submitted gloss). The approval range defines the tolerance that GSB allows for a submitted system. The tolerance range applies to an approved system and can also be within 2 approval ranges.			
Delivery tolerance for approval range >15 GU and fine structure Delivery tolerance for smooth systems with an approval range of 2-15 GU	± 5 GU ± 3 GU	± 5 GU ± 3 GU	± 5 GU ± 3 GU
Condensation constant atmosphere*: Test period Blistering Delamination at the cross section Change of colour and effect with single colours Change of colour and effect with metallics	 1000 h 0 (S0) d_{max} ≤ 1 mm max. ΔL* 1 max. key value 3	 1000 h 0 (S0) d_{max} ≤ 1 mm max. ΔL* 1 max. key value 2	 1000 h 0 (S0) d_{max} ≤ 1 mm max. ΔL* 1 max. key value 2

Condensation variable atmosphere (0.2l SO_2)* Cycles Blistering Delamination at the T-Cut Change of colour and effect Change of colour and effect with metallics	 30 0 (S0) d_{max} ≤ 1 mm max. 50 % ΔL* max. key value 3	 30 0 (S0) d_{max} ≤ 1 mm max. 50 % ΔL* max. key value 2	 30 0 (S0) d_{max} ≤ 1 mm max. 50 % ΔL* max. key value 2
Boil test / pressure cooker test** Degree of blistering Cross-cut and Adhesive tape tear	 0 (S0) GT 0/GT 1	 0 (S0) GT 0/GT 1	 0 (S0) GT 0/GT 1
Resistance to moisture	max. ΔL* 4	Florida 3: max. ΔL* 4 Florida 5: max. ΔL* 3	max. ΔL* 3
Resistance to salt water spray Test period Delamination Degree of blistering	AASS 1000 h d_{max} ≤ 1 mm 0 (S0)	AASS 1000 hours d_{max} ≤ 1 mm 0 (S0)	AASS 1000 hours d_{max} ≤ 1 mm 0 (S0)
Resistance to alkalis/mortar/NaOH Colour and effect changes Change of colour and effect with metallics	 max. 50 % ΔL* max. key value 3	 max. 50 % ΔL* max. key value 2	 max. 50 % ΔL* max. key value 2
Accelerated weathering Test duration Residual gloss	UV B (313 nm) 300 h ≥ 50 %	UV B (313 nm) 600 h for Florida 3 1000 h for Florida 5 ≥ 50 %	UV B (313 nm) 1000h for Florida 5 must be fulfilled ≥ 50 %
Natural weathering – Florida Approx. Test period (months) UV energy (MJ/m²) Residual gloss Colour difference ΔL*, ΔC*	 12 max. 300 ≥ 50 % see 2.4	 36/60 max. 840 (36) max. 1400 (60) ≥ 50 % In the case of Florida 5 systems, the residual gloss after 36 months (or UV energy of max. 840 MJ/m²) must be ≥ 75 %. see 2.4	 120 max. 2800 (60) ≥ 50% (120) In the case of Florida 10 systems, the residual gloss after 60 months (or UV energy of max. 1400 MJ/m²) must be ≥ 80 %. see 2.4

Note: * This test is only carried out for the licence test
** The boil test/pressure cooker test is not carried in the case of pre-anodising.
The values for ΔL* can be found in chapter 2.4 Colour differences ΔL*, ΔC* after weathering.

2.3 Aluminium – liquid coating materials

The coating materials must not contain TGIC (triglycidyl isocyanurate) or any heavy-metal-based pigments that are subject to labeling requirements.

Test	**Aluminium Florida 1**	**Aluminium Florida 3 & 5**	**Aluminium Florida 10**
Layer thickness	In accordance with manufacturer's guidelines	In accordance with manufacturer's guidelines	In accordance with manufacturer's guidelines
Cross cut	GT0	GT0	GT0
Mandrel bending test Thermally cured paints Two-component liquid paints Cracking of coating Adhesive tape tear	 ≤ 5 mm ≤ 12 mm Not permitted -	 ≤ 5 mm ≤ 12 mm Permitted No detachment of the coating	 ≤ 5 mm Permitted No detachment of the coating
Cupping test Thermally cured paints Two-component liquid paints Cracking of coating Adhesive tape tear	 ≥ 5 mm ≥ 3 mm Not permitted -	 ≥ 5 mm ≥ 3 mm Permitted No detachment of the coating	 ≥ 5 mm ≥ 3 mm Permitted No detachment of the coating
Cutting, drilling, sawing (naked eye assessment)	No spalling of coating	No spalling of coating	No spalling of coating
Gloss 60° Approvalrange	2 – 15 GU ± 5 GU 16 – 60 GU ±10 GU 61 GU – 100 GU ±15 GU	2 – 15 GU ± 5 GU 16 – 60 GU ±10 GU 61 GU – 100 GU ±15 GU	2 – 15 GU ± 5 GU 16 – 60 GU ±10 GU 61 GU – 100 GU ±15 GU
Gloss 60° Delivery tolerance for approval range >15 GU and fine structure Delivery tolerance for smooth systems with an approval range of 2-15 GU	 ± 5 GU ± 3 GU	 ± 5 GU ± 3 GU	 ± 5 GU ± 3 GU
Structured surfaces are exempted (±10 regardless of the submitted gloss). The approval range defines the tolerance that GSB allows for a submitted system. The tolerance range applies to an approved system and can also be within 2 approval ranges.			
Condensation constant atmosphere*: Test period Blistering Delamination at the T-Cut Change of colour and effect Change of colour and effect with metallics	 1000 h 0 (S0) d_{max} ≤ 1 mm max. 50 % ΔL* max. key value 3	 1000 h 0 (S0) d_{max} ≤ 1 mm max. 50 % ΔL* max. key value 2	 1000 h 0 (S0) d_{max} ≤ 1 mm max. 50 % ΔL* max. key value 2
Condensation variable atmosphere (0.2 l SO_2)* Cycles Blistering Delamination at the T-Cut Change of colour and effect Change of colour and effect with metallics	 30 0 (S0) d_{max} ≤ 1 mm max. 50 % ΔL* max. key value 3	 30 0 (S0) d_{max} ≤ 1 mm max. 50 % ΔL* max. key value 2	 30 0 (S0) d_{max} ≤ 1 mm max. 50 % ΔL* max. key value 2

Boil test / pressure cooker test** Degree of blistering Cross-cut and Adhesive tape tear	 0 (S0) GT0 /GT1	 0 (S0) GT0 /GT1	 0 (S0) GT 0/GT1
Resistance to the effects of moisture	max. ΔL* 4	Florida 3: max. ΔL* 4 Florida 5: max. ΔL* 3	max. ΔL* 3
Resistance to salt water spray Test period Delamination Degree of blistering	ASS 1000 hours d_{max} ≤ 1 mm 0 (S0)	ASS 1000 hours d_{max} ≤ 1 mm 0 (S0)	AASS 1000 hours d_{max} ≤ 1 mm 0 (S0)
Resistance to alkalis/mortar/NaOH Colour and effect changes Change of colour and effect with metallics	 max. 50 % ΔL* max. key value 3	 max. 50 % ΔL* max. key value 2	 max. 50 % ΔL* max. key value 2
Accelerated weathering Test duration Residual gloss	UV B (313 nm) 300 h ≥ 50 %	UV B (313 nm) 600 h for Florida 3 1000 h for Florida 5 ≥ 50 %	UV B (313 nm) 1000h for Florida 5 must be fulfilled ≥ 50 %
Natural weathering - Florida Approx. Test period (months) UV energy (MJ/m²) Residual gloss Colour difference ΔL*, ΔC*	 12 max. 300 ≥ 50 % see 2.4	 36/60 max. 840 (36) max. 1400 (60) ≥ 50 % In the case of Florida 5 systems, the residual gloss after 36 months (or UV energy of max. 840 MJ/m²) must be ≥ 75 %. see 2.4	 120 max. 2800 (120) ≥ 50% (120) In the case of Florida 10 systems, the residual gloss after 60 months (or UV energy of max. 1400 MJ/m²) must be ≥ 80 %. see 2.4

Note: * This test is only carried out for the licence test
** The boil test/pressure cooker test is not carried in the case of pre-anodising.
The values for ΔL* can be found in chapter 2.4 Colour differences ΔL*, ΔC* after weathering.

2.4 Colour differences ΔL*, ΔC* after weathering

Colour is measured in accordance with ISO 11664-4, illuminant: D65/10° standard observer; measurement geometry 45/0. The colour differences table applies to the Florida 1, 3 and 5 coating classes.

Florida 10 is in preparation.

RAL	ΔL*	ΔC* ab	RAL	ΔL*	ΔC* ab	RAL	ΔL*	ΔC* ab	RAL	ΔL*	ΔC* ab
1000	± 1	± 2	3003	± 2	± 6	5013	± 6	± 1	6034	± 2	± 2
1001	± 1	± 2	3004	± 4	± 4	5014	± 3	± 3	6035*	± 3	± 5
1002	± 1	± 2	3005	± 4	± 4	5015	± 3	± 3	6036*	± 3	± 5
1003	± 2	± 3	3007	± 4	± 4	5017	± 3	± 3			
1004	± 2	± 5	3009	± 4	± 4	5018	± 3	± 5	7000	± 2	± 1
1005	± 2	± 5	3011	± 2	± 6	5019	± 3	± 3	7001	± 2	± 1
1006	± 2	± 7	3012	± 2	± 7	5020	± 3	± 5	7002	± 2	± 1
1007	± 2	± 7	3013	± 2	± 6	5021	± 3	± 3	7003	± 2	± 1
1011	± 1	± 3	3014	± 3	± 5	5022	± 4	± 5	7004	± 2	± 1
1012	± 1	± 3	3015	± 3	± 7	5023	± 3	± 3	7005	± 2	± 1
1013	± 1	± 1	3016	± 2	± 6	5024	± 3	± 3	7006	± 2	± 1
1014	± 1	± 2	3017	± 2	± 8	5025*	± 2	± 6	7008	± 3	± 3
1015	± 1	± 1	3018	± 2	± 8	5026*	± 2	± 6	7009	± 2	± 2
1016	± 2	± 7	3020	± 2	± 7				7010	± 2	± 2
1017	± 1	± 3	3022	± 2	± 7	6000	± 3	± 4	7011	± 2	± 1
1018	± 2	± 7	3027	± 2	± 7	6001	± 3	± 4	7012	± 2	± 1
1019	± 1	± 2	3031	± 2	± 7	6002	± 3	± 4	7013	± 2	± 1
1020	± 1	± 2	3032*	± 2	± 6	6003	± 3	± 4	7015	± 2	± 1
1021	± 2	± 7	3033*	± 2	± 6	6004	± 4	± 4	7016	± 3	± 3
1023	± 2	± 7				6005	± 4	± 4	7021	± 5	± 3
1024	± 1	± 2	4001	± 3	± 5	6006	± 4	± 4	7022	± 3	± 2
1027	± 1	± 3	4002	± 3	± 5	6007	± 4	± 4	7023	± 2	± 1
1028	± 2	± 8	4003	± 2	± 7	6008	± 4	± 4	7024	± 3	± 3
1032	± 2	± 5	4004	± 4	± 4	6009	± 4	± 4	7026	± 3	± 3
1033	± 2	± 7	4005	± 3	± 5	6010	± 3	± 6	7030	± 1	± 1
1034	± 2	± 7	4006	± 3	± 5	6011	± 2	± 3	7031	± 2	± 1
1035*	± 2	± 2	4007	± 4	± 5	6012	± 4	± 4	7032	± 1	± 1
1036*	± 2	± 4	4008	± 3	± 5	6013	± 2	± 3	7033	± 2	± 1
1037	± 2	± 7	4009	± 3	± 5	6014	± 4	± 4	7034	± 2	± 1
			4010	± 3	± 5	6015	± 4	± 4	7035	± 1	± 1
2000	± 2	± 6	4011*	± 2	± 7	6016	± 3	± 5	7036	± 2	± 1
2001	± 2	± 6	4012*	± 2	± 6	6017	± 3	± 5	7037	± 2	± 1
2002	± 2	± 7				6018	± 2	± 3	7038	± 1	± 1
2003	± 2	± 6	5000	± 3	± 3	6019	± 2	± 2	7039	± 2	± 1
2004	± 2	± 6	5001	± 3	± 3	6020	± 3	± 4	7040	± 1	± 1
2008	± 2	± 7	5002	± 3	± 4	6021	± 2	± 3	7042	± 1	± 1
2009	± 2	± 7	5003	± 3	± 3	6022	± 4	± 4	7043	± 3	± 3
2010	± 2	± 6	5004	± 6	± 1	6024	± 3	± 5	7044	± 1	± 1
2011	± 2	± 7	5005	± 3	± 3	6025	± 3	± 4	7045	± 1	± 1
2012	± 2	± 6	5007	± 3	± 3	6026	± 3	± 4	7046	± 1	± 1
2013*	± 2	± 4	5008	± 3	± 2	6027	± 2	± 2	7047	± 1	± 1
			5009	± 3	± 3	6028	± 4	± 4	7048*	± 3	± 1
3000	± 2	± 6	5010	± 4	± 5	6029	± 3	± 5			
3001	± 2	± 6	5011	± 6	± 1	6032	± 3	± 5	8000	± 2	± 2
3002	± 2	± 6	5012	± 3	± 3	6033	± 2	± 2	8001	± 2	± 2

RAL	ΔL*	ΔC* ab	RAL	ΔL*	ΔC* ab	RAL	ΔL*	ΔC* ab	RAL	ΔL*	ΔC* ab
8002	± 3	± 3	8019	± 3	± 4	9004	± 4	± 1	DB703*	± 4	± 1
8003	± 3	± 3	8022	± 4	± 4	9005	± 4	± 1			
8004	± 3	± 3	8023	± 2	± 2	9006*	± 1	± 1			
8007	± 3	± 4	8024	± 2	± 2	9007*	± 2	± 1			
8008	± 3	± 4	8025	± 2	± 2	9010	± 1	± 1			
8011	± 3	± 4	8028	± 4	± 4	9011	± 4	± 1			
8012	± 3	± 4	8029*	± 2	± 4	9016	± 1	± 1			
8014	± 3	± 4				9017	± 4	± 1			
8015	± 3	± 4	9001	± 1	± 1	9018	± 1	± 1			
8016	± 3	± 4	9002	± 1	± 1	9022*	± 1	± 1			
8017	± 3	± 4	9003	± 1	± 1	9023*	± 2	± 1			

Note: Colours marked with an asterisk * are not part of the RAL 841 GL register. Colour charts for these colours are contained in the main RAL register RAL 840 HR. However, these should not be used as a model for decorative coatings.

The tolerances given refer to the comparison of irradiated and unirradiated samples.

3. Requirements for the coating material – multi-layer systems

3.1 General

All coatings used in multi-layer systems must be produced by the same manufacturer. A combination of coatings from different manufacturers is not permitted.

3.2. Powder coating material

3.2.1 Primer/ topcoat pigmented

The coating materials must not contain TGIC (triglycidyl isocyanurate) or any heavy-metal-based pigments that are subject to labeling requirements.

Testing	**Aluminium Florida 1**	**Aluminium Florida 3 & 5**	**Aluminium Florida 10**
Layer thickness Primer Top coat - depending on colour	 According to Manufacturer 50 - 80 µm	 According to Manufacturer 50 - 80 µm	 According to Manufacturer 50 - 80 µm
Cross cut (according to standard)	GT 0	GT 0	GT 0
Mandrel bending test cracking of coating Adhesive tape tear	≤ 5 mm Permissible no detachment of coating	≤ 5 mm Permissible no detachment of coating	≤ 5 mm Permissible no detachment of coating
Cupping test cracking of coating Adhesive tape tear	≥ 5 mm Permissible no detachment of coating	≥ 5 mm Permissible no detachment of coating	≥ 5 mm Permissible no detachment of coating
Ball impact test cracking of coating Tape Tear	20 inch/pound permissible no detachment of coating	20 inch/pound permissible no detachment of coating	20 inch/pound permissible no detachment of coating
Cutting, drilling, sawing (naked eye assessment at distance of 20 - 30 cm)	no spalling of coating	no spalling of coating	no spalling of coating
Condensation constant atmosphere* Test period Blistering Delamination at the T-cut Change of colour and effect change of colour and effect with metallics	 1000h 0 (S0) d_{max} ≤ 1 mm max. 50 % ΔL* max. key value3	 1000h 0 (S0) d_{max} ≤ 1 mm max. 50 % ΔL* max. key value 2	 1000h 0 (S0) d_{max} ≤ 1 mm max. 50 % ΔL* max. key value 2

Condensation variable atmosphere (0,2l SO2)* Cycles Blistering Delamination at the T-cut Change of colour and effect Change of colour and effect with metallics	 30 0 (S0) d_{max} ≤ 1 mm max. 50 % ΔL* max. key value 3	 30 0 (S0) d_{max} ≤ 1 mm max. 50 % ΔL* max. key value 2	 30 0 (S0) d_{max} ≤ 1 mm max. 50 % ΔL* max. key value 2
Boil test / pressure Cooker Test* Degree of blistering Cross-cut and Adhesive tape tear	 0 (S0) max. GT 1	 0 (S0) max. GT 1	 0 (S0) max. GT 1
Resistance to salt water spray Test period Delamination at T-cut Degree of blistering	AASS 1000h d_{max} ≤ 1 mm 0 (S0)	AASS 1000h d_{max} ≤ 1 mm 0 (S0)	AASS 1000h d_{max} ≤ 1 mm 0 (S0)

Note: * This test is only carried out for the licence test
** The boil test/pressure cooker test is not carried in the case of pre-anodising.
The values for ΔL* can be found in chapter 2.4 Colour differences ΔL*, ΔC* after weathering.

3.2.2 Basecoat/ transparent clearcoat

The coating materials must not contain TGIC (triglycidyl isocyanurate) or any heavy-metal-based pigments that are subject to labeling requirements.

Testing	**Aluminium** **Florida 1**	**Aluminium** **Florida 3 & 5**	**Aluminium** **Florida 10**
Layer thickness Metallic base coat (according to manufacturer) transparent top coat (depending on colour)	 50 - 80 µm 50 - 80 µm	 50 - 80 µm 50 - 80 µm	 50 - 80 µm 50 - 80 µm
Cross cut (according to standard)	GT 0	GT 0	GT 0
Mandrel bending test cracking of coating Adhesive tape tear	≤ 5 mm Permissible no detachment of coating	≤ 5 mm Permissible no detachment of coating	≤ 5 mm Permissible no detachment of coating
Cupping test cracking of coating Adhesive tape tear	≥ 5 mm Permissible no detachment of coating	≥ 5 mm Permissible no detachment of coating	≥ 5 mm Permissible no detachment of coating
Ball impact test cracking of coating Tape Tear	20 inch/pound permissible no detachment of coating	20 inch/pound permissible no detachment of coating	20 inch/pound permissible no detachment of coating
Cutting, drilling, sawing (naked eye assessment at distance of 20 - 30 cm)	no spalling of coating	no spalling of coating	no spalling of coating
Gloss 60° Approval range	 2 – 15 GU ± 5 GU 16 – 60 GU ±10 GU 61 – 100 GU ±15 GU	 2 – 15 GU ± 5 GU 16 – 60 GU ±10 GU 61 – 100 GU ±15 GU	 2 – 15 GU ± 5 GU 16 – 60 GU ±10 GU 61 – 100 GU ±15 GU
Structured surfaces are exempted (±10 regardless of the submitted gloss). The approval range defines the tolerance that GSB allows for a submitted system. The tolerance range applies to an approved system and can also be within 2 approval ranges.			
Delivery tolerance for approval range >15 GU and fine structure Delivery tolerance for smooth systems with an approval range of 2-15 GU	± 5 GU ± 3 GU	± 5 GU ± 3 GU	± 5 GU ± 3 GU
Condensation constant atmosphere*			

Test period Blistering Delamination at the T-cut Change of colour and effect change of colour and effect with metallics	1000h 0 (S0) d_{max} ≤ 1 mm max. 50 % ΔL* max. key value3	1000h 0 (S0) d_{max} ≤ 1 mm max. 50 % ΔL* max. key value 2	1000h 0 (S0) d_{max} ≤ 1 mm max. 50 % ΔL* max. key value 2
Condensation variable atmosphere (0,2l SO2)* Cycles Blistering Delamination at the T-cut Change of colour and effect Change of colour and effect with metallics	 30 0 (S0) d_{max} ≤ 1 mm max. 50 % ΔL* max. key value 3	 30 0 (S0) d_{max} ≤ 1 mm max. 50 % ΔL* max. key value 2	 30 0 (S0) d_{max} ≤ 1 mm max. 50 % ΔL* max. key value 2
Boil test / pressure Cooker Test** Degree of blistering Cross-cut and Adhesive tape tear	 0 (S0) max. GT 1	 0 (S0) max. GT 1	 0 (S0) max. GT 1
Resistance to moisture	max. ΔL* 4	Florida 3: max. ΔL* 4 Florida 5: max. ΔL* 3	max. ΔL* 3
Resistance to salt water spray Test period Delamination at T-cut Degree of blistering	AASS 1000h d_{max} ≤ 1 mm 0 (S0)	AASS 1000h d_{max} ≤ 1 mm 0 (S0)	AASS 1000h d_{max} ≤ 1 mm 0 (S0)
Resistance to alkalis/mortar/NaOH Colour and effect changes Change of colour and effect with metallics	 max. 50 % ΔL* max. key value 3	 max. 50 % ΔL* max. key value 2	 max. 50 % ΔL* max. key value 2
Accelerated weathering Test duration Residual gloss	UV B (313 nm) 300h ≥ 50 %	UV B (313 nm) 600h for Florida 3 1000h for Florida 5 ≥ 50 %	UV B (313 nm) 1000h for Florida 5 must be fulfilled ≥ 50 %
Natural weathering Florida Approx. testing time (months) UV energy (MJ/m²) Residual gloss Colour difference ΔL*, ΔC	 12 max. 300 ≥ 50 % See 2.4.	 36/60 max. 840 (36) max. 1400 (60) ≥ 50 % In the case of Florida 5 systems, the residual gloss after 36 months (or UV energy of max. 840 MJ/m²) must be ≥ 75 %. See 2.4.	 120 max. 2800 (120) ≥ 80% (60) ≥ 50% (120) In the case of Florida 10 systems, the residual gloss after 60 months (or UV energy of max. 1400 MJ/m²) must be ≥ 80 %. See 2.4.

Note: * This test is only carried out for the licence test
** The boil test/pressure cooker test is not carried in the case of pre-anodising.
The values for ΔL* can be found in chapter 2.4 Colour differences ΔL*, ΔC* after weathering.

3.3 Liquid coating material

3.3.1 Undercoat / topcoat pigmented

The coating materials must not contain TGIC (triglycidyl isocyanurate) or any heavy-metal-based pigments that are subject to labeling requirements.

Testing	**Aluminium Florida 1**	**Aluminium Florida 3 & 5**	**Aluminium Florida 10**
Layer thickness Undercoat / Top coat	According to Manufacturer	According to Manufacturer	According to Manufacturer
Cross cut (according to standard)	GT 0	GT 0	GT 0
Mandrel bending test cracking of coating Adhesive tape tear	≤ 12 mm Permissible no detachment of coating	≤ 12 mm Permissible no detachment of coating	≤ 12 mm Permissible no detachment of coating
Cupping test cracking of coating Adhesive tape tear	≥ 3 mm Permissible no detachment of coating	≥ 3 mm Permissible no detachment of coating	≥ 3 mm Permissible no detachment of coating
Cutting, drilling, sawing (nakes eye assessment at distance of 20 - 30 cm)	no spalling of coating	no spalling of coating	no spalling of coating
Gloss 60° Approval range	 2 – 15 GU ± 5 GU 16 – 60 GU ±10 GU 61 – 100 GU ±15 GU	 2 – 15 GU ± 5 GU 16 – 60 GU ±10 GU 61 – 100 GU ±15 GU	 2 – 15 GU ± 5 GU 16 – 60 GU ±10 GU 61 – 100 GU ±15 GU
Structured surfaces are exempted (±10 regardless of the submitted gloss). The approval range defines the tolerance that GSB allows for a submitted system. The tolerance range applies to an approved system and can also be within 2 approval ranges.			
Delivery tolerance for approval range >15 GU and fine structure Delivery tolerance for smooth systems with an approval range of 2-15 GU	± 5 GU ± 3 GU	± 5 GU ± 3 GU	± 5 GU ± 3 GU
Condensation constant atmosphere* Test period Blistering Delamination at the T-cut Change of colour and effect change of colour and effect with metallics	 1000h 0 (S0) d_{max} ≤ 1 mm max. 50 % ΔL* max. key value3	 1000h 0 (S0) d_{max} ≤ 1 mm max. 50 % ΔL* max. key value 2	 1000h 0 (S0) d_{max} ≤ 1 mm max. 50 % ΔL* max. key value 2

Condensation variable atmosphere (0,2l SO2)* Cycles Blistering Delamination at the T-cut Change of colour and effect Change of colour and effect with metallics	 30 0 (S0) d_{max} ≤ 1 mm max. 50 % ΔL* max. key value 3	 30 0 (S0) d_{max} ≤ 1 mm max. 50 % ΔL* max. key value	 30 0 (S0) d_{max} ≤ 1 mm max. 50 % ΔL* max. key value 2
Boil test / pressure Cooker Test** Degree of blistering Cross-cut and Adhesive tape tear	 0 (S0) max. GT 1	 0 (S0) max. GT 1	 0 (S0) max. GT 1
Resistance to salt water spray Test period Delamination Degree of blistering	AASS 1000h d_{max} ≤ 1 mm 0 (S0)	AASS 1000h d_{max} ≤ 1 mm 0 (S0)	AASS 1000h d_{max} ≤ 1 mm 0 (S0)
Resistance to moisture	max. ΔL* 4	Florida 3: max. ΔL* 4 Florida 5: max. ΔL* 3	max. ΔL* 3
Resistance to salt water spray Test period Delamination at T-cut Degree of blistering	AASS 1000h d_{max} ≤ 1 mm 0 (S0)	AASS 1000h d_{max} ≤ 1 mm 0 (S0)	AASS 1000h d_{max} ≤ 1 mm 0 (S0)
Resistance to alkalis/mortar/NaOH Colour and effect changes Change of colour and effect with metallics	 max. 50 % ΔL* max. key value 3	 max. 50 % ΔL* max. key value 2	 max. 50 % ΔL* max. key value 2
Accelerated weathering Test duration Residual gloss	UV B (313 nm) 300h ≥ 50 %	UV B (313 nm) 600h for Florida 3 1000h for Florida 5 ≥ 50 %	UV B (313 nm) 1000h for Florida 5 must be fulfilled ≥ 50 %
Natural weathering Florida Approx. testing time (months) UV energy (MJ/m²) Residual gloss Colour difference ΔL*, ΔC	 12 300 ≥ 50 % See 2.4.	 36/60 max. 840 (36) max. 1400 (60) ≥ 50 % In the case of Florida 5 systems, the residual gloss after 36 months (or UV energy of max. 840 MJ/m²) must be ≥ 75 %. See 2.4.	 120 max. 2800 (120) ≥ 80% (60) ≥ 50% (120) In the case of Florida 10 systems, the residual gloss after 60 months (or UV energy of max. 1400 MJ/m²) must be ≥ 80 %. See 2.4.

Note: * This test is only carried out for the licence test
** The boil test/pressure cooker test is not carried in the case of pre-anodising.
The values for ΔL* can be found in chapter 2.4 Colour differences ΔL*, ΔC* after weathering.

3.3.2 Undercoat / Base coat / transparent clearcoat

The coating materials must not contain TGIC (triglycidyl isocyanurate) or any heavy-metal-based pigments that are subject to labeling requirements.

Testing	**Aluminium** **Florida 1**	**Aluminium** **Florida 3 & 5**	**Aluminium** **Florida 10**
Layer thickness Basecoat Clear coat	According to the manufacturer	According to the manufacturer	According to the manufacturer
Cross cut (according to standard)	GT 0	GT 0	GT 0
Mandrel bending test cracking of coating Adhesive tape tear	≤ 12 mm Permissible no detachment of coating	≤ 12 mm Permissible no detachment of coating	≤ 12 mm Permissible no detachment of coating
Cupping test cracking of coating Adhesive tape tear	≥ 3 mm Permissible no detachment of coating	≥ 3 mm Permissible no detachment of coating	≥ 3 mm Permissible no detachment of coating
Cutting, drilling, sawing (naked eye assessment at distance of 20 - 30 cm)	no spalling of coating	no spalling of coating	no spalling of coating
Gloss 60° Approvalrange	2 – 15 GU ± 5 GU 16 – 60 GU ±10 GU 61 – 100 GU ±15 GU	2 – 15 GU ± 5 GU 16 – 60 GU ±10 GU 61 – 100 GU ±15 GU	2 – 15 GU ± 5 GU 16 – 60 GU ±10 GU 61 – 100 GU ±15 GU
Structured surfaces are exempted (±10 regardless of the submitted gloss). The approval range defines the tolerance that GSB allows for a submitted system. The tolerance range applies to an approved system and can also be within 2 approval ranges.			
Delivery tolerance for approval range >15 GU and fine structure Delivery tolerance for smooth systems with an approval range of 2-15 GU	± 5 GU ± 3 GU	± 5 GU ± 3 GU	± 5 GU ± 3 GU
Condensation constant atmosphere* Test period Blistering Delamination at the T-cut Change of colour and effect change of colour and effect with metallics	1000h 0 (S0) d_{max} ≤ 1 mm max. 50 % ΔL* max. key value 3	1000h 0 (S0) d_{max} ≤ 1 mm max. 50 % ΔL* max. key value 2	1000h 0 (S0) d_{max} ≤ 1 mm max. 50 % ΔL* max. key value 2

Condensation variable atmosphere (0,2l SO2)* Cycles Blistering Delamination at the T-cut Change of colour and effect Change of colour and effect with metallics	 30 0 (S0) d_{max} ≤ 1 mm max. 50 % ΔL* max. key value 3	 30 0 (S0) d_{max} ≤ 1 mm max. 50 % ΔL* max. key value 2	 30 0 (S0) d_{max} ≤ 1 mm max. 50 % ΔL* max. key value 2
Boil test / pressure Cooker Test** Degree of blistering Cross-cut and Adhesive tape tear	 0 (S0) max. GT 1	 0 (S0) max. GT 1	 0 (S0) max. GT 1
Resistance to moisture	max. ΔL* 4	Florida 3: max. ΔL* 4 Florida 5: max. ΔL* 3	max. ΔL* 3
Resistance to salt water spray Test period Delamination Degree of blistering	AASS 1000h d_{max} ≤ 1 mm 0 (S0)	AASS 1000h d_{max} ≤ 1 mm 0 (S0)	AASS 1000h d_{max} ≤ 1 mm 0 (S0)
Resistance to alkalis/mortar/NaOH Colour and effect changes Change of colour and effect with metallics	 max. 50 % ΔL* max. key value 3	 max. 50 % ΔL* max. key value 2	 max. 50 % ΔL* max. key value 2
Accelerated weathering Test duration Residual gloss	UV B (313 nm) 300h ≥ 50 %	UV B (313 nm) 600h for Florida 3 1000h for Florida 5 ≥ 50 %	UV B (313 nm) 1000h for Florida 5 must be fulfilled ≥ 50 %
Natural weathering Florida Approx. testing time (months) UV energy (MJ/m²) Residual gloss Colour difference ΔL*, ΔC	 12 300 ≥ 50 % See 2.4.	 36/60 max. 840 (36) max. 1400 (60) ≥ 50 % In the case of Florida 5 systems, the residual gloss after 36 months (or UV energy of max. 840 MJ/m²) must be ≥ 75 %. See 2.4.	 120 max. 2800 (120) ≥ 80% (60) ≥ 50% (120) In the case of Florida 10 systems, the residual gloss after max. 60 months (or UV energy of 1400 MJ/m²) must be ≥ 80 %. See 2.4.

Note: * This test is only carried out for the licence test
** The boil test/pressure cooker test is not carried in the case of pre-anodising.
The values for ΔL* can be found in chapter 2.4 Colour differences ΔL*, ΔC* after weathering.

1 Production of samples

1.1 Test panels

The following sample sheets are to be used preferably for the corrosion and technological tests:

- Technological and corrosion protection properties of steel
  - steel sheets
  - approx. 100x200 mm, material thickness 0.8 mm
  - zinc-phosphatized (Zn, Ni, Mn tri-cation phosphatizing)
  - material designation according to DIN EN 10130/10131: 1.0312 – HC220LC
  - suitable for spray application
- Technological and corrosion protection properties of galvanized steel
  - steel sheets
  - approx. 100x200 mm, material thickness 0.8 mm
  - galvanized (min. coating 140 g/m² each side equals approx. 20 µm)
  - zinc-phosphatized (Zn, Ni, Mn Tri-cation phosphatizing)
  - material designation according to DIN EN DX54D + Z275 MC
  - suitable for spray application

It is recommended that only sheets within the shelf life specified by the manufacturer be used. All sheets should be stored separately and vacuum-sealed or protected against air circulation with dry beads.

1.2 Surface pre-treatment

The chemical or electrochemical pre-treatment and testing thereof is carried out in accordance with the relevant regulations. The sample sheets or profile sections must be pre-treated in accordance with the following standard:

- Approved chromium-free or chromium VI-free pre-treatment
- Chromating based on EN 12487
- With an alternative procedure approved by GSB

1.3 Application

The coating material must be processed in accordance with the specifications of the manufacturer.

The layer thickness of the test panels must be 50 µm to 80 µm unless otherwise stated by the material manufacturer.

The samples must be produced in sufficient numbers in accordance with the minimum curing conditions specified (object temperature and dwell time); for two-component paints plus 60 minutes ageing at 120°C or in accordance with the specifications of the manufacturer.

The processing parameters must be recorded in writing.

For liquid paints on a silicone polyester or PVDF base, the minimum layer thickness on the visible surfaces exposed to weathering must not fall below the specifications of the material manufacturer submitted with the registration.

2 Requirements for the coating material

2.1 General

All tests are carried out in accordance with the GSB technical regulations for measuring and testing methods.

2.2 Galvanised steel – powder coating material

The coating materials must not contain TGIC (triglycidyl isocyanurate) or any heavy-metal-based pigments that are subject to labeling requirements.

Test	**Galvanised steel Florida 1**	**Galvanised steel Florida 3 & 5**	**Galvanised steel Florida 10**
Layer thickness Normal powder – colour-dependent Standard layer thickness	 80 – 130 µm ≥ 80 µm Two-layer system ≥ 130 µm	 80 – 130 µm ≥ 80 µm Two-layer system ≥ 130 µm	 80 – 130 µm ≥ 80 µm Two-layer system ≥ 130 µm
Cross cut	GT0	GT0	GT0
Mandrel bending test Cracking of coating Adhesive tape tear	≤ 5 mm Not permitted -	≤ 5 mm Permitted No detachment of the coating	≤ 5 mm Permitted No detachment of the coating
Cupping test Cracking of coating Adhesive tape tear	≥ 5 mm Not permitted -	≥ 5 mm Permitted No detachment of the coating	≥ 5 mm Permitted No detachment of the coating
Degree of crosslinking	ACETONE TEST No matting, no smudging	ACETONE TEST No matting, no smudging	ACETONE TEST No matting, no smudging
Ball impact test Cracking of coating Adhesive tape tear	10 inch/pound twin-layer system 20 inch/pound Single-layer system Not permitted -	10 inch/pound twin-layer system 20 inch/pound Single-layer system Permitted No detachment of the coating	10 inch/pound twin-layer system 20 inch/pound Single-layer system Permitted No detachment of the coating
Scratch resistance	No penetration up to the substrate	No penetration up to the substrate	No penetration up to the substrate

Gloss 60° Approvalrange	2 – 15 GU ± 5 GU 16 – 60 GU ±10 GU 61 – 100 GU ±15 GU	2 – 15 GU ± 5 GU 16 – 60 GU ±10 GU 61 – 100 GU ±15 GU	2 – 15 GU ± 5 GU 16 – 60 GU ±10 GU 61 – 100 GU ±15 GU
Structured surfaces are exempted (±10 regardless of the submitted gloss). The approval range defines the tolerance that GSB allows for a submitted system. The tolerance range applies to an approved system and can also be within 2 approval ranges.			
Delivery tolerance for approval range >15 GU and fine structure Delivery tolerance for smooth systems with an approval range of 2-15 GU	± 5 GU ± 3 GU	± 5 GU ± 3 GU	± 5 GU ± 3 GU
Condensation constant atmosphere*: Test period Blistering Infiltration at T-cut Change of colour and effect Change of colour and effect with metallics	 1000 h 0 (S0) d_{max} ≤ 1 mm max. 50 % ΔL* max. key value 3	 1000 h 0 (S0) d_{max} ≤ 1 mm max. 50 % ΔL* max. key value 2	 1000 h 0 (S0) d_{max} ≤ 1 mm max. 50 % ΔL* max. key value 2

Condensation variable atmosphere (0.2 l SO_2)* Cycles Blistering Infiltration at T-cut Change of colour and effect Change of colour and effect with metallics	 30 0 (S0) d_{max} ≤ 1 mm max. 50 % ΔL* max. key value 3	 30 0 (S0) d_{max} ≤ 1 mm max. 50 % ΔL* max. key value 2	 30 0 (S0) d_{max} ≤ 1mm max. 50 % ΔL* max. key value 2
Boil test / pressure cooker test Degree of blistering Cross-cut and Adhesive tape tear	 0 (S0) GT 0/GT 1	 0 (S0) GT 0/GT 1	 0 (S0) GT 0/GT 1
Resistance to moisture	max. ΔL* 4	Florida 3: max. ΔL* 4 Florida 5: max. ΔL* 3	max. ΔL* 3
Resistance to salt water spray Test period Infiltration at cross-section Degree of blistering	NSS 480 hours d ≤ 5 mm 0 (S0)	NSS 480 hours d ≤ 5 mm 0 (S0)	NSS 480 hours d ≤ 5 mm 0 (S0)
Resistance to alkalis/mortar/NaOH Colour and effect changes Change of colour and effect with metallics	 max. 50 % ΔL* max. key value 3	 max. 50 % ΔL* max. key value 2	 max. 50 % ΔL* max. key value 2
Accelerated weathering Test duration Residual gloss	UV B (313 nm) 300 h ≥ 50 %	UV B (313 nm) 600 h ≥ 50 %	UV B (313 nm) 1000h for Florida 5 must be fulfilled ≥ 50 %
Natural weathering - Florida Approx. Test period (months) UV energy (MJ/m²) Residual gloss Colour difference ΔL*, ΔC*	 12 max. 300 ≥ 50 % see 2.4	 36/60 max. 840 (36) max. 1400 (60) ≥ 50 % In the case of Florida 5 systems, the residual gloss after 36 months (or UV energy of max. 840 MJ/m²) must be ≥ 75 %. see 2.4	 120 max. 2800 (120) ≥ 80% (60) ≥ 50% (120) In the case of Florida 10 systems, the residual gloss after 60 months (or UV energy of max. 1400 MJ/m²) must be ≥ 80 %. see 2.4
Note: For galvanised steel, as of the condensation constant atmosphere test, all further tests are carried out on a single layer. * This test is only carried out during the initial approval.			

Note: For galvanised steel, as of the condensation constant atmosphere test, all further tests are carried out on a single layer.
* This test is only carried out during the initial approval.

2.3 Galvanised steel – liquid paint

The coating materials must not contain TGIC (triglycidyl isocyanurate) or any heavy-metal-based pigments that are subject to labeling requirements.

Test	**Galvanised steel Florida 1**	**Galvanised steel Florida 3 & 5**	**Galvanised steel Florida 10**
Layer thickness	In accordance with manufacturer's guidelines	In accordance with manufacturer's guidelines	In accordance with manufacturer's guidelines
Cross cut	GT0	GT0	GT0
Mandrel bending test Thermally cured paints Two-component liquid paints Cracking of coating Adhesive tape tear	 ≤ 5 mm ≤ 12 mm Not permitted -	 ≤ 5 mm ≤ 12 mm Permitted No detachment of the coating	 ≤ 5 mm ≤ 12 mm Permitted No detachment of the coating
Cupping test Thermally cured paints Two-component liquid paints Cracking of coating Adhesive tape tear	 ≥ 5 mm ≥ 3 mm Not permitted -	 ≥ 5 mm ≥ 3 mm Permitted No detachment of the coating	 ≥ 5 mm ≥ 3 mm Permitted No detachment of the coating
Cross-linking test	MEK test No matting, no smudging	MEK test No matting, no smudging	MEK test No matting, no smudging
Scratch test	No penetration up to the substrate	No penetration up to the substrate	No penetration up to the substrate
Gloss 60° Approvalrange	 2 – 15 GU ± 5 GU 16 – 60 GU ±10 GU 61 – 100 GU ±15 GU	 2 – 15 GU ± 5 GU 16 – 60 GU ±10 GU 61 – 100 GU ±15 GU	 2 – 15 GU ± 5 GU 16 – 60 GU ±10 GU 61 – 100 GU ±15 GU
Structured surfaces are exempted (±10 regardless of the submitted gloss). The approval range defines the tolerance that GSB allows for a submitted system. The tolerance range applies to an approved system and can also be within 2 approval ranges.			
Delivery tolerance for approval range >15 GU and fine structure Delivery tolerance for smooth systems with an approval range of 2-15 GU	± 5 GU ± 3 GU	± 5 GU ± 3 GU	± 5 GU ± 3 GU
Condensation constant atmosphere*: Test period Blistering Infiltration at T-cut Change of colour and effect Change of colour and effect with metallics	 720h 0 (S0) d_{max} ≤ 1 mm max. 50 % ΔL* max. key value 3	 720 h 0 (S0) d_{max} ≤ 1 mm max. 50 % ΔL* max. key value 2	 720 h 0 (S0) d_{max} ≤ 1 mm max. 50 % ΔL* max. key value 2

Condensation variable atmosphere (0.2 l SO_2)* Cycles Blistering Infiltration at T-cut Change of colour and effect Change of colour and effect for metallics	 30 0 (S0) d_{max} ≤ 1 mm max. 50 % ΔL* max. key value 3	 30 0 (S0) d_{max} ≤ 1 mm max. 50 % ΔL* max. key value 2	 30 0 (S0) d_{max} ≤ 1 mm max. 50 % ΔL* max. key value 2
Boil test / pressure cooker test Degree of blistering Cross-cut and Adhesive tape tear	 0 (S0) GT0 /GT1	 0 (S0) GT0 /GT1	 0 (S0) GT0 /GT1
Resistance to the effects of moisture	max. ΔL* 4	Florida 3: max. ΔL* 4 Florida 5: max. ΔL* 3	max. ΔL* 3
Resistance to salt water spray Test period Infiltration at T-cut Degree of blistering	NSS 480 hours d ≤ 5 mm 0 (S0)	NSS 480 hours d ≤ 5 mm 0 (S0)	NSS 480 hours d ≤ 5 mm 0 (S0)
Resistance to alkalis/mortar/NaOH Colour and effect changes Change of colour and effect with metallics	 max. 50 % ΔL* max. key value 3	 max. 50 % ΔL* max. key value 2	 max. 50 % ΔL* max. key value 2
Accelerated weathering TP Test duration Residual gloss	UV B (313 nm) 300 h ≥ 50 %	UV B (313 nm) 600 h ≥ 50 %	UV B (313 nm) 1000h for Florida 5 must be fulfilled ≥ 50 %
Natural weathering – Florida Approximate test period (months) UV energy (MJ/m²) Residual gloss Colour difference ΔL*, ΔC*	 12 max. 300 ≥ 50 % see 2.4	 36/60 max. 840 (36) max. 1400 (60) ≥ 50 % In the case of Florida 5 systems, the residual gloss after 36 months (or UV energy of max. 840 MJ/m²) must be ≥ 75 %. see 2.4	 120 max. 2800 (120) ≥ 80% (60) ≥ 50% (120) In the case of Florida 10 systems, the residual gloss after 60 months (or UV energy of max. 1400 MJ/m²) must be ≥ 80 %. see 2.4

Note: For galvanised steel, as of the condensation constant atmosphere test, all further tests are carried out on a single layer.
*This test is only carried out for the licence test.
** The boil test/pressure cooker test is not carried in the case of pre-anodising.
The values for ΔL* can be found in chapter 2.4 Colour differences ΔL*, ΔC* after weathering.

2.4 Colour differences ΔL*, ΔC* after weathering

Colour is measured in accordance with ISO 11664-4, illuminant: D65/10° standard observer; measurement geometry 45/0. The colour differences table applies to the Florida 1, 3 and 5 coating classes. Florida 10 is in preparation.

RAL	ΔL*	ΔC* ab	RAL	ΔL*	ΔC* ab	RAL	ΔL*	ΔC* ab	RAL	ΔL*	ΔC* ab
1000	± 1	± 2	3003	± 2	± 6	5013	± 6	± 1	6034	± 2	± 2
1001	± 1	± 2	3004	± 4	± 4	5014	± 3	± 3	6035*	± 3	± 5
1002	± 1	± 2	3005	± 4	± 4	5015	± 3	± 3	6036*	± 3	± 5
1003	± 2	± 3	3007	± 4	± 4	5017	± 3	± 3			
1004	± 2	± 5	3009	± 4	± 4	5018	± 3	± 5	7000	± 2	± 1
1005	± 2	± 5	3011	± 2	± 6	5019	± 3	± 3	7001	± 2	± 1
1006	± 2	± 7	3012	± 2	± 7	5020	± 3	± 5	7002	± 2	± 1
1007	± 2	± 7	3013	± 2	± 6	5021	± 3	± 3	7003	± 2	± 1
1011	± 1	± 3	3014	± 3	± 5	5022	± 4	± 5	7004	± 2	± 1
1012	± 1	± 3	3015	± 3	± 7	5023	± 3	± 3	7005	± 2	± 1
1013	± 1	± 1	3016	± 2	± 6	5024	± 3	± 3	7006	± 2	± 1
1014	± 1	± 2	3017	± 2	± 8	5025*	± 2	± 6	7008	± 3	± 3
1015	± 1	± 1	3018	± 2	± 8	5026*	± 2	± 6	7009	± 2	± 2
1016	± 2	± 7	3020	± 2	± 7				7010	± 2	± 2
1017	± 1	± 3	3022	± 2	± 7	6000	± 3	± 4	7011	± 2	± 1
1018	± 2	± 7	3027	± 2	± 7	6001	± 3	± 4	7012	± 2	± 1
1019	± 1	± 2	3031	± 2	± 7	6002	± 3	± 4	7013	± 2	± 1
1020	± 1	± 2	3032*	± 2	± 6	6003	± 3	± 4	7015	± 2	± 1
1021	± 2	± 7	3033*	± 2	± 6	6004	± 4	± 4	7016	± 3	± 3
1023	± 2	± 7				6005	± 4	± 4	7021	± 5	± 3
1024	± 1	± 2	4001	± 3	± 5	6006	± 4	± 4	7022	± 3	± 2
1027	± 1	± 3	4002	± 3	± 5	6007	± 4	± 4	7023	± 2	± 1
1028	± 2	± 8	4003	± 2	± 7	6008	± 4	± 4	7024	± 3	± 3
1032	± 2	± 5	4004	± 4	± 4	6009	± 4	± 4	7026	± 3	± 3
1033	± 2	± 7	4005	± 3	± 5	6010	± 3	± 6	7030	± 1	± 1
1034	± 2	± 7	4006	± 3	± 5	6011	± 2	± 3	7031	± 2	± 1
1035*	± 2	± 2	4007	± 4	± 5	6012	± 4	± 4	7032	± 1	± 1
1036*	± 2	± 4	4008	± 3	± 5	6013	± 2	± 3	7033	± 2	± 1
1037	± 2	± 7	4009	± 3	± 5	6014	± 4	± 4	7034	± 2	± 1
			4010	± 3	± 5	6015	± 4	± 4	7035	± 1	± 1
2000	± 2	± 6	4011*	± 2	± 7	6016	± 3	± 5	7036	± 2	± 1
2001	± 2	± 6	4012*	± 2	± 6	6017	± 3	± 5	7037	± 2	± 1
2002	± 2	± 7				6018	± 2	± 3	7038	± 1	± 1
2003	± 2	± 6	5000	± 3	± 3	6019	± 2	± 2	7039	± 2	± 1
2004	± 2	± 6	5001	± 3	± 3	6020	± 3	± 4	7040	± 1	± 1
2008	± 2	± 7	5002	± 3	± 4	6021	± 2	± 3	7042	± 1	± 1
2009	± 2	± 7	5003	± 3	± 3	6022	± 4	± 4	7043	± 3	± 3
2010	± 2	± 6	5004	± 6	± 1	6024	± 3	± 5	7044	± 1	± 1
2011	± 2	± 7	5005	± 3	± 3	6025	± 3	± 4	7045	± 1	± 1
2012	± 2	± 6	5007	± 3	± 3	6026	± 3	± 4	7046	± 1	± 1
2013*	± 2	± 4	5008	± 3	± 2	6027	± 2	± 2	7047	± 1	± 1
			5009	± 3	± 3	6028	± 4	± 4	7048*	± 3	± 1
3000	± 2	± 6	5010	± 4	± 5	6029	± 3	± 5			
3001	± 2	± 6	5011	± 6	± 1	6032	± 3	± 5	8000	± 2	± 2
3002	± 2	± 6	5012	± 3	± 3	6033	± 2	± 2	8001	± 2	± 2

RAL	ΔL*	ΔC* ab	RAL	ΔL*	ΔC* ab	RAL	ΔL*	ΔC* ab	RAL	ΔL*	ΔC* ab
8002	± 3	± 3	8019	± 3	± 4	9004	± 4	± 1	DB 703*	± 4	± 1
8003	± 3	± 3	8022	± 4	± 4	9005	± 4	± 1			
8004	± 3	± 3	8023	± 2	± 2	9006*	± 1	± 1			
8007	± 3	± 4	8024	± 2	± 2	9007*	± 2	± 1			
8008	± 3	± 4	8025	± 2	± 2	9010	± 1	± 1			
8011	± 3	± 4	8028	± 4	± 4	9011	± 4	± 1			
8012	± 3	± 4	8029*	± 2	± 4	9016	± 1	± 1			
8014	± 3	± 4				9017	± 4	± 1			
8015	± 3	± 4	9001	± 1	± 1	9018	± 1	± 1			
8016	± 3	± 4	9002	± 1	± 1	9022*	± 1	± 1			
8017	± 3	± 4	9003	± 1	± 1	9023*	± 2	± 1			

Note: Colours marked with * are not part of the RAL 841 GL register. Colour charts for these colours are contained in the main RAL register RAL 840 HR. However, these should not be used as a model for decorative coatings.

3 Multi-layer systems

3.1 General

All coating materials used in the multi-layer system should be from one manufacturer. Each of the coating materials used must have a GSB material approval.
Multi-vendor use of coating materials is permissible if the primer and top coat each have a GSB material approval. In this case, the coater is obliged to check the in-between adhesion on his own responsibility.

3.2 Galvanized Steel Primer

The coating materials must not contain TGIC (triglycidyl isocyanurate) or any heavy-metal-based pigments that are subject to labeling requirements.

Testing	
Crosscut	GT 0
Mandrel bending test cracking of the coating Tape Tear	≤ 8 mm Permissible no detachment of the coating
Cupping test Cracking of coating Adhesive tape tear	≥ 8 mm zulässig keine Ablösung der Beschichtung
Ball impact test Cracking of coating Adhesive tape tear	10 inch/pound permissible no detachment of the coating
Condensation constant atmosphere* Test period Blistering Infiltration at the T-Cut	 1000h 0 (S0) d_{max} ≤ 1 mm
Condensation variable atmosphere (0,2l SO_2)* Cycles Blistering Infiltration at the T-Cut	 30 0 (S0) d_{max} ≤ 1 mm
Boil test / pressure cooker test Degree of blistering Cross-cut and Adhesive tape tear	 0 (S0) GT 0/GT 1
Resistance to salt water spray Test period Infiltration at cross-section Degree of blistering	NSS 1440 h d ≤ 8 mm 0 (S0)

Note: All tests are carried out with a GSB approved topcoat.
* For admission test only.

3.3 Steel Primer

The coating materials must not contain TGIC (triglycidyl isocyanurate) or any heavy-metal-based pigments that are subject to labeling requirements.

Testing	
Crosscut	GT 0
Mandrel bending test cracking of the coating Tape Tear	≤ 8 mm Permissible no detachment of the coating
Cupping test Cracking of coating Adhesive tape tear	≥ 8 mm zulässig keine Ablösung der Beschichtung
Ball impact test Cracking of coating Adhesive tape tear	10 inch/pound permissible no detachment of the coating
Condensation constant atmosphere* Test period Blistering Infiltration at the T-Cut	 1000h 0 (S0) d_{max} ≤ 1 mm
Condensation variable atmosphere (0,2l SO_2)* Cycles Blistering Infiltration at the T-Cut	 30 0 (S0) d_{max} ≤ 1 mm
Boil test / pressure cooker test Degree of blistering Cross-cut and Adhesive tape tear	 0 (S0) GT 0/GT 1
Resistance to salt water spray Test period Infiltration at cross-section Degree of blistering	NSS 1440 h d ≤ 3 mm 0 (S0)

Note: All tests are carried out with a GSB approved topcoat.
* For admission test only.

Application for material approval

The manufacturer _____ hereby applies for a GSB-CERT-material approval for coating material _____ (standard market name).

	Single-layer system	
	Primer	
	Clearcoat as a transparent version of the pigmented GSB-approved material system no.	

The coating material is used to coat the substrate:*

	Aluminium
	Steel
	Galvanised steel

An application is made for the following material approvals:*

	Florida
	1
	3
	5
	10

*Please tick as appropriate. Only select one option in each case. Separate applications must be submitted for multiple selections.

The material approval application applies to the following production sites

Production sites	Details of contact person
	Name, Firstname _____
	Phone _____
	Mobil _____
	Email _____

Material system (GSB name)	**Licence No.****	**Hardening conditions**	**Object temperature in °C**	**Dwell time in minutes Min.**	**Max.**
Gloss licence value ____________GU* ☐Metallic effect	____	Minimum Average Maximum	______ ______ ______	______ ______ ______	______ ______ ______
Gloss licence value ____________GU* ☐Metallic effect	____	Minimum Average Maximum	______ ______ ______	______ ______ ______	______ ______ ______
Gloss licence value ____________GU* ☐Metallic effect	____	Minimum Average Maximum	______ ______ ______	______ ______ ______	______ ______ ______
Gloss licence value ____________GU* ☐Metallic effect	____	Minimum Average Maximum	______ ______ ______	______ ______ ______	______ ______ ______
Gloss licence value ____________GU* ☐Metallic effect	____	Minimum Average Maximum	______ ______ ______	______ ______ ______	______ ______ ______

* Please ensure that you specify the gloss in gloss units (**GU**) and not as a percentage.
** Only specify for a repeat test.

Specific information from the manufacturer	
Minimum layer thickness:	
Recommended sealant:	
Recommended pre-treatment:	

Documents to be enclosed:

- Product information sheet
- Processing instructions
- Material and safety data sheet

________________ ________________

Place, date Signature and company stamp

By registering as a contact person, I acknowledge that personal data is stored and used internally by GSB in connection with all matters relating to GSB quality guidelines. The data will be subject to the provisions of the General Data Protection Regulation (Datenschutz-Grundverordnung VO (EU) 2016/679).

(PROVISIONAL)

Material approval for coating material

Material approval number:	XXXXg
Product:	xxx
Type:	Powder coating
Colours:	Single colours, metallic
Class:	Florida 1 Year
Substrate:	
Manufacturer:	Sample company Sample Street Sample Town
Confirmation:	This material approval certifies that the requirements GSB XX XXX-4 for coating materials have been met.
Restrictions:	e.g. none (only RAL 6xxx)
Monitoring:	Annual
Valid until:	31/07/2019 (2 years)
Date of issue:	12/4/2015 Rev: 0.0

GSB International
Fritz-Vomfelde-Straße 30, 40547 Düsseldorf, Germany

GSB-CERT